



Australian Government
Department of Industry,
Innovation and Science

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Department of Industry, Innovation and Science

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The inclusion of named companies, products and services in this submission does not indicate endorsement by the Australian Government or Department of Industry, Innovation and Science of those companies, products or services. Named companies, products and services are provided to allow the committee to associate the discussion with a tangible example.

About the department

The Department of Industry, Innovation and Science (the department) drives Australian growth and job creation. It boosts Australia's competitiveness and facilitates economic transformation by backing business, science, innovation and investment. The department's effort relies on building strong relationships between businesses, entrepreneurs, employees, the science community, government, regulators and international partners.

The department facilitates Australia's economic transformation through investment, science and innovation. It supports businesses and employees as they manage market disruptions and seek new opportunities, including those presented by digital technology. It does this by:

- enabling strong science, supporting the research, infrastructure, skills development and collaboration that underpins new discoveries, better living standards and the social wellbeing of all Australians.
- promoting the growth and transformation of internationally competitive industries by enabling business investment, collaboration and international engagement in growth sectors, as well as helping to overcome barriers to their success.
- working with state and territory government counterparts, particularly through the Council of Australian Governments (COAG) Energy Council, to promote Australia's globally competitive resources sector, and supporting best practices in the mining industry to develop Australia's mineral and energy resources.
- coordinating the Government's agenda to unlock the potential of northern Australia and build on its strong primary industries, tourism and access to Asia, including by investing in critical infrastructure, facilitating private investment and developing more opportunities for industries and communities to grow.
- partnering across government to assist employees and businesses in transitioning industries and regions.

The department works to boost business competitiveness to enable businesses to grow and create jobs and prosperity across Australia by:

- helping businesses to improve their productivity, capabilities and networks. In addition to work driving innovation and business collaboration, the department facilitates business engagement in global value chains and supports the development of critical management, entrepreneurial and digital skills.
- contributing to the Government's work providing the enabling environment for business success. The department's work includes tax and regulatory reform, investment in key infrastructure and reducing the cost of doing business, particularly by providing simple, easy to access services and information and helping business to seamlessly engage with government.

Introduction

The Australian Government's ambition is for Australia to be at the global digital frontier, and for all Australians to be able to benefit from digital opportunities. Emerging digital technologies such as artificial intelligence, robotics and the Internet of Things provide significant opportunities for economic growth. Embracing these new technologies can boost national productivity and enhance the competitiveness of Australian industry. This in turn will increase investment, exports, incomes and living standards.

The department welcomes the Senate Select Committee on Financial Technology and Regulatory Technology's inquiry to promote effective and sustainable growth in these industries to enhance Australia's economic competitiveness. These industries are two of the fastest growing sectors within the global financial services industry. With the global financial technology (FinTech) market being valued at about \$128 billion¹ and the global regulatory technology (RegTech) industry estimated to have generated \$5 billion last year², these industries clearly offer significant opportunities for further growth in Australia, and expansion into international markets. FinTech and RegTech solutions have the potential to drive improvements beyond traditional financial services, offering enhanced value and efficiencies to consumers and other sectors of the economy. It is important that the government maximises the potential for a strong FinTech and RegTech industry in Australia and implements complementary policies to support broader digital transformation.

Drawing on the department's policy and program remit to support economic growth and create jobs, this submission focuses on the broader economic context and environment for supporting Australian businesses. The key topics covered in this submission are:

- evidence of the productivity benefits of technology and digital transformation;
- the opportunities of FinTech and RegTech for Australia;
- skills and talent for technology and digital industries; and
- capital availability, funding and tax settings, and the department's activities in respect of these factors.

¹ The Business Research Company 2019, *Global Fintech Market Value is Expected to Reach \$309.98 Billion at a CAGR Of 24.8% Through 2022*, viewed 6 December 2019. <https://www.prnewswire.com/news-releases/global-fintech-market-value-is-expected-to-reach-309-98-billion-at-a-cagr-of-24-8-through-2022--300926069.html>.

² Schizas, E, McKain, G, Zhang, B, Ganbould, A, Kumar, P, Hussain, H, Garvey, K, Huang, E, Huang, A, Wang, S, Yerole mou, N 2019, *The Global RegTech Industry Benchmark Report*, Cambridge Centre for Alternative Finance, University of Cambridge.

1. Digital technologies drive productivity and growth

Australia's ongoing economic success depends on our ability to harness technological advances to improve existing businesses, and create new products and markets. Investment in digital innovations and adoption of these technologies across the economy will be a key factor in lifting Australia's productivity levels.³ Embracing broader digital transformation will become increasingly important as the Australian economy continues to undergo structural changes and transitions to a more diverse economy.

Government has a key role in ensuring Australia embraces the benefits of technological advances and uses them to improve existing businesses, create new products and markets, and enhance daily life. The Minister for Industry, Science and Technology, The Hon Karen Andrews MP, released Australia's digital economy strategy, 'Australia's Tech Future' in December 2018. It sets out a clear and unified narrative about the opportunities of the digital economy and what the government is doing to ensure Australia is well positioned for the future.

Reports by the OECD show that while digital transformation does not yet show up in the aggregate productivity data, it is starting to have impacts on productivity in individual firms – and increasingly also in certain industries.⁴ The OECD estimates that further and larger impacts should emerge as digital transformation evolves and digital technologies, business models and practices diffuse to a greater number of firms and industries, and as digital-intensive firms gain market share.

The department's Office of the Chief Economist's (OCE) *Australian Industry Report 2016* also reported that business investment in digital technologies results in higher productivity.⁵ It is estimated that the adoption of digital technologies could see Australia's gross domestic product (GDP) increase by \$140–250 billion by 2025.⁶

The 'digital' and 'physical' industries have had differing productivity growth since the early 2000s. Figures 1.1 to 1.3 show that industries that are more digitally intensive are more productive, engage more employees and create more output relative to industries that make more use of physical resources.

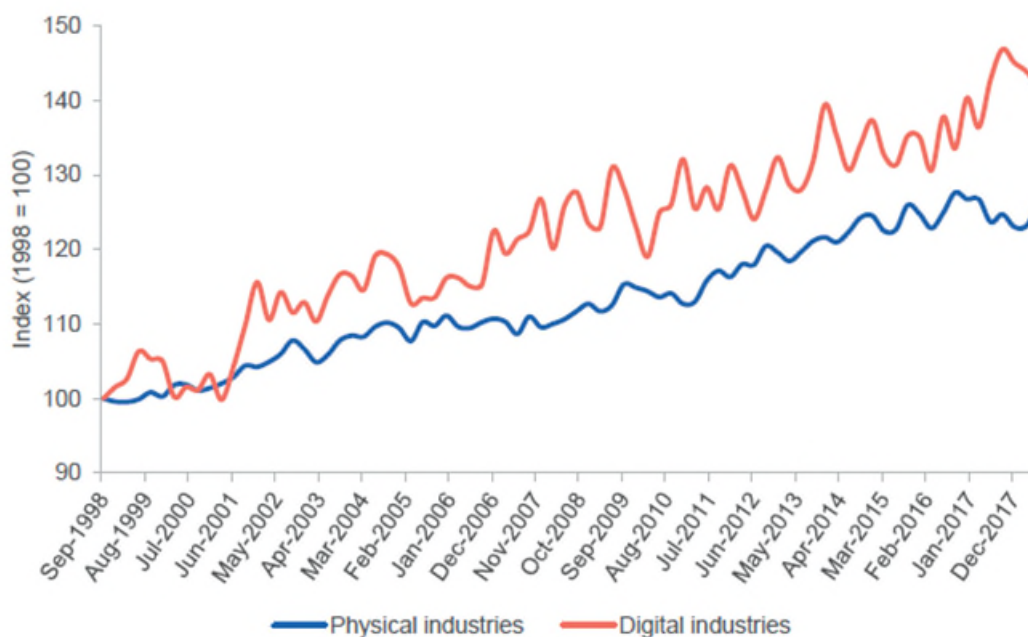
³ Productivity contributed 0.8 percentage points to Australia's output growth in the recent 2011-12 to 2017-18 growth cycle. Australian Bureau of Statistics, 2019, Australian System of National Accounts, cat. no. 5204.0, viewed 12 December 2019, <https://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/5204.0Main%20Features22018-19>

⁴ OECD 2019, *Productivity Growth in the Digital Age*, viewed 3 December 2019, <https://www.oecd.org/going-digital/productivity-growth-in-the-digital-age.pdf>.

⁵ Department of Industry, Innovation and Science (DIIS) 2016, *Australian Industry Report*, Canberra, p. 89. Based on the analysis of Shahiduzzaman, M, Layton, A & Alam, K 2015, 'On the contribution of information and communication technology to productivity growth in Australia', *Economic Change and Restructuring*, vol. 48, no. 3, pp. 281-304.

⁶ Mandel, M & Swanson, B 2017, *The Coming Productivity Boom*, viewed 6 November 2018, <http://www.techcouncil.org/clientuploads/reports/TCC%20Productivity%20Boom%20FINAL.pdf>.

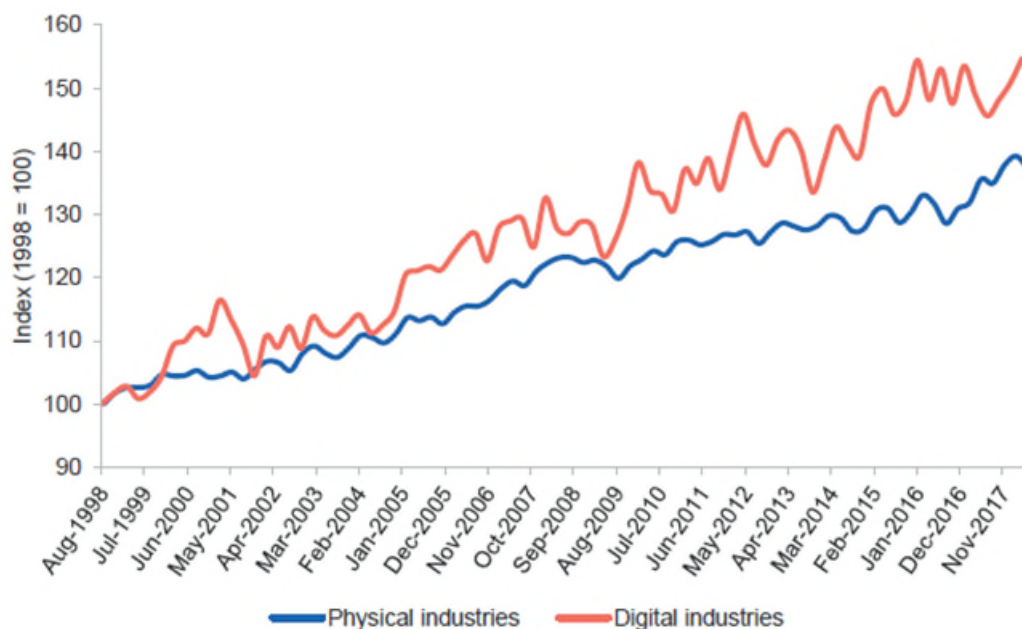
Figure 1.1: Productivity in digital and physical industries, 1998 to 2018



Notes: Figure adopted from Chapter 2 of *Industry Insights*. Methodology is based on Mandel M and Swanson B (2017), *The Productivity Boom*, productivity is calculated as total output divided by total hours worked.

Source: Australian Bureau of Statistics, Labour Force, Australia, Detailed, Quarterly, cat. no. 6291.0.55.003, table 11 and ABS, Australian System of National Accounts, cat. no. 5206, table 6.

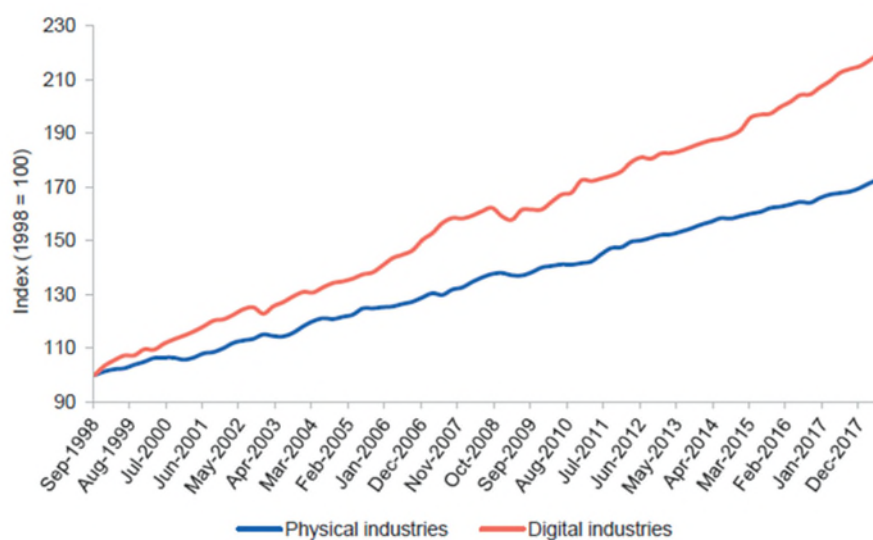
Figure 1.2: Employment in digital and physical industries, 1998 to 2017



Notes: Figure adopted from Chapter 2 of *Industry Insights*. Employment in digital and physical industries, 1998 to 20

Source: Australian Bureau of Statistics, Labour Force, Australia, Detailed, Quarterly, cat. no. 6291.0.55.003, table 11

Figure 1.3: Output in digital and physical industries, 1998 to 2018



Notes: Methodology is based on Mandel M and Swanson B (2017), *The Productivity Boom*.

Source: Australian Bureau of Statistics, Australian System of National Accounts, cat. no. 5206, table 6

Assisting businesses to embrace technology and drive productivity and growth is critical. The gap between technology frontier and non-frontier firms is widening and less innovation is spreading from leading firms to laggards, resulting in less productivity. This is especially true for firms in the ICT services sectors.⁷

Developments in emerging technologies will affect business processes, inputs and assets used to produce goods and services. However, the mere availability of technologies will not guarantee benefits and value for the Australian economy. To successfully capture the benefits from major technological changes, it is essential that these technologies are translated, commercialised and adopted. Greater benefits are likely to be captured where technological change is adopted early, or driven by innovation and research from within the Australian economy.

The adoption of digital technologies can lead to productivity gains through enabling efficiencies within business, automating processes, and producing better quality goods and services at lower prices. Businesses need to ensure they are digitally capable to remain competitive and continue to provide employment.

To succeed in a more digitally enabled and internationally competitive market, our businesses need to be innovative and digitally capable. While many Australian businesses are well placed to embrace these opportunities, this capability is not universal. The rate of digitalisation in Australia appears uneven and dependent on industry sector and business size.⁸

A major challenge for Australia is ensuring that the expected transformative breakthroughs such as in artificial intelligence, robotics and the Internet of Things benefit all industries across the economy.

⁷ Andrews, D, Crisculo, C & Gal, P 2016, "The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy", *OECD Productivity Working Papers*, No. 5, <https://doi.org/10.1787/63629cc9-en> quoted in OECD 2019, *Productivity Growth in the Digital Age*, <https://www.oecd.org/going-digital/productivity-growth-in-the-digital-age.pdf>.

⁸ McKinsey and Company 2017, "Digital Australia: Seizing the opportunity from the Fourth Industrial Revolution".

2. Opportunities of RegTech and FinTech

RegTech and FinTech are two sectors of technological innovation that offer significant opportunities for growth and spillovers into other areas of the economy. Innovations that focus on developing general purpose technologies, such as artificial intelligence (AI), help drive greater productivity than those that support very specialised or niche technology investments. Many innovations in the RegTech and FinTech industries do this. For example, AI platforms are commonly used to help predict and model regulatory risks and tracking of regulatory changes that pose compliance risks. In FinTech, AI through smarter and more intelligent chatbots are on the rise with dynamic changes to the interface between customers and how they organise their financial information.

The AI Roadmap released by the CSIRO's Data61 highlights opportunities for AI to solve some of Australia's biggest national challenges and points to AI as being the missing ingredient in the productivity equation to return the world's advanced economies to stronger growth. One strategic approach to technology development highlighted in the AI Roadmap is for Australia to identify and develop targeted areas of AI specialisation, along with other initiatives, based on evidence that technological specialisation boosts economic growth.⁹

RegTech promises to reduce regulatory costs and barriers

The department is committed to the Australian government's deregulation agenda as a means of unlocking productivity and competitiveness gains for industry. By reducing regulatory burden and compliance costs, businesses save time and money to focus on growing their business, creating more jobs and developing new products and markets. With the cost of compliance with public and private sector rules being reported to cost the nation \$250 billion every year¹⁰, the opportunities for reducing this cost is significant.

RegTech refers to the use of technology, particularly information technology, to streamline and improve regulatory monitoring, reporting and compliance. It promises to cut the cost of compliance processes and to make them quicker and more reliable.

A 2019 report by Medici identifies more than 770 RegTech companies operating around the world¹¹ and Thomson Reuters predicts the global RegTech market to nearly triple in size over the next five years from 2019 to US\$12 billion.¹² Technology such as AI and automation are helping industries

⁹ Evangelista, R., V. Meliciani, and A. Vezzani. 2018. Specialisation in key enabling technologies and regional growth in Europe. *Economics of Innovation and New Technology* 27(3) and OECD. 2013. Innovation-driven growth in regions: The role of smart specialisation quoted in the CSIRO's Data61 2019, *AI Roadmap*, viewed 6 December 2019, <https://data61.csiro.au/en/Our-Research/Our-Work/AI-Roadmap>

¹⁰ Deloitte 2014, *Building the Lucky Country #4: Business imperatives for a prosperous Australia; Get out of your own way, Unleashing productivity*, <https://www2.deloitte.com/au/en/pages/building-lucky-country/articles/get-out-of-your-own-way.html>

¹¹ MEDICI 2019, *Understanding the RegTech Effect in Numbers*, viewed 10 December 2019, <https://gomedici.com/understanding-regtech-effect-in-numbers>

¹² Thomson Reuters 2019, *Thomson Reuters Announces Global RegTech Competition*, viewed 6 December 2019, <https://www.thomsonreuters.com/en/press-releases/2019/august/thomson-reuters-announces-global-regtech-competition.html>

navigate a rapidly evolving regulatory environment and rising costs of compliance. RegTech solutions can be used to flag suspicious transactions in the vast quantities of transaction data reported by businesses to market regulators. In the area of compliance, RegTech can be used to provide audit trails, identify unusual behaviour to minimise human errors and prove to regulators that due diligence has been carried out.

The Cambridge Centre for Alternative Finance's first in-depth study of the RegTech sector suggests the industry is seeing rapid growth and an expanding global footprint.¹³ As of 2018, RegTech firms employed an estimated 44,000 people globally, earned in the region of \$4.9 billion in annual revenue, having raised about \$9.7 billion in external funding to date. The sector is also predicted to see double-digit growth as it matures. With these numbers, the potential for significant growth is clear. RegTech is particularly attractive to governments as it delivers benefits to both regulated entities and regulators through lower costs and better outcomes to the community through increased safety and confidence.

The department delivers a number of initiatives to support the government's aim of growing a vibrant and innovative cyber security ecosystem and of positioning Australia as a cyber secure and trusted destination to do business. This includes the establishment of AustCyber, funding to the Cyber Security Cooperative Research Centre and the Business Management element of the Entrepreneurs' Programme to improve the capability of eligible small and medium businesses, including helping businesses understand their cyber maturity.

Australia's Tech Future highlights that for Australians to reap the benefits of the digital world, industry and governments need to work together to improve trust, confidence and security in the cyber resilience of its digital infrastructure. The strategy referred to the investments and initiatives across government being made in cyber security to ensure our people and businesses are protected from cyber security threats and to help the public feel safe online.

Application of blockchain across the economy

The department observes that blockchain is a promising application in agriculture and food manufacturing, providing transparency and authentication of supply chains. The safety, quality, taste and well-regulated production of Australian-branded agricultural and food goods – which make them popular and high-value commodities in foreign markets—make the Australian brand an attractive target for counterfeiting. The process of growing, producing, manufacturing and transporting goods is complex, with many different participants involved in the process.

The use of blockchain in food provenance and traceability could improve food safety, and protect Australian producers from fraudulent and counterfeit products. For Australian exporters, food and wine fraud in 2017 alone was estimated at over \$1.68 billion according to Food Innovation Australia Ltd. (FIAL).¹⁴ A few examples of how blockchain is being trialled to help address this issue are outlined below.

1. A Sydney company, with assistance from the Food Agility Cooperative Research Centre, is trialling blockchain to create an unbreakable, immutable record tracking beef from paddock

¹³ Schizas, E, McKain, G, Zhang, B, Ganbould, A, Kumar, P, Hussain, H, Garvey, K, Huang, E, Huang, A, Wang, S, Yerolemos, N 2019, *The Global RegTech Industry Benchmark Report*, Cambridge Centre for Alternative Finance, University of Cambridge, https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2019-ccaf-global-regtech-benchmarking-report.pdf

¹⁴ McLeod, R 2017, *Counting the Cost: Lost Australian food and wine export sales due to fraud*, Food Innovation Australia Ltd.

to plate, credentialing the provenance of Australian beef. This information will drive apps for consumers and suppliers, giving them confidence that their meat is 100% Australian.

2. Ecommerce and supply chain management not-for-profit GS1 has developed a Traceability Model that helps to standardise data sharing along a supply chain. It covers data protocols for all activities from procurement, production, processing and manufacturing, distribution, import and export, retail. For example, in Australia traceability is used for manufactured blood products, and meat messaging when exporting to America. The use of an industry web portal facilitates the collection, processing and reporting of serialised carton GS1 barcodes to meet US requirements.

The department is also currently developing a National Blockchain Roadmap to highlight the opportunities posed by blockchain technology across the whole economy, not just the financial sector. The Roadmap will assess sectoral opportunities including in agriculture, credentials for individuals and know-your-customer checks. It will also examine key issues of regulation and standards, skills, capability and innovation, international investment and collaboration in blockchain. The Roadmap is being developed in collaboration with key stakeholders with oversight by an Advisory Committee comprising representatives from industry, academia and government. The Roadmap is expected to be finalised and published early next year.

Australia's involvement in the development of international blockchain standards

Common standards for blockchain are crucial as the technology matures. Currently there is a lack of interoperability between blockchain platforms, and many will require replacement in the near future to remain competitive and to avoid security problems and obsolescence.¹⁵ Standards for blockchain will improve market confidence and support broader rollout of blockchain systems.

The Australian Government provided \$350,000 to Standards Australia to lead the development of international blockchain standards through the International Standards Organisation (ISO).

A new ISO technical committee focused on blockchain and distributed ledger technologies was created following a proposal to ISO from Standards Australia. This ISO committee is developing blockchain standards on a number of key topics including interoperability, terminology, privacy and security and has recently published a technical report on the interactions between smart contracts in blockchain. Common standards will enable the establishment of more extensive and cohesive digital infrastructure and collaboration for blockchain activities and enable a wider range of blockchain-empowered activities.

¹⁵ Content based on Gartner press release [Gartner Predicts 90% of Current Enterprise Blockchain Platform Implementations Will Require Replacement by 2021](https://www.gartner.com/en/newsroom/press-releases/2019-07-03-gartner-predicts-90--of-current-enterprise-blockchain) <https://www.gartner.com/en/newsroom/press-releases/2019-07-03-gartner-predicts-90--of-current-enterprise-blockchain>

3. Skills and talent

Increasing the skills of the workforce, including in FinTech and RegTech industries, will be an important ingredient to raising productivity. New skills and more highly skilled individuals will be required to take advantage of the opportunities technology presents to Australian businesses.

Technology requires new skills and can create new jobs

Technological advances, such as machine learning and artificial intelligence, are already being used by many businesses to reduce errors, increase safety, improve speed and save businesses money. The application of these technologies is expanding and freeing people from more routine tasks resulting in increased focus on activities that create higher value.

While some tasks will be automated, many high-value jobs will also be created, contributing to higher incomes and living standards for the community. Technology can effectively augment human labour and be a force multiplier in the production and the availability of goods and services. McKinsey & Company estimates that by 2030:

- \$170 billion could be added to Australia's annual GDP and an additional 4.1 million jobs could be created; and
- workers will be spending up to 60 per cent more work time on technological tasks, and about 40 per cent more on tasks requiring social and emotional skills.¹⁶

Both individuals, businesses and governments have a role to play in ensuring people can reskill and upskill across their lifetimes to meet job requirements and to transition within and between industries.

- By 2040, AlphaBeta forecasts that the average Australian will spend an additional three hours per week in education and training, and will need to double the share of learning they do after the age of 21, from 19 per cent to 41 per cent.¹⁷
- Education and training systems will need to play their part in meeting the significant future demand for technology workers.
- Businesses will also need to invest in new organisational capabilities to better embrace digital innovation.¹⁸

Findings from the OCE on firm performance is that higher scores on measures of management capability — including scores for overall, digital, environmental, supply chain and strategic management — are associated with higher levels of labour productivity after controlling for firm size, industry and age.¹⁹

The department's Entrepreneurs' Programme, through its Business Management element provides eligible small and medium businesses with support and advice to improve their business management

¹⁶ Taylor, C, Carrigan, J, Noura, H, Ungur, S, van Halder, J, Dandona, G 2019, *Australia's Automation Opportunity*, McKinsey & Company.

¹⁷ AlphaBeta 2018, *Future Skills*, <https://www.alphabeta.com/wp-content/uploads/2019/01/google-skills-report.pdf>

¹⁸ Paunov, C & Planes-Satorra, S 2019, "How are digital technologies changing innovation?: Evidence from agriculture, the automotive industry and retail", *OECD Science, Technology and Industry Policy Papers*, no. 74, OECD Publishing, Paris, <https://doi.org/10.1787/67bbcafe-en>.

¹⁹ Agarwal, R, Bajada, C, Brown, P.A, Moran, I & Balaguer, A 2019, *Development of Management Capability Scores*, Office of the Chief Economist Research Paper no. 10, Canberra.

capability. Technology businesses may be eligible if they are operating in or providing enabling or supporting technologies, inputs or services to drive business growth or improve business competitiveness in one or more of five growth sectors (advanced manufacturing; food and agribusiness; medical technologies and pharmaceuticals; mining equipment; technology and services; and oil gas and energy resources).

The department will continue working to keep workforce skills aligned with current and emerging industry needs and make sure Australia's workforce is adaptive, resilient and well-prepared for the future.

Skilled migration has an important role.

Skilled migration plays a key role in helping firms grow and to compete internationally. OCE research shows that small and medium-sized enterprises (SMEs) across a diverse array of Australian industries made use of skilled migrants and that this lifted their comparative turnover and employment performance.²⁰

Skilled migrants bring innovative ideas and work practices that improve productivity and can open new business opportunities. Skilled migration is a multiplier for employment and OCE found that Australian SMEs did not overly rely on the 457 visa program and did not use it as a substitute for local labour. Technology businesses have advised that skilled and experienced workers from overseas help build local Australian capability through knowledge transfer.

The department will continue to work with the Department of Home Affairs to ensure that Australia's migration program creates pathways for industry to access skilled and specialised workers that cannot be found locally and to attract skilled migrants at the top of their profession to Australia.

Increasing participation of women

Australia supports driving greater participation of girls and women in science, technology, engineering and mathematics (STEM), including in the FinTech industries, strengthening women's entrepreneurship, and bridging the digital gender divide. Achieving this requires a system level response with long-term strategic action from across the sector – government, industry, academia and education – to address the cultural and systemic barriers, as well as compliance with relevant legislation and regulations.

The department provides programs to support women's entrepreneurship. The department administers the Women in STEM and Entrepreneurship grants program to increase the participation of girls and women in STEM and entrepreneurship careers, and increase the number of women in senior leadership and decision making positions.

The department's Boosting Female Founders initiative will provide funding and support for women engaging in innovative entrepreneurship. The initiative is part of the Women's Economic Security Statement announced in November 2018 and is currently in development. It will provide \$18 million in grants (from 2020) to help more women-led startups gain access to finance that will enable them to take their ideas to the global stage. This support is particularly important to women entrepreneurs

²⁰ Rafi, B and Talgaswatta, T 2019, *The characteristics and performance of 457 migrant visa sponsoring businesses*, Office of the Chief Economist Research Paper no. 5, Canberra.

located outside of metropolitan cities, who may miss out on other funding sources due to the concentration of start-up activity in capital cities.

4. Capital availability, funding and tax settings

The department recognises capital availability, funding availability for research and innovation activities, and suitable tax settings for investment, research and development as contributing to a favourable environment for sectors and firms. The department administers (solely or jointly with the ATO) a number of programs that contribute to this favourable environment including:

- Early Stage Venture Capital Limited Partnerships (ESVCLP)
- Venture Capital Limited Partnerships (VCLP)
- R&D Tax Incentive (RDTI)
- Cooperative Research Centres and
- Accelerating Commercialisation element of the Entrepreneurs' Programme.

Role of Venture Capital

Venture capital (VC) is a specialised form of finance suited to high potential young technology-focused businesses targeting rapid growth. It is an alternative to traditional bank finance which is often not readily available to these businesses.

While not all technology-focused startups seek external finance, substantial capital is necessary to finance business expansion and growth. Expansion activities may involve building manufacturing capacity, expanding the customer base, continued product development and entering export markets. VC investment enables accelerated expansion and growth and this is important to exploit 'first mover' advantages. Unlike other forms of finance, VC also helps investee businesses by accompanying funding with strategic knowledge and guidance for investors.

Global investment in FinTech

The CB Insights Global Fintech Report reported global VC-backed FinTech financing of US\$24.6 billion for 2019 to date.²¹ This included 19 investment rounds each exceeding US\$100 million and worth approximately US\$4 billion in the third quarter of 2019. There were 58 VC-backed unicorns worth a combined US\$213.5 billion.²² Six of the 58 unlisted companies were new FinTech unicorns including Australia's Judo Bank. Judo Bank is an Australian 'challenger bank'²³ focused on small and medium-sized lending.

Australian-based Techboard collects data on Australian startups and young tech companies. Over a third (37.4%) of all funding Techboard identified in the 2018-19 financial year was attributed to FinTech.²⁴ A significant portion of this funding is attributable to Judo Bank.

²¹ CB Insights 2019, *Global Fintech Report Q3 2019*. Note: the CB Insights report tracks equity investment into VC-backed FinTech companies. For example, it does not cover companies funded solely by angel investors, private equity firms, or debt finance.

²² Unicorns refer to unlisted companies with a valuation exceeding US\$1 billion

²³ 'Challenger bank' is a term used to describe small, recently established banks competing with large, long-established banks.

²⁴ Techboard 2019, "Australian Startup and Young Technology Company Funding Report FY 2018/19".

Venture Capital in Australia

The VC market in Australia has largely tracked global trends. Australian annual VC investment peaked at \$900 million in 2007-08 according to published Australian Bureau of Statistics (ABS) data. In the years following the global financial crisis, annual VC investment was volatile, averaging around \$300 million from 2010-11 to 2015-16.²⁵

Total VC investment in 2017-18 was \$574 million through 383 investment deals (up from \$463 million through 226 deals in 2016-17). This is the highest level of annual VC investment since 2008-09. The ABS survey reports investment by Australian VC funds. It does not track foreign investment unless made through an Australian-based fund.

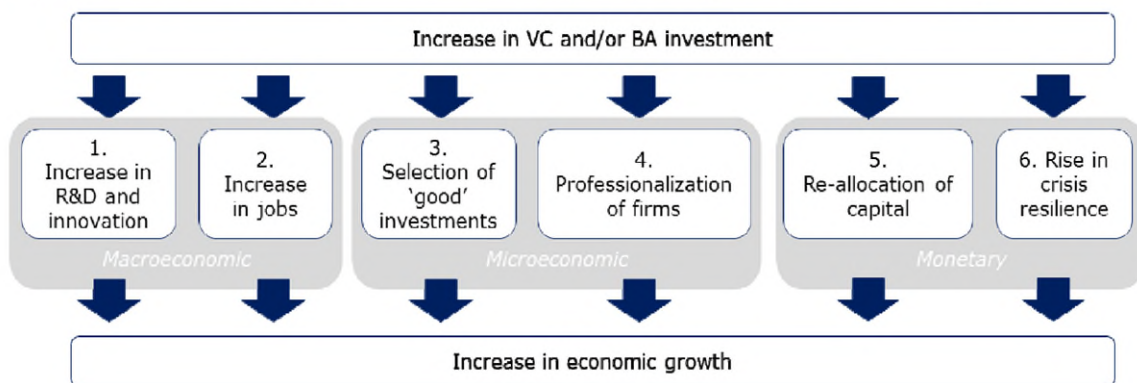
In 2017-18, there was increased activity across most measures related to VC according to ABS data, including the amount invested, number of investment deals and capital commitments yet to be invested (also referred to as 'dry powder').²⁶ According to the ABS, investment is mostly in: information and communications technology (ICT); biotech, pharmaceuticals and health; and manufacturing and transport.

The Australian VC sector is still relatively small by international standards. In 2017-18 VC investment as a percentage of Australia's GDP was 0.030% compared to an OECD average of 0.075%.

How VC increases economic growth

The European Commission's 2017 report²⁷ on the effectiveness of tax incentives for venture capital illustrates the channels through which VC (and business angel investment (BA)) can increase economic growth, as set out below.

Figure 4: Channels through which VC and BA financing increase economic growth



The report refers to research findings that, while most VC financed businesses fail, the outstanding performance of the successful enterprises positively contributes to job creation and economic growth.

The report's analysis also notes VC investment in start-ups increases economic growth through:

- contributing to innovation, with productivity and spillover benefits to the wider economy

²⁵ Australian Bureau of Statistics 2019, 5678.0 – Venture Capital and Later Stage Private Equity, Australia, 2017-18, <https://www.abs.gov.au/ausstats/abs@.nsf/0/BFFEF2819DF68CA2CA256B6B007AB94E?Opendocument>

²⁶ Ibid.

²⁷ European Commission 2017, "Effectiveness of tax incentives for venture capital and business angels to foster the investment of SMEs and start-ups".

- providing knowledge, advice and networking support to investee businesses, enabling their professionalisation and adding value
- contributing to the redistribution of capital from more established businesses to more innovative start-ups with higher rates of return, and
- making businesses more resilient to crises through being less liquidity constrained.

Venture capital programs administered by the department.

The principal programs to encourage VC investment in FinTech businesses in Australia are the ESVCLP and VCLP programs.²⁸

The ESVCLP program provides tax exemptions to domestic and foreign investors on their share of the fund's income and capital gains. Investors also receive a 10 per cent non-refundable tax offset on capital invested during the year. ESVCLPs receive flow-through tax treatment. The partnership is not a taxing point and the income and gains flow through to investors. This avoids double taxation.

The VCLP program is aimed at increasing foreign investment in the Australian VC sector. VCLPs also provide flow-through tax treatment. Eligible foreign investors receive a capital gains tax exemption for gains made on eligible investments.

Providing certainty for FinTech investors

Companies developing technology, including for use in the financial services sector, are eligible for investment by ESVCLPs and VCLPs. However ESVCLPs and VCLPs are not permitted to invest in companies predominantly undertaking financial services activities. The close relationship between FinTech and these ineligible activities had given rise to uncertainty about the eligibility of FinTech investments and some stakeholders expressed concerns that this could constrain investment in Australian FinTechs.

To make it clear that FinTech companies are eligible for investment through the ESVCLP and VCLP programs, the government amended the legislation governing the programs. The changes amended the *Income Tax Assessment Act 1997* to allow investment in companies:

- developing technology for use in relation to finance, insurance or making investments;
- undertaking an activity that is ancillary or incidental to developing technology for finance, insurance or making investments; or
- covered by a finding from Innovation and Science Australia, in force at the time of investment, that it is a substantially novel application of technology.

These measures commenced on 1 January 2019 and apply to investments made on or after 1 July 2018.²⁹

Program data shows ESVCLPs and VCLPs are investing in FinTech and RegTech. In 2018-19 these partnerships invested over \$42 million in 47 FinTech and RegTech companies. This is a significant increase over the last five years, when \$6 million was invested in 4 companies in 2013-14.

²⁸ Further information about the department's venture capital programs is available at <https://www.industry.gov.au/funding-and-incentives/venture-capital>

²⁹ The measures are in the amending legislation, the *Treasury Laws Amendment (Tax Integrity and Other Measures) Act 2018* (the Act), which received Royal Assent on 3 October 2018.

Examples of Australian VC firms investing in local startups

The following examples demonstrate the benefits of VC investment as well the range of opportunities in FinTech:

- Rampersand focuses on early stage investments across a range of sectors within the technology sector, including FinTech, digital infrastructure and digital marketplaces. For example it invests in Spaceship, an Australian FinTech disrupting the investment management industry by engaging and educating young people.
- Reinventure focuses on FinTech and adjacent markets and on investments at seed and venture stages of the early stage company lifecycle. Westpac Bank is an investor in the partnership. For example, Reinventure invests in InDebted, a platform that helps businesses of all sizes collect more debts, in less time, by leveraging modern communications, automation and machine learning.
- Square Peg Capital has invested in Australian unicorn Airwallex which is addressing the high costs of cross-border transactions for businesses by enabling small and medium sized businesses to access interbank exchange rates.
- Blackbird Ventures has invested in 100 businesses through three funds worth \$194 million under the department's early stage venture capital tax concession program, primarily high-tech start-ups developing software and frontier technologies such as autonomous vehicles, robotics and the commercial space industry. Since its initial 2012 investment of \$250k in Canva the software business has grown to be worth more than \$100 million and now employs over 600 people.

Support for research and development

R&D Tax Incentive

R&D is a key driver of innovation, which in turn contributes to economic and productivity growth. The R&D Tax Incentive is a broad based, market driven program that is accessible to all industry sectors. It is the Australian Government's principal measure to encourage industry to invest in the risky R&D they would not otherwise do due to uncertainty around outcomes and the ability to capture benefits, which could spill over to the broader economy.

At a cost of over \$2.0 billion per year in taxpayer support, it is important for the program to be driving this additional investment. The 2016 Review of the R&D Tax Incentive found that it was not fully meeting its stated objectives of inducing additional business investment in R&D and generating spillover benefits. In response to the 2016 Review and Innovation and Science Australia's 2030 Plan, as well as over two years of extensive stakeholder consultation, the Government announced reforms to the R&D Tax Incentive in the 2018-19 Budget to improve its integrity and its effectiveness in encouraging additional business investment in R&D.³⁰

The key elements of the reforms include:

- an R&D intensity premium for larger companies, which replaces the existing 38.5 per cent non-refundable R&D tax offset with a tiered series of thresholds, and provides progressively higher rates of support as a claimant's R&D intensity increases;

³⁰ Further information on the government's R&D Tax Incentive is available at <https://www.industry.gov.au/funding-and-incentives/research-and-development-tax-incentive>

- an annual \$4 million cap on cash refunds for SMEs in tax loss (twice the level recommended in the 2016 Review, and expected to impact around 20 out of over 11,000 current registrants), with the remaining benefits taken as offsets against future profits;
- an increase in the annual R&D expenditure threshold from \$100 million to \$150 million;
- linking the R&D tax offset rate to each claimant's company tax rate; and
- a number of amendments to improve integrity, certainty and transparency (including a requirement to publish claimant names and amounts two years after lodgement).

Legislation to support these reforms was reviewed by the Senate Economics Legislation Committee. The Committee acknowledged the need for reform, but recommended the Senate defer consideration pending refinement of two measures – the \$4 million cap on cash refunds, and the R&D intensity formula.

Revised legislation supporting the R&D Tax Incentive reforms, taking into account the Senate Committee's recommendation, was introduced to the House of Representatives on 5 December 2019. The refinements in the revised legislation included:

- deferring of the start date for the reforms by 12 months, now applying to income years commencing on or after 1 July 2019 –
 - this helps minimise the impact on investment decisions made by businesses before the reforms were announced, including SMEs impacted by the cap on cash refunds; and
- simplifying of the R&D intensity premium by reducing the tiers from four to three –
 - this improves the benefit for initial R&D investment in keeping with the Senate recommendation, but continues to reward those with higher R&D intensity with a higher premium, consistent with the aims of the reforms.

The R&D Tax Incentive will continue to support Information and Communications and Technologies (ICT) and software development where it is eligible R&D as defined by the legislation. In 2017-18, \$4.82 billion dollars was registered under the program for these activities.

While often innovative, not all ICT and software development and other digital innovation activities are eligible R&D, as defined in R&D Tax Incentive legislation. Since 2011, consistent with the program's objectives, this definition has centred on the extent to which outcomes are uncertain without undertaking specific R&D processes, and whether activities are being undertaken with the purpose of generating new knowledge.

However, digital innovation activities frequently utilise approaches that do not rely on a traditional R&D cycle. These approaches can include agile methodologies, incremental improvements to existing products or services, or business model optimisation.

Consequently, a range of digital innovation activities are not eligible for the R&D Tax Incentive, or may have met the definition at one time, but no longer do so due to the pace of technological advancement in this sector. For example, over a relatively short period of time, the outcomes of particular ICT and software development activities become more certain, the knowledge generated no longer new, the risks lower and the benefits easier to capture. As businesses are more likely to invest in these sorts of activities without government support, they are not the intended target of the R&D Tax Incentive.³¹

³¹ The department provides guidance on the scope of the R&D Tax Incentive in respect of software development at <https://www.business.gov.au/Grants-and-Programs/Research-and-Development-Tax-Incentive/Help-guides-and-resources/Software-development>

The limitations of the program's scope, including with regard to digital innovation, has been raised on a number of occasions. For example, it was considered by the 2016 Review, the Government's response to the Review and the Senate inquiry. In all cases, it was agreed that current scope was fit for purpose and should be retained.

To ensure the Government achieves best value for Australian tax payers and is not simply funding businesses to do what they would have done anyway, its support for digital innovation activities needs to be deliberate and targeted. The Government has a range of more direct measures to support and drive broader R&D and innovation of this kind. These include Cooperative Research Centres, Venture Capital incentives (discussed earlier), and elements of the Entrepreneurs' Programme, like Accelerating Commercialisation.

Cooperative Research Centres Program

The Cooperative Research Centres (CRC) Program is longstanding competitive, merit based grant program established in 1990 administered by the department. The program aims to lift levels of industry-research collaboration to assist in supporting science, research, and commercialisation; and enable growth and productivity for globally competitive industries.³²

The program is open to all industries and research sectors including FinTech and RegTech companies. A number of CRCs and CRC-Projects focus on challenges related to the FinTech and RegTech sectors and include start-ups and other companies in these industries. For example, the Capital Markets CRC has successfully brought together expertise in data management, mining and visualisation from industry and university partners in Australia and internationally to advance knowledge and build operational technology solutions working across the domains of the finance, energy and digital finance and health industries. The CRC has developed operational technology solutions to enhance the integrity and efficiency of health, insurance and capital markets in Australia and globally. The work of the Capital Markets CRC also resulted in the spin-out of Digicash, a lead partner in a CRC-P. The project aims to develop next-generation security and trading technology for a smart-contract based marketplace, and make it available to issuers of unlisted securities.

Innovative AgTech solutions have also been supported through the most recent Cooperative CRC-Projects grant round. CRC-Project grants provide funding for short-term (up to 3 years) research collaborations which develop a product, service or process that will solve problems for industry and deliver real outcomes. Examples of the AgTech projects funded are:

1. Growing the medicinal cannabis industry – precision farming to pharmaceuticals

This project will provide the medicinal cannabis industry with step change solutions to its key problems: production costs, product consistency and supply chain traceability. By developing products, processes and services in cultivation, analysis, quality assurance and chain of custody, industry will be enabled to produce safe, uniform and traceable medicinal cannabis products.

2. Live inbound milk supply chain monitoring and logistics for productivity and competitiveness

This project will develop an Internet of Things (IoT)-based System that allows live monitoring of an inbound milk supply chain consisting of 100 dairy farms, milk carriers, and a milk processor. The data collected by the IoT sensors will drive dynamic milk pick up (re)scheduling as the milk quantity and

³² Further information relating to the Cooperative Research Centres (CRC) Program is available at <https://www.industry.gov.au/funding-and-incentives/cooperative-research-centres>

quality varies, track adherence to pick up processes and enable highly accurate milk supply forecasting. These collectively enhance the chain's productivity and competitiveness.

Start-ups and entrepreneurs

Startups across the economy drive net job growth and play an important role in economic transformation. OCE research indicates that around 80 per cent of net jobs growth in Australia over the decade to 2014 is attributed to small young firms.³³

Australia has some of the highest rates of startup activity among developed economies, but indications are that our startups are domestically orientated and generally not scaling internationally. The 2015 Australian Innovation System report notes that Australian entrepreneurs apparently face difficulty generating commercially viable innovative outputs. One explanation for this poor ranking is that a majority of firms are insufficiently outward oriented.³⁴ The Australian Government can invest in job creation by helping startups to exploit global market opportunities.

Startups also provide Australia with the opportunity to diversify its economy and generate export income that is not tied to the resources sector (which currently accounts for over 60% of Australia's exports).

Australian policies and initiatives to support entrepreneurs

The department supports business innovation and the commercialisation of new ideas as critical requirements for productivity and economic growth. Evidence shows that business innovation, business R&D and business-research collaboration all improve business performance; and that innovative entrepreneurship supports job creation. The role of management and leadership in driving innovation, firm performance and building business capability is increasingly recognised.

In addition to the R&D Tax Incentive and venture capital programs mentioned earlier, the department provides support through the Accelerating Commercialisation element of the Entrepreneurs' Programme (EP).

There are no sectoral requirements limiting applicants from the technology sector accessing support through the Accelerating Commercialisation element of EP. There have been many innovative technology companies that have been supported through the element. For example:

- Kasada was awarded a \$484,824 Accelerating Commercialisation Grant under EP in June 2017 to scale their polyform web application security business. The technology stops automated cyber-attacks before they reach a website or web applications. Kasada has since raised \$13.5 million, grown their revenue by 500 per cent and tripled their staff.
- AgriDigital is making global agricultural supply chains simple and easy by connecting all parties to ensure the integrity of the trading, tracing and finance involved. With help from EP, AgriDigital has grown from 22 to 47 staff after receiving a \$1 million Accelerating Commercialisation Grant in July 2017. AgriDigital now has 37 customers and more than 3,000 active users, operates in 30 different countries.
- With help from EP, handdii has developed and commercialised a platform to streamline the process of making property insurance claims. The digital technology behind handdii streamlines the claims process and connects customers, insurers and tradespeople. handdii was awarded

³³ Bakhtiari, S 2019, *Updates on Entrepreneurship Dynamics in Australia*, Office of the Chief Economist Research Paper no. 9, Canberra.

³⁴ Department of Industry, Innovation and Science (DIIS), 2015 *Australian Innovation System Report 2015*, Canberra, p. 83.

Accelerating Commercialisation grant in December 2018 to help to commercialise its platform, which was launched in March 2019 in Melbourne, and has begun expanding nationally.

Support for incubators

Incubators play a key role in improving the entrepreneurial and management competencies and capabilities of innovative startups. They plug a gap in 'entrepreneurship education', by providing innovative startups with the opportunity to learn by doing. International studies indicate that high performing incubators and accelerators, by providing entrepreneurial learning and networks, can improve and accelerate fundraising outcomes and have positive spillovers on regional innovation ecosystems.³⁵

Through its Incubator Support element, the Entrepreneurs' Programme provides funding to incubators to deliver services to Australian start-ups. Funded incubators assist startups with improving business capabilities and prospects of commercial success in international markets. There are no sectoral requirements limiting applicants from the technology sector to apply for the Incubator Support element of EP.

The Incubator Support element of EP is supporting technology based startups located in regional areas, which is one area of concern raised in the Committee's issue paper. For example, the University of New England is supercharging innovation in the Armidale region. UNE's SMART Region Incubator is helping local agribusinesses to pursue opportunities to scale into international markets. Almost 50 local start-ups in Armidale and Tamworth, including in the AgTech sector, are now accessing tailored assistance, accelerator programs and connections with other start-ups to learn from.

³⁵ Gonzalez-Uribe, J & Leatherbee, M 2015 Business Accelerators and New-Venture Performance: Evidence from Start-Up Chile; Hallen, B, Bingham, C & Cohen, S 2014 'Do Accelerators Accelerate?', Academy of Management Annual Meeting Proceedings.

5. Conclusion

Lifting Australia's productivity growth will depend to a large degree on the creation, adoption and diffusion of new technologies as the Australian economy undergoes structural change and transitions to a more diverse economy. The FinTech and RegTech sectors can play an important role in aiding this transformation to a more digitised economy and opening up opportunities for increased exports. Technologies developed for FinTech and RegTech sectors may find use in other sectors of the economy, thereby providing spillover benefits.

Increasing skills of the workforce and addressing other barriers to digital adoption and innovation will allow Australian businesses to take greater advantage of the opportunities presented from technological advances. The department will continue to deliver on the government's priorities for the Australian business community by investing in business, science and innovation through its suite of programs and work across government to create the right enabling environment for business growth and prosperity for all Australians.