



Government of
South Australia



Hi-Tech Sector Plan 2030

NOVEMBER 2020

GROWTH STATE



The Department for Innovation and Skills acknowledges Aboriginal people as the state's first peoples and Nations of South Australia. We recognise and respect their cultural connections as the traditional owners and occupants of the land and waters of South Australia, and that they have and continue to maintain a unique and irreplaceable contribution to the state.

Foreword from the Minister for Innovation and Skills



The growing and dynamic hi-tech sector is spearheading a new era in innovation, productivity and growth, and South Australia is in prime position to reap the benefits.

Nationally, the technology sector contributes \$122 billion to the Australian economy, with the potential to generate an additional \$50 billion per year. As Australia's sixth largest sector, it employs nearly 580,000 Australians and acts as a key enabler across multiple industries and essential services, including water, energy, healthcare, education, defence, communications, and transport.

Developments in new technologies are pushing the boundaries of possibility—from establishing the provenance of food and wine supply chains using blockchain, to improving health outcomes using artificial intelligence, to securing critical supply chains using advanced manufacturing.

As we enter a new decade faced with increasingly complex economic and industrial environments, building capability in South Australia's hi-tech sector and growing a skilled workforce has never been more important.

The Hi-Tech Sector Plan 2030 – part of the South Australian Government's Growth State agenda – draws on extensive industry consultation and research to provide insight into the opportunities, challenges and priority actions that will grow our state's hi-tech sector.

While the hi-tech sector is still developing, there are increasing numbers of South Australian success stories, particularly in our growing areas of defence, space, cybersecurity and health.

Now is the time to supercharge this vibrant and rapidly advancing sector.

Key to our success will be collaborations between business and researchers, alongside developing a workforce that thrives on co-designing and co-creating the solutions that will become new products and services for global markets.

To drive business innovation and growth, we must also capture and promote more of the hi-tech value chain.

By responding to the challenges of today with new ideas and innovation, we can continue attracting talent and investment into South Australia and build our reputation as a globally recognised destination for the hi-tech sector by 2030.

Hon David Pisoni MP

Minister for Innovation and Skills

South Australia's Hi-Tech sector

Growth State

Growth State is a partnership between industry and government to accelerate South Australia's economic growth and transformation and lead the way to a new economy shaped by innovation and opportunity.

This Hi-Tech Sector Plan is one of nine strategies across a range of priority sectors, including health, agriculture, mining and energy, creative industries, space, defence, tourism and international education.

Growth State brings together businesses, researchers, educators, investors, creatives, entrepreneurs and government to forge a roadmap for new jobs and prosperity in South Australia.

As the world changes and economies adjust to new opportunities, threats and unforeseen shocks, this plan will need to evolve to ensure we remain competitive and focused on achieving our growth ambitions.

Hi-Tech in South Australia

Through a series of workshops, submissions and interviews between December 2019 and March 2020, more than 60 representatives from business, research and regional South Australia identified that hi-tech is an **enabler** of productivity, competitiveness and growth across all sectors.

They further highlighted a number of technologies and capabilities that would have the greatest potential to contribute to the state's economic growth over the next decade, including:

- advanced manufacturing and Industry 4.0
- artificial intelligence, machine learning and data analytics
- blockchain
- computer vision, augmented and virtual reality
- cybersecurity
- Internet of Things (IoT)
- optics and photonics
- quantum computing.

These technologies are interconnected, often showing up across the value chains of multiple industries, and will evolve over time.

It is vital that South Australia leverages national hi-tech sector frameworks and initiatives to access new markets and increase the potential scale of research and business investment and collaborations.





Gathering momentum

Recently released national hi-tech frameworks emphasise strengthening the value chain from research to industrial applications, aligning to areas of comparative advantage, driving economic growth through productivity gains, investment attraction through recognised technical excellence and strengthening our foundational and specialised skills base. These publications include:

- AustCyber's Digital Trust Report 2020
- CSIRO's Quantum Technology Roadmap 2020
- National Blockchain Roadmap 2020
- CSIRO Data61's Artificial Intelligence Roadmap 2019

Why a Hi-Tech sector plan for South Australia?

Global challenges such as health pandemics, climate change, population growth, resource scarcity, geopolitical conflict and ageing populations also present opportunities to forge new partnerships between research, industry and government.

With recognised scientific, research and industrial excellence in key hi-tech fields, partnered with robust digital capacity and connectivity, South Australia is well positioned to develop effective solutions to these challenges.

Complemented by the entrepreneurship and start-up strategy FIXE and the 10-year science and innovation strategy EXCITE, the Hi-Tech Sector Plan is a 10-year framework that outlines strategic priorities for strengthening South Australia's research, entrepreneurship and innovation ecosystems to create skilled jobs and open new trade and investment opportunities.

The magnet state

The **Future Industries eXchange for Entrepreneurship** (FIXE) is the new model for entrepreneurship in South Australia. Led by the inaugural Office of the South Australian Chief Entrepreneur, FIXE aims to inspire, equip, enable and celebrate South Australian entrepreneurs.

Led by the state's Chief Scientist, South Australia's new science and innovation strategy (EXCITE) will strengthen our research and innovation value chain to deliver economic and social outcomes. The strategy is driven by the key pillars of **Excellence, Collaboration, Innovation and Translation**, and an **Enabled Future Workforce**.

Entrepreneurship, science and innovation are intrinsically linked to South Australia's hi-tech sector. They drive our hi-tech capabilities, enhance business applications and provide new opportunities for economic growth.



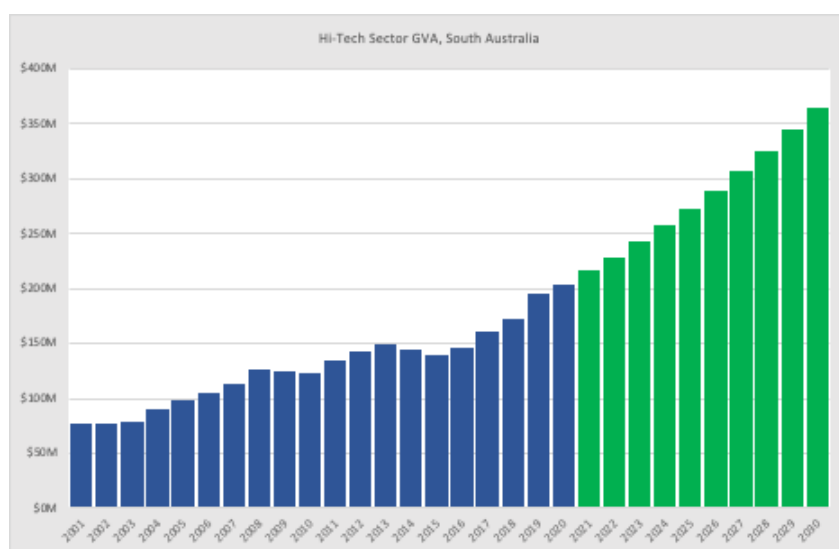
Vision for growth

South Australia is globally recognised as one of the world's leading hi-tech centres, with a thriving skilled workforce supporting a diverse and connected ecosystem of businesses, researchers and investors driving economic growth.

Growth target

The Hi-Tech Sector Plan sets a target average of 6 per cent growth per annum to 2030. This target will see the gross value added (GVA) for the sector increase from the current level of \$204 million to reach \$365 million by 2030.

Historic and target GVA growth for Hi-Tech sector, 2001 to 2030



Source: Department for Innovation and Skills using state administrative records and 2017/18 Input-Output Model for South Australia and Regions.

This impact will be borne out in increases in a range of areas, including contribution to gross state product (GSP), revenue, employment, investment, export, and wage growth.

The underlying philosophy of this Plan is that industry and government commit to working together to realise these opportunities for growth.

Hi-Tech sector spotlight



There's a big future in Hi-Tech

- \$122B - Australia's technology sector contribution ⁱ
- 39,000 South Australian technology workers, representing 5 per cent of the total workforce ⁱⁱ
- 9th largest employer in the state ⁱⁱⁱ
- South Australia has the highest number of machine learning researchers in the nation ^{iv}
- Hi-tech businesses are productive, profitable and global ^v
- Hi-tech workers are highly skilled, productive and earn higher wages ^{vi}



Economic growth and new opportunities

- Cyber security contributes \$17B to the national economy and supports \$426B worth of digital activity to GDP. ^{vii}
- The contribution of digital skills and technology to Australia's GDP is expected to grow by 40 per cent. ^{viii}
- 2 out of 5 Australian jobs are vulnerable to digital disruption^{ix} - embracing new technologies and upskilling our current workforce will boost productivity and open up new markets.



Exporting South Australia's technical expertise

- In 2018-19, the tech sector comprised 9 per cent of South Australia's overall international services exports, while nationally, the sector accounts for 13.5 per cent. ^x



Technical skills are vital for hi-tech growth and innovation

- South Australian Industry Skills Councils identified skills across STEM and ICT, as well as specific hi-tech expertise in artificial intelligence, machine learning, robotics and data analytics as vital for growing all industries. ^{xi}
- STEM skills are critical to innovation, increased productivity and growth. ^{xii, xiii, xiv}



Increasing investment is a priority

- Venture capital investment in hi-tech hubs such as Israel and the United States is over 0.35 per cent of GDP, more than seven times greater than Australia at less than 0.05 per cent of GDP. ^{xv}
- South Australia's business expenditure on research and development as a proportion of GSP is 0.74 per cent, lower than the national average of 0.9 per cent, and South Australian businesses claim only 3.4 per cent of the national research and development tax incentive, with an average claim of 64 per cent of the \$1.1 million national average. ^{xvi}
- In 2019, nearly 11 per cent of National Competitive Grants Program funding in Australia was allocated to research projects in South Australia. ^{xvii}

South Australia's Hi-Tech sector: opportunities and challenges

Adelaide is consistently ranked in the top ten most liveable cities in the world, offering a low cost of living compared to other Australian capitals as well as direct access to Asia-Pacific markets. South Australia provides the safety, security and digital infrastructure to enable business growth and attract talent and investors looking to start and scale hi-tech ventures.

However, South Australian businesses invest less in research and development (R&D) than the national average and access less Commonwealth funding, such as the national research and development tax incentive. In addition, Australian businesses have lower R&D levels than many other industrialised nations. There is strong potential to bring together South Australia's researchers and businesses - particularly small businesses with limited in-house R&D capability - to increase our global profile as a hi-tech centre.

Better understanding the value proposition of hi-tech capabilities will lead to greater technology adoption across industry. National and international regulatory frameworks for advanced technologies such as artificial intelligence need to evolve to a point that provides business and investor confidence.

South Australia's research institutes offer specialised facilities and capabilities in artificial intelligence, computer vision and photonics, among others, while our hi-tech sector boasts strengths in advanced manufacturing and digital technologies such as electronics, sensors and communications.

In addition, South Australia's emerging industrial strengths in defence, space, energy, agriculture and healthcare create new opportunities to align with Commonwealth initiatives, such as Cooperative Research Centres, which have frequently generated significant financial leverage and benefit for the state.

Industry representatives identified a number of elements as critical to growing and transforming businesses, boosting the hi-tech ecosystem and capturing more of the hi-tech value chain. These include better connecting technical experts, industry mentors, market specialists and commercialisation support, and attracting skilled South Australians with national and international experience back to the state. A diverse and interconnected hi-tech ecosystem will facilitate sector growth by providing access to the right skills and capabilities at the right time.

South Australia has a lack of critical mass of investors and large R&D-intensive firms to match competing national and international regions. Countries such as Israel and the United States have greater access to early and late stage venture capital - more than seven times as much as Australia as a proportion of GDP. As a consequence, there are fewer venture capital fund managers here, providing an investment advantage to interstate and international hi-tech ventures. Increasing access to capital is a significant opportunity for the hi-tech sector in South Australia.

For South Australia to become recognised as one of the world's leading hi-tech centres, we must strengthen and leverage the connections between our investments in people, places and infrastructure at precincts such as Lot Fourteen, Tonsley and Adelaide BioMed City as we continually evolve and build our state's culture of innovation.

Growth plan

Industry has identified four strategic priorities for this plan, which will provide a framework to achieve our vision to become one of the world's leading hi-tech centres, driving high value jobs and economic growth:

1 Strengthening technical capability

2 Connections and collaboration

3 New jobs and career pathways

4 Market access and development

Strengthening innovation and agility across a broad suite of hi-tech capabilities for both new and existing businesses is critical for meeting our essential needs and developing sovereign supply chains across a range of industries. Innovation will help us to develop globally competitive hi-tech products, services and capabilities that attract investment, grow jobs and increase exports.

Local collaborations between industry, research and government provide the synergies needed for industry to scale and access global markets, leading to more South Australian products and services being exported to the world. This in turn drives local industries to become globally competitive, which enhances the state's global reputation as a place to do business.

Skilled hi-tech people drive innovation and industry capability. They connect, collaborate and develop ideas to drive business growth, improve productivity and create jobs. Capitalising on local and national investments in hi-tech industries such as defence, space and cyber will attract global talent and grow South Australia's hi-tech sector through knowledge transfer and strengthened industry-research partnerships. Our hi-tech sector leaders will be developed through stronger connections with our innovation ecosystem, precincts and networks.

Accessing new markets provides opportunities for businesses to attract global investment and talent, and link South Australia's leading technology and research to commercialisation opportunities on a global scale. Local markets, including government, can be first customers, giving businesses the opportunity to demonstrate novel hi-tech products and services and act as a springboard into other domestic and international markets.



Strategic priority 1: Strengthening technical capability

Strong, recognised hi-tech capabilities will make South Australia an attractive place to do business.

Countries around the world are strengthening their technical capabilities to gain competitive advantage, sovereignty and resilience to global economic shocks. Strong capabilities in areas such as cybersecurity, electronics and advanced manufacturing will help South Australia to capture more of the hi-tech value chain in the health, agriculture, defence and space industries. Stronger technical capability also leads to new products and services, high value local jobs, increased investment, exports and business growth.

The **Australian Cyber Collaboration Centre (A3C)** is a partnership between industry, research and government to deliver state of the art training and testing capabilities in the rapidly growing cybersecurity field, complementing our state's existing strengths in defence and space. The A3C provides the infrastructure to develop advanced cybersecurity products and services, and grow South Australia's cybersecurity ecosystem by encouraging new entrants and new connections.

South Australia's cyber security capability will be further strengthened by developing and implementing a **Cyber Action Plan**, growing our state's reputation as a cyber security centre of excellence, creating high value and high growth jobs and protecting South Australian innovation precincts, businesses and research organisations through increased adoption of best-practice cyber technology.

As part of EXCITE, South Australia's science, research and innovation strategy, the **SA Innovation Challenge** will showcase local technologies and talent, attract global investment, and support South Australian businesses and start-ups to gain early market advantage in the hi-tech sector. **Industry-led challenges and prizes**, such as

OzMinerals' Explorer Challenge, showcase local capability applied to real-world business challenges and connect smaller and emerging hi-tech ventures with larger businesses.

Industry feedback revealed that accessing support to develop hi-tech capabilities can be a challenge for new ventures, particularly pre-proof of concept. The **Research, Commercialisation and Start-up Fund** provides support for local researchers, entrepreneurs and businesses to start and scale hi-tech ventures, including innovation and research translation.

The **Artificial Intelligence Collaborative Network** is an industry-driven initiative to promote collaboration and build links between research, business, policymakers and the broader community in the areas of artificial intelligence, machine learning and data science. This work complements and helps disseminate our state's existing expertise in artificial intelligence across our three universities.

South Australia's research infrastructure and technology represents significant investment on behalf of research, industry and government. Developing a **10-year major research infrastructure and technology plan** for South Australia to scope infrastructure and technology needs will ensure competitive positioning of the state by capitalising on our existing capability and directing future investment to identified strategic priorities.

Case Study

South Australia's advanced manufacturing innovation precincts

Advanced manufacturing technologies can transform industries, value chains and business models at speed and scale, driving strong returns through developing world-class – and often niche – products and services.

In South Australia, innovation precincts are becoming hotspots for collaboration, job creation and growth. Precincts such as Lot Fourteen, Tonsley Innovation District, the Australian Advanced Materials Manufacturing precinct and the University of South Australia's Future Industries Institute are all providing strengths across artificial intelligence, advanced manufacturing, materials science, defence, healthcare and natural resources.

Access to leading-edge infrastructure and knowledge can foster new collaborations between industry and researchers and help businesses to grow by adopting new technologies and translating ideas into new products and services for global markets.



Micro-X facility.

Photo credit: Build Inc.

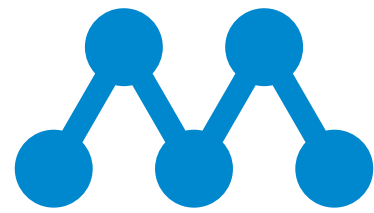
Case Study

Revolutionising water monitoring for Australian farmers

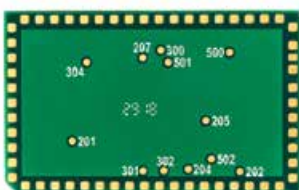
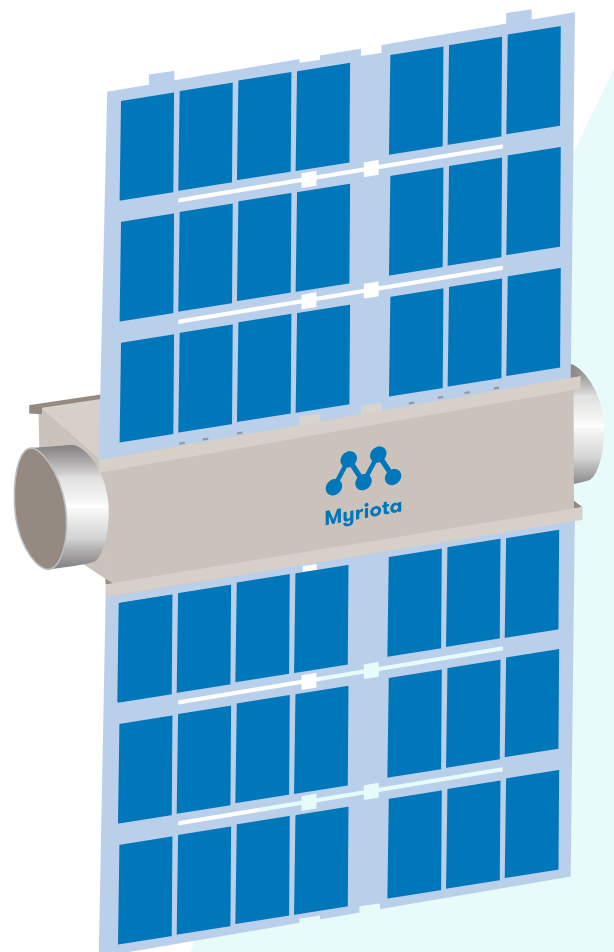
Making the most of every drop of water is a challenge that Australian farmers have faced for generations. Monitoring rainfall and water storage is a critical to guide decision-making and on-farm management. While remote monitoring has emerged as a far more efficient approach over the past decade, ground-based communications require capital and geographical prioritisation, and often encounter 'black spots' in connectivity where data is lost.

To solve this issue and create a more robust water monitoring system, Queensland-based Goanna Ag has partnered with local IoT company Myriota to create a powerful network of satellites that enables farmers to monitor watering systems anywhere in the world. Using Myriota's cutting edge, low-power IoT satellite devices, farmers can now access water data remotely and in real-time, without coverage dropouts or connectivity issues, boosting on-farm efficiency.

South Australian company, Motherson Innovations, will produce Myriota's devices locally and is expected to manufacture millions of units of over the next five years, revolutionising the way companies share information across multiple industries, including agriculture, defence, mining, transport, logistics, and more.



Myriota





Case Study

From raw materials to hi-tech hardware

There are many pathways to hi-tech, with leading ventures combining deep subject matter expertise with advanced technology to explore new ideas and capability and deliver market-leading solutions.

South Australian company Archer is one firm achieving great success in the evolving hi-tech industry. With its origins in mineral exploration, the company is using Australia's natural resource materials and engineering advanced materials to address complex challenges in quantum technology, human health and reliable energy.

The company recently developed significant intellectual property in materials technology that will unlock strong growth in quantum computing, lithium-ion battery and biosensor fields. Its breakthrough solutions aim to introduce innovative approaches to global industries across medicine, energy and electronics.

Archer currently works with global giants such as IBM, while continuing to develop disruptive technologies with unparalleled access to the state-of-the-art facilities afforded to its pioneering senior management team.

Hi-Tech snapshot



Industry 4.0

Technological advances across digital and engineering disciplines drive process and production improvements across the entire value chain.

South Australian advanced manufacturers such as REDARC deliver world-leading solutions to global customers.

Industry 4.0 represents a transformation of traditional manufacturing into innovative, high quality, specialised products and services supported by a highly skilled workforce.



Cyber security

Significant growth is predicted for cyber security products and services, driven by increasing digital dependency and transformation.

South Australia's cyber security ecosystem includes several SME-sized businesses, as well as large prime firms supporting some of the nation's largest defence contracts

The Australian Cyber Collaboration Centre at Lot Fourteen will accelerate the development of a strong and interconnected cyber ecosystem in the state.



Quantum computing

Recent quantum computing advances result in an exponential increase in computational power, which could theoretically be leveraged to attempt tasks currently beyond the capacity of a classical computer.

Examples include modelling complex physical and chemical phenomena and breaking encryptions on secure transmissions.

South Australian expertise in quantum theory and practice include IPAS, Archer and QXBranch/Rigetti.



Internet of Things (IoT)

IoT consists of devices which capture and exchange data via an internet connection. Examples from everyday life include fitness trackers and smart homes systems.

IoT represents a conceptual and practical shift from discrete devices to a system of systems, where everyday objects and places can be viewed as a platform for embedding interconnected digital capability.

Major areas of IoT growth include manufacturing, automotive, security and essential services. Successful South Australian businesses leveraging the power of IoT include Codha and Myriota.

Computer vision and VR/AR



Powered by artificial intelligence, computer vision techniques train computers to recognise and classify objects, replicating human vision. These techniques are used in augmented and virtual reality, where a user is immersed partially or wholly in a simulated reality.

Augmented and virtual reality have many industrial applications across entertainment, simulation and training using smart glasses such as the Microsoft HoloLens.



Artificial intelligence, machine learning & advanced data analytics

AI tools can make decisions, solve problems and recognise patterns without explicit human instruction.

Successfully used in health and medical, finance and marketing and agriculture among others, AI has a wide range of applications for decision support and productivity gains.

South Australia has the third-highest proportion of research spending and the highest number of machine learning researchers in Australia, with expertise across all three universities.



Optics and photonics

Theoretical and applied research into the properties of light have led to advances in computing and material sciences, including the telecommunications systems that underpin all digital technologies.

Advanced manufacturing and signalling capabilities underpinned by precision photonics technology are used in defence, space, health and medical and primary industries among others.

South Australian researchers at IPAS and DSTG are leading the way in these technologies.



Block Chain

Blockchain technology is disrupting transaction-reliant industries such as retail, finance and logistics.

Described as secure-by-design, blockchain offers an advantage over traditional labour-intensive and duplicative transactional methods and is resistant to record tampering.

Premier's Blockchain Challenge winner VinoTrust is partnering with Clare Valley winemakers to establish and secure provenance of premium wines via blockchain-based technology.

Strategic priority 2: Connections and collaboration

Collaboration will enhance our global competitiveness through knowledge creation and sharing.

Industry representatives told us that improving connections between businesses, research and government presents a significant opportunity for growth in the hi-tech sector.

Bringing together problem solvers with potential new customers and business partners in effective partnerships could result in substantial return on investment, driving innovation and transfer of hi-tech skills and capabilities across sectors. There are many successful examples of South Australian businesses achieving growth through local collaborations, which can serve as a model for future hi-tech ventures.

Cooperative Research Centres (CRCs) are an example of collaborative partnerships that drive economic growth, resulting in a net return three times more than their costs.^{xviii} The **SmartSat CRC** partnership between industry, research and government partners aims to grow Australia's space industry by developing new technological capability.

New and potential entrants to South Australia's hi-tech ecosystem include individuals, researchers, businesses and not-for-profits. South Australia's **Growing Data Foundation** supports Internet of Things projects and systems by developing sustainable open solutions for community improvement and social good as part of the global Things Network.

Industry identified a need to bridge the gap between research experts and South Australia's SMEs. **Dedicated Innovation and Translation Intermediaries**, an EXCITE

initiative, will be established within South Australia's innovation districts, focused on SMEs, to enhance industry-research collaboration and increase knowledge transfer, technology capability, growth in revenue and export as part of a South Australian Knowledge Transfer Network.

Hi-tech collaboration is underpinned by the capacity to readily transfer large volumes of information across high-speed digital networks. As **Australia's first GigCity**, Adelaide is well served in this regard, with its ultra-fast and affordable internet service available to innovative businesses in GigCity locations across Adelaide and two regional cities. GigCity offers businesses speeds of up to 10 gigabits per second for leading edge applications that create new market opportunities. There are 24 innovation precincts across South Australia connected by GigCity, serving more than 350 businesses leveraging technologies as diverse as virtual reality, IoT, advanced manufacturing and gene sequencing.

To ensure robust knowledge exchange and strategy development for the future, industry and government will consider new opportunities for enhanced collaboration, skills and innovation in **advanced manufacturing**.

Developing our capability requires a connected network of expertise within and outside the state. South Australia will partner with researchers and businesses with unique capabilities to develop a national **Artificial Intelligence Capability Map**, in collaboration with the Commonwealth and state and territory governments.

LBT Innovations' Automated Plate Assessment System

Case Study

GigCity – a new era in digital connectivity

In an ever-changing modern economy, access to fast and reliable internet is critical to developing leading-edge ideas, products and services. In South Australia, the GigCity network is connecting businesses in Adelaide, Mt Gambier and Whyalla to high-speed and affordable gigabit internet.

Access to high-speed internet has been a welcome boost for Tonsley-based company, Healthy Technology. As an IT consulting services provider, Healthy Technology provides infrastructure, data security and software development support to clients both locally and internationally.

Gigabit internet has been vital for the company's internal operations and overall business. With GigCity, Healthy Technology is now connecting to speeds that are 20 times faster than with its previous supplier, boosting productivity and changing the way they do business.

The company can restore backups for client servers quicker and easier - something that used to take a day now takes 20 minutes. Website, web system and infrastructure upgrades can also be performed in less than half an hour, allowing the company to capture new clients and deliver cost-effective services.

Case Study

Automation and artificial intelligence speeding disease diagnosis

Pathology laboratories around the world test millions of culture plates daily in order to provide timely patient diagnostics for life-threatening infections. Skilled microbiologists manually examine each plate and separate those showing significant bacterial growth, which can take time and resources.

To address this problem, LBT Innovations collaborated with the Australian Institute for Machine Learning to develop innovative technology that automates this process. Known as the Automated Plate Assessment System, or APAS®, the technology automates culture-plate reading and screens plates showing no significant bacterial growth from the laboratory workflow. The machine learning model was developed using a custom suite of software tools and trained on thousands of culture plate images.

This unique industry-research collaboration has enabled a global first in developing and using artificial intelligence for automated pathology detection. It has achieved regulatory clearances and sales in key global markets across the US, Europe and Australia, delivering customers process efficiencies and productivity gains for their laboratory.



Case Study

Improved road safety outcomes through IoT capability

Road safety and reducing trauma on the road is a national and state level priority, as outlined in *Towards Zero Together – South Australia's Road Safety Strategy 2020*.

University of South Australia spinoff Cohda Wireless has developed innovative software solutions which connect vehicles to each other and to smart city infrastructure, enabling accurate vehicle positioning, and cooperative collision avoidance to improve safety and reduce congestion. This technology is known as vehicle to everything (V2X) for use in connected vehicles, connected autonomous vehicles (CAV), as well as cities' infrastructure.

With support from the South Australian Government's Future Mobility Lab Fund, Cohda Wireless is currently trialling its CAV technology using fixed roadside units in Adelaide's CBD.

As the largest CAV network in Australia, it will deliver improved road safety outcomes for Adelaide residents through smart technology, supplementing human decision-making with real-time information through interconnected Internet of Things (IoT) systems.

Strategic priority 3: New jobs and career pathways

Growing South Australia's hi-tech sector requires skilled talent, including entrepreneurs, innovators, communicators, educators and wealth creators.

A highly skilled and diverse workforce is essential for innovation, business creation and growth.

Industry told us that matching skills supply and demand is a well-known challenge in STEM and ICT disciplines that underpin the hi-tech sector. Matching workforce skills with industry needs will increase employment in high-growth, high paying jobs, and will enable South Australia's hi-tech industry to grow.

Attracting talent into the state can help fill these skill gaps in the short-term. South Australia is at the forefront of using targeted migration to attract talent from overseas, with a nation-first new visa for aspiring entrepreneurs.

The **Designated Area Migration Agreement** with the Commonwealth also focuses on Adelaide's hi-tech growth industries, including defence, space, technology and advanced manufacturing, where employers can sponsor skilled overseas workers for positions they are unable to fill locally.

Growing our domestic hi-tech workforce capability throughout the skills supply chain is a priority. To meet industry's growing demand for applied Industry 4.0 skills, South Australia has introduced the nation-leading **Diploma of Applied Technologies**, a vocational pathway into hi-tech careers, which was co-designed by industry, training providers and government.

South Australia is also embracing novel learning methods with the planned opening of **42 Australia**, the first Australian campus of '42' a private, non-profit and tuition-free computer programming school with campuses growing around the world. When fully established, 42 Australia is expected to enrol up to 450 students per year to gain skills through a peer-to-peer learning model focused on project-based learning. Graduates will bring job-ready, high demand skills to South Australian businesses, fuelling innovation and economic growth.

As early-stage hi-tech businesses start to scale, founders need to be equipped with the skills to lead their companies through the next phases of growth. **FIXE Scholarships** for start-up founders and teams will help develop our future business leaders and wealth creators, providing a grant towards a formal education program that will benefit the future growth prospects of the business, while the **FIXE Leadership** program pairs founders with experienced business leaders. Industry-led support for local hi-tech businesses includes the **Entrepreneurs' Program led by Business SA**, targeting technology businesses operating across South Australia's growth sectors.



Case Study

Why innovation and risk-taking can lead to business success and job creation

Innovation drives growth, sustainability and diversification for businesses. REDARC's renewed focus and investment in research and development, product quality and building in-house intellectual property has boosted its manufacturing capabilities across transport, mining and defence. It has also led to substantial business growth and job creation in advanced manufacturing.

The company recently expanded its advanced manufacturing capacity by creating an additional space to house state-of-the-art equipment that will augment human capability with collaborative robots – or 'Cobots' – putting REDARC at the forefront of human-machine interaction and robotic technology.

REDARC has partnered with the South Australian Government and Skills Lab to deliver the Diploma of Applied Technologies, a new higher apprenticeship pathway that will see the upskilling of workers in the digital skills needed for Industry 4.0.





Case Study

Growing South Australia's cybersecurity capabilities

Cybersecurity is a dynamic and evolving sector, offering tremendous economic opportunity. Australia's revenue from cybersecurity has the potential to almost triple by 2030, creating new opportunities for jobs and economic growth.

Strengthening cybersecurity skills and capabilities has never been more important. To meet growing demand for cybersecurity products and services and to strengthen our skills and capabilities, Australia will require approximately 17,000 more cyber security workers by 2026.^{xiii}

The \$8.9 million Australian Cyber Collaboration Centre (A3C) based at Lot Fourteen will capitalise on the demand for cyber expertise by providing a central connection point for businesses looking to improve

business resilience. The centre will assist businesses to understand and address their specific cybersecurity needs and challenges, enable hardware and software testing, help launch new products and services to global markets, and provide access to training courses and skilled workers.

The first cohort of TAFE SA-trained cyber security professionals will graduate in 2021 with a Certificate IV in Cyber Security. The qualification is the first national skills-based cybersecurity certificate level qualification and was developed in partnership between industry and government. Graduates will fill critical skills gaps in the local cybersecurity industry, spurring the growth of local hi-tech businesses and securing supply chains in core industries such as defence.

Strategic priority 4: Market access and development

Tapping into growth markets interstate and internationally is key for growing South Australia's hi-tech sector.

Many South Australian hi-tech success stories have global market footprints, however the path to market can be unclear. Industry identified the 'valley of death' cash-flow gap during scale-up as a significant constraint to business growth and market access. By tapping into new markets, local businesses will be able to attract global investment and talent, and link South Australia's leading technology and research sectors with global companies to achieve scale and growth.

In order to improve access to early-stage risk capital, identified by industry as a key catalyst for growth, initiatives including **Activate Angels** and the **SA Venture Capital Fund** back local start-ups to scale into global markets. South Australian businesses who are looking to grow into international markets are supported by the **South Australia Export Accelerator** program.

Industry and government are partnering for ongoing **investment attraction and market intelligence** initiatives across key export and investment sectors, with the aim of capitalising on emerging opportunities through timely market access. Sources of strategic market intelligence expertise includes South Australia's expatriate community, such as the **South Australia Club International** business network of South Australians living and working overseas across Asia and Europe, with planned expansion into the USA.

Businesses spun out from the research sector deliver innovative products and services and have the potential to become market leaders who put the South Australian hi-tech sector on the map. One South Australian example is Fivecast, a digital intelligence solutions provider with global market reach, which originated from the former Data to Decisions CRC.

Government can also act as a first customer to provide opportunities to hi-tech businesses to demonstrate novel products and services, particularly in the areas of data management, business analytics and user experience. This can act as a springboard into other domestic and international markets.

The Go2Gov initiative connects start-ups to government, assisting government agencies to fund the piloting of early-stage business solutions to addresses a problem faced by the organisation. This will provide hi-tech sector businesses with an opportunity to showcase their products and services and demonstrate proof of concept with a trusted customer, opening up broader market access potential.

Further planned procurement reforms will also enable more South Australian businesses to participate in government procurements by requiring at least one local supplier to be involved in every tender process that goes to market.

Case Study

From terroir to table: securing our winemakers' world class reputation

The world's largest wine provenance blockchain trial is being conducted in South Australia's Clare Valley, aiming to disrupt the multi-billion-dollar market for counterfeit wines.

Counterfeit wines are a global issue and a sophisticated operation, known to misinterpret a premium producers' origin, history, bottle labels and corks.

Clare Valley technology business VinoTrust is working with 12 wineries in the region to trial proprietary technology combining blockchain, IoT, cloud, mobile, automation and geolocation on a platform to fully integrate immutable winery information management in real time.

The trial has enabled real-time tracking of grapes leaving the vineyard, weighbridge data, automated yield averaging and live comparisons of yields in various Clare Valley sub regions. The secure-by-design distributed ledger technology can be made available to consumers via bottle labels, allowing them to track and trace products from the vineyard to their glass.

Case Study

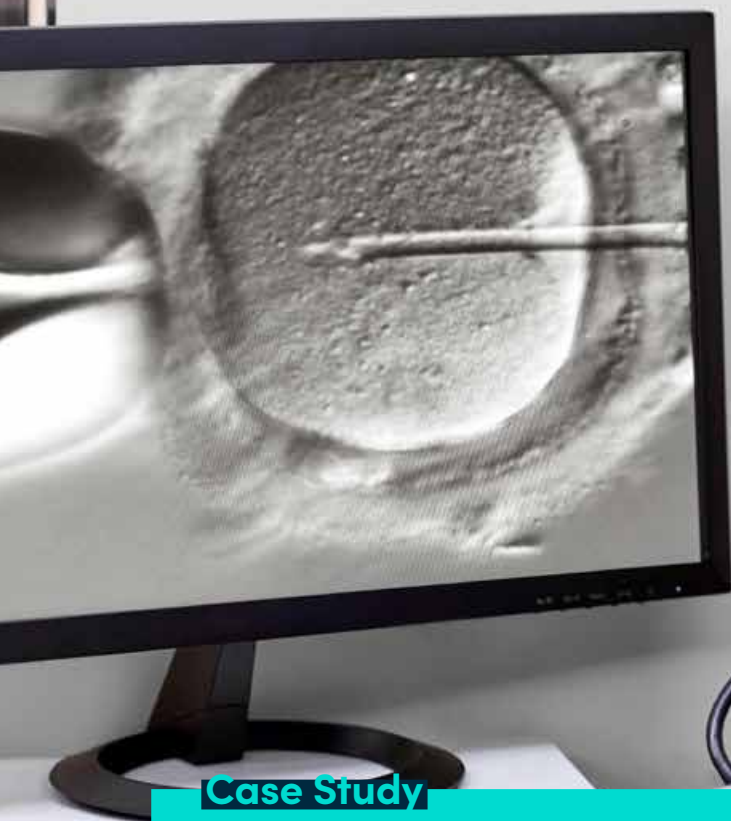
Unlocking economic and population growth with big data

South Australia has a robust reputation for industry-leading capabilities and leadership in data analytics and machine learning.

Noting the unique opportunities available in South Australia, the globally renowned Massachusetts Institute of Technology (MIT) has engaged in a collaborative research partnership to develop a Living Lab at the Lot Fourteen innovation precinct.

The Living Lab is enabled by principal partner BankSA, MIT, the South Australian Government and technical partners Optus and DSpark. This partnership brings together the public, private and global research organisations to analyse data and determine the most effective ways to drive economic and sustainable growth in South Australia.

Being situated within Lot Fourteen allows those working in the Living Lab unparalleled access to businesses across a range of high-growth and high-tech industries. This is an example of business, universities and government collaborating to safely and securely analyse and present big data and improve the social integration of growing states such as South Australia.



Case Study

Using artificial intelligence to deliver life-changing results for IVF couples

Using artificial intelligence to improve health outcomes demonstrates the transformative power of new technologies to solve problems for the health and medical industry.

Adelaide-based start-up Presagen saw the potential for artificial intelligence to create a life-changing medical product for IVF couples. Its centrepiece technology, Life Whisperer, uses artificial intelligence to assist clinicians to identify healthy embryos that will lead to successful pregnancies. Selecting the healthiest embryo will help shorten the time to pregnancy and improve the outcome for couples undergoing IVF treatment.

The web-based tool works by enabling a computer to process and learn huge quantities of data in a short time, including identifying complex patterns which can be invisible to the human eye.

Early results for Life Whisperer indicate a marked improvement beyond traditional methods of embryo selection. The software is commercially available for patients in Australia, with plans to roll out the application worldwide and at low cost.



Industry's role in growing the Hi-Tech sector

Industry has identified that strong technical capabilities and connections with research, skilled workers, trade and investment are essential for the Hi-Tech sector to scale and contribute to economic growth in South Australia.

Case Study

South Australian manufacturer pivots during COVID-19 crisis

The COVID-19 pandemic ignited an urgent scaling up of operations for South Australian companies, with some businesses pivoting their workforce towards producing personal protective equipment for the nation's medical professionals.

One such company is the Detmold Group – a family-owned business specialising in packaging solutions. With support from the state and Commonwealth governments, the company has created a new division, Detmold Medical, and will create an additional 160 roles to produce millions of respirator and surgical masks, ensuring an adequate supply across the country and protecting the healthcare industry.

Leveraging local expertise, networks and research collaborations with Flinders University and the University of South Australia, Detmold Medical will design, develop and manufacture products that provide effective solutions to the healthcare industry.

Before the masks enter the supply chain, they will be tested at South Australia's new face mask testing facility, which is the first of its kind in Australia. This significant investment in local manufacturing will make Detmold Medical the largest Australian manufacturer of face masks and foster the development of critical local medical capability in South Australia.

A person wearing glasses and a plaid shirt stands in a server room. The room is filled with server racks that have glowing blue lights. The background is a warm orange color. A teal line graphic starts from the top left, goes down, then up, then down again, ending near the person.

To achieve industry's vision for the Hi-Tech sector, we are committed to:

- ✓ **creating** new hi-tech products and services for local and international markets by investing in technical capabilities, including research and development
- ✓ **linking** South Australia's leading technology and research to commercialisation capability at global scale by collaborating with research and government partners
- ✓ **identifying** the short, medium and long-term skills required to grow jobs in the hi-tech sector in partnership with government
- ✓ **promoting** South Australia's hi-tech capabilities nationally and internationally to attract investment and increase exports.

What does success look like?

A growing hi-tech sector in South Australia will attract national and international collaborations with local businesses and encourage global technology leaders to establish a South Australian presence. This will open up global customer networks and create new opportunities for engagement in national and international hi-tech research projects, exports of hi-tech products and services, and increased hi-tech jobs.

Increased levels of investment in R&D from business, government, research and private capital funds will also drive innovation and business growth in the hi-tech sector, with opportunities to gain a larger share of national research funding. In the longer term, this will be enabled by a growing set of options to build a pipeline of skilled hi-tech workers in South Australia.



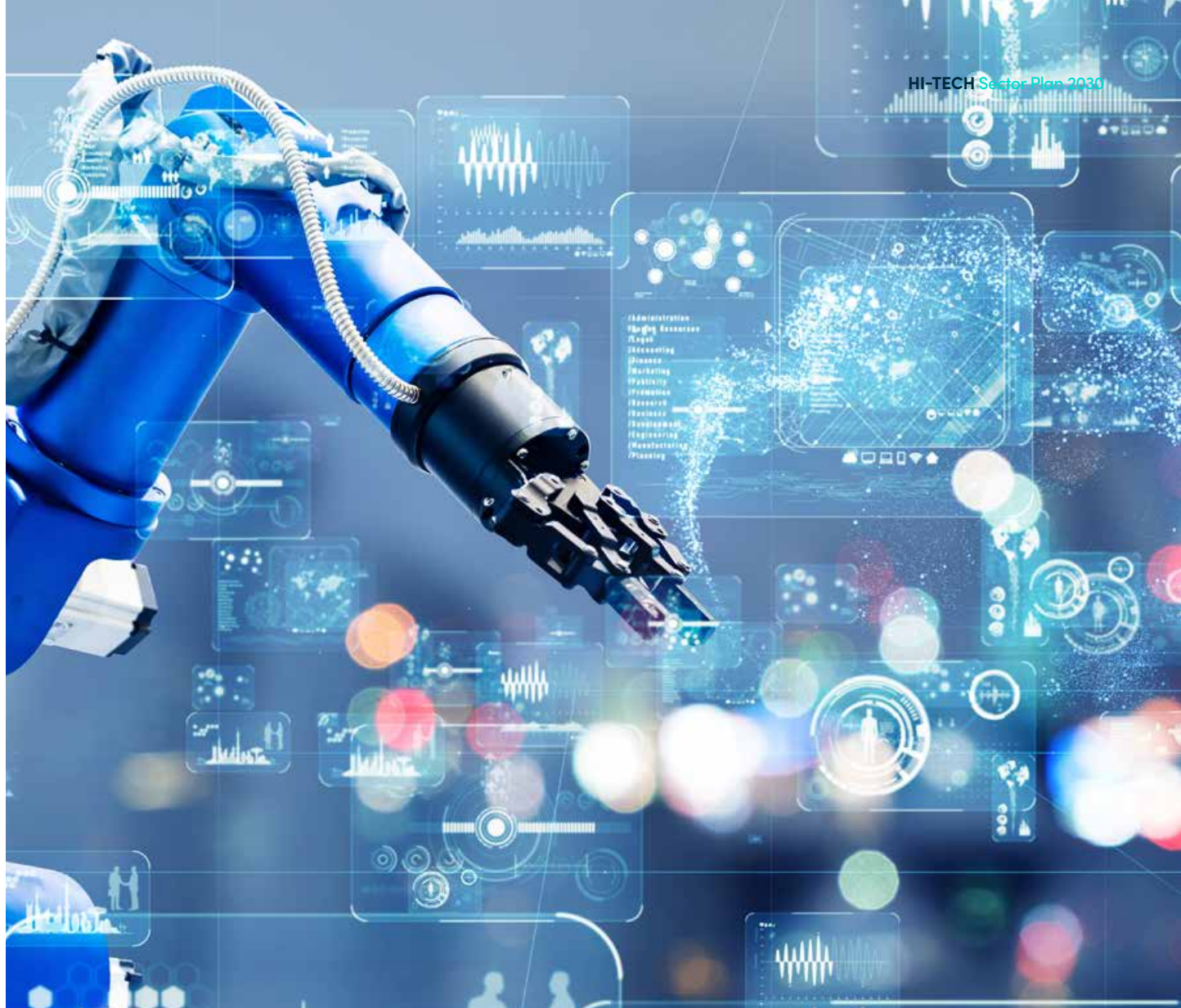
Where will we see impact?

Action	Jobs	Investment	Trade
Align to national strategies and roadmaps			
Capability mapping			
Build core Hi-Tech capabilities			
Increase research and innovation translation and collaboration			
Increase intrastate collaboration			
Hi-Tech skills development			
Capitalise on high-profile industries and investments			
Showcase SA's Hi-Tech capabilities			
Increase access to capital			

[NB: The depth of colour in the above graph indicates the strength of impact for each objective of jobs, investment and trade.]

Success measures

- ✓ Growing number of high-value Hi-Tech jobs, exports and investments
- ✓ Growing levels of business expenditure on R&D
- ✓ Growing number of global Hi-Tech businesses in South Australia
- ✓ Growing number of national Hi-Tech research centres with a South Australian presence
- ✓ Growing number of Hi-Tech training qualifications and participants



Footnotes

- ⁱ AlphaBeta (2019) Australia's Digital Opportunity. Accessed from: <https://digi.org.au/wp-content/uploads/2019/09/Australias-Digital-Opportunity.pdf>
- ⁱⁱ DIS (2020) Estimated 2016 ABS Census data and Detailed Quarterly ABS Labour Force Data, May 2020, following AlphaBeta's tech sector classification methodology outlined on p.58 of Australia's Digital Opportunity.
- ⁱⁱⁱ DIS (2020) Estimated 2016 ABS Census data and Detailed Quarterly ABS Labour Force Data, May 2020, following AlphaBeta's tech sector classification methodology outlined on p.58 of Australia's Digital Opportunity.
- ^{iv} DIS (2019) Hi-Tech Sector Discussion Paper.
- ^v Andrews D, Criscuolo C and Gal PN (2015) The future of productivity: Frontier firms, technology diffusion and public policy: micro evidence from OECD countries.
- ^{vi} AlphaBeta (2019) Australia's Digital Opportunity. Accessed from: <https://digi.org.au/wp-content/uploads/2019/09/Australias-Digital-Opportunity.pdf>
- ^{vii} AustCyber (2020) Australia's Digital Trust Report, Figure 3 p.14
- ^{viii} Deloitte & ACS (2019) Australia's Digital Pulse: Booming today, but how can we sustain digital workforce growth?
- ^{ix} Deloitte & ACS (2019) Australia's Digital Pulse: Booming today, but how can we sustain digital workforce growth?
- ^x DIS (2020) estimates using Table 3, International Trade in Services Data by State, ABS, , following AlphaBeta's tech sector classification methodology outlined on p.58 of Australia's Digital Opportunity.
- ^{xi} Training and Skills Commission (2020) Workforce Insights and Data Tool. Accessed from: <http://tasc.staging.tde.agency/Workforce-Insights/Workforce-Insights-Data-Tool>
- ^{xii} DESE (2019) STEM jobs growing almost twice as fast as other jobs. Accessed from: <https://www.employment.gov.au/newsroom/stem-jobs-growing-almost-twice-fast-other-jobs>
- ^{xiii} World Economic Forum (2019). The digital skills gap is widening fast. Here's how to bridge it. Accessed from: <https://www.weforum.org/agenda/2019/03/the-digital-skills-gap-is-widening-fast-heres-how-to-bridge-it/>
- ^{xiv} PWC (2020) Problems worth solving: STEM. Accessed from: <https://www.pwc.com.au/about-us/social-impact/problems-worth-solving/stem.html>
- ^{xv} OECD (2020) Venture Capital Investments. Accessed from: https://stats.oecd.org/Index.aspx?DataSetCode=VC_INVEST
- ^{xvi} ABS (2019) Business Resources Devoted to Research and Experimental Development (R&D). Accessed from: <https://www.abs.gov.au/AUSSTATS/abs@nsl/mf/8104.0/>
- ^{xvii} DIS (2020) from the National Competitive Grants Program (NCGP) Yearly Funding Allocation Data, ARC. Accessed from: <https://www.arc.gov.au/grants-and-funding/apply-funding/grants-dataset>
- ^{xviii} Cooperative Research Centre Association (2020) CRCs have been an important driver of GDP for three decades and are set to continue. Accessed from: <https://crca.asn.au/crcs-have-been-an-important-driver-of-gdp-for-three-decades-and-are-set-to-continue/>



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GROWTH STATE