Industry Report

Emerging Technology - Australia

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VEDP | Virginia Economic Development Partnership

Contents

Executive Summary

As the Australian Global Network Consultant to the Virginia Economic Development Partnership (VEDP), Foley & Associates was commissioned to prepare an in-depth industry report covering the **ICT**, **Emerging Technology** and **Digital Health** sectors in Australia.

The **ICT & Emerging Technology** section of this report is intended to provide Virginian companies with a general overview of the sector in Australia, as well as offer specific insights into **three (3) key strategic areas** that have been identified as critical to the next wave of Australian economic growth:

- The **Internet of Things (IoT)**;
- **Robotics and Artificial Intelligence** (Automation & Machine Learning); and
- **Software**.

For each of these sectors, we have covered the following areas:

- **Overview & Current Status of the Australian Sector;**
- **Recent Developments & Industry Opportunities;** and
- **Key Players**.

Our office has also provided an overview of the Australian **Digital Health sector** as an additional sector undergoing digital transformation that may also present opportunities to Virginian exporters. This **Current Trends Summary** covers the following areas:

- **Overview & Current Status of Australia's Health Care Sector**;
- **Recent Developments in Digital Health**; and
- **Industry Publications & Industry Events**.

The final section of the report provides information and general recommendations regarding:

- **Relevant Australian Legislation & Regulation**; and
- **Market Entry Options**.

We encourage any Virginian companies with questions or enquiries to contact VEDP for further information.

We look forward to continuing to assist VEDP and Virginian exporters in the Australian market.

Foley & Associates

Sydney, 3 June 2019

Emerging Technology in Australia

Introduction

As one of the richest nations in the world, Australia is currently in a strong economic position. Over the last quarter century, Australia's **medium-sized AU$1.7 trillion economy** (**ranked 14th in the world)**, has proven exceptionally resilient, recording **27 years of uninterrupted economic growth**. This growth was catalysed in part by microeconomic reform and a productivity boost in the 1990s, and then fuelled by a terms-of-trade boom after 2000, as a global rise in resource prices increased the value of Australia's commodity exports.

Since their peak in 2011, however, Australia's terms of trade have fallen by over 30%. According to the Australian Treasury, in order to achieve a long-run trend rate of 2% growth in GDP – which is required to maintain current standards of living – **Australia requires an annual productivity growth of 2.5% a year**. Based on current figures, **this cannot be achieved by increases in labour productivity alone**, which over the five years to 2015-16 remained at 1.8%. Australia therefore needs to find new ways to lift its productivity and identify new sources of export competitiveness to ensure its future economic prosperity.

Why Australia?

Both Australian industry and government have recognised that **emerging technology and digital innovation are critical ingredients to the nation's ongoing economic success,** and **offer Australia the opportunity to drive the next wave of economic growth.**

Australia's future economic prosperity depends on its ability to harness emerging technologies, and follow the lead of countries who are already investing heavily in the digital economy to take advantage of the significant economic and social opportunities that it presents.

The next wave of digital innovation – **the Fourth Industrial Revolution – plays to many of Australia's existing competitive strengths and economic imperatives**, and will create new markets, products and services in industries where Australia has a significant presence, such as mining, resources, and agriculture.

Australia currently lags behind other countries in capturing the full economic potential of emerging technologies. Globally, digital innovation has created enormous value and accounts for around 11% of GDP in advanced economies. However, according to the CSIRO's *Digital Innovation* report, **Australia has captured a third less value from digital innovation than its advanced economy peers**, with the total economic value derived in Australia representing only 7.4% of the country's GDP.

Despite this, **Australia remains well-placed** to capitalise on the opportunities afforded by digital innovation, and **the Australian emerging technology sector offers compelling opportunities** for prospective Virginia-based companies looking to invest or do business in the market. A number of key characteristics of the Australian economy underpin these opportunities, including:

- ✓ Natural advantages in key global growth industries;
- ✓ High levels of digital infrastructure maturity;
- ✓ A robust research & development ecosystem in which international collaborators are active and welcomed;

- ✓ A highly-educated, digitally-aware, and innovative workforce in comparison to other OECD nations;
- ✓ A well-educated and tech-savvy consumer market, willing to embrace and adopt new technologies;
- ✓ A stable economic and political environment with robust regulatory protections; and
- ✓ Federal and state governments that welcome and support digital innovation.

Key Findings

1. **Digital innovation could deliver A$315bn (~US$217bn) in gross economic value to the Australian economy over the next decade** through improvements to existing industries and the growth of new ones (source: CSIRO, *Digital Innovation: Australia's $315B Opportunity*, September 2018).

2. Australia's **digital growth has doubled over the past five years**. However, there are significant **differences in digital uptake between industries**. Virginian companies will need target their technology at priority end-customer segments – we have identified priority industries later in this report.

3. **The Australian Federal Government has made a concerted effort to support and drive investment in emerging technologies**. Since 2015, it has made emerging technologies an essential part of its National Innovation and Science Agenda (NISA) and introduced a series of initiatives including the Prime Minister's Industry 4.0 Taskforce to drive innovation, investment and adoption of disruptive technologies across the economy.

4. **In December 2018, the Federal Government published its national digital economy strategy** *Australia's Tech Future: Delivering a strong, safe and inclusive digital economy*, which details the areas Australia must focus on in order to maximize the potential opportunities for growth offered by emerging technology and digital innovation.

5. The **Australian IoT sector is expanding rapidly**, with opportunities across a number of Australia's core industries, as well as **significant growth within the smart cities, and IoT at home sub-sectors**.

6. **Robotics and AI are seen to represent Australia's biggest economic opportunity over the next 30 years**, with government providing significant impetus and funding to aid implementation across a number of industries.

7. The **Australian software sector is showing strong signs of growth**, **with government agencies a significant potential end-customer**. However, in a market dominated by large, multinational companies, potential entrants may need to target niche areas of expertise, and establish a local partnership on on-the-ground presence.

8. Australia spends approximately **A$181 billion (~US$125 billion)** on health each year, which equates to **~10% of overall economic activity**.

9. In 2017, the Australian Digital Health Agency released the National Digital Health Strategy, aiming to achieve a set of strategic digital health outcomes by 2022.

10. Whilst the Australian health sector is still **digitally immature**, research, trials and initiatives related to emerging digital health technologies (e.g. precision medicine, mobile health apps, wearables, IoMT) are contributing to its digitalization.

The Internet of Things (IoT)

Current Trends Summary

The Internet of Things (IoT) is a core component of the new digital reality redefining how humans interact with data, technology, and each other. Though discussion is sometimes dominated by breakthroughs in wearables, 'smart' objects, and sensors, the point is not necessarily the device itself, but the otherwise impossible interactions and experiences that are being unlocked. By connecting data, devices people and processes to the internet, IoT is providing unprecedented amounts of new information to aid decision making, creating a 'network of networks' where digital data can be analyzed and used to drive new applications, services and efficiencies across a wide range of industries.

Australia's IoT Sector

The **Australian IoT sector is expanding rapidly**, with the peak industry body representing IoT in Australia – the IoT Alliance Australia (IoTAA) – forecasting that **IoT will contribute over A$120bn (~US$83bn) to the Australian economy by 2025.**

In addition to the potential future value it can contribute to the economy, the Australian IoT industry is also significant in and of itself:

- ✓ **The IoT industry in Australia is already worth close to A$19bn (~US$13bn**, representing twenty-two (22) percent of the current ICT market in Australia;
- ✓ IoT-related products and services are **expected to grow at a significant fourteen (14) percent CAGR** over the next five years;
- ✓ The IoT market is **expected to reach A$30bn (~US$21bn) in five years' time**, representing almost thirty (30) percent of Australia's predicted total ICT spend (Source: PwC, *Australia's IoT Opportunity: Driving Future Growth*, September 2018).

The increasing application of IoT technology and growth in the sector is being driven by:

- ✓ The decreasing cost and improved quality of IoT hardware;
- ✓ The greater availability of internet connectivity (especially with the continued roll out of Australia's National Broadband Network (NBN) and 5G networks);
- ✓ Increased computing power and a surge in cloud platform adoption and advanced data analytics;
- ✓ Rising demand for smart devices; and
- ✓ Increases in the number of government initiatives and available funding.

Current Status of IoT in Australia

Australia is blessed with a robust IoT industry ecosystem, natural advantages in key industries, and federal and state governments that welcome and support innovation in the sector.

However, as with the broader process of digitalization, Australia's uptake of IoT technology **varies significantly from industry to industry** and remains **some distance from full potential.**

Nonetheless, the Australian economy remains **ideally positioned** to take advantage of the benefits and efficiencies offered by IoT technologies:

- ✓ In 2017, the *IDC Asia Pacific IoT Readiness Index* (updated report available for purchase here) ranked Australia as the **fourth most capable and prepared country in the region for sustained IoT adoption** due to the "level of overall **infrastructure maturity**, size of the **digitally-aware skills base** and the level of **innovation."**
- ✓ Similarly, in the 2016 update to the *IDC G20 IoT Development Opportunity Index*, Australia was **also ranked fourth**, behind the US, South Korea, and the UK.

To assess the level of **IoT maturity within Australian organizations**, in 2017, Telsyte, an Australian technology analyst firm, **surveyed a representative sample of 302 Australian CIOs and IT decision-makers** and published their findings in the *Australian Emerging Enterprise Technology Study 2017*. The study revealed that:

- ✓ Enterprise IoT has quickly become mainstream, with 90% of Australian CIO's believing **IoT will become important or critical to their organization within five years**;
- ✓ At present **29%** of Australian organizations are **actively investigating devices and an IoT strategy**; and
- ✓ **23%** of Australian organizations are in the **test, development or production phase of IoT pilots or programs**.

Source: Telsyte Australian Emerging Enterprise Technology Study 2017

Recent Developments

One of the most **significant challenges related to IoT adoption in Australia is data and network security**, with many of the security mechanisms in place to support identity also acting as barriers to the uptake of digital services.

In 2017, in response to growing reports of data integrity attacks, **the IotAA developed an industry-wide *Internet of Things Security Guideline*** to act as an industry benchmark and guide the development of IoT products from a security perspective. As such:

- ✓ Local and international companies that endeavor to develop IoT products and solutions with a pre-emptive, in-built, 'security by design' approach will be well received.
- ✓ Companies must also be able to successfully demonstrate effective data and network security to potential end users of the technology.

Industry Opportunities

Foley & Associates have identified the following **seven (7) sectors**, which are driving demand for IoT in Australia and present potential opportunities for Virginia-based companies:

1. Smart Cities + Smart Infrastructure
2. IoT at Home
3. Digital Health
4. Digital Agriculture, Fishing and Forestry
5. Construction
6. Manufacturing
7. Mining

IoT solutions are being sought across these sectors to improve productivity, safety, resource efficiency, logistics, maintenance, asset/personnel tracking, security and communication.

1. Smart Cities + Smart Infrastructure

As one of the world's most urbanized nations, Australia is looking to increase its investment in digital technologies to make cities work better.

At present there is growing evidence of Australian councils and local governments proactively developing smart city plans and embracing new IoT technologies through trials, pilot programs, and project rollouts.

These initiatives have leveraged IoT technology to develop solutions that enhance the livability, productivity and sustainability of Australia's cities by addressing challenges concerning:

- ✓ **Energy Efficiency** (i.e. Smart utilities, grids, renewables, LED street lighting);
- ✓ **Mobility** (Smart transport, MaaS, parking and traffic congestion solutions);
- ✓ **Smart Buildings** (i.e. Asset tracking, BIM systems, security); and
- ✓ **Smart Water and Waste Management** (i.e. Smart bins, efficient waste collection).

Demand for IoT products, platforms and services that contribute to the development of smart cities is primarily driven by state and local governments (councils). However, federal government funding also plays a significant enabling role.

In particular, the **federal government's A$50m (~US$35m) Smart Cities and Suburbs Program**, announced in 2016, has provided local governments with the financial capacity to engage with both local and international companies offering IoT products and services.

- ✓ In November 2018, the outcome of the program's second round of funding was announced, with **thirty-two (32) projects receiving over A$21m (~US$14.5m)** in government funding
- ✓ This followed the announcement of the round one results in November 2017, in which **forty-nine (49) projects were awarded a total of A$27.7m (~US$19.5m)** in funding.
- ✓ For example: **The City of Darwin** (Northern Territory) was **awarded A$5m (~US$3.5m)** towards their A$10m (~US$7m) 'Switching On Darwin' project, involving the **implementation of an open IoT platform** with the capacity to integrate city-scale smart infrastructure and smart services (including lighting, parking and Wi-Fi).

In addition, local councils are also showing initiative outside of the Smart Cities and Suburbs Program. For example, in May 2019, the **City of Gold Coast** (Queensland) announced the rollout of a national-first IoT / LoRaWAN network:

- ✓ Part of an ambitious plan by the City of Gold Coast to become Australia's most advanced smart city.
- ✓ According to developers, it will be Australia's largest and most diverse IoT network.
- ✓ The network will be used to introduce a number of smart services including smart water meters, waste management services and parking.
- ✓ It is expected to streamline public services and unlock A$12m (~US$8.5m) in savings annually for the city council.

Other project examples involving smart infrastructure and utilities include:

- ✓ **Melbourne Water**, in conjunction with Green Technology Services (GTS) group, network operator Thinxtra and IBM, have developed a customised IoT system to monitor cathodic protection installations that protect steel pipes from corrosion, removing the need for manual inspections.
- ✓ **SA Water's Smart Water Network** was awarded 'IoT Project of the Year' at the 2018 Australian IoT Awards held in Melbourne on June 4. The network uses Visenti sensors and alert algorithms and Taggle data communication services to monitor water flow

2. IoT at Home

The Australian home IoT market has **expanded rapidly** over the last couple of years. In 2018, the IoT at home market was **worth A$1.1bn (~US$765m)**, and the **forecast is for the market to continue to boom** over the next four years, **reaching A$5.3bn (~US$3.7bn) by 2023:**

- ✓ In 2018, **IoT adoption amongst Australian consumers grew by 57%**;
- ✓ This followed a similar **increase of 55% in 2017**;
- ✓ More than five million, or **over 50 percent of total Australian households** now have at least one IoT at home product installed;
- ✓ The **increase of over 30 percent in 2018** – from around four million households in 2017 – was primarily due to the surge in adoption of smart speakers;
- ✓ Of the five million households adopting IoT at home devices, 1 in 4 are 'invested' in smart technology (i.e. have at least five different home IoT products installed), and this figure set to grow rapidly. (Source: Telsyte, *Australian IoT@Home Market Study 2019*, May 2019).

With more and more homes getting ready for the new era of connectivity being ushered in by the roll out of the NBN and 5G networks, 'smart homes' are opening a new world of IoT-Commerce, and vendors from every point in the value chain are staking their claim to this market.

Manufacturers, retailers, ISPs, utilities, insurance providers, electricians, consultants and software-as-a-service providers all need to understand what consumers of home IoT products expect, as well as their position within this fast-changing, competitive landscape.

3. Digital Health

The sustained adoption of IoT technology in the healthcare market is set to potentially **deliver annual benefits of A$34-68bn (~US$23.5-47.5bn) to the Australian economy** over the next eight to eighteen years (Source: PwC, *Australia's IoT Opportunity*, September 2018).

While other industries have reinvented their deliver models, technology base and value chain, healthcare delivery in Australia has remained relatively unchanged and is only now beginning to embrace emerging technologies such as IoT. With the previous industry models becoming increasingly unsustainable in the face of growing demand, the potential impact of IoT on the broader healthcare sector is enormous.

NB. Specific opportunities in this sector are discussed in more detail below in the attached summary of current trends in the Digital Health sector (see: p. 34).

4. Digital Agriculture, Fishing and Forestry

In Australia's agriculture, fishing and forestry sector, the adoption of IoT technology can aid primary producers to increase yields and reduce costs, in turn lifting profitability and improving Australian competitiveness.

These advances could potentially **deliver an additional A$14-22bn (~US$10-15bn) in value annually to the Australian economy** over the next eight to eighteen years (Source: PwC, *Australia's IoT Opportunity*, September 2018).

In particular, **digital agriculture is a rapidly developing market** with Australian farmers increasingly making use of sensor data and data analytics to overcome challenges posed by the harsh Australian environment, limited water supplies, and extremely large distances to markets. Examples of Australian start-ups who are designing specific IoT solutions for this market include:

- ✓ Smart Paddock is developing small lightweight sensors for the beef industry that can detect potential health issues in individual cattle by tracking heart rates, temperature, location and movement patterns.
- ✓ The Yield is using IoT to help agribusiness and aquaculture industries improve productivity and reduce waste using their 'Sensing+' technology.

We recommend any Virginian firm who can offer a tailored solution in this sector to consider Australia as an export market.

Similarly, the application of IoT to digital agriculture is also being driven by **increasing government funding initiatives and programs**. For example:

- ✓ As part of **Victoria's Digital Agriculture Strategy (2018)**, The Victorian government announced an **investment of A$12m (~US$8.5m) to fund a two-year On-Farm Internet of Things (IoT) Trial,** which is currently being rolled out across the state.
  - This marks a significant trial, as Victoria is Australia's largest agricultural producer, generating A$13.16bn (~US$9.15bn) of agricultural products annually.
  - By the end of the trial, there will be up to **600 IoT enabled farms** across four of the state's largest agricultural sectors: dairy, orchards, sheep, and broadacre cropping.

5. Construction

Despite being characterized by physical activities and significant amount of technical equipment, **construction has been one of the slowest industries to adopt process innovations**. As such there remain significant opportunities in the sector, with the sustained adoption of IoT technologies **forecast to deliver substantial benefits to the Australian economy worth up to A$75-96bn (~US$52-67bn) annually** (Source: PwC, *Australia's IoT Opportunity*, September 2018).

6. Manufacturing

The stable and controlled setting of manufacturing operations, combined with the number of 'things' involved (i.e. machines and sensors), creates the **ideal environment for the deployment of IoT** technologies. If adopted at scale, forecasts suggest the industry **could realize potential annual benefits of between A$50-88bn (~US$35-61.5bn)** over the next eight to eighteen years (Source: PwC, *Australia's IoT Opportunity*, September 2018).

7. Mining

Australia is **currently a world leader in mining IoT applications**, with Rio Tinto employing IoT technologies in its AutoHaul autonomous heavy-haul rail system and 'Mine of the Future' design in the Pilbara (Western Australia), and competitor BHP Billiton also deploying IoT technology in the design of its Mount Whaleback and South Flank projects, also in the Pilbara.

However, as research by PwC highlights, there are **still significant further opportunities for IoT adoption within the sector**, which remains asset-heavy, device-rich and physically intense. If capitalised on these could **deliver A$22-34bn (~US$15-24bn) annually to the Australian economy** over the next eight to eighteen years. (Source: PwC, *Australia's IoT Opportunity*, September 2018).

Key Players

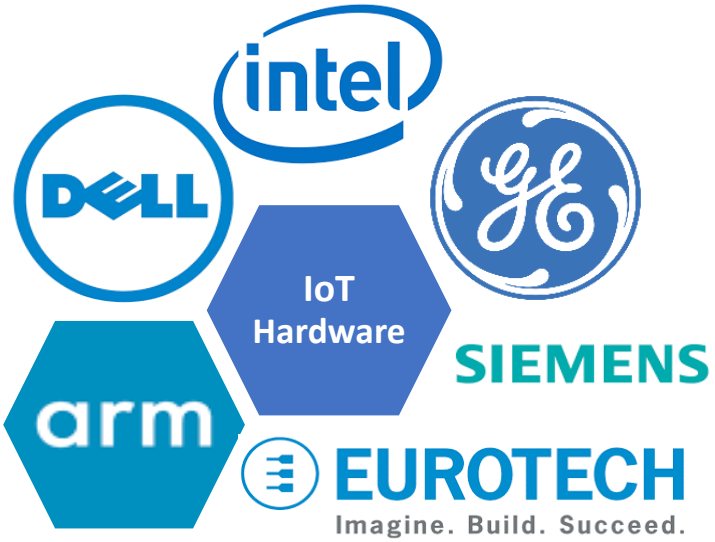
- ✓ Like the overall global market, the **Australian IoT industry is dominated by large, multinational technology companies**.
  - This is particularly true in sub-sectors such as: IoT hardware, network and communication technology, connectivity providers, IoT backbone, enablement platforms and IoT solution services.
- ✓ Despite this dominance, there are also a **small but rapidly growing number of international and local startups**, typically providing specialized or niche IoT solutions.
- ✓ Compared to other sub-sectors, the **Australian market for IoT Applications remains highly fragmented**:
  - While the European and the US markets are beginning to see some market consolidation, the specificities of the Australian market means it remains wide open
  - Despite the presence of the industry giants, there are spaces and opportunities for start-ups and smaller companies offering innovative or specialized solutions.

Within the Australian IoT industry the following companies represent the key players already present in the sub-sectors of the industry:

IoT Hardware

The vast majority of IoT hardware used in Australia is imported from Europe and the US, and, to a lesser extent, North Asia.

The market also includes international and local startups developing specialized sensors for niche applications – i.e. Smart Paddock (described above).



Network and Communication Technology:

The market also includes some small Australian players such such as Morse Micro, who have developed a Wi-Fi chip that is cheaper, more powerful and five times smaller than conventional IoT Wi-Fi chips.

Connectivity Providers:

Market Leaders
TELSTRA thinxtra Empowering Internet of Things
Up-and-Comers
Definium Technologies MESHED NATIONAL NARROWBAND NETWORK Co.

IoT Backbone:

Microsoft Google SAMSUNG ORACLE IBM amazon vodafone TELSTRA

Enablement Platforms:

amazon web services™ Microsoft Azure IBM Watson salesforce HITACHI Inspire the Next Hewlett Packard Enterprise CISCO

Applications:

Identity and Security:

- **Cisco is the current market leader** in the fragmented global IoT security market with a market share of 7%, while the top 10 providers account for over 40% of the total market.
- These **large players are all present in the Australian market, and often wield significant competitive advantages** due to their brand power and ability to bundle security solutions with other IoT elements.
- However, there are **also a number of rising Australian startups punching above their weight** such as **Cog Systems**, which works with device manufacturers to build better security resilience and richness into their products, and **SIEMonster**, which provides IoT Security monitoring.

Solution Services:

Competitors now entering the sector

Technology firms	*Telecommunication firms*	*Professional Service firms*
ERICSSON HITACHI Inspire the Next	AT&T vodafone	KPMG Deloitte.

Robotics and Artificial Intelligence (Automation & Machine Learning)

Current Trends Summary

Powerful new automation technologies such as machine learning, artificial intelligence (AI), and advanced robotics have already started to transform the Australian economy, and are set to reach scale in the decades ahead. These technologies are central to the fourth industrial revolution (Industry 4.0) and present an enormous opportunity to restore momentum to the Australian economy and, if carefully managed, extend its 30-year boom in an inclusive way.

For the purpose of this industry snapshot, Artificial Intelligence (AI) is used to describe a collection of technologies such as Automation and Machine Learning that can solve problems and perform tasks to achieve defined objectives without explicit human guidance. Alongside robotics, AI has the potential to automate repetitive or dangerous tasks, increase productivity and allow the development of innovative consumer products, thereby adding trillions of dollars to the global economy in the near future.

Australia's Robotics and AI Sector

Robotics and AI represent Australia's biggest economic opportunity over the next thirty years, with the **Australian market expected to grow rapidly** as industries seek opportunities to broaden their adoption of automation technologies and drive innovation.

Provided Australian businesses continue to accelerate their uptake of new automation technologies, and workers displaced in the process are efficiently redeployed, **AI and robotic automation technologies represent by far the largest potential sources of productivity growth in the Australian economy**:

- ✓ **Between 25 and 46 percent of current work activities in Australia could be automated by 2030**, revolutionizing sectors right across the economy; and
- ✓ **Robotics and AI will add between A$1.1 to A$4 trillion (~US$0.8-2.8 trillion) to the economy over the next 15 years**, depending on how well Australia is able to manage the resulting disruption**.** (Source: McKinsey & Company, *Australia's Automation Opportunity: Reigniting productivity and inclusive income growth*, March 2019).

At present the **Australian robotics industry is diverse**:

- ✓ Comprises **more than 1,100 companies**, predominantly:
  - Service businesses within major corporations; or
  - Small-medium sized enterprises meeting niche markets.
- ✓ Conservatively estimated to **employ over 50,000 Australians** and generate more than **A$12bn (~US$8.5bn) in annual revenue**;
- ✓ Presence concentrated on the eastern seaboard (i.e. Queensland, NSW, & Victoria);
- ✓ **Supported by technological expertise across the Australian university sector**, and by the federal government's independent agency, **CSIRO**.

Current Status of Robotics and AI in Australia

Despite its size, Australia has been a relative leader in the use of robotics and autonomous systems:

- ✓ Australia is a **world leader in research** into cyber-physical systems, computer vision, field robotics, simulation and robotic vision; and
- ✓ Australian industry was an **early adopter of automation technologies**;

However, the nation's uptake of robotics and AI **remains some distance from full potential**:

- ✓ In 2018, **Australia ranked 18th in the world in the application of industrial robots**;
- ✓ Although awareness is high, with more than half of Australian organisations having started to adopt AI, Australia has begun to lag behind its regional neighbours:
  - Automation strategies and capabilities remain immature; and
  - 50 percent fewer Australian firms are engaged in automation compared to leading countries (source: Microsoft – summary here).

As a result, **the federal government has recognised the need for Australia to urgently invest in its robotics and AI capabilities** in order to keep pace with its economic peers.

- ✓ The Australian government has designated the development and implementation of automation technologies as a critical priority of both:
  - The National Strategic Innovation and Science Plan *Australia 2030: Prosperity through Innovation*, released in November 2017; and
  - The National Digital Economy Strategy, *Australia's Tech Future: Delivering a strong, safe and inclusive digital economy*, released in December 2018.
- ✓ In addition, the federal government has also announced a number of funding initiatives designed to develop and speed industry uptake of robotics and AI.

Recent Developments

Robotics Roadmap

In June 2018, the government-funded Australian Centre for Robotic Vision released ***A Robotics Roadmap for Australia*, the nation's first robotics plan** detailing how Australia can best harness the benefits of the new robotic and artificial intelligence driven economy.

The key recommendations made by the Roadmap include:

- ✓ **Industry:** Encourage the formation of new hi-tech firms, as well as automation in existing firms; Encourage global tech giants to invest in Australia; & assist SMEs in developing skills and capabilities to take advantage of robotics.
- ✓ **Education:** Build national capability through education, training and research across all industry and education sectors; Equip Australians with Industry 4.0 skills.
- ✓ **Government**: Lead the region in catalysing robotics activity by setting ethical, legal, regulatory and standards frameworks, and adopting robotics in government services.
- ✓ **Culture:** Develop a national robotics strategy, support an an entrepreneurial culture around Australia's niche robotics capability, and harness the nation's imagination through aspirational goals solving Australian challenges.

One by-product of the Robotics Roadmap has been the **formation of the Sixth Wave Alliance (SWA) in May 2018** as a result of the Roadmap's consultation process.

- ✓ The SWA consists of government agencies, university and industry joining forces to "**create the critical mass**" needed to tackle robotics and automation challenges.
- ✓ Its aim is to "put Australia on the map as the global leader in robotics" by focusing on:
  - Changing the narrative around robotics and automation technologies by highlighting their positive impact;
  - Boosting the adoption of technologies to improve productivity and safety in Australian industry; and
  - Creating an ecosystem to assist start-ups in the sector and transform research into market reality.

Influx of Government Funding:

In the last three years the Australian federal government has announced a number of funding initiatives as part of its push to increase the development and industry implementation of AI and robotics technology. These include:

- ✓ In the 2017-18 federal budget, a **A$100m (~US$70m)** **Advanced Manufacturing Fund** to boost innovation, skills and employment in advanced manufacturing;
- ✓ As part of its broader Australian Technology and Science Growth Plan, in the 2018-19 federal budget the government announced **A$29.9m (~US$21m) over four years** to go towards **strengthening Australia's capability in AI and machine learning**.
  - Government also pledged to fund the development of a 'technology roadmap' and 'standards framework' for AI, as well as an **Australian AI Ethics Framework**.
- ✓ The 2019-20 federal budget announced a **Streamlined Incentives Program worth A$44m (~US$30.5m) over four years**, as well as a further **A$156.3M (~US$109m) over the same period for the Additional Identified Skills Shortage Payment.**
  - Both these programs are aimed at making it easier for employers – especially SMEs – to meet current and future workplace skill needs;
  - Government provided further support to SME's ability to invest in their robotics and automation capabilities by **increasing the Instant Asset Write-Off to A$30,000 (~US$20,850)** and **expanding access to the scheme** to medium-sized businesses with an annual turnover of less than A$50m (~US$35m).
- ✓ In November 2018, **CSIRO announced A$35m (~US$24.5m) of funding** for frontier research in space technology and artificial intelligence:
  - Investment is part of CSIRO's Future Science Platforms (FSP) program, which has invested A$205m (~US$143m) since launching in 2016
  - **AI and machine learning will receive A$19m (~US$13.5m)** to target AI-driven solutions for areas including food security and quality, health and wellbeing, sustainable energy, and resources, resilient and valuable environments, and Australian and regional security
  - In March 2019, CSIRO also announced the building of a new purpose-built Robotics Innovation Centre in Pullenvale, Brisbane.

Industry Opportunities

Foley & Associates have identified the following **seven (7) sectors**, which present current opportunities for Virginia-based companies in the Australian robotics and AI market:

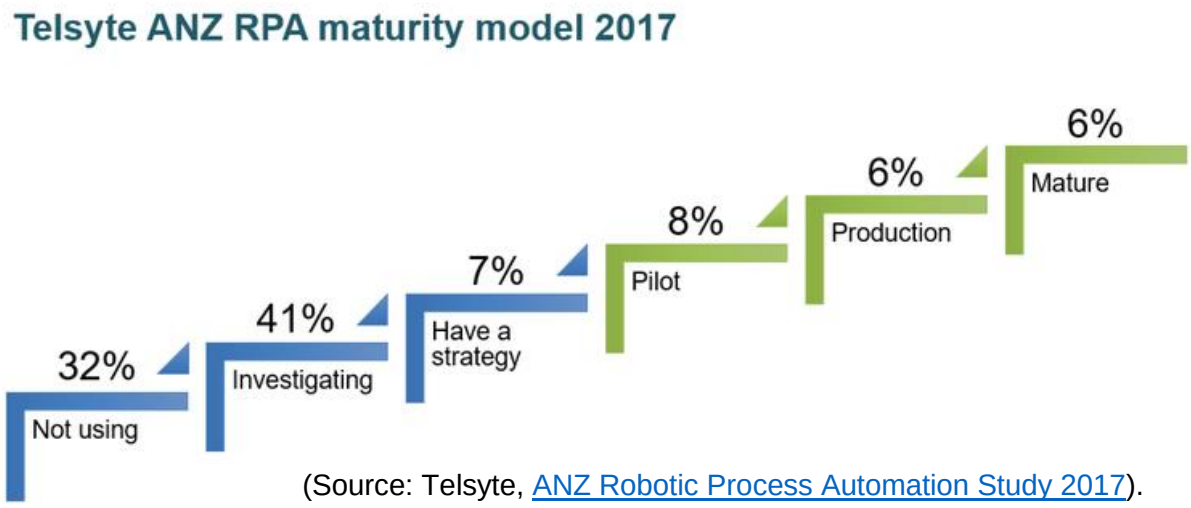
1. Robotic Process Automation (RBA)
2. Manufacturing
3. Distribution Services
4. Food and Agriculture
5. Construction
6. Space
7. Resources

1. Robotic Process Automation (RPA)

AI and Robotic Process Automation (RPA) – the replacement of humans with software, to perform repetitive rule-based tasks – have rapidly evolved from being far-fetched notions with little follow through, to being increasingly central to real-world business practices.

When deployed effectively, RPA increases efficiency and productivity whilst reducing errors.

- In 2018, **worldwide spending on RPA was estimated to reach US$680m**, an increase of 57 percent on 2017 levels, with the **global market forecast to reach US$2.4bn by 2022** (Source: Gartner);
- In 2017, the **Australian and New Zealand RPA market was worth A$216m (~US$150m)**, and was **forecast to grow annually at 45 percent** over the next four years **to reach A$870m (~US$605m) by 2020**;
- The Australia market presents **significant growth opportunities**, with businesses aware of the potential benefits of RPA, but most still in the early stages of adoption.



(Source: Telsyte, ANZ Robotic Process Automation Study 2017).

2. Manufacturing

Australia's manufacturing **sector is worth just under A$100bn (~US$70bn):**

- ✓ Eighty (80) percent of the value of sector comes from four major sub-sectors:
  - Food, beverage and tobacco products = twenty-seven (27) percent
  - Petroleum, coal, chemical and rubber products = nineteen (19) percent
  - Machinery and equipment = eighteen (18) percent
  - Metal products = fifteen (15) percent
- ✓ Australia leads the world in niche manufacturing for several high-value industries including medical technology and aerospace.

While larger Australian manufacturers have adopted Industry 4.0 capabilities well, there is **space for significant growth within small-to-medium-sized businesses:**

- ✓ SMEs dominate the industry, representing sixty-four (64) percent of jobs in the sector;
- ✓ In the 2011-2016 period, Australian manufacturing robotics numbers flat-lined at around 7,500 installed units, growing at a rate of only one percent.
- ✓ In the same period, the number of robots installed worldwide grew by 56%, from 1,147,000 to 1,785,000, with 285,100 units installed in 2016 alone.
- ✓ As a result, there are only 83 manufacturing robots per 10,000 employees in Australia at present, which is only just above the world average (74), and well behind world leaders South Korea (631).

According to Universal Robots ANZ general manager, Peter Hern **the uptake of robotics and AI within SMEs is starting to take off,** as shown by:

- ✓ A **growing awareness** among SMEs of how robotics and AI can increase their business capabilities;
- ✓ A similar increase in awareness of how **SMEs can implement technologies step by step and without extensive upheaval**; and
- ✓ A recognition that the **large overheads previously associated with automation are changing**.

As a result, automation – and particularly the integration of robotics within automated processes – is increasing within the Australian manufacturing sector.

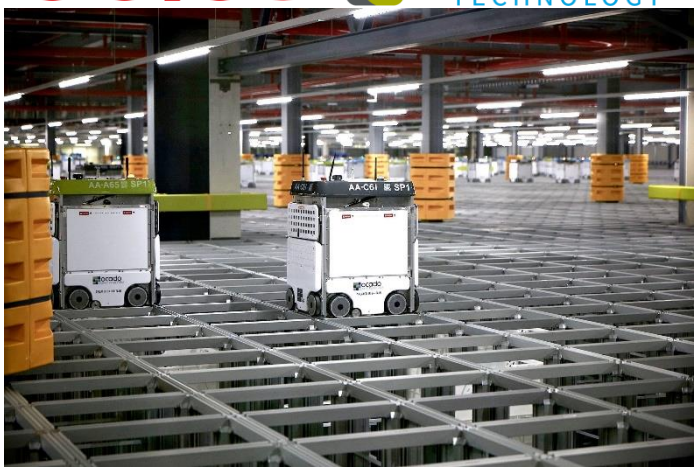
- ✓ Areas of significant growth include:
  - Advanced manufacturing; and
  - Collaborative robots (cobots), the market for which is expanding rapidly, with a compound annual growth rate of forty to fifty (40-50) percent.

3. Distribution Services

Australia's distribution services **sector is worth A$273bn (~US$190bn), or 16% of GDP**. In the digital landscape, **Australia's retail and logistics challenges are becoming more complex,** and the sector requires robotics and AI solutions to improve:

- Warehousing;
- Transport; and
- Custom-facing retailing.

- ✓ Alongside technological development in areas such as automated vehicles, customer-facing robots and AI, a **recent announcement by Australian supermarket giant Coles** provides a pertinent reminder that robotics and AI deployment does not necessarily have to involve ground-breaking advances, but can also be powered by relatively simple technology:
  - In May 2019, **Coles announced a deal with British firm Ocado to bring 2000 robots** to Australia as part of Cole's decision to build two highly automated fulfilment and distribution centres.
  - Part of a global trend as the changing nature of e- commerce forces retailers to develop more customised and fragmented logistics solutions automated warehouses.
  - Coles hopes the deal will boost its online sales by A$1bn and, hopefully, push their online grocery business from loss-making to profitable.



4. Food & Agribusiness

Australia's **agricultural sector generates A$60bn (~US$41.7bn) in annual revenue**. It is one of Australia's most productive sectors technologically, with **AgTech set to become Australia's next A$100bn (~US$70bn) industry.**

- ✓ In April 2019, the establishment of the Brisbane-based, Future Food Systems Co-operative Research Centre was announced, involving:
  - A$35m (~US$24.5m) of federal government funding over 10 years;
  - another A$150m (~US$104.5m) from the centre's more than 50 supporting commercial and research partners;
  - The centre has three R&D foci:
    - Planning and logistics in linking growers to their market;
    - Developing smart indoor cropping; and
    - Creating hybrid and nutrient-dense foods and medical goods tailored to growing domestic and export markets.

- ✓ The University of Sydney's **Australian Centre for Field Robotics (ACFR)** has been conducting research into autonomous remote sensing systems, and developing innovative robotics and intelligent software for the agricultural community for over a decade. For example:

- RIPPA (Robot for Intelligent Perception & Precision Application) has the capability to operate autonomously 24 hours a day, seven days a week;
- RIPPA can automatically detect and remove weeds and foreign objects; determine crop health and soil status; conduct autonomous precision spraying on individual plants; and monitor crop growth and estimate yield through intelligent data analytics.

5. Construction

Australia's construction **industry is worth A$124bn (~US$86.2bn) to the Australian economy**. Although the sector appears large, with over A$356bn (~US$247.4bn) in revenue, it is **heavily fragmented with over 328,000 businesses operating in the industry**.

Although, construction in Australia currently lags behind comparable industries in terms of digital maturity, this is beginning to change:

- ✓ While the industry remains labor intensive, AI and robotics technology is increasingly being integrated into operations in order to boost efficiency, and improve safety.
- ✓ **Globally, the use of AI in construction is forecast to grow by 450% over the next five years**, from A$585m (~US$407.2m) in 2018, to A$2.6bn (~US$1.8bn) in 2023.
- ✓ Currently, AI technologies are effectively used for managing projects, fields, risk, schedules, supply chains, equipment and materials, resources, subcontractors and costs.
- ✓ **Residential markets are set to experience the greatest growth**, driven by increasing demand for luxurious and high-rise residential buildings.
- ✓ Increased demand for robotics solutions is also being driven by the construction industry's move towards pre-fabrication. Assembly principles are being applied to the construction of building elements, in a plant with a mass-customization mindset, and the assembling of these elements then taking place onsite.
- ✓ ASX listed start-up, Fastbrick Robotics, have developed a truck mounted robot that works in conjunction with their proprietary building design software, and has the capability to lay the bricks for a render-ready, standard home in 15 hours (at a rate of 1000 bricks per hour).

6. Space

The **space industry in Australia currently generates revenues of A$3-4bn (~US$2-2.8bn)** and employs 10,000 people. The industry comprises around 388 companies (more than 75 start-ups), 56 education and research institutions and 24 government agencies.

- ✓ There are significant opportunities for robotics and AI in activities relating to space manufacturing, space operations, and space applications and ancillary services (Source: Centre for Robotic Vision, *A Robotics Roadmap for Australia*, 2018).
  - In October 2018, Lockheed Martin Australia announced the formation of a strategic partnership with the University of Adelaide's new **Australian Institute for Machine Learning.**
  - The partnership aims to deliver world leading machine learning research for national security, the space industry, business and the broader community

7. Resources

Resource operations **account for 40% of Australia's exports and over 8% of GDP**, and are vital to sustaining Australia's ongoing economic prosperity.

Australia leads the world in mining automation technologies, allowing the resources sector to operate safely and more efficiently in remote and harsh conditions.

- ✓ In particular, mining companies such as **Rio Tinto and BHP Billiton are leaders in remote mining & mining automation systems and operate extensive networks of autonomous and intelligent transport equipment.**
  - Rio Tinto, in particular, has taken a leading role in bolstering R&D and uptake in the Australian robotics sector.
- ✓ Despite this, **there are still significant opportunities for the further application of robotics and AI within the sector**, in driving better safety outcomes, higher productivity, and providing more economical solutions for remote and small-scale extraction (Source: Centre for Robotic Vision, ***A Robotics Roadmap for Australia***, 2018).

Key Players

Because the **Australian robotics and AI industry is diverse and fragmented** (1,100+ companies, who are predominantly start-ups, SMEs, or service businesses within major corporations), **potential entrants need to be aware of the relevant industry associations and government agencies.**

Key Australian government agencies include:

Department of Industry, Innovation and Science (DIIS)

Australian Government
Department of Industry, Innovation and Science

- ✓ Charged with overseeing government's attempts to develop and implement automation technologies within the Australian economy.
- ✓ Responsible for direction of government investment into robotics and AI capabilities.
- ✓ Key policy and planning documents to be aware of:
  - The National Innovation and Science Agenda (NISA), announced in December 2015;
  - The National Strategic Innovation and Science Plan: *Australia 2030: Prosperity through Innovation*, released in November 2017; and
  - The National Digital Economy Strategy, *Australia's Tech Future: Delivering a strong, safe and inclusive digital economy*, released in December 2018.

CSIRO (Commonwealth Scientific and Industrial Research Organization)

- ✓ CSIRO is Australia's government-funded, national science research agency.
- ✓ CSIRO's **Data61** is Australia's leading digital research network.
- ✓ Data61 house CSIRO's **Robotics and Autonomous Systems group**:
  - The group is one of the world's leading robotics and autonomous systems research groups;
  - It develops foundational and applied research across a broad range of domains including: agriculture, advanced manufacturing, mining, and others.
- ✓ Data61 is also CSIRO's hub of research and development for Artificial Intelligence
- ✓ CSIRO / Data61 play an important role collaborating with industry, working with corporates and high-growth SMEs to transform their products and services using data driven research and technology.

Australian Centre for Robotic Vision

- ✓ Government-funded Australian Research Council (ARC) Centre of Excellence, based out of the Queensland University of Technology in Brisbane.
- ✓ The Centre for Robotic Vision is a world-leading research centre, **responsible for providing national leadership for the robotics community in Australia**. As part of this, the centre:

- Published the nation's first robotics plan, ***A Robotics Roadmap for Australia***, (2018); and
- Run an online platform – **roboticsinaustralia.com.au** – which acts as a portal for industry and research groups to showcase the impact of current and future work across all sectors of the economy.

The **relevant industry associations** are:

Institute of Instrumentation, Control and Automation (IICA)

- ✓ The **peak industry body for the robotics sector**, IICA is a professional, not-for-profit organisation that provides an open arena for industry members to build their network and knowledge.
- ✓ IICA aims to:
  - Stimulate improvements in research and practice in the sector
  - Advocate on behalf of members with all levels of government
  - Assist in increasing instrumentation, control and automation curricula content of engineering courses in tertiary institutions.
- ✓ A list of **current industry members** can be viewed here.

The Sixth Wave Alliance

- ✓ Created to integrate all key robotics research organisations and industry partners in Australia, providing a framework to enable a high level of R&D collaboration among partner institutions, leveraging existing programs and investments. It aims to:
  - Facilitate robotics and automation technology adoption;
  - Promote the social benefits of robotics; and
  - Facilitate the creation of robotic and automation technology in Australia.
- ✓ **Member organisations** include: CSIRO Data 61; AlphaBeta; DIIS; METSIgnited; NERA (National Energy Resources Australia); Australian Centre for Robotic Vision / Queensland University of Technology; Australian Centre for Field Robotics / The University of Sydney; the University of Queensland; and Woodside Energy Ltd.

Australian Robotics & Automation Association (ARAA)

- ✓ ARAA is an Australian and New Zealand professional society that is concerned with robots, their applications and their implications, and related automation technologies
- ✓ ARAA serves as a focal point for Australian industry and researchers concerned with robotics and automation, organizing conferences and other meetings, including the Australasian Conference on Robotics and Automation (ACRA)
  - ACRA 2019 will be held at the University of Adelaide, 9-11 December 2019.

Local companies of note within the Australian robotics and AI sectors, include:

ARCRobotics	**ARC-Robotics**: www.arc-robotics.com ARC-Robotics provide a comprehensive range of complex services in the area of automated units, and boast over 10 years of experience in integrating robots into production. They are a certified supplier of FANUC robots and offer solutions in load handling, automated finishing, automated production lines, machine operation,and the food industry.
BARAJA	**Baraja:** www.baraja.com Baraja is a rapdily growing Sydney-based start-up, developing LiDAR for autonomous vehicles, robotics, site surveing and mining applications. In January 2019, BAraja raised A$45m (~US$32m) in Series A funding, and it is expanding rapidly with offices in Sydney, China and the US.
gooroo	**Gooroo Ventures:** www.goorooventures.com Gooroo is an ASX-listed company offering technology, based on neuroscience and artificial intelligence, which maps how different people think and make decisions in their lives and at work. Gooroo applies its AI technology in the areas of Human Capital, Marketing and Careers. Current industry partners include, Microsoft, Amrop Carmichael Fisher, and KPMG.
LiveTiles	**LiveTiles:** www.livetiles.nyc LiveTiles is an ASX-listed AI software company, offering cloud-based intelligent workplace software for the commercial, government and education sectors. As of 2018, LiveTiles had raised more than A$50m (~US$35m) in funding, and in May 2018 acquired the Microsoft-aligned Hyperfish.
	Marathon Targets marathon-targets.com Marathon Targets design and build autonomous robotic systems designed to dramatically increase the level of realism in live-fire training environments. They supplied the world's first autonomous targets to the Australian Defence Force in 2008, and have since expanded operations onto four continents.
RCT	**Remote Control Technologies (RCT)** rct-global.com RCT are the Australasian market leader in smart Guidance, Teleremote, and Remote Contol automation solutions for the mining industry. Unlike OEM-based automation solutions, RCT's adaptable technology can be fitted to any third-party vehicle affording mining companies with greater flexibility on fleet-sourcing strategies.

Software

Current Trends Summary

With increasing numbers of businesses and government agencies seeking to transform and move into the digital future, capital expenditure on the software solutions that enable and drive these processes is increasing rapidly. Key product areas include enterprise software, accounting software, and smartphone and tablet apps, while the increasing adoption of cloud computing and software-as-a-service (SaaS) distribution models are driving industry growth.

Australia's Software Sector

- ✓ **Australia's software industry has grown strongly over the past five years**. This growth has been **driven by increased online connectivity**, the **uptake of cloud computing**, and the **growing proliferation of smartphones and tablets**.
- ✓ These developments have increased demand by enlarging both the consumer and business user bases for new software products, as well as increasing the number of platforms and mobile operating systems across which software can be developed and taken to market.
- ✓ According to Gartner's October 2018 forecast, **Australian IT spending will grow by 3.5% to A$93bn (~US$64.6bn) in 2019**, and is then **projected to increase further to A$105.7bn (~US$73.5bn) by 2022.**
- ✓ Gartner has forecast **enterprise software to be the fastest growing category of IT spend between 2018 and 2022**, expecting the **sector to grow by just over ten (10) percent to A$15.9bn (US$11bn) in 2019**, and to **reach A$21.2B (~US$14.7bn) by 2022**.
- ✓ Improved online connectivity and the growing adoption of the subscription-based Software as a Service (SaaS) business model will continue to drive industry growth.

Current Status of Software in Australia

- ✓ The **Australian software sector is broad in nature**, covering a wide spectrum of software designed to meet a range of business and consumer needs, including: enterprise software, smartphone and tablet apps, accounting software, and software for education, gaming, security, and design and rendering.
- ✓ The Australian software **industry is dominated by large, global players** such as Apple, Google, Microsoft, Oracle, and SAP. These multinational companies develop the majority of software products used in Australia.
- ✓ **SMEs need to identify niche areas of expertise** either through the delivery of new or advanced technology, or industry specific applications tailored to local conditions.
- ✓ Although the remote delivery of software solutions is becoming more readily accepted, those **companies that have on-the-ground or in-country systems integration and support services appear to be more successful** in winning business.

Recent Developments & Industry Opportunities

Uncertainty due to federal government policies:

- ✓ In the 2018-19 budget, the Federal cracked down on software-based companies claims for research and development tax incentives;
- ✓ In December 2018, the government railroaded through unpopular encryption laws (*Telecommunications and Other Legislation Amendment (Assistance and Access) Act 2018*) requiring encrypted communications providers in Australian to enable law enforcement agencies to gain access to data if requested.
- ✓ These policies have caused some uncertainty within the market.

Cloud-based SaaS

Digital transformation and the rapid adoption of cloud computing services by corporations and government has created **significant growth in the Australian cloud-based SaaS sector**:

- ✓ **Eighty-four (84) percent** of Australian organisations now have a cloud computing strategy (Source: Telsyte, *Australia Cloud Market Study 2019*)
- ✓ In 2018, a **twenty-five (25) percent increase in SaaS spending**, saw Australian organisational **expenditure on cloud services rise to A$4.6bn (~US$3.2bn)**
- ✓ The **cloud-based SaaS market** is forecast to rise from **A$2.6bn (~US$1.8bn) in 2018**, to **A$4bn (~US$2.8bn) in 2019**, and is **projected to surpass A$6.7bn (~US$4.65bn) by 2022** (Source: Gartner – summary here).
- ✓ SaaS represents the bulk of organisational cloud spending, which is **forecast to reach A$5.45 (~US$3.8bn) in 2019,** and grow by a further **eighty-seven (87) percent over the next three years** to **reach A$10.3bn (~US$7.15bn) by 2022**.

However, for all the projected growth in the sector, entering the Australian SaaS market is challenging, particularly for small to medium-sized software developers:

- ✓ The **market is highly globalised and extremely competitive**, with the top international providers (i.e. Amazon, Microsoft, Oracle, Google, Salesforce, etc) already present and well established.
- ✓ Smaller firms are anticipated to be squeezed out of the industry due to greater regulatory compliance, encouraging industry consolidation.
- ✓ High industry competition is also projected to dampen profitability growth over the next five years, although larger players' profit margins are likely to remain strong, as they build economies of scale and leverage their reputations to charge higher prices.
- ✓ SME's looking to enter the market, therefore need to:
  - **Identify a niche**
  - **Establish a local presence**,
  - and are **likely to require significant capital investment**.

Indian software investment in Australia

In February 2019, fast-growing Indian software industry disrupter **Zoho**, announced an **investment of over A$40M** to establish itself the Australian market.

According to local managing director, Timothy Kasbe, Zoho targeted Australia as one of their top five markets in the world due to the speed of adoption among local businesses. Mr Kasbe also said that the emergence of 5G this year would have a huge impact in enabling people to use business software anywhere via mobile.

Procurement – Government as a key software consumer

For Virginia-based companies seeking to enter the growing Australian software market, government agencies represent a significant opportunity:

- ✓ Federal **government agencies have spent nearly A$10 billion (~US$7bn) annually on ICT products and services** in recent years.
- ✓ Since 2015, the Australian Government has been progressing a Digital Transformation Agenda, overseen by the Digital Transformation Agency (DTA), an Executive Agency within the Prime Minister and Cabinet portfolio, which was established to help government departments and agencies undergo digital transformation.
- ✓ As part of the Digital Transformation Agenda, **government has sought to streamline and simplify its procurement process**, establishing the ICT Procurement Portal, an online marketplace that connects government buyers with eligible ICT suppliers, who are listed on different ICT panels and arrangements according to which ICT products and services they offer.
- ✓ It is important for Virginia companies seeking to supply software or other ICT solutions to the Australian government to **be aware of the relevant standing panel** through which government will be procuring software services. For example:
  - The Whole-of-Government Software Licensing and Services (SLS) Panel, the procurement mechanism for government agencies purchasing 1) Microsoft Licensing Solutions, Services and Deliverables, as well as 2) Commercial-off-the-Shelf (COTS) Software Licensing and Services.
    - As of May 2019, the SLS panel listed 127 eligible suppliers.

- The Whole-of-Government Cloud Services Panel (CSP), the procurement mechanism for government buyers seeking Software-as-a-Service (SaaS), Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Specialist Cloud Services (SCS).
  - As of May 2019, the CSP contained 177 eligible suppliers.

Fintech

The financial services sector also provides opportunity for software industry growth:

- ✓ **Software products for the fintech sector** – such as those which can analyze spending behaviors and offer automated financial advice – **are anticipated to generate significant interest from major banks and other financial service institutions in the next three years.**
- ✓ In 2018, deals totaling $842 million were struck relating to Australian fintech companies.
- ✓ In February 2019, KPMG's fintech industry head, Ian Pollari, predicted that there was much more to come in 2019, as new open banking laws come into effect, creating fresh opportunities for entrepreneurial tech-based companies.

Other

- ✓ In general, most sub-sectors of the Australian software market are dominated by the large, multinational technology companies.
- ✓ Markets, like that for Big Data software, are too competitive to provide easy market entry opportunities:
  - They are mature markets in which the global giants are well-established alongside strong local companies; and
  - There is also a clear preference from most Australian companies for engaging with local partners.
- ✓ Small-to-medium sized software developers looking to enter the Australian market are recommended to follow the lead set by successful local operators:
  - Identify and focus on niche market segments and areas of expertise;
  - Seek to differentiates themselves by developing products that are tailored, and better cater to the specifics of the Australian market:
    - i.e. leading accounting software firm MYOB has modified its software packages to adhere to Australian reporting requirements and incorporate local regulations and tax laws.
  - Establish a local presence, or partnership with a local partner in order to provide on-the-ground systems integration and support services.

Key Players

Competitive Landscape:

- ✓ The Australian software market is **dominated by large, well-known, global technology companies**.
- ✓ **Industry globalization is high, a trend that is increasing in the new digital environment.**
- ✓ At present, the **majority of software products used in Australia are developed overseas** by multinational technology companies.
- ✓ Within the Australian market, the key players include the following global companies:

- ✓ **Local companies accounted for less than a third of the overall market.** They had combined revenues of A$4.2bn (~US$2.9bn) in 2018-19.
- ✓ Within this smaller market segment, there is also **moderate market consolidation**, with the largest **three companies accounting for over 50% of local software revenue in 2018-19**:

ATLASSIAN	**Atlassian** = 35.4% of the local sub-market www.atlassian.com Enterprise software company developing products for software developers, project managers, and content management. Market cap currently at more than US$31bn
myob	**MYOB Australia** – 11.5% of the local sub-market www.myob.com/au Australian multinational corporation that provides tax, accounting and other business services software to small and medium business.

	**Xero Australia** – 5.6% of the local sub-market www.xero.com/au New Zealand domiciled, ASX-listed public software company that offers a cloud-based accounting software platform for small and medium-sized businesses. Xero has offices in New Zealand, Australia, the United Kingdom, the United States, Canada, Asia and South Africa

Other local companies of note include:

	**Altium Limited**: www.altium.com PC-based electronics design software for engineers. Founded in Tasmania, Altium now has offices in the US, Australia, China, Europe, and Japan, and resellers in other major markets.
	**Hansen Software**: www.hansensoftware.com Provides software used by telecommunications companies and utilites to bill clients.
	**IRESS Australia:** www.iress.com/au Australian software company specializing in the development of software systems and services for financial markets and wealth management. Provides services to stockbrokers, financial institutions and research analysts.
	**Isentia:** www.isentia.com Isentia is a media intelligence and data technology company headquartered in Sydney, with offices in New Zealand, South-East Asia and Greater China.
	**Nearmap Ltd:** www.nearmap.com.au SaaS business providing frequently-updated, high-resolution aerial imagery and location intelligence & data for government agencies & business organisations in Australia.
	**Pro Medicus Ltd:** www.promed.com.au Leading SaaS medical imaging provider. Founded in 1983, the company provides a full range of readiology IT software and services to hospitals, imaging centres and health care groups worldwide.
	**TechnologyOne Limited:** www.technologyonecorp.com Australian enterprise software company listed on the ASX 200 index. Founded in 1987 in Brisbane, Australia.
	**WiseTech Global Ltd:** www.wisetechglobal.com/ WiseTech Global is an innovative developer of cloud-based software solutions for international and domestic logistics. Their core product, CargoWise One, is a sophisticated, comprehensive, end-to-end global logistics solution

Government Agencies:

Companies interested in supplying software solutions to Australian government departments need to be aware of the roles and responsibilities of the following two agencies:

The Australian Signals Directorate (ASD)

- ✓ The **Australian Signals Directorate (ASD)** is the national agency responsible for the collection and analysis of foreign signals intelligence, and the provision of cyber security advice and assistance to Australian government industries.
- ✓ The ASD also works closely with industry to develop and deploy secure cryptogrphic products.
- ✓ **The ASD is responsible for**:
    - The production of **Australian Government Information Security Manual (ISM)**, which is the standard that governs the security of government ICT systems;
    - Providing certifications based on the ISM, and producing lists of accredited ICT providers to government, such as the ASD Certified Cloud Services List (CCSL); and
    - Overseeing the Australasian Information Security Evaluation Program (AISEP) which tests ICT security products for possible inclusion on the Evaluated Products List (EPL).

The Digital Transformation Agency (DTA)

- ✓ The **Digital Transformation Agency (DTA)** is an Executive Agency within the Prime Minister and Cabinet portfolio established in 2015. **Key responsibilities include**:
    - Leading the digital transformation of government services;
    - Working in partnership with government agencies to improve how they buy and deliver digital services;
    - Developing products/platforms for government agencies that can be reused; and
    - Advising government about digital service delivery and shared platforms.
- ✓ In particular, the DTA is responsible for managing the ICT Procurement Portal, the online marketplace that connects government buyers with the eligible ICT suppliers listed on the various standing ICT panels and arrangements.

Digital Health in Australia

Current Trends Summary

Digital health is a technological evolution spanning the entirety of the health paradigm, from prevention and diagnosis to management and treatment. Digital health has the potential to transform the way healthcare services are created, delivered and measured and empower patients to drive improved health outcomes.

According to ANDHealth, Australia's National Digital Health Initiative, embracing new types of digital healthcare management and treatment tools will be key to the future wellbeing of the Australian population as the cost of healthcare continues to rise.

Australia's Health Care Sector

Australia's health care and aged care sectors are currently experiencing growth, being driven by population growth, the increasing occurrence of chronic and degenerative diseases, and Australia's ageing population.

According to the most recent figures published by the Australian Institute of Health and Welfare (AIHW), Australia's expenditure on health in 2016-17 was close to **A$181 billion (~US$125 billion)**, equating to ~10% of overall economic activity.

Combined, the Australian Government and state/territory governments account for over **two-thirds (69%) of health spending** (A$75 billion (~US$51 billion) and A$50 billion (~US$35 billion), respectively).

Other major funding sources include individuals, private health insurance funds, workers compensation and third-party insurance.

In Australia, Medicare provides universal health insurance that delivers affordable, accessible and high-quality health care for most Australian residents. However individuals can also choose to obtain private health insurance to give themselves more health care options and to cover extras not covered by Medicare (e.g. dental, physio).

Current Status of Digital Health in Australia

The scope and uses of digital health technologies in the Australian health sector are rapidly growing and evolving.

According to ANDHealth's report on 'Digital Health: Creating a New Growth Industry for Australia', Australia's healthcare system is *"inherently complex"*, involving a matrix of public and private sector entities. The complexity of this system slows innovation, the uptake of new technologies, and their transfer to hospitals and clinics.

However, while Australia's health sector is still digitally immature, research, trials and digital health initiatives such as the My Health Record electronic health record (EHR) system and establishment of fully-integrated digital hospitals, are contributing to and facilitating growth within the sector.

According to the CEO of ANDHealth, Australia has the potential to develop a cohesive, collaborative, commercially viable and internationally competitive digital health industry. ANDHealth recommends that key stakeholders within the Australian health care sector focus

on **technology development**, **regulation**, **investment** and **implementation** in order to stimulate a thriving industry.

Recent Developments

The key federal government agency responsible for improving health outcomes by enabling the seamless, sage, and secure delivery of digital health services is the Australian Digital Health Agency.

In August 2017, the agency released the National Digital Health Strategy.

The Strategy, which was agreed upon by Australia's federal, state and territory health ministers, aims to achieve the following **seven (7) strategic priority outcomes** by 2022:

1. Health information that is available whenever and wherever it is needed through **My Health Record**;

2. Health information that can be exchanged between health care providers and patients through **secure digital technologies**;

3. **High-quality data** with a commonly understood meaning that can be used with confidence;

4. Better availability and access to **electronic prescribing and dispensing**;

5. **Digitally-enabled models of care** that drive improved accessibility, quality, safety and efficiency;

6. That all health care professionals can **confidently and efficiently use digital health technologies** to deliver health care; and

7. A thriving digital health industry that delivers **world-class innovation**.

Digital Hospitals

Australia's first hospital with fully integrated, digital eHealth capability, St Stephen's Private Hospital in Hervey Bay (Queensland), was opened in December 2014. Since then, several other private and public hospitals across Australia have undergone digital transformation.

For example, Queensland's integrated electronic medical record (ieMR) program was introduced in 2016, with the goal of implementing the ieMR solution in twenty-seven (27) public hospitals across Queensland by March 2021.

As at June 2018, eight (8) hospitals and community health services had this advanced digital capability, including Princess Alexandra Hospital, Queensland Children's Hospital, Logan Hospital, Redland Hospital etc.

According to the Queensland Government, the rollout of their digital hospital program and implementation of ieMRs is reducing errors, improving patient outcomes and safety, and decreasing operating costs.

My Health Record

In 2015, the Australian Government announced the introduction of My Health Record, a national cloud-based EHR system that became available to Australians at the end of 2018. Operated by the Australian Digital Health Agency, My Health Record provides health care professionals and patients with online access to a summary of key health information that can be easily updated.

Currently, the My Health Record EHR system provides access to the following types of healthcare documentation:

- ✓ **Shared Health Summary**: A clinically reviewed summary prepared by an individual's key healthcare provider;
- ✓ **Event Summary**: To capture key information about a key healthcare event relevant to ongoing care;
- ✓ **Discharge Summary**: To support the transfer of a patient from a hospital back to the care of their nominated primary healthcare provider;
- ✓ **Specialist Letter**: To capture key information about specialist visits;
- ✓ **eReferral**: Patient referrals from GPs to specialists; and
- ✓ **Prescription and Dispense Records**.

Between 16 July 2018 and 31 January 2019, Australians had the opportunity to opt out if they did not wish to maintain a digital record. Any individual also has the option to permanently delete their My Health Record at any time. As at February 2019, ~2.5 million Australians had opted out of the system (equating to ~9.9% of eligible users), predominantly due to concerns over the system's security and data integrity.

Preventative Health Care

In September 2018, the Commonwealth Science and Industrial Research Organization (CSIRO) published a report titled *"The Future of Health - Shifting Australia's focus from illness treatment to health and wellbeing management"*.

According to the report, the adoption of innovative medical technologies and the development of a more diverse approach to collaboration will improve the Australian healthcare system and enable a sector-wide shift from illness treatment towards precision, preventative, and holistic health and wellbeing management over the next 15 years.

Remote Patient Monitoring

The current trend towards home-based health care and remote patient monitoring indicates that technologies such as mobile health apps, wearable health & fitness monitoring devices, and proactive wellness technologies will be increasingly used to reduce health care costs and improve patient monitoring.

In December 2018, the Australian Digital Health Agency announced an A$8.5 million (~US$5.9 million) Digital Health Test Beds trial to test the impact of digital technologies on the care of chronically ill patients.

One of the test beds, led by Precedence Health Care, will assist patients with chronic illness to better manage their own health using the MediTracker app, which links directly to their GP medical records and My Health Record, in addition to digital monitoring devices and wearables worn by the patient.

Internet of Medical Things (IoMT)

Sensors and connected devices, e.g. in-home monitoring devices and telehealth, are transforming the home environment in particular, creating a bridge between individuals and healthcare professionals.

According to Vodafone, one of Australia's largest telecommunications providers, healthcare is one of the fastest industries to adopt to IoT technology. IoT- enabled wearables, ingestibles, implantables and stationary devices are currently being used to track heart rates, issue medication reminders, send out emergency alerts as well as for other functions.

David Hansen, CEO of the Australian E-Health Research Centre (AEHRC), agrees that there is evidence of *"a real increase in people using measuring devices to monitor their own health and physiological signals. IoT sensors provide medical professionals with a much more complete picture of patient health and behavior" (NAB).*

In the aged care sector, IoT also represents a powerful tool that can assist older Australians to live at home longer. Currently, low-cost, non-invasive sensors, monitoring and support systems are being used in the home environment, however the uptake of IoT by health care and aged care providers is expected to increase.

Industry Publications

VEDP and companies from Virginia are encouraged to subscribe to relevant industry publications (including reports, presentations, newsletters and magazine) to stay up to date on recent developments and current trends within the Australian digital health sector.

Our office has identified the following publications that we recommend VEDP review:

ANDHealth – Australia's National Digital Health Initiative
www.andhealth.com.au/news
E: info@andhealth.com.au

Australian Digital Health Agency
www.digitalhealth.gov.au/about-the-agency/publications
Tel: +61 2 8298 2600

Healthcare IT News Australia
www.healthcareit.com.au
Hafizah Osman, Editor
E: hafizah@mahlab.co

Health Informatics Society of Australia (HISA)
www.hisa.org.au/publications
www.hisa.org.au/news
Heather Hunt, Media Director
E: media@hisa.org.au

Hospital + Healthcare
www.hospitalhealth.com.au
Laini Bennett, Editor
Tel: +61 2 9487 2700
E: hh@wfmedia.com.au

Pulse+IT
www.pulseitmagazine.com.au
Simon James, Editor
Tel: +61 2 8006 5185
E: hello@pulseitmagazine.com.au

Industry Events

VEDP and Virginian companies interested in exploring opportunities in the Australian digital health sector are encouraged to combine a market visit with participation at one of Australia's leading industry events. Some examples over the next year include:

AusMedtech 2019
Dates: 14 & 15 May, 2019 (2020 dates TBA)
Location: Melbourne Convention Centre, Melbourne
Web: www.ausmedtech.com.au

AusMedtech is Australia's premier medical technology conference for medtech executives, providing business partnering opportunities for decision makers and investors. The theme of AusMedtech 2019, 'Bionics and beyond', featured a lineup of keynote speakers and knowledgeable panelists.

Australian Healthcare Week (AHW)
Dates: 25 & 26 March, 2020
Location: International Convention Centre, Sydney
Web: www.iqpc.com/events-austhealthweek

Australian Healthcare Week has established itself as the one-stop-shop for Australasia's healthcare community. In 2019, over 5,000 clinical, corporate, technology and infrastructure professionals attended the free-to-attend expo, featuring over 250 exhibitors and six speaker stages. The event also featured a two-day conference for industry professionals. The 2019 Australian Healthcare Week focused on the key investment areas of infrastructure, eHealth, aged care, workforce, medical devices and consumables, and start-ups.

Health Informatics Conference (HIC)
Dates: 11 - 14 August, 2019
Location: Melbourne, Victoria
Web: www.hisa.org.au/hic/

The Health Informatics Conference (HIC), organized and hosted by the Health Informatics Society of Australia (HISA), is Australia's premier digital health, health informatics and eHealth conference. The 2018 conference was held in Sydney, and featured 150+ industry leading speakers, 1000+ delegates, and 50+ exhibitors.

HealthShare NSW / eHealth NSW Expo
Date: 22 November, 2019
Location: International Convention Centre, Sydney
Web: www.hsnsw-ehnswexpo.health.nsw.gov.au/

Now in its tenth year, the HealthShare NSW and eHealth NSW Expo has grown to become the largest event on the NSW Health calendar, attracting more than 1,900 delegates and featuring a trade exhibition with over 110 stands. The event aims to promote effective business partnerships between NSW Health organizations and local health districts, other health agencies and private industry, to provide excellent networking opportunities for all attendees and to explore the latest developments in healthcare technologies and support products by involving private industry in the trade exhibition.

***Note:** This is an event focused on the Australian state of New South Wales: ~80% of event attendees are NSW Health employees from HealthShare NSW, eHealth NSW, Local Health Districts, Health Networks/Agencies & the NSW Ministry of Health, whilst ~20% of attendees are from private industry.*

ITAC (IT and Aged Care) Conference
Dates: 21 & 22 November, 2018 (2019 dates TBA)
Location: Adelaide Convention Centre, Adelaide, South Australia
Web: www.itacconference.com.au

ITAC 2018 brought together IT leaders from Australia and the globe across the fields of community care, medication management, assistive technologies and offsite information systems delivery. The critical aged care topics were discussed from a practical perspective, highlighting how to better manage and design aged care service delivery which will contribute to the evolving environment of enhanced consumer choice.

The theme of the 2018 ITAC conference, 'Co-Designing our Digital Future', emphasized the importance of assistive technology supporting service quality and independence. National experts presented on a range of topics related to the conference theme.

Legislation & Regulation

Information on Local Legislation & Regulators

Australia provides a stable economic and political environment with robust regulatory protections, thereby offering a safe and low-risk environment for foreign companies to invest and do business in.

- ✓ Australia is well-recognized internationally for the strength of its regulatory and governance arrangements.
- ✓ However, the Federal Government has recognized the regulatory challenges posed by the rapidly moving nature of the digital economy.
    - In the national digital economy strategy *Australia's Tech Future* (Dec. 2018), the government pledged to work with industry to ensure that regulatory frameworks across all areas of the modern economy are fit-for-purpose, promote digital innovation, and provide innovative businesses with the social license to operate as they need, while still protecting consumers and the community.
- ✓ The government is committed to aligning Australia's regulatory frameworks with international standards in order to facilitate the growth of the digital economy.

At present, there are **no specific legislative or regulatory requirements that would constitute a barrier to entry** for prospective companies looking to invest or participate in the Australian emerging technology sector.

However, there are some legal formalities and regulatory requirements which any interested company would need to take into consideration.

Company Registration:

Companies looking **to set a company up in Australia** must be registered with the Australian Securities and Investments Commission (ASIC) before commencing any business activities.

For additional background information on how to establish a company in Australia, Virginia companies are encouraged to familiarize themselves with the following resources:

- ✓ ASIC's guide on Starting a Company in Australia;
- ✓ the Legal Essentials for Business section of the Business.gov.au Starting a Business Guide; and
- ✓ the relevant Industry Fact Sheets provided by Business.gov.au.

Privacy Legislation and Responsibilities:

Australia has a robust legislative framework protecting the use of personal data, data privacy and data security requirements:

- ✓ In Australia, the ***Privacy Act 1988*** regulates the handling of 'personal information' – i.e. any information or opinion that identifies, or could 'reasonably used' to identify or locate an individual – by:
    - Most government agencies;
    - All private and not-for-profit organizations with an annual turnover of more than A$3M; and

- All smaller businesses that trade in 'personal information' – i.**e. health service providers.**
    - Personal health data is classified as sensitive information, meaning there are also added restrictions on how health services providers can handle health information.

✓ Businesses are subject to the obligations set out in the **Australian Privacy Principles (APPs):**

- The APPs are a set of technologically-neutral, and legally binding principles that provide the cornerstone of the *Privacy Act*'s protection framework; and
- They set out the standards, rights and obligations in relation to the handling, holding, accessing and correction of personal information.

✓ **In 2014, a new set of APPs were enacted**, which can be viewed here.

✓ These have particular significance for emerging technology companies offering cloud-based solutions are:

- Cloud providers' privacy policies must state the intended disclosure arrangements of personal information, including to any offshore storage destination/recipients (APP 1).
- **Personal information subject to cross-border disclosure must be kept in a jurisdiction with similar regulation to Australia:**
    - Cloud providers can only disclose to a person or organization outside Australia where they have taken reasonable steps to ensure the overseas recipient does not breach the protections afforded under Australian privacy law;
    - The cloud provider remains legislatively accountable for unauthorized or inadvertent data security breaches that may occur offshore (APP 8);
- Cloud providers must give individuals access to personal data held about them upon request – and take reasonable steps correct any personal data if required (APP 10, APP 12, APP 13)
- Cloud providers must take reasonable steps to secure personal data from misuse, interference or loss, and from unauthorised access, modification or disclosure (APP 11);
- Cloud providers must take reasonable steps to delete or de-identify personal information that is no longer needed for the purpose for which it was collected (APP 11).

✓ Many of the APPs are also relevant in the IoT sector:

- For an overview of their IoT impact Virginia companies are encouraged to familiarise themselves with Section 4 of the IoTAA Security Guideline.

✓ The Office of the Australian Information Commissioner (OAIC) is responsible for enforcing the *Privacy Act*. The OAIC has published a range of privacy guidelines online aimed at assist companies comply with Australian legislation:

- The Privacy Management Framework;
- Australian Privacy Principles Guidelines;
- A Guide to Undertaking Privacy Impact Assessments; and
- A Guide to Securing Personal Information

Telecommunications Law (IoT)

- ✓ If an IoT solution involves the deployment of a wireless network, and/or includes the sale of carriage services to customers, the solution will (very likely) be regulated by telecommunications law. This may include:
  - Onerous security obligations on services that provide or resell carriage;
  - The protection of information transiting the network;
  - Heavy restrictions on the use of information and customer details; and
  - Unless exempt, there is an obligation to ensure that messages can be intercepted by law enforcement, and to retain and make available certain data.
- ✓ In December 2018, the government passed unpopular encryption laws (*Telecommunications and Other Legislation Amendment (Assistance and Access) Act 2018*) requiring encrypted communications providers in Australian to enable law enforcement agencies to gain access to encrypted data if requested.
- ✓ For further information on the responsibility of IoT providers under telecommunications law, see Section 9 of the IoTAA Security Guideline.

Australian Standards

- ✓ Standards Australia is the nation's peak non-government, not-for-profit standards organization.
- ✓ Standards Australia is charged by the Australian Government to meet Australia's need for contemporary, internationally aligned standards and related services.
- ✓ Virginian companies looking to enter the Australian market are encouraged to familiarize themselves with the relevant sections of the standards catalogue to ensure that their supplied products or services satisfy Australian standards.
- ✓ Sectors that may be of particularly relevance to companies within the emerging technology space include:
  - Communications, Information Technology and e-Commerce Services
  - Manufacturing and Processing
    - i.e. AS 4024.3301:2017 Safety of machinery, Part 3301: Robots and robotic devices - Safety requirements for industrial robots (2017).
- ✓ In addition, some emerging technologies, such as the industrial application of robotics and artificial intelligence, will also need to comply with the requirements of Australian Workplace Health and Safety legislation (i.e. minimizing risk by design).
- ✓ For further information, Virginia companies are encouraged to review the website of Safe Work Australia, and familiarize themselves with the overview of WHS/OH&S Acts, Regulations and Codes of Practice provided by Business.gov.au.

Healthcare Industry Regulation

- ✓ Australia has considerable expertise in healthcare regulation, and, according to ANDHealth, the Australian sector is a *"highly regulated, risk-aware environment."*
- ✓ Australia's **Therapeutic Goods Administration (TGA)** is a founding member of the International Medical Device Regulators Forum (IMDRF), along with the US FDA.

- Both countries are part of the IMDRF management committee, placing them in an ideal position to maintain international leadership and drive harmonization.

✓ In regards to digital health specifically, there are a number of international initiatives that Australian regulators can look to for inspiration and guidance. For example:

- **The FDAs current pilot of the Digital Health Software Pre-Certification (Pre-Cert) Program**, which encompasses products classified as 'Software as a Medical Device' (SaMD), and provides an expedited approval pathway for new products released by a 'pre-certified' company.

✓ Recently, the TGA has taken steps to make itself more accessible for industry participants seeking advice and guidance on existing regulatory requirements, therapeutic goods classification and processes for regulatory acceptance.

✓ This consultative process supports the view that the relatively small size of Australia supports greater access and consultation between industry and the regulators.

✓ A recent CSIRO report also found that Governments need to defragment the sector-based approach to regulatory compliance and remove barriers to regulatory process efficiency where possible.

Market Entry Options

Recommendations for Market Entry

Successful market entry strategies for Virginia companies wishing to explore opportunities in Australia's emerging technology sector have three key common elements:

- ✓ **Understanding the market and customer demand;**
- ✓ **Selecting the most suitable partner and/or establishing a presence; and**
- ✓ **Providing ongoing support in the market.**

Key Steps:

In general, Virginia companies should consider the following key steps:

- ✓ It is important for Virginia companies to first gain a deeper **understanding of the Australian market and demand** for a particular product, its competitive environment, relevant standards and regulations, sales channels etc.
- ✓ Success in the Australian market will often require **establishing a local sales presence**, through either a subsidiary, or the appointment of an in-country partner (agent or distributor).
- ✓ Virginia companies should conduct a **visit to Australia** (individually or as part of a group trade mission) to gain better understanding of the market and meet with prospective partners before making any commitments.
- ✓ Once a suitable partner is appointed, providing **ongoing local support and service** is very important as well as maintaining good communication with the partner.

Engage with Industry Associations

As part of their market research, Virginia companies should consider engaging with the relevant industry associations in the emerging technology sector, including:

- ✓ Australian Information Industry Association (AIIA)
- ✓ Australian Computer Society (ACS)
- ✓ Institute of Instrumentation, Control and Automation (IICA)
- ✓ IoT Alliance Australia (IoTAA)
- ✓ Australian Robotics & Automation Association (ARAA)
- ✓ Australian Business Software Industry Association (ABSIA)
- ✓ Medical Software Industry Association (MSIA)

Establish a Presence in the Australian Market

There are various strategies that prospective Virginia companies may want to adopt when wishing to enter the Australian market. These include setting up a local office, appointing a local distributor, acquiring a local company, or setting up a foreign joint venture/strategic alliance.

Each of the options will have advantages and disadvantages, and the decision on which route to take will ultimately come down to the short, medium and long-term business objectives of the specific company. Some of these strategies are highlighted below for further reference:

- ✓ **Setting up a local office or branch** offers customers a reassurance of your company's commitment to the local market, as well as more control of the business operations and marketing. Some drawbacks include higher risk and set up capital, initial lack of business contacts, and lack of established reputation in Australia.
- ✓ **Appointing a local distributor / integration partner** offering similar or complementary products offers the benefits of lower initial investment, established local contacts and a faster time frame for market entry. Some drawbacks include trust issues (regarding liability), lack of control of business operations and possible performance issues if no sales milestones are set in place.
- ✓ **Acquiring a local company** – May take less time to access and penetrate the market as the company would have an existing distribution network in place. The drawback would be a **large capital investment**, and possible slower post-merger integration.
- ✓ **Setting up a Foreign Joint Venture/Strategic Alliance** – Virginian companies could also consider forming a joint venture, or strategic alliance with a local Australian company. The advantage would be possible faster market entry. However, potential risks could be differing on goals and objectives and also lack of total control of management.

Considering the options listed briefly above, it is our general recommendation that Virginia companies wishing to explore opportunities in the Australian emerging technology sector should **appoint a local distributor / integration partner**. Ideally, these local partners would have established working relationships with key stakeholders in both the public and private sectors, and operate across a range of industries.

Participate in a Market Visit

Before making any commitments, however, **we recommend that Virginian companies should participate in a market visit** in order to gain a better understanding of the market and interview prospective partners. This visit could be undertaken individually, or as part of a group trade mission, such as that being **run by VEDP in October 2019.**