The Digital Economy: Opening up the conversation

This is the plain text version version of our consultation paper. To view the designed version, visit http://industry.gov.au/digitaleconomy.

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Ministerial preface

The Australian Government will develop a new Digital Economy Strategy—a forward-looking plan to maximise the potential of digital technology to improve the nation's productivity and competitiveness, while minimising its negative effects. The strategy will focus on ways governments, businesses and the community can adjust to seize the benefits of digital transformation—including improving access to new and emerging technologies and digital infrastructure to grow Australian industry and jobs.

The digital economy and the technologies that underpin it are fundamental for Australia's success—they create opportunities for our communities and our businesses, drive competitiveness and productivity, and strengthen connectivity across our broad country.

Most of us participate in the digital economy from the moment we wake up in the morning. We check our emails and social media accounts, top up our bus pass online and pay our bills using banking apps while drinking our first coffee of the day.

Digital technologies also allow our businesses to work smarter, save time and access new customers, markets and information. Digitally advanced businesses are more innovative and more likely to be growing revenue and creating jobs.

Australia already has areas of competitive strength, such as energy resources and medical and mining related technologies. We have significant opportunities in emerging sectors like FinTech and precision agriculture. If we move quickly to get in front of our competitors, build on these strengths and become a world leader in digital innovation, McKinsey has predicted we could boost the Australian economy by $140 billion to $250 billion over the next eight years.

Like the previous three industrial revolutions, technological advancement creates challenges for humanity—challenges that cannot be solved by science alone. The shift we are undergoing, as every sector becomes data-driven, is similar in scale to the social and economic shift that took place when the world moved from being agriculture-centric to manufacturing-centric. Australian industries are experiencing increased productivity due to automation, use of sensors, data analytics, and the Internet of Things.

We need to make sure all Australians can take the journey. Our access to broadband has improved but there is still a gap in ability, basic skills, and attitudes to technology, with low income households, people aged over 65, and people with disability more likely to be digitally excluded. For these people, the benefits of being connected can seem out of reach.

We know government doesn't have all the answers. That's why we have committed to developing the strategy in an open and inclusive way. We will be working with experts within and outside of government, and engaging with the community.

This paper marks the start of that conversation and I'm asking for your ideas to help develop the strategy. By planning ahead, we are not only responding to change, but we are seeking to create change—change that is to our benefit.

Senator The Hon Arthur Sinodinos AO
Minister for Industry, Innovation and Science
September 2017

The Digital Economy: Opening up the conversation

Rapid developments in technology and science are changing the way we live, work and do business. These changes come with challenges for our industries, work places and communities. They also present opportunities to increase wellbeing and secure Australian jobs and prosperity.

Digital technologies have immense potential to drive competition, innovation and productivity. There is evidence that business investment in digital technologies results in higher productivity,[1] but Australian businesses are not fast adopters of technology by international standards.[2]

The rest of the world will not wait for us. We need to make the most of digital technologies to develop a diverse and flexible economic base, so that businesses can seize domestic and international opportunities that play to their competitive strengths. Businesses that use and invest in digital technologies tend to be more productive and competitive.[3] We need to look forward at emerging technologies to harness new opportunities for growth.

Digital technologies can also deliver broader benefits by supporting social inclusion and helping us to address big challenges like the changing nature of work, protecting our environment and looking after our ageing population.

Purpose of this paper

This paper is the start of the conversation with all Australians and we're asking for your ideas to help develop the strategy. Your responses will help the government to identify the key issues, challenges and opportunities, and to develop a way forward.

In this paper, we consider the broader digital economy, followed by three broad themes:

- enabling and supporting the digital economy (through digital infrastructure, standards and regulation, and trust, confidence, and security)
- building on our areas of competitive strength to drive productivity and raise digital business capability
- empowering all Australians through digital skills and inclusion.

These themes have been informed by our early conversations with the community on the digital economy.

The strategy

On 19 September 2017, the Australian Government announced it will develop a national Digital Economy Strategy.

The strategy will set out a roadmap for government, the private sector and the community to work together to:

- build on our competitive strengths and develop new ones by:
    - driving productivity within existing industries

[1] Shahiduzzaman, M., Layton, A. and Alam, K. (2015). On the contribution of information and communication technology to productivity growth in Australia. *Economic Change and Restructuring*, 48(3-4), p.300. Abstract available online at https://eprints.usq.edu.au/29017/

[2] Australia ranks in the middle of OECD countries on a range of digital indicators. See OECD (2015), *OECD Digital Economy Outlook 2015*, OECD Publishing, Paris. Available online at: http://www.oecd.org/internet/oecd-digital-economy-outlook-2015-9789264232440-en.htm

[3] Department of Industry, Innovation and Science: Office of the Chief Economist (2016). *Australian Industry Report 2016*. Commonwealth of Australia. Available online at: https://industry.gov.au/industryreport.

    - taking advantage of the changes in our economy
    - opening up new sources of growth to sustain Australia into the future
- develop world-leading digital business capability for globally engaged, innovative, high-growth businesses of all sizes
- drive a culture and mindset that supports lifelong learning, a global outlook, and helps us respond positively to change
- address the 'digital divide' in skills and confidence to help all Australians succeed in a digital economy.

The government will launch the strategy in the first half of 2018, following an open conversation with governments, businesses and the community.

The government already supports action on a diverse range of digital economy initiatives across multiple agencies. A key purpose of the strategy will be to draw together, complement and build on these existing initiatives.

The launch of the strategy in 2018 will set the scene for continuing discussion and debate with the Australian public on our digital future. To make sure we stay up to date, the strategy will continue to evolve over time.

1. The Digital Economy

The term 'digital economy' describes the range of economic and social activities that are enabled by information and communications technologies. It includes activities like banking, buying and selling, and accessing education or entertainment using the internet and connected devices. The digital economy is not separate to the economy. It impacts all industries and business types, and influences the way we interact with each other every day. It also recognises that as sectors become data driven their economic structures change, industry boundaries blur, and the basis of competition changes.

We need to be ready, as an economy and a community, to respond to change and to grasp the opportunities of the digital economy.

State of play

The past ten years have seen significant economy-wide change. We have seen the ubiquity of smart phones; the rise of global tech companies; and worldwide economic shifts following the global financial crisis. Many say it is the *pace* of change that makes this current wave of digital disruption (the 'fourth industrial revolution') different from those we have faced in the past. It is impossible to predict the future with certainty. But we can expect the shifts of the past ten years to continue as technology continues to accelerate.

Our digital readiness

Australia's performance in the digital economy has been mixed. As consumers, we are embracing technology. In the six months to June 2016, 91 per cent of adult Australians had accessed the internet. Data download volumes increased by 52 per cent between the June 2015 and June 2016 quarters to over 2.2 million terabytes.[4]

We risk slipping behind the rest of the world in digital readiness, especially in growing digital businesses. Australia is now ranked 18th on the World Economic Forum's Network Readiness Index, slipping two places from the previous year. The Network Readiness Index measures the capacity of countries to leverage Information and Communications Technology (ICT) to improve competitiveness and wellbeing. We rank even worse in business use of ICTs, with Australia ranked 24th in the WEF rankings.[5]

Businesses and governments worldwide are moving quickly to build new and advanced digital technology capabilities. Research and development (R&D) expenditure provides insight into what businesses see as important for their future, and the world's largest publicly listed companies are investing heavily in digital R&D. The most recent PwC Global Innovation 1000 Study reported that these companies are shifting their R&D resources away from physical products to software and services and this is paying off financially.[6]

This suggests that businesses worldwide are developing a powerful arsenal of digital technologies. These businesses are increasingly competing in the same global marketplace as Australian businesses, as the digital economy breaks down geographic barriers to market entry.

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[4] ACMA (2016). *Communications report 2015-16*. Commonwealth of Australia. Available online at: https://www.acma.gov.au/theACMA/communications-report-2015-16

[5] World Economic Forum (2016). *The Global Information Technology Report 2016*. Geneva. Available online at: https://www.weforum.org/reports/the-global-information-technology-report-2016

[6] PwC (2016). *2016 Global Innovation 1000 Study: Software as a Catalyst.* Available online at: https://www.strategyand.pwc.com/innovation1000

Despite these market signals, a recent McKinsey report found that the rate of digitisation in Australian industries is uneven, and still a distance from its full potential. Knowledge-intensive industries like financial and professional services lead the pack, while construction and agriculture have low levels of digitisation.[7]

The role for government and the private sector

New and emerging digital technologies are changing the way industries and business work. There are many instances where the market is adjusting well to digital transformation and government intervention is not required. However, in other areas government action might be needed—for example, in connectivity for remote areas and managing security risks.[8] Government and the private sector have a shared responsibility and mutual interest in managing these new challenges.

As well as considering the wider economy, government can set an example by making it simpler, clearer and faster for people and businesses to deal with us, and by better using technology and public data. Government can also drive industry modernisation as a major customer and investor. For example, the Naval Shipbuilding Plan will support innovation and build capability in Australian industry by investing in modern and innovative shipbuilding facilities and processes.

The strategy will link with and reflect, the work already underway to digitally transform government.

Questions

1. How are advances in digital technology changing the way you work, your industry, and your community?

   Current approaches are outdated with no real changes in operations. There is a shift to online data/file interactions with again no change in the approach. This neither delivers the opportunity for innovation but moreover leaves an environment open for security breaches including fraudulent and threat activities with no legally binding evidence.

2. What is your vision for an Australia that thrives in a digital economy? Where would you like to see Australia in five, 10 and 20 years' time?

   Australia has already lost that race. The GDPR and other standards are well on their way and drives innovation, security and privacy responsibility. Third world countries such as Mexico and Peru amongst others have already actioned due to corruption and other necessities already delivering advanced and secure digital services. I would like to see Australia support legislation that drives innovation and the ability for local business to compete, implement procurement policies that support local industry rather than multinationals and deliver services that are trusted and secure and not based on lobbying to drive a political outcome.

3. What is the role of government in achieving that vision?

   Government should be a proving ground for innovation such as occurs in most nations around the world. Senior executives and government need to remove reliance on their gatekeepers, large multinationals and outsourcers and develop a backbone when it comes to making decisions. Government need to review how knowledge and capability that isn't available at the senior levels is gained in the decision process including removing the who you know approach with one that considers merit. Further, government need to support local industry by inacting legislation that supports rather than hampers this effort including reviewing the impact on

[7] McKinsey & Company (2017). *Digital Australia: Seizing the opportunity from the Fourth Industrial Revolution*. Available online at: http://www.mckinsey.com/global-themes/asia-pacific/digital-australia-seizing-opportunity-from-the-fourth-industrial-revolution

[8] Productivity Commission (2016), *Digital Disruption: What do governments need to do?*, Commission Research Paper, Canberra. Available online at https://www.pc.gov.au/research/completed/digital-disruption

policies to advance our capabilities. Current arrangements are politically motivated and includes ministerial influences to deliver regardless of lack of capability, oversight agencies such as ASD are forced into politically motivated decisions that have a major impact on local market, innovation, capability, security and hence Australia's prosperity, executive decisions are not merit based, but are based on relationships rather than technical capability or capacity to deliver and/or are individually motivated to be seen as evangelists that delivered on an outcome (some panel arrangement for instance) without regard to impact or repurcussions including to security breaches as they are never held accountable.

4. What are the key disruptive technologies or business models that you are seeing? What do you predict is on the horizon in five, 10, 20 years' time?

   There are many business models and strategies that have or had the opportunity to disrupt.

   My prediction is that over the next 15 to 20 years most of these and any new programs will fail with failure being measured on deliverables in line with security and privacy and trust. I predict that government will continue to revise legislation to mitigate these failures as to deliver the services by bandaiding the deliverables taking away any consideration to privacy or security. I predict that identity fraud will continue to rise at unacceptable levels and that legislation will continue to support large business not to change and sweep any breaches under the carpet minimising responsibility and fines.

   When it comes to technology, digital certificates attached to files proving ownership and origin is the only means of delivering digital transformation. If Australia and particularly government (yes industry does look at government for guidance) does not realise the opportunity it will continue to play catch up.

   In the near future a technology will be available where you will own and manage your own identity and share it based on your decision and without having to trust a third party. The transaction and recipient are inherently validated with deliver guaranteed security and trust. It will firstly drive uptake of IoT by delivering and validating command and control information over any medium securely and in the future will drive how the internet was intended to operate. It will deliver trusted and secure communications without a third party for any device, application, transaction and/or communications.

2. Enabling and supporting the digital economy

Digital infrastructure

The demand for digital infrastructure for data collection, storage, transmission and analysis is growing. To take part in the digital economy, and to drive innovation and productivity, Australians need access to quality, affordable and reliable communications services, as well as the underlying data, platforms and protocols that support our online activities.

State of play

Connectivity

The Australian Government is providing affordable **high-speed broadband** to all Australian homes and businesses through its $29.5 billion investment in the National Broadband Network. Over six million homes and businesses are already in service areas, with the network on track for completion.[9] The accelerated rollout means that eight million homes and businesses will be connected by 2020.

As at June 2016, 4G mobile networks had expanded to cover up to 98 per cent of the population.[10] Rounds one and two of the government's Mobile Black Spot Program is delivering 765 new mobile base stations to improve mobile coverage across regional and remote Australia. The government's investment in rounds one and two of the program has leveraged a total new investment of almost $600 million, including funding from carriers, state and local governments, and third parties. Included in the government's commitment to the program is $60 million for a priority locations round to target specific priority locations announced by the government.

The government is also improving arrangements for spectrum access by implementing the recommendations of the Spectrum Review, which will ensure mobile broadband services can develop in Australia in line with emerging technology and international standards.

As our appetite for data and connectivity continues to increase, industry is looking to newer technologies like 5G to meet these needs. For example, spectators at the 2018 Commonwealth Games on the Gold Coast will be able to access and experiment with 5G mobile technology for the first time.

Emerging technology: 5G

5G is the fifth generation of mobile phone technology which started with 1G (first generation) in the 1990s. It builds upon the previous generation of mobile technology, promising to deliver dramatically increased speeds and potentially enabling millions more people and devices to be connected to mobile and internet networks. While widespread availability is not expected until after 2020, 5G will open up opportunities for services such as Internet of Things,[11] smart homes and cities and super-fast file sharing while on the move.

The next phase of the internet, where we are always on and always connected, has the potential to transform our economy even further. Horizontal platform technologies like distributed ledger technology (for example, blockchain) and machine learning will support innovation and productivity right across the economy.

Australia has opportunities to build capability in some of these key platform technologies – including artificial intelligence, robotics, privacy-preserving analytics and computational law. These technologies can deliver solutions at scale that can be leveraged by Australian industries.

Emerging technology: artificial intelligence

Artificial intelligence, or AI, combines a number of technologies including hardware and software, machine learning, natural language processing and computational power to make machines 'intelligent'. AI has the potential to greatly enhance existing human capabilities and drive

[9] nbn (2017). *nbn hits six million Ready for Service mark*. Available online at: http://www.nbnco.com.au/corporate-information/media-centre/media-releases/six-million-ready-for-service.html

[10] ACMA (2016). *Communications report 2015-16*. Commonwealth of Australia. Available online at: https://www.acma.gov.au/theACMA/communications-report-2015-16

[11] The 'Internet of Things' is a sensor-driven digital network that enables devices to communicate with each other and collect data. This includes everything from cellphones, coffee makers, washing machines, headphones, lamps, wearable devices and almost anything else you can think of.

productivity improvements across all facets of industry and life. AI will provide opportunities to help reduce repetitive tasks and augment how we work.

Data is a key economic asset. It can stimulate economic growth and innovation and improve the delivery of services, but it is underused. Around 90 per cent of the world's information was generated in just the past two years – but less than five per cent of the potentially useful data is actually analysed and used.[12] Three out of four Australian businesses have stated that data analytics is not important at all to their business.[13] Australian businesses may find themselves at a disadvantage if they are not able to collect and use important data while effectively managing community concern about privacy, confidentiality and transparency.

Data sharing

The Australian Government is investing in **whole-of-government data initiatives** which will open up opportunities for businesses and researchers, while also ensuring data privacy is appropriately addressed. This includes responding to the the Productivity Commission's Inquiry Report into Data Availability and Use; bringing together data assets from across government; and increasing the number and availability of high-value datasets.

For example, the government has taken an important step in promoting innovation by releasing **Australia's Geocoded National Address File**, one of the most requested and high-value digital datasets. Australia is one of only a few countries in the world to make this data openly available. Geocoded address data can be used for many purposes, including personal navigation applications and infrastructure planning.

The government has commissioned an independent review to investigate implementing an **open banking** regime in Australia, with the report due by the end of 2017. Open banking is about giving Australians greater access to their own banking data and has the potential to transform the way in which Australians interact with the banking system.

Questions

5. What communication services, and underlying data, platforms and protocols, does Australia need to maximise the opportunities of the digital economy?

   5G and fibre to the home using CWDM.

6. What opportunities do we have to accelerate the development of technologies that will underpin Australia's digital economy?

   None.

   The opportunity during the initial development of DWDM backed by research of blue laser technology at the ANU and UNSW with Redfern Broadband Networks proved how innovation in Australia is dismissed. Other research included the pump laser for high speed communications that never saw further funding.

   Innovation in 5G in Australia will never occur. The short term view to spectrum licensing and its costs making it only affordable to the larger end of town ensured control over the market. It is not in their best interest to allow technologies that impinge on their financial success. 5G innovation relies on offering individual services within a building removing the cost of communicating by controlled means. As there is no opportunity due to licensed spectrum costs

[12] Productivity Commission 2017, *Data Availability and Use*, Report No. 82, Canberra. Available online at: http://www.pc.gov.au/inquiries/completed/data-access#report
[13] Australian Bureau of Statistics (ABS) 8129.0 Business use of Information Technology 2015-16, Table 12. Available online at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/8129.0

for individual installations why would the local market invest in these technologies noting that the bigger end of town are generally consumers of technology.

Standards and regulation

The advancement of digital technologies – such as cloud computing, the Internet of Things, autonomous systems, trusted data analytics, and the next generation of digital products, services and applications – present major challenges for governments, policy-makers, regulators, standards-setting bodies and industry.

As technology advances, outdated or inconsistent regulation can stifle innovation and drive up costs. New businesses may find themselves operating in a regulatory grey area and new risks may not be anticipated by old legislation. For example, we need to consider the social and ethical implications of our regulations relating to emerging technologies, such as AI and autonomous systems.

As a small, open economy, Australia also needs internationally agreed standards and interoperable systems to support our participation in global supply chains.

Global digital economy engagement

The government **engages internationally** to promote Australian interests and influence international discussions on digital economy policy with organisations such as the OECD and the G20. We work with three key OECD committees to further our economic, entrepreneurial, innovation and digital policy platforms, and to gain policy insights through OECD research and feedback from other countries.

Australia also places a high priority on the G20 as the premier forum for global economic cooperation. The 2017 G20 summit under Germany's Presidency included a digital economy work stream. The 2018 G20 Presidency will be held by Argentina and will continue to progress digital policy agendas, including digital inclusion.

State of play

Regulatory reform

Digital transformation is changing our markets, and taking place faster than the renewal of existing legal frameworks. Digital platforms can resolve information asymmetries by arming consumers and small businesses with information previously only available to large companies. They can solve other competition problems, by lowering barriers to entry to markets.

However, new technologies can present new risks to the community around privacy, security and ethical concerns – including the implications of autonomous systems making decisions for us, or around us (for example, autonomous vehicles). Digital transformation can also lead to new forms of market power and barriers to entry through control over data, networks and platforms.

Traditional industries are being disrupted and the distinctions between industry sectors are becoming blurred as tech firms move into new areas like banking, retail and healthcare. Our traditional regulatory approaches, which take a sectoral approach, may no longer be appropriate.

These changes are already impacting on our regulatory system. For example, government has acted to level the playing field for small Australian businesses by extending the GST to low value imported goods that are purchased online and cracking down on multinational tax avoidance.

Technology can also be used simplify business and automate aspects of compliance.

Better digital government services

Australians want access to government online. Research shows most people are comfortable with using digital channels to interact with federal government agencies, and more than a third have said it was most preferred, or one of their preferred, channels. This was even higher for small businesses, at 45 per cent.[14]

That is why the government has established the **Digital Transformation Agency**[15] to drive digital transformation of government services.

The role of the Digital Transformation Agency is to build capability across the Australian Public Service in digital delivery and central oversight of the government's ICT agenda. The government has three clear digital transformation objectives:

- continued migration of government services to digital channels
- significantly improved experiences for individuals and businesses
- improved outcomes from taxpayer's money spent on ICT.

Federal, state and territory governments are working together under the **National Business Simplification Initiative**[16] (NBSI) to make it easier for business to get things done with government. By delivering better digital services and streamlined regulation, the NBSI will deliver real savings to business so they can focus on growing their business, creating more jobs, developing new products, and exploring new market opportunities.

A joint NBSI initiative with the NSW government links the Business Registration Service with the Service NSW system to make it faster and easier to start a café or restaurant in five council areas. In the future, the initiative will be extended to other locations and sectors.

Standards

Effective standards are vital for success in a digital world. For example, smart cities, advanced manufacturing, digital health care, and FinTech all rely on an unprecedented degree of system integration and interoperability. Given the global nature of technology, internationally harmonised standards can help businesses boost efficiency, increase productivity and maximise opportunities for growth by ensuring interoperability of technology across jurisdictions.

In a World Economic Forum study, 47 per cent of respondents indicated that establishing and promoting common standards is an important action that governments can take to accelerate the adoption of the Industrial Internet of Things.[17]

[14] Digital Transformation Agency research. Available online at: https://www.dta.gov.au/blog/how-do-australians-really-feel-about-digital-government-services/
[15] http://www.dta.gov.au/
[16] http://www.industry.gov.au/smallbusiness/Pages/National-Business-Simplification-Initiative.aspx
[17] World Economic Forum (2015). *Industrial Internet of Things: Unleashing the Potential of Connected Products and Services*. Available online at: http://www3.weforum.org/docs/WEFUSA_IndustrialInternet_Report2015.pdf.

Developing international standards

On behalf of the Australian Government, Standards Australia is leading the Reference Architectures, Standards and Norms working group as part of **Prime Minister's Industry 4.0 Taskforce**.[18] Industry 4.0 has been called the fourth industrial revolution. Successful adoption of Industry 4.0 standards is critical for Australian manufacturing to remain globally competitive.

The Taskforce has now signed an agreement with Germany's *Plattform Industrie 4.0* to cooperate across five work streams, representing key challenges in the transition to Industry 4.0. These include reference architectures, standards and norms; support for small and medium businesses; *industrie 4.0* testbeds; security of networked systems; and work, education and training.

The work of the Taskforce and Standards Australia ensures Australia is involved in and aware of potentially disruptive changes taking place globally. It also ensures Australia is able to provide expert advice and representation in relevant international standards development processes.

Emerging technology: Blockchain

Distributed ledger technology (e.g. blockchain) has the potential to disrupt and revolutionise financial transactions and services. It can be applied wherever a verified and trusted transaction is required – health, government services, real estate, media, energy and more. Blockchain allows parties to transact without the need for a centralised intermediary (like a bank) to verify the transaction. The Treasury and CSIRO's Data61 have undertaken a **review** to examine distributed ledger technology's general potential and its implications for government and industry.[19] Australia is also leading the development of blockchain standards.

Questions

7. What opportunities do we have in standards development and regulation to:
   - enable digital entrepreneurship, innovation and trade?

   It requires cooperation on a case by case basis including collaboration with a range of stakeholders. It requires access to the relevant skills and industry to cooperate to deliver outcomes. There are certain skills that are either not readily available or not engaged as these individuals are engaged elsewhere or to small to be noticed as mentioned in earlier responses. Again, as mentioned earlier standards development and regulation may conflict with strategy and/or policy as it may impede on deliverables or existing governance arrangements and hence the potential to innovate. The preference presently is to either change legislation or deliver sub-optimal outcomes in the hope that if failure occurs it can be hidden or pointed to a previous owner or contractor. Examples that impede digital entrepreneurship, innovation and trade are some of the current panel arrangements such as cloud, data sovereignty and jurisdiction mandates based on limited knowledge and capability, ASD often a toothless tiger, the bigger end of town having the loudest voice and therefor heard, using legislation to overcome privacy and security requirements, not keeping up with global standards and technology effectively using Australia as a potential vehicle for crime and terrorism along with many other limitations and issues. Further and as mentioned earlier, Australia is not in a position to innovate as it does not support local industry as is evidenced for instance with Caltex and bio-fuels amongst many others and any capital support is based on guarantees in for instance existing business or shifting any risk solely to the innovator.

[18] https://industry.gov.au/industry/Industry-4-0/Pages/PMs-Industry-4-0-Taskforce.aspx
[19] http://www.data61.csiro.au/en/Our-Work/Safety-and-security/Secure-Systems-and-Platforms/Blockchain

- mitigate the risks associated with digital disruption?

  Industry engagement and specialisation with the relevant skilled individuals. Enable specialist players to communicate with stakeholders that have at least some technical capability which can then be translated into business terms and to the executive.

  In many cases and as mentioned, certain skills are difficult to obtain as only a few are available in Australia, some are already engaged and not available but primarily, executives DO NOT have the relevant skills to understand complex technology and how these may deliver the required outcomes.

8. What digital standards do we need to enable Australian businesses to participate in global supply chains and maximise the opportunities of the digital economy?

   This is a broad subject and requires a long and complex answer. Look at the ISM (an indication is Clause 1073) and work through the impacts for instance. I am not about to give you all the answers or the approaches as they come at a price.

Trust, confidence and security

Online engagement comes with risks associated with national security, cybercrime, data breaches and other types of malicious online activity. At an individual level, some citizens are particularly vulnerable to online threats, technology-facilitated violence and scams.

Our ability to make the most of digital technologies depends on the extent to which Australians can safely and confidently interact online. At the core of this is trust in the companies, services, people and data we transact or communicate with. Community education and digital literacy is key.

State of play

The cyber security environment is constantly evolving. We need to be adaptive and proactive to face the cyber security challenges on the horizon.

Cyber threats

Awareness and readiness of cyber threats is improving in Australia. While Australian companies are being hit with more malicious cyber activity, they are also putting in place better defences. In 2016, 59 per cent of organisations in Australia detected a business-interrupting security breach on at least a monthly basis, which is more than twice as often as 2015.[20] Reports of ransomware activity reported to the Australian Cybercrime Online Reporting Network roughly doubled in 2016 compared to 2015.[21] However, 71 per cent of respondents to the Australian Cyber Security Centre Cyber Security Survey reported having a cyber security incident response plan in place, compared to 60 per cent in 2015.[22]

Cyber security

The Australian Government has identified cyber security as a key element for national prosperity and security. The **Cyber Security Strategy**[23] aims to secure Australia's prosperity in a connected

[20] Telstra Corporation Limited (2017). *Telstra Cyber Security Report 2017*. Available online at: https://www.telstraglobal.com/au/insights/whitepapers/whitepaper/telstra-cyber-security-report-2017
[21] Australia's Cyber Security Strategy – First Annual Update. Available online at: https://cybersecuritystrategy.pmc.gov.au/first-annual-update/index.html
[22] Australian Cyber Security Centre (2017). *2016 Cyber Security Survey*. Commonwealth of Australia. Available online at: https://www.acsc.gov.au/publications/ACSC_Cyber_Security_Survey_2016.pdf
[23] https://cybersecuritystrategy.pmc.gov.au/

world, with a focus on: a national cyber partnership; strong cyber defences; global responsibility and influence; growth and innovation; and a cyber smart nation.

Scams and privacy risks

As Australians spend more time online, they can be susceptible to online scams and cyber-crime. In 2016, the ACCC received reports of $48.4 million in losses from online scams, with an increase in the number of social media scams reported.[24]

Australians are increasingly concerned about the privacy risks that have evolved in tandem with new technology and increasing exposure to cyber security threats.

A recent survey found that 69 per cent of Australians are more concerned about their online privacy than they were five years ago.[25] However, when it comes to protecting our personal information, the majority of Australians do not use the security and privacy settings available to them. More than three-in-five Australians do not regularly read online privacy policies or adjust their privacy settings on social media sites.[26]

Australia's cyber security industry

The global cyber security market is expected to grow from about AU$100 billion in 2015, to more than AU$200 billion by 2020.[27] This presents Australian businesses with the opportunity to tap into a growing industry for cyber security products and services. Cyber security in Australia is a small but fast-growing industry, employing approximately 19,000 people,[28] either as part of an organisation's internal cyber security workforce or through external cyber security providers.

Having a stronger cyber security industry will enhance Australia's global reputation as a trusted and secure business environment. There will be significant spillover benefits to the wider economy. Deloitte has predicted that a greater focus on cyber security by Australian businesses could lead to a lift of 5.5 per cent in business investment by 2030, and an extra 60,000 people employed.[29]

Boosting Australia's cyber security industry

Through the National Innovation and Science Agenda, the government committed $30.5 million to establish the Australian Cyber Security Growth Network (ACSGN).[30] The ACSGN is an independent, not-for-profit company, driven by eminent industry leaders. The network has developed a Sector Competitiveness Plan, informed by interviews with the private sector, policymakers and researchers, designed to help Australia become a global leader in cyber security solutions.

Questions

9. What opportunities do we have to build trust and community confidence through resilience to cyber threats, online safety and privacy?

   Is this a serious question? Look at breaches and media, enacting non-acceptable legislation such as opt-in, digital identity with privacy concerns and Australia card, no enactment of

[24] Australian Competition & Consumer Commission (2017). *Targeting scams: Report of the ACCC on scams activity 2016*. [online] Commonwealth of Australia. Available at: https://www.accc.gov.au/publications/targeting-scams-report-on-scam-activity/targeting-scams-report-of-the-accc-on-scam-activity-2016.
[25] Office of the Australian Information Commissioner, 2017 Community Attitudes to Privacy Survey 2017. https://www.oaic.gov.au/engage-with-us/community-attitudes/australian-community-attitudes-to-privacy-survey-2017
[26] Ibid.
[27] Gartner as reported by Forbes: http://www.forbes.com/sites/stevemorgan/2016/03/09/worldwide-cybersecurity-spending-increasing-to-170-billion-by-2020/#d1423c676f80
[28] Australian Cyber Security Growth Network (2017) Australian Cyber Security Competitiveness plan: The potential of Australia's Cyber Security Industry. https://www.acsgn.com/cyber-security-sector-competitiveness-plan/potential-australias-cyber-security-industry/
[29] Deloitte Access Economics for Australian Computer Society (2017). *Australia's Digital Pulse*. Deloitte Touche Tohmatsu. Available online at: https://www2.deloitte.com/au/en/pages/economics/articles/australias-digital-pulse.html
[30] http://www.acsgn.com

delegate responsibilities, agencies and ministers using systems and applications that are not secure (Whatsapp for instance), do you need more….

10. What roles should government, business and individuals play in protecting the community in a digital economy?

11. What integrity and privacy measures do we need to ensure consumers can protect their data?
12. What are barriers for business, particularly small business, in adopting cyber security and privacy practices?
13. What integrity measures do the Australian Government and the private sector need to take to ensure business-consumer transactions are secure?

3. Building on our areas of competitive strength

Adoption and use of digital technologies can be a significant driver of economic growth. Digitally mature businesses tend to be more productive and competitive than those that are less digitally mature. This capability can be a significant source of growth at a time when we need productivity growth to improve.[31]

State of play

Australia has strengths in areas like our stable financial and legal frameworks and institutions; quality infrastructure; and our skilled workforce. We have the abilities, talent and ideas to tap into emerging digital industries like cyber security. Many of our existing competitive industries like resources, manufacturing and the financial and insurance services sector are using technology to drive growth. Digital technologies are now generating productivity benefits across Australian industries. These technologies include the use of new sensors, big data analytics, cloud computing and the Internet of Things.[32]

Australian businesses are not fast adopters of technology by international standards. Australia ranks in the middle of the OECD economies on a range of digital engagement indicators.[33] If adoption of technologies does not improve, we put ourselves at risk of falling further behind.

At an individual business level, many Australian businesses are lagging in the sophisticated use of digital technologies. Most businesses have internet access (95.3 per cent), about half have a website (50.1 per cent), and relatively few have a social media presence (38.2 per cent).[34]

The National Innovation and Science Agenda

The government launched the **National Innovation and Science Agenda** (NISA) in December 2015.[35] This is a $1.1 billion investment in a package of measures, which provide a strong foundation for innovation-led growth. The NISA package includes funding the development of a silicon quantum integrated circuit – the first step in developing a practical quantum computing system, and several initiatives to better equip young Australians to create and use digital technology. NISA also includes support for Data61, the country's leading data science innovation network. Over 80 per cent of the NISA initiatives have already been implemented and we will continue to do more. Our approach will be informed by Innovation and Science Australia's 2030 Strategic Plan.

The **Industry Growth Centres Initiative** [36] is helping Australian firms to be more internationally competitive by enabling key sectors to build capability through a collaborative, industry-led approach. These sectors are Advanced Manufacturing; Cyber Security; Food and Agribusiness; Medical Technologies and Pharmaceuticals; Mining Equipment, Technology and Services; and Oil, Gas and Energy Resources.

[31] Department of Industry, Innovation and Science: Office of the Chief Economist (2016). *Australian Industry Report 2016*. Commonwealth of Australia. Available online at: https://industry.gov.au/industryreport.
[32] OECD (2017). *Key issues for digital transformation in the G20*. Available online at: https://www.oecd.org/g20/key-issues-for-digital-transformation-in-the-g20.pdf
[33] For example, Australia ranks 12th for business IT investment as a proportion of total capital investment. See OECD (2015), *OECD Digital Economy Outlook 2015*, OECD Publishing, Paris. Available online at: http://www.oecd.org/internet/oecd-digital-economy-outlook-2015-9789264232440-en.htm
[34] Australian Bureau of Statistics (ABS) 8129.0 Business use of Information Technology 2015-16, Table 1 (cat no. 8129.0). Available online at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/8129.0
[35] https://www.innovation.gov.au/page/agenda
[36] https://industry.gov.au/industry/Industry-Growth-Centres/Pages/default.aspx

The growth centres, particularly the Cyber Security Growth Centre, are setting digital skills and capability as a focus of firms in their sectors and are identifying challenges and opportunities from rapid advancements in digital technologies.

Going digital isn't just for big business and start-ups. Small and medium businesses are an essential driver of the Australian economy. The 2.1 million small businesses in Australia represent 97 per cent of businesses, employ more than 40 per cent of Australia's workforce and contribute 33 per cent of Australia's GDP.[37] But many small businesses are not realising the full potential of digital technologies. Research from the Commonwealth Bank suggests that 80 per cent of small and medium businesses are delaying the adoption of technology that could offer long-term benefits.[38]

Digital technologies offer opportunities for small and medium businesses to work smarter and more efficiently, and to access new customers, markets and information. But smaller businesses tend to lag their larger counterparts in adopting digital technologies.

Using computer games in new ways

The potential gains from encouraging innovative games and interactive content development are significant. For example, research undertaken by Neuroscience Research Australia included a games-based stepping exercise to assist sufferers of multiple-sclerosis to develop their balance and mental skills, and Mines Rescue offers virtual reality training that is revolutionising the way miners are taught about safety.

A further example is the award winning interactive online game, The Voyage Game. Developed jointly by the Australian National Maritime Museum, Roar Film, Screen Australia, Screen Tasmania and the University of Tasmania, The Voyage Game teaches students in Australia and overseas about Tasmania's convict history.

Developing domestic digital capabilities will support and enable Australian businesses and consumers to participate in global digital trade.

Global e-commerce sales continue to grow rapidly and e-commerce is projected to grow from approximately 10 per cent of total retail to greater than 40 per cent in 2026.[39] While a significant proportion of e-commerce is still conducted domestically, the nature of digital trade means that Australian businesses of all sizes can readily target markets around the world. This potential extends even to small businesses which would not previously have had the capacity to develop overseas markets. Australian business can leverage worldwide reputational advantages for Australia as a producer of safe, high quality products across a range of sectors.

Digital trade is not just about buying and selling goods and services online. It includes the transmission of information and data across borders.

There is significant potential for growth in digital trade in the Asia-Pacific region as internet usage increases, providing Australian businesses opportunities for increased export of digital goods and services to the region.

[37] Australian Small Business and Family Enterprise Ombudsman (2016). Small Business Counts. Commonwealth of Australia. Available online at: http://www.asbfeo.gov.au/small-business-counts

[38] Commbank.com.au. (2016). *Small business postpone digital adoption*. Available online at: https://www.commbank.com.au/guidance/newsroom/small-businesses-research-tech-201609.html.

[39] World Economic Forum (2017) Shaping the Future of Retail for Consumer Industries' Insight Report. Available online at: http://www3.weforum.org/docs/IP/2016/CO/WEF_AM17_FutureofRetailInsightReport.pdf

Digital Trade

Australia is pursuing rules in trade negotiations to create a consistent, predictable and stable environment for business. For example, the government looks to achieve rules through its free trade agreements to provide businesses flexibility in the way they send data across borders, and where they can store their data. The government also pursues rules to facilitate paperless trade and electronic transactions in addition to rules on privacy and cooperation on cyber security.

International fora such as APEC and the G20 also provide opportunity to cooperate and share best practices on digital trade with major trading partners.

Through Australia's Aid for Trade investments, the government helps build the capacity of developing country partners to implement regulations and standards that facilitate global trade. Through these investments, the government also encourages developing countries' uptake of technologies that make trade more efficient. Australian firms have notable technologies and expertise to offer in this field.

Further information on the government's digital trade initiatives including opportunities for public input can be found at http://www.dfat.gov.au/.

Emerging technology: quantum computing

Quantum computers can solve bigger problems faster through the power of quantum physics. A classical computer can check many different possibilities in rapid succession but a quantum computer can check many different possibilities in parallel, reducing computing time significantly. Quantum computing has the potential to transform the way Australian and global firms do business – from banks undertaking financial analysis, to transport companies planning optimal logistic routes, to healthcare companies designing and delivering new personalised medicines.

Australia is well placed to be a world leader in quantum computing. There are significant activities underway right now to grow and build a quantum ecosystem here, which will create new growth and job opportunities.

Questions

14. What is holding Australian businesses back in terms of benefiting from digital technologies?
15. What would help Australian businesses to embrace digital technologies?
16. What efforts are you or your organisation making to respond to digital transformation? Why?
17. What opportunities do we have to use digital technologies to improve linkages into export markets and global supply chains?
18. What opportunities do small and medium-sized businesses have to embrace digital innovation to drive customer value, improve their services and unlock their potential?
19. What are the key new growth industries that Australia should be tapping into? In what technologies and sectors should Australian businesses take the lead, and where should we be a 'fast follower' of international trends?

4. Empowering all Australians through digital skills and inclusion

As digital technology changes the way we live, it impacts our society through disruption to workforces and industries, and our social relationships and cultural practices. There are good opportunities to use technology to improve access and outcomes in education, health and social inclusion. But those who could most benefit are at risk of being left behind.

State of play

We are relying on the internet more and more for our everyday activities. In June 2016, 94 per cent of adults used the internet to conduct banking, pay bills, or buy and/or sell goods and services.[40]

Despite this a digital divide still exists. The 2017 *Australian Digital Inclusion Index* found those with low levels of income, education and employment are significantly less digitally included. While the gap in access to broadband has narrowed in recent years, there are still gaps in digital ability, basic skills, and attitudes to technology.[41]

There is also more to be done to promote the inclusion of women in STEM areas related to digital production and infrastructure, and women as entrepreneurs in the digital economy.

Improving digital literacy

The government is working to improve digital literacy. The **National Innovation and Science Agenda** contains several initiatives to equip young Australians to create and use digital technologies, and inspire STEM literacy in early education. We are expanding opportunities for women in STEM by investing $13 million over five years to encourage more women to choose and stay in STEM research, related careers, startups and entrepreneurial firms.

We are also working to raise the digital skills of older Australians. **Be Connected**[42] is an initiative aimed at increasing the confidence, skills and online safety of older Australians. From early October 2017, Be Connected will deliver a range of resources specifically for those aged 50 years and over, who have minimal or no engagement with digital technology.

The way we work is changing with more part time work and the rise in the 'gig' economy. Structural changes in our economy, including digital disruption, are changing the skills that employers need. This requires workers to be adaptable enough to adjust to the changing nature of work and undertake life-long learning, including the use of micro-credentialing.

People will need a combination of technical skills – a trade, university degree or on the job training – and entrepreneurial skills like communication, critical thinking and digital literacy. Management skills are vital for digital businesses to achieve global scale, and capture market value. We also need the right culture and mindset to embrace innovation and lifelong learning.

Technology change also has wider cultural implications and offers opportunities for all Australians. Our cultural institutions for example, are taking advantage of improved connectivity to educate, entertain and improve awareness of Australia's heritage and cultural treasures. It is recognised that technology and humanity shape each other.[43] The creation and use of technology can lead to

[40] ACMA (2016). *Communications report 2015-16*. Commonwealth of Australia. Available online at: https://www.acma.gov.au/theACMA/communications-report-2015-16

[41] Thomas, J, Barraket, J, Wilson, C, Ewing, S, MacDonald, T, Tucker, J & Rennie, E, 2017, *Measuring Australia's Digital Divide: The Australian Digital Inclusion Index 2017*, RMIT University, Melbourne, for Telstra. Available online at www.digitalinclusionindex.org.au

[42] https://www.dss.gov.au/seniors/be-connected-improving-digital-literacy-for-older-australians

[43] Robert C. Williamson, Michelle Nic Raghnaill, Kirsty Douglas and Dana Sanchez, Technology and Australia's future: New technologies and their role in Australia's security, cultural, democratic, social and economic systems, Australian Council of Learned Academies, September 2015. Available online at: http://users.cecs.anu.edu.au/~williams/TAAF.pdf

social change – for example, the rise of social media has been linked to changes in the way people interact with each other. Many decisions and recommendations are now made in an automated way using internationally developed algorithms, based on retrospective data. We need to develop a deeper understanding for how we retain the cultural and ethical values that are important to us, while also benefiting from these new global systems.

Questions

20. What opportunities do we have to equip Australians with the skills they need for the digital economy, today's jobs, and jobs of the future?

21. What opportunities do we have to bridge the 'digital divide' and make the most of the benefits that digital technologies present for social inclusion?

22. What opportunities do we have to ensure digital technology has a positive impact on the cultural practices and social relationships of Australians?

5. Your views

Australia already has significant areas of strength. We need to build on these strengths and make the most of our opportunities for Australia to fulfil its potential. That's why it's important that we have a robust conversation now to work out how we can best build on what we've done and make the most of the opportunities presented by the digital economy.

How to have a say

We've made it easy to get involved.

To share your views, for more information, or to sign up for strategy updates, visit http://industry.gov.au/digitaleconomy.

You can share your views on some, or all, of the topics and questions – it's entirely up to you.

You can also get in touch with us by emailing digitaleconomy@industry.gov.au.

Alternatively, you can contact us by mail at:

Digital Economy Strategy team
Department of Industry, Innovation and Science
GPO Box 2013
Canberra ACT 2601

You have until 30 November 2017 to engage with the discussion paper and submit your ideas. Get in early to be part of the conversation.