ACCELERATING AUSTRALIA'S DIGITAL TRANSFORMATION

STRATEGIES FOR THE FOURTH INDUSTRIAL REVOLUTION

CONTENTS

1. FOREWORD

Australia is well positioned to be an international trailblazer in digital transformation. In fact, building the nation's cloud capabilities could contribute up to $9.2 billion to the economy by 2020 – and government has a key role to play.

Deploying cloud technology to digitise services and processes in citizen-driven sectors can also yield results. Together, healthcare, education, finance, and retail could add an estimated $2.3 billion to Australia's GDP by 2020.

There's plenty of inspiration to help light the way. This report explores world-class examples of governments providing digital services for citizens and supporting businesses in Australia, Germany, Singapore, and South Korea.

These examples and our wider discussion are designed to serve as an inspiration for policy-makers and business leaders to speed up Australia's digital transformation.

Tangible steps that the Australian Government could take to further this process include:

- Setting bold targets, such as aiming for 80% of government transactions to be digital by 2020 and accelerating the use of cloud computing.
- Appointing a national Chief Customer Service Officer to champion the interests of citizens and encourage businesses to focus on improving their customer experience.
- Streamlining and improving government procurement processes.

Acting now is an urgent priority, as neither international competitors nor technological advances will wait for Australia to catch up. We are in the midst of an era of digital transformation – an incredible wave of innovation that is radically transforming our economies, our societies, and our daily lives.

Working in close partnership, business, government, and the technology industry can help Australia thrive in the Fourth Industrial Revolution.

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II. INTRODUCTION

In many respects, Australia is a digital transformation pioneer. Its economy and society have already achieved important milestones in their technological development.

Following the adoption of a forward-looking Australian Government Cloud Computing Policy,[1] the federal government recently introduced robust cybersecurity principles. [2] A revamped version of the myGov platform is helping consolidate the delivery of health, tax, benefits and welfare services into a single portal[3], while rising demand for online content and services is driving investment in the technology sector.[4]

More focus and effort are needed to maintain the momentum. According to the latest Digital Evolution Index, Australia has become a 'stall out' country, meaning that while it has attained digital maturity in key areas, the overall pace of innovation has slowed.[5]

Other indexes tell a similar story: Australia ranks 18th on the Network Readiness Index[6] and 6th on the Cloud Readiness Index (CRI).[7] It also ranks 23rd in the Global Innovation Index, losing four spots compared to the previous year.[8]

Together, these rankings suggest a precarious position: by not taking digital readiness to the next level, Australia risks losing its competitive edge just as others are aggressively attempting to strengthen their digital capabilities. In this context, it is significant that the Australian Government has formally committed to becoming "one of the world's top three digital governments by 2025".[9]

This report considers what it will take to turn that objective into reality. Certainly, the scale of the challenge should not deter the government from pursuing its digital aspirations. As this report demonstrates, the road to becoming not merely a digitally enabled government but a digitally transformative government is paved with a host of promising opportunities.

Measuring the impact of digital technologies on Australia's economy has been attempted several times.

Most of these projections tend to define 'digital technologies' as a broad category of products and platforms that have comparable degrees of economic potential. However, certain technologies emerge and mature faster than others, and can be expected to affect the economy significantly ahead of others.

Cloud computing is one such technological enabler. From the Internet of Things (IoT) and analytics to mobile applications and big data, 'the cloud' touches all aspects of modern digital ecosystems. In this sense, the cloud it is both a technology and an economic paradigm shift, allowing governments and businesses to re-imagine the way they use and allocate information and communications technology (ICT) resources.[10]

Salesforce commissioned TRPC to develop worst-case and best-case scenarios to quantify the potential impact of cloud computing on Australia's digital economy. Using work already undertaken on the readiness and development of cloud computing across the Asia Pacific, TRPC finds that Australia can increase the potential economic impact of cloud technologies by up to 20% by strengthening its digital approach and capabilities. This could increase the value of the cloud sector to up to $9.2 billion[11] by 2020.

Moreover, if cloud computing fundamentals are comprehensively improved over the next two years, it can help economic sectors such as healthcare, education, finance, and retail to collectively add around $2.3 billion to Australia's GDP.

Recognising this, and considering how leading digital nations target specific technology enablers in tandem with key economic sectors, this report focuses on the areas in which Australia stands to benefit most from holistic digital transformation. Sector-specific findings are summarised below.

Healthcare

Digital technologies are bringing three major benefits to the healthcare sector: improving quality of life by reducing potential human error and cutting the length of time needed to make diagnoses; reducing costs by expanding remote patient care and management techniques; and reducing costs by using hospital resources in smarter ways.

Finance

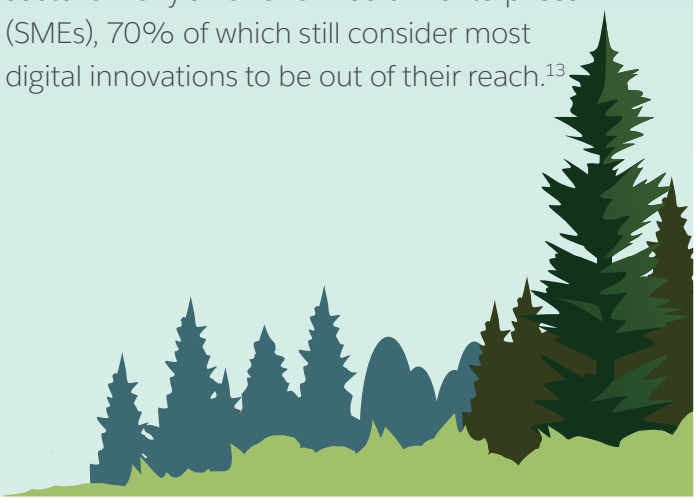
The recent surge in new competitors in the financial technology ('fintech') space has spurred traditional firms to significantly invest in digitalising platforms and services in an effort to retain customers. Now more than ever, the Australian financial sector must take advantage of emerging digital technologies to operate more efficiently and update business models to compete against new disruptive entrants.

Education

Digital technologies enable Australian students to be more competitive in a global marketplace, and provide cost-effective tools for addressing skills inequalities and workforce reskilling. They can also significantly reduce costs. This report identifies some immediate reskilling requirements to enable the government to power a sustainable digital transformation agenda.

Retail

From personalised customer experiences to faster market growth and enhanced international competitiveness, digital technologies promise major opportunities for the retail sector.[12] The potential for growth is especially great among the retail sector's many small and medium enterprises (SMEs), 70% of which still consider most digital innovations to be out of their reach.[13]



2
THE INSTITUTIONAL IMPACT OF DIGITAL TRANSFORMATION

The digital transformation of the Australian Government can bring major institutional changes on three distinct but complementary levels. It can:

- Provide more effective approaches to the provision of public services in a digital world
- Equip public sector leaders with relevant skills
- Allow the public sector to adapt to any future disruption that comes its way.

Australia must accelerate the pace and effectiveness of the public sector's transformation to reach this next level of digital maturity. Indeed, rapid advances in technology have led to dramatic progress in the ability of governments and citizens to communicate and exchange ideas. Around 10 years ago, so-called Government 3.0 reforms gave government entities an online presence and voice, making public service provision an interactive experience.

Today, the concept of Government 4.0 goes further and digitalises internal systems and operations for more predictive, immersive and self-learning platforms that focus on people, processes and possibilities. In this context, a digital economy cannot thrive without the guidance and support of a forward-looking, digitally enabled public sector.[14]

This report provides recent and relevant statistics, regional and global best practices, and case studies from around the world to demonstrate how the Australian Government can accelerate digital transformation internally and nationally.

III. THE DYNAMICS OF DIGITAL TRANSFORMATION

1

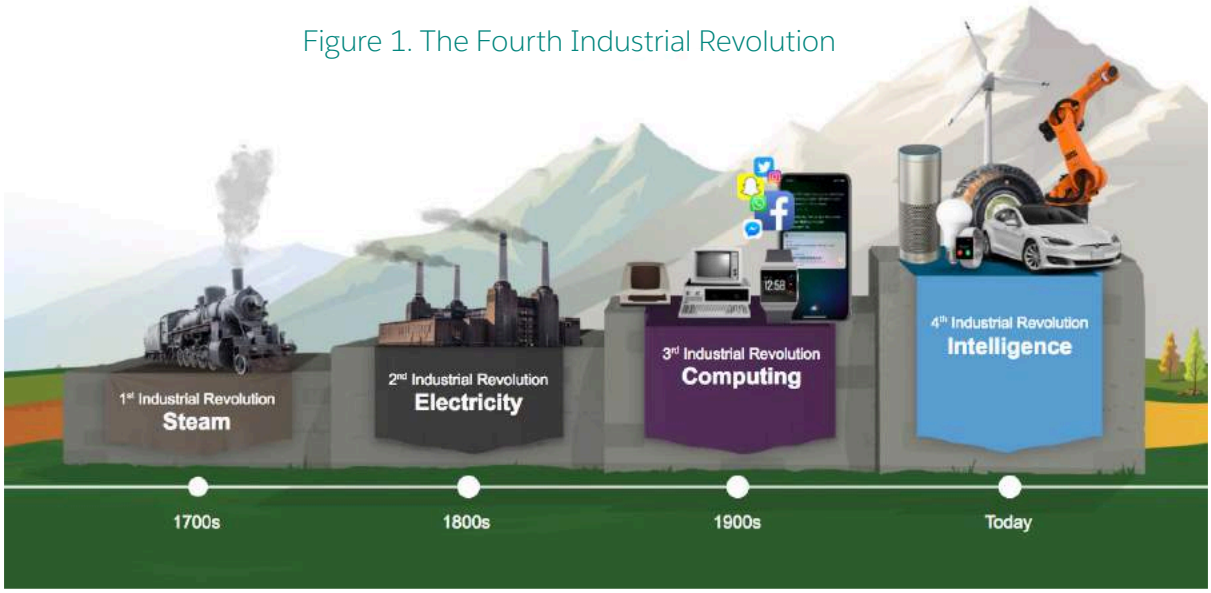
CAPTURING EMERGING TRENDS AND LEVERAGING GLOBAL BEST PRACTICES

A major global trend behind governments' digital transformation efforts is what the World Economic Forum (WEF) calls the Fourth Industrial Revolution.[15] This revolution is a new paradigm in which advanced technologies fundamentally alter the way people live, work and relate to one another, as captured in Figure 1.[16]

The WEF predicts that by 2025, 10% of people will wear Internet-connected clothing, the first 3D-printed liver will be transplanted, taxes will be collected via blockchain and big data sources will start to replace government censuses.[17]

These predictions do not seem too far-fetched, considering that about 60% of government transactions in Australia have already been digitalised.[18]

Figure 1. The Fourth Industrial Revolution



The WEF highlights six key technology megatrends that are set to emerge between today and 2027, thanks to the Fourth Industrial Revolution. It's crucial that governments address these trends to ensure a successful digital transformation.

Permanent communication

Wearable and implantable technologies will enhance people's 'digital presence', allowing them to interact and exchange information with objects and one another in unprecedented ways..

Omniscient computing

Computing power will continue to grow and become more widely accessible, putting pocket-sized supercomputers with nearly unlimited storage capacity within the reach of many.

Hyper-connectivity

Smaller, cheaper and smarter sensors will connect everything from people and devices to homes, vehicles and clothes. This will create vast, interconnected networks of data, information and insights.

Data-driven intelligence

The exponential rise of the type and quantity of available data will accelerate IT systems' ability to learn and evolve. This capability will eventually become a vital source of support to anyone in any decision-making role.

Distributed trust

The shift towards network- and platform-based technologies and economic models could make it faster and easier to securely share both physical and intangible assets. It may also see trust shift from institutions to these new systems. For instance, proof of property ownership may be held in a distributed public 'blockchain' rather than centrally by a government or bank.

On-demand manufacturing

3D-printing will transform industrial processes and perhaps even replace manufacturing altogether. This will disrupt industries that rely on heavy machinery and specialised skills, and open the door to new, people-driven industrial models.[19]

These shifts will extend to the dynamics that have traditionally existed between citizens and institutions. They will blur the lines between citizen and consumer, institution and platform, pushing governments to more actively instigate and embrace change in the digital age.

Australia's government institutions are also gradually being turned into digital platforms that stand to facilitate every aspect of citizens' lives. From cashless payments in public transport ticketing to electronic voting, simply providing online services is no longer enough. Public sector organisations must also strengthen their digital capabilities to transform the way services, processes and decisions are designed and delivered.[20]

Indeed, a digitally transformed government should remember information citizens have already provided so they don't have to submit personal details every time they access a different government service. It should be able to let citizens know when they need to do something, rather than waiting for them to remember. In providing integrated services, the government should be able to securely verify a user's identity while protecting their privacy and giving them control over how their data is used.

Services

Citizens primarily interact with government when seeking services. For the past 15 years, governments have used digital tools and channels to simplify and streamline these interactions. They must now accelerate their efforts and keep users' perspectives in mind, ensuring that any changes address gaps or grievances, or improve effectiveness. For example, the Australian Taxation Office (ATO) pre-fills online tax returns with information that it already has.[21]

Processes

The Australian Government can take inspiration from other countries that have streamlined their processes. For example, Singapore's integrated SingPass system now gives citizens access to over 350 e-government services through a single platform, including creating and registering a company. [22] In Finland, the Invest in Finland platform serves as a one-stop shop for a wide range of digital services for businesses, including book-keeping, advertising, banking, recruitment and legal services.[23]

Decisions

The public sector has much to gain from gathering data and using it to refine knowledge, inform decision makers and help solve problems. For instance, the ATO analyses the tax returns of more than a million SMEs to develop industry-specific financial benchmarks. It uses these benchmarks to identify firms that may under-report income, fighting tax fraud before it even takes shape.[24] Singapore's Smart Nation Sensor Platform takes this approach further.

This nationwide network of sensors collects data on energy consumption, road traffic, and air and water quality and feeds it into a single digital repository. This allows government agencies to draw tailor-made insights as and when required.[25] This points to the need to adopt a centralised whole-of-government funding and delivery approach for common platforms, managed using a cogent road map and reference architecture.

AUSTRALIA

The Australian Capital Territory's (ACT) Government defines what it means to be fearlessly digital.

The Office of the Chief Digital Officer (OCDO) drives the ACT's digital strategy and shapes new capabilities. The OCDO aims to bring cohesion to the territory's digital transformation program and has been working with government directorates to co-design new services.

Making new digital systems easy to adopt while safeguarding access to appropriate information is a major challenge.

The ACT Government has used Salesforce Identity to successfully implement a multi-level access capability. Citizens go through a simple on-boarding process to create an ACT digital account, which allows access to non-sensitive transactions. They can securely access more sensitive transactions by providing additional ID (such as a driver's licence or passport).

The OCDO is standardising how the ACT Government creates and delivers new digital services, using Salesforce technology as a foundation. It has built a small suite of services on Service Cloud and Community Cloud, all co-designed with the government directorates that will manage them. One of the services is a diversity register, which aims to ensure diverse representation on government and non-government boards.

The government also uses Salesforce to solve challenges related to public housing. One practical application is a mobile application, under development, that will allow public housing tenants to lodge maintenance requests from their phones. When a tenant initiates a request, the smart application pulls in contact details from the tenant's ACT digital account and prompts them to add details and photos that may help to manage and resolve the issue faster.

Even more progressive is a digital application being developed to automate the government's loan facility for rental bonds. This will speed up the application and approval process to help people secure housing quicker.

2

MEASURING IMPACT AND ASSESSING BENEFITS

Economic benefits

A 2009 report by Deloitte projected that the widespread adoption of smart technologies in the key sectors of electricity, irrigation, health, transport and broadband communications would increase the net present value of Australia's GDP by up to $106 billion over the first 10 years of their deployment.[26]

In 2012, IBISWorld examined the way ubiquitous high-speed broadband, along with analytics, learning systems and cognitive computing could generate around $1.3 trillion in revenue for Australia.[27] More recently, McKinsey estimated that the use of digital technologies could contribute between $107 billion and $260 billion to Australia's GDP by 2025.[28]

Though their methodologies differ, all these firms define 'digital technologies' as a broad category of products and platforms that have comparable degrees of economic potential. In reality, certain technologies emerge and mature faster than others, and are likely to support and accelerate the economic impact of the technologies and applications that are built on top.

In fact, some technologies need to be at advanced stages of maturity for other innovations to even take shape. Cloud computing, the focus of this paper, is a foundational enabler of digital transformation. From the IoT to mobile analytics and big data, cloud is an essential part of modern digital ecosystems.

The Asia Cloud Computing Association (ACCA) recognises cloud's economic importance. Its flagship publication, the Cloud Readiness Index (CRI), measures the extent to which Asia-Pacific (APAC) economies are prepared to adopt and roll out cloud computing technologies. It formulates recommendations for APAC economies to improve cloud infrastructure, security, regulation and governance.

The 2018 CRI states that Australia is a strong regional contender thanks to a solid performance in key readiness areas. It is a low-risk location in which to build data centres; it strongly protects intellectual property rights; and it is among the few APAC economies to have a cloud-first policy in place. However, the country's overall cloud readiness has been weighed down by its relatively poor cloud infrastructure. It ranked 6th out of 14 APAC nations in 2018, falling two positions (behind Japan and Taiwan) compared to 2016.[29]

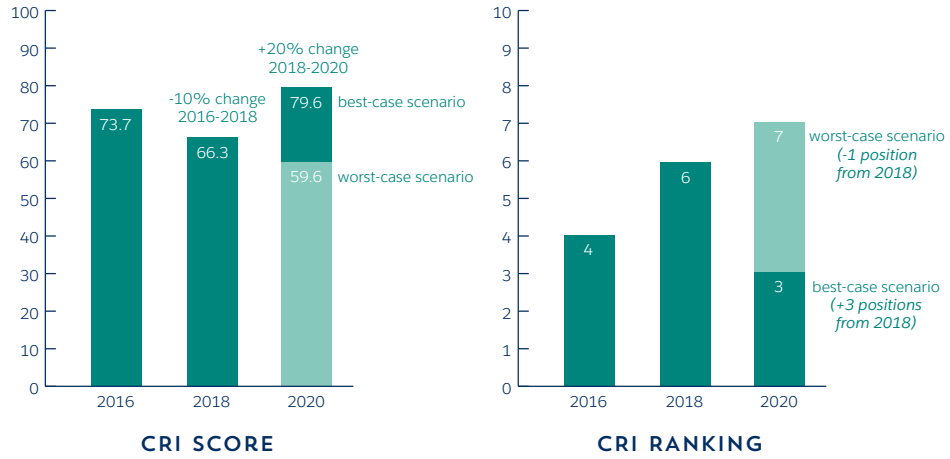
Using the 2018 CRI scores and rankings as a baseline scenario and overall cloud readiness as a proxy measure for the potential impact of cloud technologies on Australia's digital economy, TRPC develops worst- and best-case scenarios:

- Worst-case scenario – Australia falls to 7th by 2020 as its relative cloud readiness declines at the same pace as in the previous CRI rankings (a 10% decrease between 2016 and 2018).
- Best-case scenario – Australia moves up to 3rd by 2020 as its relative cloud readiness rises at double the rate of the previous CRI rankings (a 20% increase between 2018 and 2020).

TRPC finds that if Australia fails to address its current challenges it will realise the worst-case scenario. This will hinder its ability to capture and accelerate the economic benefits of cloud technologies and see it fall behind regional competitors such as Japan and Taiwan.

If, however, Australia manages to strengthen its current digital capabilities by 2020, it will increase the potential impact of cloud technologies by up to 20%. This would move Australia ahead of neighbour New Zealand in terms of regional cloud competitiveness and only marginally behind Asian leaders Hong Kong and Singapore (see Figure 2).

Figure 2. Cloud Readiness Index 2020, Australia's projected scores and rankings



Source: TRPC calculations based on the Asia Cloud Computing Association's Cloud Readiness Index (CRI) database, http://asiacloudcomputing.org/studies/cri2018/results

According to Gartner, Australia's public cloud services revenue is expected to reach $7.7 billion in 2020.[30] Using this estimate as a baseline and extrapolating the worst-case/best-case scenario methodology, TRPC finds that improving Australia's cloud computing readiness could increase the value of the cloud sector to up to $9.2 billion by 2020 (best-case scenario). If however, Australia's cloud computing capabilities stagnate between 2018 and 2020, then it will only realise a $6.9 billion gain (worst-case scenario, see Table 1).

Table 1. Projected growth of Australia's public cloud sector, different scenarios for 2020

	AUSTRALIA'S PUBLIC CLOUD SERVICES REVENUE, 2020	PUBLIC CLOUD SERVICES AS A SHARE OF AUSTRALIA'S DIGITAL ECONOMY, 2020	CONTRIBUTION OF PUBLIC CLOUD SERVICES TO AUSTRALIA'S GDP, 2020
WORST-CASE SCENARIO	$6.9 billion	4.29%	0.31%
BEST-CASE SCENARIO	$9.2 billion	5.71%	0.41%

Source: TRPC calculations based on various public databases.[31] See Annex for detailed sources and calculations.

Relative to Australia's digital economy, this would mean a 5.7% contribution (best-case scenario). Relative to Australia's GDP, this would equate to a contribution comprised between 0.31% (worst-case scenario) and 0.41% (best case scenario).

3
INSTITUTIONAL IMPACT

Rapid advances in technology have led to dramatic progress in governments' and citizens' ability to communicate and exchange ideas. The last decade was about Government 3.0 providing an online presence and voice, and making public service provision an interactive experience.

Today, Government 4.0 advances promise to go much further, digitalising internal systems and operations for more predictive, immersive and self-learning platforms that focus on people, processes and possibilities. They include:

Solution-enabling platforms

Digitally powered governments are turning into 'enabling platforms of possibilities'. Instead of managing top-down decisions, they build dialogue, define targets and outcomes, hold partners accountable, open services to competition, and manage crowdsourced campaigns.

Made-for-me service delivery

A wide range of public services already take the shape of personalised digital interactions accessible from home and on mobile devices. This will increase and accelerate as more complex operations become decentralised, and tailor-made services become convenient and efficient. The data-driven ability of government to anticipate and respond becomes crucial in this phase.

Data-smart government

The systematic collection and understanding of data on the use and impact of government services can help policy makers design more effective programs and initiatives. Predictive modelling and other types of data analytics allow the public sector to focus on preventing problems before they take shape, instead of devoting resources to reactively overcome them.

Just-in-time public service

Digital technologies and the emergence of the 'gig economy' are redefining what it means to work for the government. From flexible working arrangements to teleworking schemes, government employees increasingly use digital technologies to streamline operations, simplify processes, and boost productivity.

CASE STUDY 2

SOUTH KOREA

The Asian Tiger builds the public sector of the future with cloud.

South Korea's focus on technology has been an important factor in its socio-economic growth over the past few decades, as it transformed from a developing nation to one of the world's most vibrant technology markets. One key driver of future growth is the rise of cloud computing for the public sector.

Since 2015, South Korea has actively pushed for public institutions to adopt cloud storage. The government provided its agencies with bonus points on their evaluations, removed obstacles to adoption, opened a public cloud support centre, and even appointed 48 'chief cloud first officers' across the government. After implementing the Cloud Computing Act in September 2015 to promote cloud computing by enhancing information security and user protection, the government earmarked $93 million in June 2016 for efforts to integrate information systems.[32]

In 2016, the National Information Society Agency (NIA) launched the Open Cloud Platform (PaaS-TA), an open-source platform that enables developers to create software on a standardised framework.[33] PaaS-TA supports more than six development languages and diverse cloud computing infrastructure services. It can be used by anyone, encouraging the development of innovative e-government products and services. Leading cloud computing companies have continued to collaborate on the platform to build IoT, big data and

CASE STUDY 2 (CONT'D)

artificial intelligence (AI) offerings for private and public-sector use.

In 2017, the Ministry of Science, ICT and Future Planning outlined an ambitious agenda to bring the government and private businesses onto cloud servers. It aimed to get 40% of public agencies to commit to adopting cloud services by 2018, to reduce IT costs. This would drive the creation of a more robust domestic cloud services market and make the country a global leader in cloud technology by 2021. The plan also included revamping two state-run cloud server centres, completing a third one by the end of 2018, and establishing a cloud procurement support centre to help public agencies make the transition.[34]

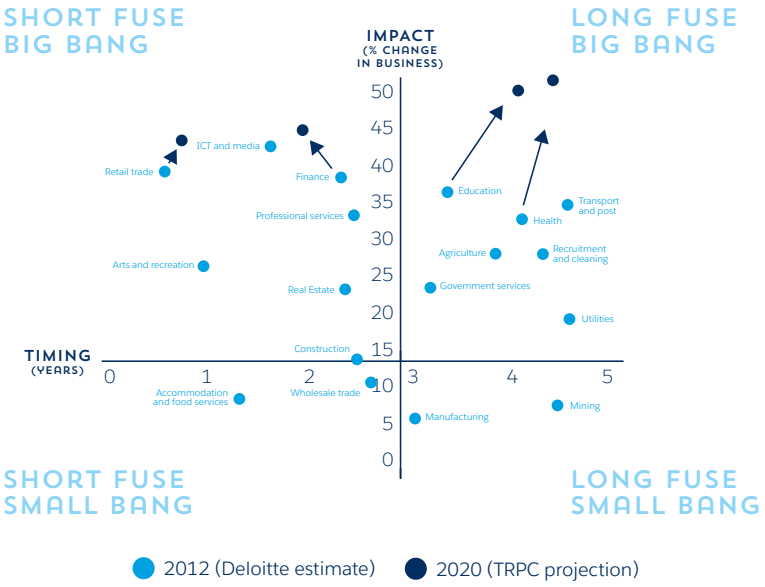
In addition, South Korea plans to expand cloud adoption to companies operating in national industrial complexes, promote cloud-based precision medical projects and smart factories, and continue to upgrade PaaS-TA to enable a national cloud ecosystem.

IV. TRANSFORMING KEY ECONOMIC SECTORS

A 2012 report on the importance of digital adaptation to Australia's key economic sectors concluded that the urgency attributed to transformation in each sector depended on the anticipated impact and the perceived adjustment time.[35]

Sectors that are expected to generate large near-term returns – such as finance, media and retail – would be under more immediate pressure to transform themselves digitally. Other sectors including healthcare, education, utilities and agriculture were considered 'long-fuse' sectors (see Figure 3).

Figure 3. Digital disruption trajectories, 2012 and 2020



Source: TRPC projections based on Deloitte research, www2.deloitte.com/content/dam/Deloitte/au/Documents/Building%20Lucky%20Country/deloitte-au-consulting-digital-disruption-whitepaper-230217.pdf

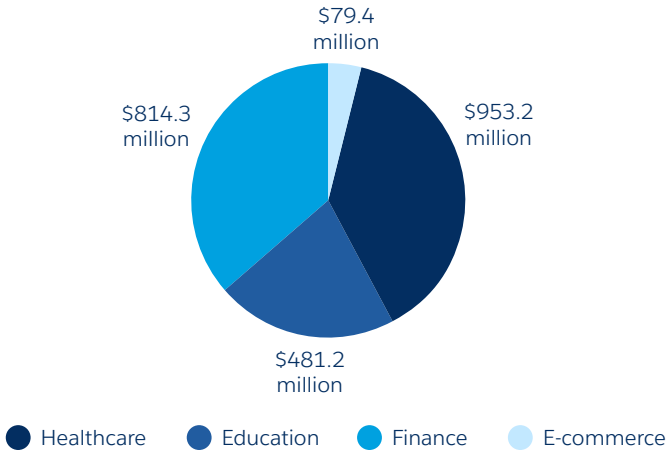
Early analyses of digital transformation tended to miss two key factors. One was the cross-sectoral impact – or enablement – of digital disruption. Digital change in one sector influences change in another. For example, the financial sector was accustomed to digital adoption within itself, but unprepared for the impact of digital technologies introduced by other sectoral players, such as those that emerged with high-frequency trading and cryptocurrencies.

Service providers were not the only ones forced to change their models; regulators also needed to embrace the new landscape.[36] The same can be seen in retail, where responses to the rise of e-commerce and start-ups in the 'sharing economy' have actively reshaped the sector.

By contrast, sectors such as healthcare and education, in which the state plays an important role, have presented very different sets of challenges to digitalisation.[37] This illustrates the second under-emphasised factor: the profoundly transformative impact that government can have by enabling and promoting the structured and targeted adoption of digital technologies. In the case of healthcare and education, regulatory constraints and bureaucratic blockages slow the pace of transformation, despite both sectors being potential heavyweight contributors to the digital economy.

If cloud computing fundamentals can be improved over the next two years in Australia, cloud technologies can be expected to enable the healthcare, education, finance, and online retail sectors to collectively add $2.3 billion to Australia's GDP. Healthcare and education alone represent more than 60% of the total (see Figure 4).

Figure 4. Contribution of cloud to GDP, by sector: best-case scenario (2020)



Source: TRPC calculations based on multiple publicly available databases.[38] See Annex for detailed sources and calculations.

1
HEALTHCARE

A complex, multifaceted division of roles and responsibilities across different levels of public and private providers characterises Australia's healthcare system.

The efficiency and productivity of healthcare service providers can be substantially raised by using digital systems. However, such improvements are constrained by the scale of initial investments required; equipment incompatibility (when multiple vendors are involved); security and privacy issues; and the need to train staff to work with new digital tools and systems.[40]

The Australian Government's My Health Record enables healthcare providers to share patients' personal health information. Recent figures from the Australian Digital Health Agency show that the advantages of sharing medical data are not fully realised, as only 263 specialists have connected to the system and only about 200 of the health summaries shared by general practitioners (GPs) were accessed by healthcare professionals in public and private hospitals.[41] No technology sells itself; it needs to be seen and experienced as convenient (easy to use), secure and cost-effective.

Australia stands to be a global leader in health and biotechnology research. For example, biotechnology revenue is expected to grow 4.3% to $9.1 billion by 2021-2022.[42] However, Australia's ability to maintain its position as a global leader in world-class research relies on access to research infrastructure that allows the free flow of data, and the ability to rapidly move large and complex data sets easily, efficiently and securely. This ability is currently undermined by restrictions on data flows.

KEY TAKEAWAYS

Digital technologies bring four major benefits to the healthcare sector: reducing potential human error and cutting the length of time needed to make diagnoses; reducing costs by employing better techniques to care for and manage patients remotely; and reducing costs by using hospital resources in smarter ways. Digitalising and automating patient records – or creating electronic medical records (EMRs) – will cut the most costs. A McKinsey report estimates a 25% reduction of costs in avoidable hospital admission rates, and 20% in the length of stay.[39] It also notes that the use of electronic Intensive Care Unit (eICU) sensors leads to a 22% reduction in mortality rates and a 23% reduction in time spent in hospitals.

AUSTRALIA

St John of God Healthcare transforms patient care with seamless admissions.

St John of God Healthcare, established 120 years ago, has 23 facilities and 3,200 beds across Australia. The organisation's mission is to help people realise the richness and fullness of life, offering them hope and best in class care. The healthcare provider understands that fulfilling this mission will require a substantial change of approach.

The old admissions process at St John of God Healthcare involved many manual steps and repeated capture of the same or similar information from patients. Patients would meet hospital employees face-to-face or over the phone and then send required paperwork by email or fax.

St John of God Healthcare wanted a solution that would centralise data on a single platform and streamline the admissions process. The solution also had to be scalable, and help the organisation provide more efficient and more personal care. St John of God Healthcare partnered with Salesforce, which built an easy to use portal on Community Cloud in just four months.

Salesforce, together with PwC, helped St John of God Healthcare bring the new portal into operation, starting with the Murdoch hospital in Perth, Western Australia. The experience for patients and their caregivers has been entirely transformed, alleviating potential anxiety about payments, paperwork and admission times.

In the first few months of its operation, about 85% of surgical patients used the new admissions portal, compared to example adoption rates of 30% for other solutions. The portal allowed St John of God Healthcare to collect and manage data more efficiently and automate workflow prioritisation. It also reduced administrative and psychological burdens on caregivers.

2
EDUCATION

Digital transformation does more than increase efficiency in education.

The focus of digitalisation initiatives in many sectors is improving efficiency. However, in education, something more complex is at work. As early as 2008, an Australian Government report noted that "the increasing use of mobile and other student personal IT devices as well as student-generated content and social networks will impact bandwidth and data services requirements",[44] alluding to the fact that digital can radically change the way education takes place.

Changes include more self-learning, peer-group learning, and access to a wider variety of source materials through digital platforms. These changes significantly affect how schools, local authorities, and government bodies approach the adoption of digital technologies.

Australia's federated system of education means that the federal government is a facilitator of digital in schools. It helps schools go digital through the Fibre Connections to Schools (FCS) program, designed to bring the National Broadband Network (NBN) to educational institutions. The federal government has also extended Australia's Academic and Research Network (AARNet), which offers universities and research institutes high-speed fibre connections on a subscription-basis.

KEY TAKEAWAYS

The most important benefit of digitalising education systems is widening the scope of teaching and learning. Adopting digital technologies can make Australian students competitive in a global marketplace, address national and international skills inequalities, and prepare young people to prosper in an increasingly unpredictable future. It can also significantly reduce costs. A study found that implementing cloud technologies in higher education institutions could reduce IT costs related to software licensing and staffing by up to 75%.[43]

3
FINANCE

In 2017, Australia's financial services sector contributed around $140 billion to the country's GDP, making it the largest sectoral contributor to the national economy.[45]

Government agencies recognise the potential application of digital technologies as a catalyst for further growth in financial services. For instance, in 2017, the securities regulator, the Australian Securities and Investments Commission, launched a 'sandbox' innovation facility for current and emerging fintech products and services.[46]

The Australian Stock Exchange has also announced that it is seeking to introduce blockchain technology for its clearing and settlements process,[47] while the Treasury now sets out Australia's fintech priorities[48] as part of the government's broader innovation agenda.

The Australian Bankers' Association reacted positively to the results of the federal government's 2017–8 Open Banking Review. The review aimed to establish a model for allowing consumers to share their personal information between financial institutions to find better deals on financial services.[49]

Open banking presents opportunities for FinTechs and traditional firms to offer more tailored products and services. However, the technologies that enable these commercial opportunities pose new risks, as well as technical and organisational challenges, to financial services firms in managing and effectively using the massive amounts of data available. The highly regulated nature of financial services is also likely to mean that internal approvals for the use of new technologies will be handled cautiously.

In 2018, Salesforce commissioned Deloitte Digital to survey more than 1,000 consumers in Australia and New Zealand to assess the impact of customer and market trends on the financial services industry.[50] More than half of those surveyed said their financial service provider could improve the digital experience they provide, indicating there are many opportunities for change.

KEY TAKEAWAYS

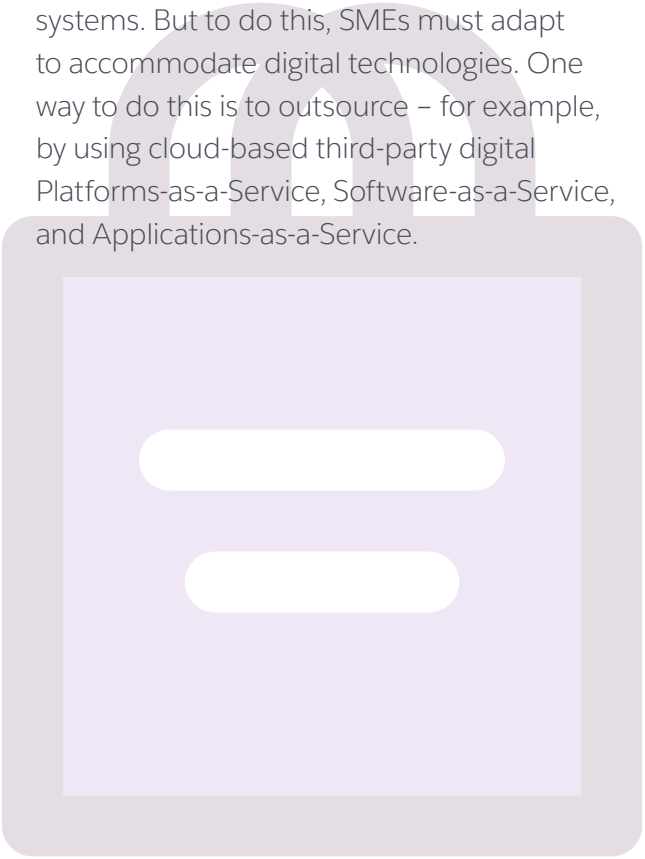
The recent surge in the number of new entrants in the fintech space has spurred significant investments in initiatives to digitalise platforms and services to retain customers. Given the importance of financial services to the economy, the government has a strong incentive to continue to promote Australia as a stable, high-performing financial centre for institutional investors. Now more than ever, the Australian financial sector must take advantage of emerging digital technologies to gain immediate operational efficiencies and update business models in the face of disruption.

4
RETAIL

According to a survey by Deloitte, SMEs at an 'advanced' level of digitalisation are more likely to multiply their revenue growth by a factor of 1.5; revenue per employee by 1.6; and exports, jobs and innovation by factors of 7, 8 and 14 respectively. They are also more likely to have diversified their customer base.[53]

In 2018, small online retailers in Australia accounted for 37% of $25.3 billion in online retail sales, with homewares, appliances, media and toys their biggest sales categories. More interestingly, the annual sales growth rate to March 2018 for small retailers was 21.7%, compared to 14.2% for large retailers.[54] This suggests SMEs are becoming more aware of the opportunities to reach customers through digital channels as smartphone ownership becomes ubiquitous and businesses become more digitally capable.

Using e-commerce platforms has become a cost-effective way for retail traders, especially, to find new customers and markets – particularly adopting online payments systems. But to do this, SMEs must adapt to accommodate digital technologies. One way to do this is to outsource – for example, by using cloud-based third-party digital Platforms-as-a-Service, Software-as-a-Service, and Applications-as-a-Service.



KEY TAKEAWAYS

The rise of e-commerce has significantly disrupted Australia's retail sector, demonstrating just how much there is to gain in efficiently harnessing digital innovations such as big data, analytics and AI. Digital technologies promise more personalised customer experiences, faster market growth and enhanced international competitiveness for the retail sector.[51] The potential for growth is remarkable given that Australia's retail sector comprises many small and medium-sized enterprises (SMEs), 70% of which still consider most digital innovations to be out of their reach.[52]

GERMANY

Germany enables the digitalisation of SMEs to become Europe's fastest growing digital economy.

In 2017, Germany's ICT market recorded a turnover of $248.5 billion, making it the fifth biggest ICT market in the world. The country's IT sector is the main driver of economic growth, with turnover of more than $132 billion in 2017 (3.4% growth between 2016 and 2017).[55]

A recent PwC study found that many German companies have moved beyond pilot projects and are already investing in rolling out digital solutions. Indeed, 91% of industrial companies have invested in digital factories, expecting efficiency gains of a total of 12% over five years.[56]

Representing 58.5% of jobs in Germany, SMEs are the country's strongest driver of innovation. Overall, one in four SMEs has increased its digitalisation in the past three years.[57] A recent study commissioned by the Federal Ministry for Economic Affairs and Energy found that innovative SMEs will continue to drive the success behind the 'Made in Germany' trademark, provided they embrace new trends – particularly digitalisation – and recruit skilled labour.[58]

In this context, the German government is mobilising its resources to strengthen SMEs' competitiveness, capacity to innovate, and ability to create jobs.

V. NEXT STEPS AND RECOMMENDATIONS

Digital transformation is first and foremost a governance and change management exercise.

The biggest impediment to change is culture. This is true in both the public and private sectors, but the consequences of change for governments and related agencies and organisations can be more far-reaching.

To be effective, the Australian Government must coordinate its approach to building short-term capacity and preparedness, as well as embrace new technologies and policies that will help set a long-term road map for digitalisation. It is in this context that we offer recommendations for ensuring Australia's successful digital transformation.

1
POLICY RECOMMENDATIONS

Establish a more effective whole-of-government approach to digital transformation with centralised agency oversight

To be properly effective, Australia's digital transformation relies on a common design and funding approach that uses a centralised road map. The current whole-of-government approach has its advantages and should be given attention and resources to be successful.

Appoint a Chief Customer Service Officer

The federal government needs a Chief Customer Service Officer (CCO) to be truly customer-centric and meet the expectations of the connected citizen. The CCO would be a citizen advocate who could help shift thinking and attitudes, so that citizens are thought of as customers, and government services are built with customers' needs at

the heart. The CCO would champion the customers' interests, challenging businesses to refocus their people, processes, technologies, policies and data on improving the customer experience. The CCO would work across government agencies particularly around digital transformation projects. Roles like this already exist in the private sector and the NSW Government.

Increase cloud readiness by at least 20% by 2020

Increasing Australia's cloud readiness by at least 20% from its current position could increase the value of the cloud sector to a projected $9.2 billion by 2020, as well as contribute more than 5% to the digital economy. helping the country accelerate its digital development and growth. Improving the country's underlying and interconnected digital infrastructure must be a priority.

Improve procurement

Changes to the Australian Government's technology procurement system must recognise that the current system remains process-driven, slow and ill-suited to agile project delivery, even though the government is the country's largest customer in this market.

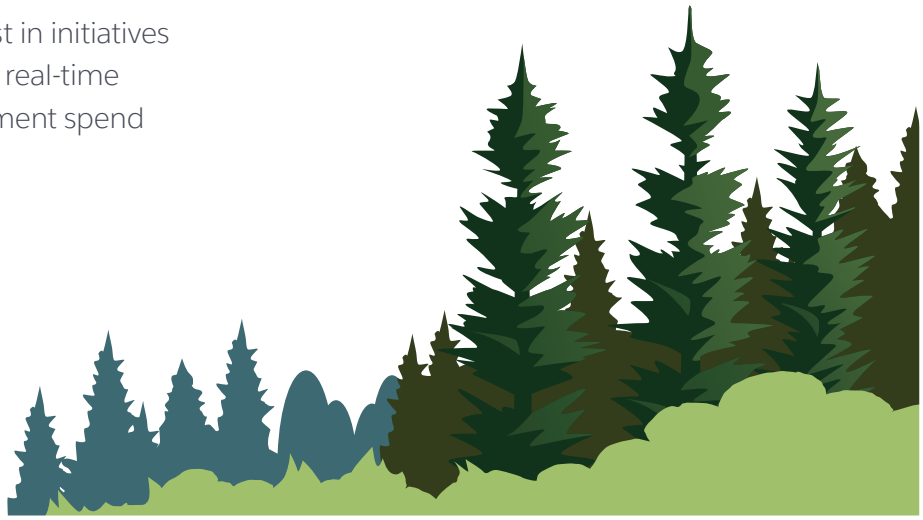
Monitor government IT spend more effectively

The public service should invest in initiatives that will help it understand the real-time whole of government procurement spend on IT. A cumulative and comprehensive account should allow comparison of current spend versus contractual commitments. Use of data analytics and predictive modelling will show the real-time impacts of resource allocation, and identify the most significant and most effective suppliers.

Improve the cloud services certification process for businesses wishing to be considered for government procurement

Businesses face a number of challenges in gaining a spot on the Certified Cloud Services List for government cloud services procurement. The timeframe for reviewing applications is long and unpredictable. The process also lacks transparency, including on the costs involved, which can in turn affect market competition for services. The process can be improved, simplified and streamlined while upholding high standards and security.

For example, once an Information Security Registered Assessors Program (IRAP) assessment report is submitted to the Australian Cyber Security Centre, along with an IRAP assessor's recommendation, it should be listed publicly. This ensures all cloud providers who have received an assessment of their security and suitability of their services have full transparency.



SINGAPORE

Singapore's Smart Nation program creates data protection frameworks for the digital age.

Launched in 2014, Singapore's Smart Nation program is set to transform the country into the world's first Smart City-State. From healthcare to urbanisation, Singapore's Smart Nation program aims to address global urban challenges by developing people-centric solutions across all sectors of the economy. A crucial element is building a robust, future-proof data protection framework to ensure public and private sector organisations can grow and sustain their activities in the digital economy.[59]

The Personal Data Protection Act 2012 (PDPA) establishes a light-touch, technology-neutral data protection regime in Singapore. It sets rules for private sector organisations concerning the collection, use and disclosure of individuals' personal data. It also offers rights for individuals to access and correct their personal data. Its provisions are based on the principles of consent, purpose, reasonableness, access, correction, accuracy, protection, limited retention and limited transfer.[60]

The Personal Data Protection Commission (PDPC) promotes awareness of data protection in Singapore and enforces the PDPA. The PDPC aims to promote proper management of personal data and safeguard against its misuse. Its activities enhance Singapore's competitiveness and strengthen the nation's position as a trusted business hub, as with other countries that have data protection laws.[61]

In June 2018, the PDPC published a discussion paper examining the privacy implications of the commercial development and adoption of AI.[62] The paper concludes that the following guiding principles must

CASE STUDY 5: SINGAPORE (CONT'D)

be built into a comprehensive framework to ensure AI technologies effectively benefit people and businesses in a safe, transparent and accountable manner.

- AI systems, robots and decisions made using AI should be human-centric. Organisations that are perceived to have caused harm to consumers as a result of their AI deployments do not inspire consumer trust and confidence.
- An organisation that employs AI in its decision-making process should be able to explain how its AI engine functions. Where this is not possible for certain types of AI engines (e.g. neural networks), the organisation should, at a minimum, be able to verify that the AI engine is performing to expectations and within the technical and ethical parameters set. This would provide reassurance that the decision-making process is supervised and not overly reliant on AI to suggest decisions or even simply delegated to a set of software codes.
- Organisations should have good data accountability practices, including knowing where data originally came from; how it was collected, curated and moved within an organisation; and how its accuracy will be maintained over time. Organisations should also ensure that the AI algorithms and models embedded in decision-making systems use selection models that avoid unintentional biases or discriminations; and maintain data provenance records to establish data lineage and verify data integrity.
- Stakeholders in the AI value chain should communicate with end users to ensure needs, priorities and objectives are effectively aligned, open and transparent.

2

SEVEN STEPS TO ACCELERATE AUSTRALIA'S DIGITAL TRANSFORMATION

The digital transformation of government does not take place in a vacuum. It is the product of social and economic dynamics that change the ways people and technologies work together.

The following seven recommendations will help Australia strengthen its digital ambitions.

1. Think big, start small

The first obstacle that governments face is the temptation to digitalise as many things as possible and as quickly as possible. Even with a sound strategy in place, doing too much too fast will heavily strain resources. Small wins are more likely to bring key stakeholders on board, rather than complicated large-scale projects. An example might be the digitalisation of a key department (such as the Department of Social Services[63]) or central agency (such as the Department of Finance[64]), or the replacement of a legacy technology.

2. Keep it simple

Regularly consulting the Australian public, as well as public servants responsible for designing, managing and delivering services, helps ensure the quest for better government does not end up having the opposite effect. Guided by real, on-the-ground concerns, reviews and consultations can help address the right issues in the right way.

3. Focus goals and priorities

Defining strategic objectives around users' perspectives can garner big support. An example is the NSW Government's plan to boost the number of digital transactions to 70% by 2019. Such a comprehensive objective not only aligns citizens' and institutions' interests, but also provides a target against which to measure the government's progress and performance. Similarly, the Australian Government wants Australia to among the top three digital countries by 2025.

4. Drive cultural shifts

Government-wide digital transformation requires abandoning preconceived notions of what government can and should do. For some, this means becoming comfortable with relatively new practices that can evolve as fast as they are implemented. For others, it means re-calibrating mindsets to challenge the status quo, experiment with emerging technologies, and – much like their counterparts in the private sector – seeing the risk of failure not as a limiting factor but as a catalyst of progress.

5. Engage stakeholders

Strategically engaging public sector leaders, departments and agencies to embrace digital transformation is just as important as the transformation strategy itself. A government's vision, ambition or plan may not come to fruition if public sector stakeholders are not genuinely convinced by the shifts and adjustments expected of them. To maintain momentum, the government must align its strategies with the needs and priorities of the organisations being transformed. Seeking the participation of those most likely to need or want to transform their operations will reduce potential resistance or backlash and increase the chances of success.

6. Cultivate the workforce of the future

Australia must ensure its workforce has the appropriate skills to implement the innovations it champions and deploys. People at all levels of the public service must be equipped with the skills and confidence to become the agents of their own transformation. This will ensure public sector leaders can foster, manage and support digital transformation initiatives.

7. Promote the digitalisation of other sectors

The Australian Government has a responsibility to its citizens to ensure digital transformation initiatives bring more efficient use of resources, better customer service and a wider scope of services. The government can also influence the take-up of digital technologies in the private sector through industry and business support measures, most notably for SMEs.

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Salesforce is the global leader in customer relationship management (CRM), bringing companies closer to their customers in the digital age. Founded in 1999, Salesforce enables companies of every size and industry to take advantage of powerful technologies – cloud, mobile, social, internet of things, and artificial intelligence – to connect to their customers in a whole new way. The Salesforce Customer Success Platform includes industry-leading services spanning sales, service, marketing, commerce, communities, collaboration and industries, all on a single trusted cloud platform. The company is ranked #1 on Fortune's World's Best Workplaces list, and Forbes has ranked the company one of the world's most innovative companies for eight years in a row. For information, please visit www.salesforce.com.

ABOUT TRPC

TRPC is a boutique consulting and research firm with over 25 years' experience in the telecommunications and ICT industries in the Asia-Pacific. We offer specialised advisory, research, and training services, with a focus on regulatory and strategic business issues, and possess an extensive network of industry experts and professionals throughout the region. For information, please visit http://trpc.biz.

ANNEX

Statistical tables presenting sources and calculations used to reach the findings presented in this report.

Annex 1. Calculations of worst-case/best-case scenarios

	Value	Calculation	Source	Note
Australia's total GDP, 2017 (A$)	1.79 trillion	N/A	Australian Bureau of Statistics: www.abs.gov.au/ausstats/meisubs.NSF/log?openagent&5206001_key_aggregates.xls&5206.0&Time%20Series%20%20Spreadsheet&C1145211D5AF80E5CA2582FE0014F063&0&Jun%202018&05.09.2018 &Latest Column "BJ", data retrieved in May 2018	2017 data was used as complete 2018 data was not released at the time of research.
Australia's total GDP, 2020 (A$)	2.21 trillion	Conversion from USD to AUD (1 USD = 1.331048 AUD)	Statista: www.statista.com/statistics/263573/gross-domestic-product-gdp-of-australia X-Rates: www.x-rates.com/historical/?from=USD&amount=1&date=2018-05-18 Data retrieved and converted in May 2018	AUD converted from USD in June 2018 using a currency converter. Statista updates its live datasets as new releases are made available, so the projection retrieved (US$ 1.667 trillion) may have been revised since then.
Australia's public cloud services revenue, 2018 (A$)	5.78 billion	N/A	ARN Net: www.arnnet.com.au/article/628579/aussie-public-cloud-services-market-reach-5b Forecast table consulted in May 2018	
Australia's public cloud services revenue, 2020 (A$)	7.71 billion	N/A	ARN Net: www.arnnet.com.au/article/628579/aussie-public-cloud-services-market-reach-5b Forecast table consulted in May 2018	
Economic contribution of the digital economy to Australia's GDP, 2020 (%)	7.30%	N/A	Deloitte: www2.deloitte.com/content/dam/Deloitte/au/Documents/Economics/deloitte-au-economics-connected-continent-ii-2015-300315.pdf Page 46 consulted in May 2018	
Economic contribution of the digital economy to Australia's GDP, 2020 (A$)	$161.9 billion	7.3% of $2.21 trillion	TRPC calculation	
Australia's public cloud services revenue, 2020 (A$) Worst-case scenario	6.9 billion	$7.71 billion with a 10% decrease	TRPC calculation	

ANNEX

Annex 1. Calculations of worst-case/best-case scenarios (continued)

	Value	Calculation	Source	Note
Australia's public cloud services revenue, 2020 (A$) Best-case scenario	9.2 billion	$7.71 billion with a 20% increase	TRPC calculation	
Public cloud services as a share of Australia's digital economy, 2020 Worst-case scenario	4.29%	$6.9 billion divided by $161.9 billion	TRPC calculation	
Public cloud services as a share of Australia's digital economy, 2020 Best-case scenario	5.71%	$9.3 billion divided by $161.9 billion	TRPC calculation	
Contribution of public cloud services to Australia's GDP, 2020 Worst-case scenario	0.31%	$6.9 billion divided by $2.21 trillion	TRPC calculation	
Contribution of public cloud services to Australia's GDP, 2020 Best-case scenario	0.41%	$9.2 billion divided by $2.21 trillion	TRPC calculation	

ANNEX

Annex 2. Calculations of worst-case/best-case scenarios, by sector

	Value	Calculation	Source	Note
Australia's total GDP, 2020 (A$)	2.21 trillion	Conversion from USD to AUD (1 USD = 1.331048 AUD)	Statista: www.statista.com/statistics/263573/gross-domestic-product-gdp-of-australia X-Rates: www.x-rates.com/historical/?from=USD&amount=1&date=2018-05-18 Data retrieved and converted in May 2018	AUD converted from USD in June 2018 using a currency converter. Statista updates its live datasets as new releases are made available, so the projection retrieved (US$ 1.667 trillion) may have been revised since then.
Australia's total GDP, 2016-17 (A$)	1.76 trillion	N/A	AIHW: www.aihw.gov.au/getmedia/e8d37b7d-2b52-4662-a85f-01eb176f6844/aihw-hwe-74.pdf.aspx?inline=true, p. 7	
Total spending on health in Australia, 2016-17 (A$)	180.7 billion	N/A	AIHW: www.aihw.gov.au/getmedia/e8d37b7d-2b52-4662-a85f-01eb176f6844/aihw-hwe-74.pdf.aspx?inline=true, P. 7	
Share of healthcare in GDP, 2016 (%)	10.3%	$180.7billion divided by $1.76 trillion	TRPC calculation	
Share of education in GDP, 2014 (%)	5.2%	N/A	World Bank: https://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?locations=AU	
Share of financial and insurance sector in GDP, 2016 (%)	8.8%	N/A	Ibis World: www.ibisworld.com.au/media/2016/08/10/australias-growth-industries/	
Australia e-commerce market revenue, 2020 (A$)	19.04 billion	Conversion from USD to AUD (1 USD = 1.331048 AUD)	Contevo: https://contevo.com.au/the-state-of-australian-ecommerce-2018 Data retrieved and converted in May 2018	
Share of e-commerce in GDP (%)	0.86%	$19.04 billion divided by $2.21 trillion	TRPC calculation	
Contribution of Cloud computing to the healthcare sector, 2020 (A$) Worst-case scenario	714.9 million	$6.9 billion multiplied by 10.3%	TRPC calculation	

ANNEX

Annex 2. Calculations of worst-case/best-case scenarios, by sector (continued)

	Value	Calculation	Source	Note
Contribution of Cloud computing to the healthcare sector (A$) 2020 Best-case scenario	953.2 million	$9.2 billion multiplied by 10.3%	TRPC calculation	
Contribution of Cloud computing to the education sector (A$) 2020 Worst-case scenario	360.9 million	$6.9 billion multiplied by 5.2%	TRPC calculation	
Contribution of Cloud computing to the education sector (A$) 2020 Best-case scenario	481.2 million	$9.2 billion multiplied by 5.2%	TRPC calculation	
Contribution of Cloud computing to the financial and insurance sector (A$) 2020 Worst-case scenario	610.7 million	$6.9 billion multiplied by 8.8%	TRPC calculation	
Contribution of Cloud computing to the financial and insurance sector (A$) 2020 Best-case scenario	814.3 million	$9.2 billion multiplied by 8.8%	TRPC calculation	
Contribution of Cloud computing to the e-commerce sector (A$) 2020 Worst-case scenario	59.5 million	$6.9 billion multiplied by 0.86%	TRPC calculation	
Contribution of Cloud computing to the e-commerce sector (A$) 2020 Best-case scenario	79.4 million	$9.2 billion multiplied by 0.86%	TRPC calculation	

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