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Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/econis-archiv/>

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Australian Government
Productivity Commission

NEW ZEALAND
PRODUCTIVITY COMMISSION
Te Kōmihana Whai Hua o Aotearoa



Growing the digital economy in Australia and New Zealand

Maximising opportunities for SMEs

Joint Research Report
January 2019

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Publications enquiries

Australian Productivity Commission

Phone: +61 2 6240 3200

Email: media@pc.gov.au

New Zealand Productivity Commission

Phone: +64 4 903 5150

Email: info@productivity.govt.nz

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Joint study terms of reference

Growing the Digital Economy and Maximising Opportunities for SMEs – Joint Research by the Productivity Commissions of Australia and New Zealand

Scope of Research

At their annual leaders' meeting in March 2018, the Prime Ministers of Australia and New Zealand commissioned a review into how Australia and New Zealand can work together to remove barriers to growing the digital economy, both between the two countries and into the region, to ensure that the two countries are prepared to seize the opportunities arising from digital transformation. They also commissioned work to identify opportunities for small and medium sized enterprises (SMEs) to make full use of trans-Tasman economic integration.

Growth in digital technologies - and availability of the data that supports them - has enabled a range of new business models, products and insights, providing new trade opportunities and opportunities to boost productivity.

The Productivity Commissions of Australia and New Zealand will undertake joint research to examine priority areas for growing the digital economy, in particular opportunities for SMEs.

In undertaking the research, the Productivity Commissions should explore the extent to which institutional and regulatory settings in the two countries support opportunities for the utilisation of digital technology. In doing so, the Commissions should consider the ability of SMEs to benefit from trans-Tasman economic integration and digital technology, including barriers to entry or expansion and any factors specific to SMEs that might impede them harnessing the opportunities from digital technology.

The Productivity Commissions should focus their attention on areas that offer the greatest potential benefits to both economies.

The Commissions should commence the joint work in September and submit a report to leaders, through the Treasurer of Australia and the Finance Minister of New Zealand, by the end of January 2019. The report will be published.

The Hon Scott Morrison MP
Treasurer

The Hon Grant Robertson MP
Minister of Finance

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Foreword

We welcome the opportunity to work together again — this time identifying priority areas for growth in the digital economy, including opportunities for small and medium enterprises.

In 2012, we jointly reviewed the trans-Tasman economic relationship, which is governed by the Australia–New Zealand Closer Economic Relations Trade Agreement, commonly known as CER. The CER is one of the most comprehensive in the world. Much has been achieved under the Agreement and the subsequent Single Economic Market (SEM) agenda, including elimination of tariffs on goods, facilitation of labour mobility, and regulator collaboration.

The digital economy presents new challenges and opportunities for the trans-Tasman economy and for the Australian and New Zealand Governments. Government efforts to lift digital ‘laggards’ or build national digital niches or champions are unlikely to succeed. Instead, our report identifies opportunities for the Australian and New Zealand Governments to strengthen institutional and regulatory settings that will support greater use of digital technologies. This can be achieved by designing regulatory regimes to enable innovation while controlling potential harms, and by improving the efficiency and effectiveness of government services to firms through greater use of data and digital technologies. In doing so, there are opportunities for the two countries to learn from each other while tailoring responses to domestic preferences and circumstances.

There are also opportunities to build on the demonstrated success and outward focus of the SEM agenda to advance shared interests in international forums. This can include promoting common global standards in areas where Australia and New Zealand have mutual interests, such as a global rules-based trading system and the elimination of non-tariff barriers.

Our report seeks to identify incremental and pragmatic opportunities that complement existing domestic or trans-Tasman policy priorities. Such opportunities exist in the delivery of trans-Tasman financial services, digital identity frameworks, streamlined digital trade processes and other areas.

Our work was constrained by a very tight timeframe with limited scope for our usual consultation and engagement processes. As such, we were not able to address some of the big drivers of the diffusion and use of digital technologies, such as skills and labour market flexibility. However, our established and rigorous inquiry processes make the two Commissions well placed for future investigation of education and training systems and how well they are meeting the needs of workers in a digital economy.

We would like to acknowledge the trans-Tasman team that produced this report: Mary Cavar, Judy Kavanagh, Miriam Veisman-Apter, Dave Heatley, Nik Green, Claire Prideaux and Mike Hayward. We would also like to thank the participants who contributed their views to this research; we held over thirty-five engagement meetings across Australia and New Zealand and met with representatives of other OECD governments.

Murray Sherwin

Chair

New Zealand Productivity Commission

Michael Brennan

Chair

Australian Productivity Commission

January 2019

Glossary

agencies	Used in this report to collectively refer to government departments, ministries, commissions, Crown entities, regulators and similar organisations
agglomeration	The geographic clustering of people, firms and economic activity. This clustering occurs because of cost savings and other benefits when others are located nearby
algorithm	A set of instructions to solve a problem or follow a process
anti-money laundering and countering financing of terrorism (AML/CFT)	Regulatory regimes requiring banks and other organisations to screen financial transactions and report suspicious activity to regulators
artificial intelligence (AI)	A system able to learn and adapt to perform specific tasks normally requiring human-like cognition and intelligence, such as visual perception, speech recognition and problem solving
Australian and New Zealand Standard Industry Classification (ANZSIC)	A system jointly developed by the Australian Bureau of Statistics and Stats NZ to classify industry statistics in New Zealand and Australia. ANZSIC96 and ANZSIC06 refer to the 1996 and 2006 versions respectively
big data	A large volume of structured and unstructured data that has the potential to be mined for information and used in machine learning projects and other advanced analytics applications
cloud	A remote network of computers providing data storage and digital services
complementary investments	Additional investments required to derive value from a primary investment
data	Information translated into a form for efficient storage, transport or processing. Increasingly synonymous with digital information
database	A structured collection of data stored, accessed and updated by a computer system
dataset	A collection of related digital information that can be manipulated independently or collectively
data localisation	Laws or regulations that require data about a nations' citizens or residents be collected, processed and/or stored within that country
diffusion	The process by which a new idea, technology or product is adopted across a society or economy
digital	Of, or pertaining to, the use of binary numbers (zeros and ones) for the representation and manipulation of information
digital economy	Economic activities conducted or facilitated through digital computing technologies. In modern economies, increasingly synonymous with the entire economy
digital good	A 'good' that exists in a digital form and can be replicated digitally to serve many consumers, e.g. a movie, e-book or music track

digital identifier	A persistent identifier that uniquely identifies a person, organisation or object. For example, a driver's licence number, a business registration number or an ISBN number
digital identity	Information that represents a person or organisation on a computer system. A digital identity allows a computer user to prove to a remote system that they are who they say they are
digital identity service	A system that collects, stores and manages the information necessary to determine whether or not a computer user is who they say they are.
digital innovation	A new or novel application of digital technologies to improve a good or service
digital intensity	An assessment or measure of the degree to which a firm or industry uses digital technologies
digital sector	The ICT sector plus platform firms and digital media firms. The latter category includes producers and distributors of movies, TV, videos and music
digital service	A service delivered over a computer network, typically customised for the needs or characteristics of the user. Examples include mapping, video streaming and internet search
digital technologies	Digital systems and applications that store, analyse and communicate information. Used in this report as a generic description for recent advances in technology and in business models, including pervasive internet connectivity, digital platforms, big data, machine learning and social networks
digital transformation	The integration of digital technology into all areas of a firm, government agency or economy in ways that fundamentally change how they operate
digitalisation	Converting physical processes into digital ones
digitisation	The process of converting information from a physical form into a digital one
e-commerce	The buying and selling of goods or services using the internet, and the transfer of money and data to execute these transactions
e-invoice	A machine-readable invoice issued, received and processed electronically. It is digital from its creation in the issuer's financial system until it is received and processed by the recipient
entry barrier	A real or anticipated obstacle that discourages a firm from entering a market
free trade agreement (FTA)	An agreement between two or more countries that regulates (and typically reduces) tariffs and other restrictions on trade between those countries
fintech	Financial technology: specifically, new technologies and innovations that challenge traditional methods of delivering financial services (such as banking)
general purpose technology	A revolutionary and far-reaching technology that enables further innovation across the economy. Historical examples are steam power, the internal combustion engine and electricity
gig economy	A labour market characterised by the prevalence of short-term contracts or freelance work as opposed to permanent jobs.
harmonisation	The process of two (or more) countries establishing laws or regulations that are identical or interoperable

ICT sector	The collection of firms in an economy whose main activity is the production of software, computer or communications hardware, or information or communications services
increasing returns to scale	A situation in which output from a production process increases by a larger proportion than an increase in inputs
information and communications technology (ICT)	Telecommunications, broadcast media and information technology. ICT is a more encompassing term than IT
information technology (IT)	Computer-based information systems, networks and software
intangible assets	Non-physical assets, such as reputation, brands, datasets, skills, market research and patents
latency	The delay incurred in transporting data over a distance
machine learning	A system with the ability to automatically learn and improve from pre-existing datasets and experience, rather than being explicitly programmed for a task
monopoly	A market with a single supplier of a product or service. A monopoly is characterised by an absence of competition, which often leads to high prices and inferior products
multi-factor productivity (MFP)	Changes in output that cannot be attributed to changes in the level of labour or capital input. It captures factors such as advances in knowledge and improvements in management and production techniques
mutual recognition	Where two jurisdictions agree to recognise each other's laws or regulations
network effects	Network effects occur when a product or service becomes more valuable to customers as more customers choose to use or access it
non-rivalry	Non-rivalry of a good or service means consumption by one person does not reduce its value to others. For example, music does not become less valuable to listeners should others hear it
non-tariff barriers	Barriers to international trade other than tariffs and trade quotas. For example, the cost of complying with domestic labelling requirements and restrictions on foreign firms' operations and investment
open banking	A banking system in which customers can securely access information held by a bank about them and share that data with third parties
open data	Data that can be freely copied and used (i.e. without payment to, or restriction by, its owners or collators)
platform	In this report, a digital platform. Software systems that match buyers, sellers, advertisers and other participants, creating or expanding trade in goods and services
procurement	Purchase of goods and services by government and the processes surrounding such purchases
productivity	A measure of output per unit of input
reallocation	The transfer of labour, capital or other resources from one firm, industry or region to another. As new technology develops, reallocation is required to put assets to their most productive use
regulatory capture	A form of government failure where regulators or regulations are overly influenced by incumbent firms or interest groups, and that favours their interests over those of consumers or potential competitors

Single Economic Market (SEM)	A 2004 rejuvenation of the Australia–New Zealand Closer Economic Relations Trade Agreement
single log-in	A system that allows the same username and password to be used to access multiple digital services. Also called a single sign-on
small to medium enterprise (SME)	A firm with less than 200 employees. Note that this report draws on sources that use a variety of employment-size criteria
transaction costs	Costs incurred by the parties making an economic exchange, other than the amount paid directly for the good or service purchased
tangible assets	Physical assets, such as land, buildings and computers

Executive summary

Digital technologies have transformed nearly every aspect of daily interactions between households, firms and governments. For consumers, digital technologies have brought about lower prices, increased choice and better information, but also new potential risks. Firms can face disruptive change from digital technologies — while innovators and fast adopters of new technologies may thrive, others may struggle to adapt to the digital economy. For governments, digital technologies are prompting large-scale changes, from the design of regulation to the delivery of services.

The Australian and New Zealand Productivity Commissions were tasked with examining priority areas for growing the digital economy — in particular, opportunities for small to medium enterprises (SMEs). Given the ubiquitous nature of ‘digital’ in everyday life, there is little to differentiate the digital economy from the broader economy; in other words, the digital economy *is* the economy. Therefore, to identify growth opportunities, we looked at the broad challenges and opportunities created by the digital economy and at what institutional and regulatory settings by the Australian and New Zealand Governments would be most effective.

Australia and New Zealand in the digital economy

Digital technology has transformed many aspects of the economy, but some things have not changed. Digital technologies have not ‘made the world flat’, as some commentators expected a decade ago. Rather than overcoming the distance between Australia, New Zealand and the rest of the world, digital technologies have increased the returns to scale and agglomeration. Most digital innovation and its commercialisation occurs in other countries, and proximity to innovation centres is increasingly important for firms and entrepreneurs.

In the context of the global digital economy, Australia and New Zealand are more similar than different. Australian and New Zealand consumers are fast adopters and avid users of digital services and technologies. Many of the benefits of digital technology improve the wellbeing of consumers directly, without appearing in GDP measures.

There are numerous examples of innovation by Australian and New Zealand firms, but most are not at the forefront of digital invention and production. Firms have high levels of access to the internet and a sizable proportion of firms use the internet for sales. Yet, adoption of digital technologies varies widely by industry and by firms within industries. The rate of diffusion of different digital technologies likely reflects the costs and benefits of their application by industry and rational individual decisions by firms.

There is no simple remedy that will transform firms from conventional users of technology into digital leaders. Government programmes to lift digital ‘laggards’ that target digital skills or capabilities are unlikely to make much difference to firm performance. Similarly, efforts to build national digital niches or champions face stiff international competition. What is more important for SMEs — and indeed, the broader economy — is the enabling environment that the Australian and New Zealand Governments can create, both domestically and trans-Tasman. In such an environment, firms can make their own choices about which technologies will benefit them and which ones will not.

An enabling environment requires infrastructure, skilled workers, open and competitive markets and effective institutions. In many of these areas, Australia and New Zealand are ranked highly compared with other advanced economies. Making further progress will depend on strengthening those foundations and implementing other steps identified in this report, including:

- designing regulatory regimes to enable innovation while controlling harms
- using data and digital technologies to improve the efficiency and effectiveness of government services to firms
- working together to develop and promote regional and global standards that enable greater use and diffusion of digital technologies.

Fit-for-purpose regulation

Firms in New Zealand and Australia are not large by world standards. New firms are typically small and failure rates for new firms are high. Due to their restricted resources, small firms are most affected by regulatory inefficiency and the high fixed costs of compliance.

Digital innovation is putting many regulatory regimes under pressure. Technology can change at a faster pace than regulators can manage. It creates new goods and services (everything from video streaming services to driverless cars) that current regimes did not anticipate, or where the responsibilities of multiple regimes overlap or are unclear.

Many regulators are playing catch-up in a digital world, and this can create an uneven playing field from which incumbent firms can benefit. Regulatory capture, excessive risk-aversion by regulators, regulation that does not balance costs, benefits and risks, or that sets unworkable standards can prevent the entry of new, innovative goods and services or make their diffusion unnecessarily slow and costly. Conversely, there are instances where new entrants have taken advantage of regulatory loopholes to grow unhindered by the regulations that incumbent firms must comply with.

Nonetheless, some regulators in Australia and New Zealand, such as those overseeing financial markets, have responded to the emergence of innovative firms by creating new tools to support start-ups, while maintaining regulatory oversight.

The digital economy continues to throw up new challenges for regulators yet the traditional principles for good regulation remain highly relevant. Regulatory regimes should be technology neutral and be regularly reviewed. Such reviews should consider whether new technologies provide adequate protections that can replace regulation, or whether the technologies create harms that require further mitigation.

Some issues are particularly challenging to manage, including how to apply consumer law to digital and cross-border transactions and how to address the market power of global platforms. Greater cooperation between trans-Tasman agencies, and action to strengthen consumer protection in trade agreements and global trade rules, would be beneficial.

Transforming government services

The efficiency and effectiveness of interactions with government agencies — from registering a motor vehicle to completing a tax return — have been improved using digital technologies. But ‘digital government’ remains far from a reality. Because the transaction costs created by government interactions can fall more heavily on smaller firms than on larger ones, further reductions in those costs could be particularly beneficial to SMEs.

Governments in Australia and New Zealand have integrated a range of ICT and digital technologies into their operations, delivering cost savings in back-office processing and, in many cases, lowering transaction costs for service users. However, governments in Australia and New Zealand are yet to realise the full potential of data and digital technologies for the delivery of public services. To do so will require complementary investments, capability building, and sometimes cultural and organisational change. Over time, digital technologies could shift the boundaries of government itself — that is, what government owns as opposed to rents, or produces as opposed to purchases from external providers.

When adopting digital technologies for service delivery, governments should design their systems from a customer-focused perspective, so that users of digital government services can carry out those interactions more easily. Further digitalisation of government services would also create opportunities for SMEs to participate in more markets, including through government procurement.

SMEs can have trouble finding all the government information they need, such as information on compliance and the opportunities available to them. Along with streamlining information sources more generally, there is potential for government agencies to tailor information and service delivery to individual firms, using the data already held about them.

Priorities for trans-Tasman policy

The digitalisation of the economy presents new opportunities for trans-Tasman collaboration and integration.

Given the long and largely successful history of trans-Tasman integration, few barriers to trade remain. Some of these, such as complex trade compliance systems, can be simplified using digital technology. Removing others — such as the limitations on cross-border sharing of credit reporting — would require relatively small changes to legal frameworks, which are already largely aligned.

Individuals and SMEs that work or trade across the Tasman can face high money transfer costs; in effect, these act as a tariff on trade. The Australian Competition and Consumer Commission is currently investigating the supply of currency conversion services in Australia, and the New Zealand Government could carry out a parallel study.

Future momentum in Single Economic Market (SEM) policy development can come from thinking broadly about what the two countries can achieve together, such as by creating joint standards to support growth in the digital economy, and by working together on the international stage. Table 1 summarises our suggested additions to the SEM agenda. Taken together, these measures could have a beneficial impact on the trans-Tasman economy in the digital era.

In digital financial services, New Zealand could join in the development of open banking standards, which is currently underway in Australia. Open banking is due to start in Australia in mid-2019. It has the potential to support greater competition in the financial system, which can benefit individuals and SMEs.

The Australian and New Zealand Governments can work on together on other digital policies that would help grow the trans-Tasman economy. For example, trans-Tasman

recognition of digital identities could improve trust and streamline transactions for individuals and firms interacting with governments across the Tasman.

The two countries can also work together to address non-tariff barriers that affect digital goods and services, such as data localisation, privacy and intellectual property laws. Australia and New Zealand should take an active part in international digital trade rule negotiations and put forward balanced, evidence-based proposals for consideration.

Table 1 Suggested additions to the Single Economic Market agenda

	<i>Action required</i>	<i>Expected benefit</i>
Data sharing		
Trans-Tasman sharing of credit information	Minor changes and clarification to privacy legislation	Improved access to finance for individuals and SMEs operating trans-Tasman
New Zealand researchers to be considered trusted users in Australia's new data sharing and release framework	The upcoming Australian <i>Data Sharing and Release Act</i> would include specific mechanisms to enable New Zealand researchers to become trusted users	More trans-Tasman sharing of data and collaboration in research
Digital financial services		
Joint open banking standards	Including New Zealand representatives in the open banking working groups in Australia	Improved trans-Tasman banking services; growth in the fintech sector
Currency conversion	New Zealand Government action to mirror the Australian Competition and Consumer Commission inquiry into foreign currency conversion costs	Lower costs of trans-Tasman payments and funds transfers
Digital trade		
Digitalising trade compliance processes	Completing trials for mutual recognition of supply chain security and a secure trade lane, and moving to full implementation Aligning standards for the data collected from importers and exporters, such that data is collected once and shared across borders	More efficient trans-Tasman trade; less paperwork; lower compliance costs for SMEs
Trans-Tasman recognition of digital identity services	Agreement between the Australian and New Zealand Governments to recognise digital identity services	Streamlined online trans-Tasman interactions between individuals, firms and governments
Cross-border consumer protection	Develop a consumer protection framework that encompasses cross-border transactions	More trans-Tasman digital transactions; more effective consumer redress for unsatisfactory transactions
Addressing barriers to digital trade, such as shortcomings in intellectual property legislation	Updating intellectual property legislation in both countries	Enable more innovation and trade as well as greater adoption of digital technology
Improving global digital trade rules	Collaboration between the Australian and New Zealand Governments in international forums	Reducing, eliminating or avoiding non-tariff barriers to international digital trade

1 Australia and New Zealand in the digital economy

Key points

- Digital technologies are part of everyday life and business in Australia and New Zealand. Households are intensive users of digital services and technologies. Firms have high levels of access to the internet and a sizable proportion of firms use the internet for sales. However, the digital technologies used, and the rate of adoption, differ by industry.
- Despite widespread adoption, the full impact of digital technologies is not apparent in national productivity figures. Many of the benefits of digital technologies increase consumer wellbeing but are not reflected in standard economic measures.
- Digital goods and services create many benefits for firms and individuals, including greater convenience, lower prices, more choice and better information. They can also lead to disruption — changing the nature of work and the profitability of existing business models and investments.
- Digital technologies have not eliminated the ‘curse of distance’ that affects Australia and New Zealand. Rather, they have reinforced the economic value of being close to large markets and to other innovative firms. The production of digital goods, services and technologies has become concentrated in a small number of countries.
- In both Australia and New Zealand, there is evidence of innovation, productivity growth and increasing use of data even in industries with apparently low levels of ‘digital intensity’. However, the majority of firms — with a few notable exceptions — are not at the forefront of digital innovation and production.
- Government attempts to lift digital ‘laggards’, or build national digital champions or niches, are unlikely to succeed. Governments can, however, develop environments that promote the beneficial uptake and diffusion of digital technologies, allowing firms to make their own choices about what technologies will benefit them.
- To grow the digital economy, governments can improve regulation, use digital technologies to improve government services, and strengthen aspects of trans-Tasman cooperation.

Few activities in the modern economy are unaffected by digital technology. The falling costs and rising quality of digital goods and services have fundamentally changed both consumption and production — and this process has had a substantial effect on the Australian and New Zealand economies. In New Zealand, for example, the Weta Group of film and television production companies began as a small model and prop-making firm. It is now a large-scale digital effects and digitally-based post-production services provider, with a global reputation. It has

won numerous international awards, including Academy Awards, and has experienced rapid revenue growth (NZIER 2017).

While many firms use digital technologies, a much smaller number produce them. Statistical agencies (including the Australian Bureau of Statistics (ABS) and Stats NZ) classify firms into industries and sectors based on their primary activity. They typically group information and communications firms into an ICT sector. Such firms represent a small proportion — at most 10% — of the total economy. But many industries have adopted digital technologies, even when the core service has remained unchanged for many decades (box 1.1).

Box 1.1 Digital technology is pervasive throughout the economy

Is every firm now a digital firm? Consider a plumber — the pipes have not changed since 1979^a, but almost everything else has. Many of the activities below are common to all firms.

Plumbing business activities, 1979 and 2019

<i>Activity</i>	<i>1979</i>	<i>2019</i>
Marketing	Yellow pages	Google AdWords, own website
Accounting	Hand-written ledgers	Xero or MYOB
Accepting payments	Cheque in the mail	Electronic card reader attached to phone; internet banking
Making payments	Cheque in the mail	Internet banking; PayPal
Finding pipes	Paper maps — or dig and hope	GPS and digital maps; digital pipe locators
Accepting orders and dispatch	Telephone	Online booking; mobile phone
Reputation and customer feedback	Word of mouth	Reputation rating website (e.g. No Cowboys)
Customer management	Card file	Customer relationship management software
Pipe inspection	Dig it up and look	Video camera
Occupational licensing	Separate licence required in NZ and each Australian State and Territory	Mutual recognition agreements are in place ^b

^a We chose 1979 as a reference point as in that year the first software generally useful for small firms — the VisiCalc spreadsheet — was released. It ran on an Apple II personal computer.

^b The 1992 Mutual Recognition Agreement between the Australian State, Territory and Commonwealth Governments, and the 1996 Trans-Tasman Mutual Recognition Arrangement between Australia and New Zealand, cover many regulated occupations, including plumbers.

A narrow focus on the producers of digital technologies overlooks the wider benefits, opportunities and impacts of these technologies on the wider economy and society. This report therefore starts from the position proposed by the International Monetary

Fund (2018, p. 7), that ‘all activities that use digitized data are part of the digital economy: in modern economies, the entire economy’.

It follows that the digital economy is not something that can be easily separated from the total economy. Accordingly, we interpret ‘growing the digital economy’ as increasing the use of data and digital technologies in ways that grow the economy.

F1.1

Digital technology is pervasive throughout the economy to the extent that it is difficult, and of little value, to separate out the digital economy from the broader economy. In effect, the digital economy *is* the economy.

1.1 Why digital matters

The development and diffusion of digital technologies has been characterised as a fourth industrial revolution, following on — but distinct from — earlier revolutions based on steam, electricity and ICT (Schwab 2016). Digital technology has altered the way firms and individuals produce, access and use information, by combining ‘technological and human capacities in an unprecedented way’ through developments such as self-learning algorithms, big data analytics and human-machine interconnection (Schäfer 2018, p. 6).

Part of the transformational effect of digital technologies is due to the unusual characteristics of data.

- Physical goods need to be stored and transported to consumers at considerable expense, while digital goods are ‘moved’ by copying an original. This dramatically lowers transport and trade costs, especially where digital goods substitute for physical versions (e.g. e-books as opposed to hard-copy books) (Quah 2003).
- Data can be copied at relatively low cost and with no loss of fidelity (Shapiro and Varian 1999), and use by one person does not, of itself, prevent another from using that data (in economic terms, this is known as non-rivalry) (Duch-Brown, Martens and Mueller-Langer 2017). These two properties allow both larger production runs and greater consumption than is possible or cost-effective with physical goods. However, they can also require producers to take additional steps (e.g. paywalls or subscription access) to protect their investments from piracy and free-riding.

- Whereas physical capital depreciates with use, data does not wear out and can be reused for multiple purposes (Tucker 2018). This can reduce costs for firms and consumers, and increase the value extracted.

Earlier industrial revolutions primarily transformed production processes; but digital technologies have changed production, consumption, and the nature of the transaction between producers and consumers (table 1.1). While the uptake of digital goods and services by consumers has been rapid, the diffusion of digital technologies across firms and industries has been variable (Andrews, Nicoletti and Timiliotis 2018).

Table 1.1 Examples of what digital technologies can do ...

<i>... for producers</i>	<i>... for consumers</i>
Greater opportunities for outsourcing elements of production and distributed production	More personalised services (as data permits better targeting)
Reduced costs of experimentation and lowered size of a minimum viable firm	Greater consumer empowerment (e.g. through review and rating functions)
Improved abilities to monitor performance and target clients (e.g. application of data analytics)	More channels through which to purchase goods and services (e.g. internet-based purchases of groceries vs. visiting 'brick-and-mortar' stores)
Reduced need for some forms of capital investment (e.g. cloud services replacing in-house servers) and hence lower production costs	Opportunities to earn income from household assets and human capital (e.g. Airbnb, Uber and TaskRabbit)

Australians and New Zealanders are avid consumers of digital goods and services (figure B.1 — see appendix B) and make online purchases at higher rates than the OECD average (figure B.2). For example, Book Depository, one of the world's largest online book sellers, claims that New Zealand is its second largest international market (Forster 2018). This may reflect a desire by Australians and New Zealanders to access the product variety that is a feature of larger markets.

Australian and New Zealand firms also have very high levels of access to the internet and broadband, and a significant proportion use the internet for sales (tables B.1 and B.2). But the uptake of digital technologies that have the potential to transform how firms operate, such as cloud computing and data analytics, remains low in the majority of industries, and is particularly low among small to medium enterprises (SMEs) (table B.3) (SBDT 2018). We explore the reasons for this in section 1.3.

Digital technologies create many benefits ...

The benefits for consumers and firms from digital technologies are numerous, including more convenience, lower prices, more choice and better information.

Convenience

There are many examples of the convenience offered by digital technologies. Services such as Google Maps allow visitors to cities to find their way around and help residents to select the fastest routes to work, home or play. Google Maps was estimated to reduce average private driving times by 8% and public transport travel times by 13% in Auckland in 2015. These transport efficiencies would translate into savings of between 14 500 and 19 500 tonnes of carbon dioxide from vehicle emissions in New Zealand each year (AlphaBeta 2017). In Australia, Google Maps was estimated to save each driver (and their passengers) 13.5 hours on the road, 13 hours on public transport and 2.5 hours of walking in the 2014–15 year (AlphaBeta 2015).

Other services free people and firms from the need to own physical goods or invest in storage.

- Rather than having shelves full of invoices and accounts, firms can now store all their financial information electronically using cloud storage services and process it using cloud-based accounting packages (e.g. MYOB and Xero).
- Instead of owning large numbers of CDs or buying individual songs and storing them on a hard drive, people can now use (free or subscription-based) music streaming services (e.g. Spotify and Apple Music) to immediately access a huge variety of music. Similarly, online services (e.g. Texture and Kindle Unlimited) allow subscribers to access new editions and back catalogues of many magazines and newspapers, freeing up bookshelves, coffee tables, recycling depots and rubbish dumps.

Lower prices and new ways of trading

Platforms are systems that match buyers, sellers, advertisers and other participants, creating or expanding trade in goods and services. They are a distinct feature of the digital era. Examples include Tinder, which matches singles for chats and dates, Trade Me and Gumtree, which match sellers to buyers, and Uber Eats, which creates three-way matches of restaurants, diners and drivers.

While the idea of a platform is not new (in effect, every market place is a platform that matches buyers and sellers), digital platforms can have global span, linking

far greater numbers of potential participants than earlier technologies. Platforms standardise terms and conditions, and most simplify payment. They have also introduced innovative ways to reduce risks for participants. Apple's App Store, for example, uses automated quality control software to screen out apps that might contain malware (software designed to harm app users or others). Tinder holds contact details but does not share them until both parties to a match agree. Airbnb uses identity checks and reputational scoring to reduce risks to property owners and renters.

Such digital platforms can create trade in goods and services that were previously untradeable, such as ridesharing services or short-term rentals of spare rooms in private homes. This increases the productivity of those assets, and of the wider economy.

More generally, firms with new business models can disrupt incumbent firms, increasing competition and lowering prices. For example, Australian Uber services in 2015 were 'on average, just under 20 per cent cheaper than the equivalent taxi fare, including dynamic pricing', creating an estimated total annual consumer benefit of A\$81 million (Deloitte Access Economics 2016, p. 1).

Platforms collect substantial amounts of data about how their services are used and by whom. This data can serve many purposes, including personalising the service, improving service quality and targeting advertising. Data can also be sold to third parties. Revenue from advertising and data sales can subsidise services for consumers, even making them free. Google's business model, for example, is to give away search services and sell advertising.

New technologies can reduce the prices faced by consumers and firms to zero. In the case of photography, the development of digital cameras, falling costs and their inclusion into smartphones, saw the number of photos taken worldwide increase from 80 billion in 2000 to 1.6 trillion by 2015. The price per photo over the same period fell from US\$0.50 to zero. These price reductions were accompanied by quality and convenience improvements, such as less waste, immediate processing and free photo touch-up software (Varian 2016). On the other hand, shops developing film have all but disappeared.

More choice

Small markets such as those in Australia and New Zealand can typically only support a limited number of goods and services. Online retail services such as Amazon, Book Depository and Alibaba increase the effective size of the two markets, by allowing Australian and New Zealand residents to find and purchase a

wider variety of products than are available locally. Similarly, internet search and advertising services allow Australian and New Zealand firms to access more potential customers at lower costs than traditional modes of advertising and marketing.¹

Better information

Digital technologies can improve information flows to consumers and firms, allowing them to make better decisions. Review platforms and functionalities allow people to access and generate more up-to-date information about the quality of goods and services (e.g. TripAdvisor, as opposed to physical travel guide books). Aggregator websites allow consumers to easily compare products by price or other attributes. In New Zealand, the Electricity Authority and Consumer New Zealand have set up websites to allow households or firms to find the cheapest and most suitable electricity and gas pricing plans. The Victorian Government has set up a similar service, called Victoria Energy Compare.

... but can bring disruption for workers, entrepreneurs and investors ...

While the application of digital technologies can have clear benefits for consumers, they may also create costs or risks for workers, entrepreneurs and investors. High levels of innovation and the growing entry of new products and services increase the chance that a worker's skills will be devalued or made obsolete, an entrepreneur's venture will be driven out by a more profitable business model, and an investor's stake in an incumbent firm will be wiped out by new entrants. This disruption is part of the way markets evolve — and governments cannot hasten nor stop this process (APC 2016b).

In normal circumstances, there is a considerable amount of churn in the economy. Firm birth, growth, decline and death is a dynamic process. Firm decline and job losses create room for new firms, new investment opportunities and new jobs (Meehan and Zheng 2015). There is some evidence that, in New Zealand, ICT and digital content and media firms comprise a growing share of this dynamic. Such firms tend to be born small and die young; but, if they survive, they grow faster than other firms (Stephenson 2019) (figure B.9).

¹ AlphaBeta (2017) estimated the benefit to New Zealand firms in 2015 from Google Search and AdWords at more than NZ\$2.9 billion. The benefit to Australian firms in 2014-15 was estimated at A\$14.5 billion (AlphaBeta 2015).

Productivity growth in OECD countries is driven by small numbers of firms at the frontier of knowledge, and the gap between these ‘frontier’ firms and the rest of the economy is widening. Many of these ‘frontier’ firms are heavy investors in, and creators of, knowledge-based capital, including digital technologies (Andrews, Criscuolo and Gal 2016). Where there are low levels of competition, the diffusion of knowledge and technology from the ‘frontier’ to the rest of the economy is slow, as is the reallocation of resources from laggards to leaders (Conway and New Zealand Productivity Commission 2016).

Markets for digital goods and services also tend to exhibit a ‘winner-takes-most’ dynamic, which could lead to a growing concentration of wealth in a small number of ‘superstar’ firms (Autor et al. 2017). On the other hand, market dominance is often temporary in technology markets, as demonstrated by the decline of many once-dominant firms including IBM, Nokia, Blackberry and Myspace.

We will not be exploring firm dynamics and the nature and implications of technological disruption on labour markets further in this report. The Australian Productivity Commission (APC) (2016b) addressed some of these issues in its report *Digital Disruption: what do governments need to do?* and the New Zealand Productivity Commission (NZPC) will be considering the impacts of technological disruption on the future of work in an upcoming inquiry (Robertson 2018).

... and new digital harms

New technology brings potential harms as well as benefits, and digital technologies are no exception. Some of these harms can have very serious implications, in particular for vulnerable people and children who can be exposed to offensive materials online or approached by people with malicious intent through social media and online game forums (UNICEF 2018).

From the perspective of firms, there are new potential harms brought about by cyber-attacks and the need to keep data safe. Review functions — generally a positive feature, and especially important for SMEs seeking to build a reputation — can also be misused or have unintended consequences.

Box 1.2 describes a recent example of just how important good reviews can be to a firms’ reputation, and how easily (and even unintentionally) that reputation can be damaged.

Box 1.2 **Failing the grade: when schoolyard humour goes viral**

Victoria's senior secondary English exam for 2018 included a question where students were asked to analyse a 'scathing review' of the (fictional) Calmer Coffee café. The fictional reviewer criticised the café's 'exhaustive list of frappes, soy and almond milks', a 'tablet-wielding' employee with a man bun, and its terrible coffee.

Unfortunately, the fictional subject of the exam question had a real-life namesake in the Melbourne suburb of Aberfeldie. Shortly after the English exam ended, the Calmer Café was inundated by school students leaving joke negative reviews on Google, which mirrored the fictional comments in the exam. The café's Google rating plunged from 5 to 3.5 stars, leading the owner to plead with students to stop leaving the reviews:

'I'm shaking from head to foot,' [Ms. Jenkins] said. 'We are a small business and these reviews mean a lot.'

The owner of Calmer Café ultimately decided to take legal action against the Victorian Curriculum and Assessment Authority, because of concerns over the long-term damage caused to the café's reputation.

Sources: Cook (2018); Cook and Webb (2018).

Chapter 2 discusses the issues and challenges of regulating digital harms.

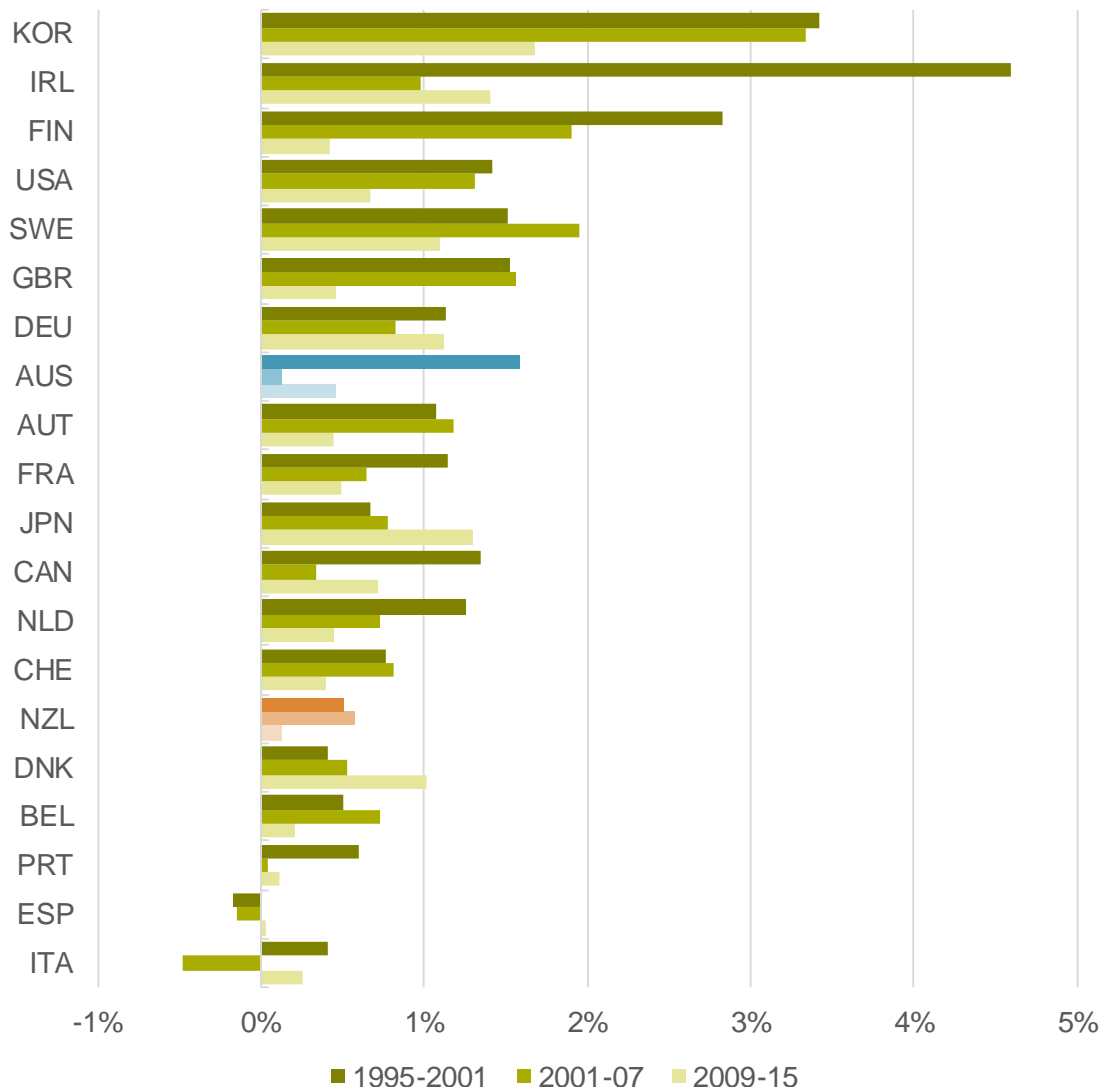
1.2 If digital is everywhere, where is its productivity impact?

Although digital technologies are spreading throughout the economy, there does not seem to have been much impact on measured productivity growth. Australia and New Zealand both experienced a productivity slowdown over 1995–2015. Multifactor productivity growth rates in both countries over 2009–2015 were much lower than those experienced in 1995–2001 (figure 1.1).

These trends are not unique to Australia and New Zealand — they appear across other advanced economies (Andrews, Nicoletti and Timiliotis 2018). They are also not unprecedented. Earlier general-purpose technologies also took time to translate into higher productivity. In the United States, for example, it took several decades for electrification to have an impact on productivity growth in the early 20th century (David 1990). Nobel economics laureate Robert Solow (1987, p. 36) famously quipped that 'you can see the computer age everywhere but in the productivity statistics'. An ICT-based boost to total factor productivity did occur, but somewhat later. In the United States it occurred between 1996 and 2004, before dropping back to the average growth rate for 1974 to 1995 (Fernald (2016); cited in Van Reenen (2018)).

Figure 1.1 **Multifactor productivity growth, 1995–2015**

Total economy, percentage change at an annual rate



Source: OECD (2017b).

One explanation for the delay between technology adoption and productivity growth distinguishes between the installation and deployment phases of digital technologies. In the installation phase, new markets emerge and innovative technologies are developed. But it is in the deployment phase when new technology achieves widespread acceptance and generates large-scale benefits for the economy (van Ark 2016).

An explanation of the apparent short-lived nature of the productivity boost is that ICT has not changed the basic constructs of societies and economies, such as working conditions and the need for shelter, transportation and health services. Therefore, while technology has changed the way people communicate and process

information, its transformative effects were limited and did not result in sustained productivity improvement (Gordon 2016).

A common thread is that simply installing new hardware or software is unlikely to generate measurable benefit. Firms need to combine new technology with human capital in an effective way to achieve productivity gains (van Ark 2016). In other words, successfully adopting new technology typically requires complementary changes to business processes, skills and access to capital (Bloom, Sadun and Van Reenen 2012; Brynjolfsson and Hitt 2000; Gali, Gretton and Parham 2004; Pilat 2004). Similarly, governments cannot achieve the full scale of efficiency improvements from digital technologies without complementary investments in skills and process improvements (see chapter 3).

F1.2

To realise productivity gains from investments in digital technology, firms and governments need to make complementary investments in skills and process improvements.

The conundrum of measuring the economic effects of digital technology

The lack of reported productivity improvements also reflects measurement and definitional problems, including ‘unmeasured quality changes associated with the introduction of novel commodities’ and the emergence of new goods and services that lack suitable categories in the national accounts (David 1990, p. 358).

Further, measurement of gross domestic product (GDP) and productivity is based on changes in the size of the economy, according to movements in the prices and quantity of transactions. Yet, as we note above, many digital goods and services firms charge zero prices to consumers, or have reduced the costs of existing goods and services while dramatically improving their quality and convenience. These improvements may not be recorded as boosts to GDP.² In some cases, improvements can have a direct measured negative effect on GDP; Varian (2016)

² Many statistical agencies adjust their inflation and GDP calculations for quality changes. Such adjustments can be difficult when quality changes quickly.

described the absorption of cameras into smartphones, which led to a reduction in the sales of cameras. Photography, for many users, is now in effect zero priced.³

Many of the benefits of digital technologies may therefore accrue as unmeasured improvements in consumer wellbeing (or, in economic terms, consumer surplus), rather than in measured income.

Regardless, the value of zero-priced goods and services created by digital technologies is considerable. The International Monetary Fund (2018) estimated that US consumers would be willing to pay up to half their disposable income for free digital goods and services they used daily (table 1.2). Corrigan et al. (2018, p. 1) found that ‘the average Facebook user would require more than [US]\$1000 to deactivate their account for one year.’ Similar consumer gains could exist for Australians and New Zealanders.

Table 1.2 **Median annual consumer surplus from free digital goods, internet users in the United States, 2016**

US dollars

<i>Digital goods</i>	<i>Willingness to accept^a</i>
Search engines	\$14 760
E-mail	\$6 139
Digital maps	\$2 693
Online videos	\$991
E-commerce	\$634
Social media	\$205
Messaging	\$135
Music	\$140
TOTAL	\$25 697
<i>For reference: Household disposable income per capita in the US</i>	<i>\$43 469</i>

^a The minimum amount of money that a person is willing to accept to no longer use a good.

Sources: Brynjolfsson and Oh (2012); IMF (2018).

It is also difficult to measure the effect of innovative technology on firm assets. Digital technologies such as artificial intelligence require ‘significant complementary investments ... [that] are often intangible and poorly measured in the national accounts, even if they create valuable assets for the firm’ (Brynjolfsson, Rock and Syverson 2018, p. 2). Researchers cite the high valuations of leading technology

³ Zero-priced activity is not a new problem for the measurement of GDP. For example, voluntary household tasks such as cooking, cleaning and childcare are not included in GDP calculations (IMF 2018). However, digital technologies appear to be increasing the volume of zero-priced goods and services.

firms as evidence that investors believe those firms have accumulated large stocks of intangible assets, which will underpin their future profitability.

F1.3

Digital goods and services create many benefits for consumers and firms. However, these benefits are difficult to measure and their full impact is not apparent in national productivity figures.

1.3 Implications for Australia and New Zealand

The benefits, costs and challenges of the digital economy are a global phenomenon. But the Australian and New Zealand economies have some unique features that distinguish them from other parts of the world. The ‘curse of distance’ and the relatively high proportion of primary industries in international trade are two such features. The digital economy is relevant to both, in different ways.

Distance is not dead

Australia and New Zealand both suffer from the ‘curse of distance’. Remoteness from international markets ‘might contribute negatively to GDP per capita by as much as 10% in Australia and New Zealand’ (Boulhol and de Serres 2008, p. 6). Distance from markets constrains income growth by:

- acting as a barrier to investment, knowledge spill-overs and technology diffusion
- increasing the cost of getting goods and services to markets and thereby reducing trade
- limiting the ability of domestic firms to operate at an efficient scale and exploit increasing returns to scale
- reducing domestic competition and lowering incentives for innovation (Boulhol and de Serres 2008).

Despite some early commentary to the contrary, the development and expansion of digital technologies has not eliminated distance as a barrier to firm and national economic growth (box 1.3).

Box 1.3 Why digital has not made the earth flat

Some authors have argued that the development and expansion of digital technologies reduce the impact of borders and distance on production and trade, making the world ‘flat’ (Friedman 2005). Examples include the improved ability to work remotely or in multiple locations using shared servers and teleconferencing, and to trade across borders using platforms such as Amazon Marketplace. However, digital technologies also have ‘concentrating’ effects.

- Knowledge-intensive firms benefit from co-location: the production of digital goods and services is concentrated in a relatively small number of centres, such as Silicon Valley in the United States. This clustering enables the development of shared infrastructure, specialised workers and venture capital, better matching, and the easier transmission of ideas through networks and informal contacts. This is similar to the benefits of co-location enjoyed by firms across the economy; in other words, digital communications have simplified some things but have not overcome or replaced the benefits of personal knowledge and interpretation through face-to-face interactions.
- Some digital technologies exhibit scale economies: data processing centres have high fixed costs and require large scales of operation to be commercially viable. They will therefore tend to be located near major population centres or where firms can access cheaper inputs, including infrastructure and electricity.
- Distance creates latency: latency is the delay incurred in transporting data over a distance. Services that depend on real-time interaction — such as teleconferencing and virtual desktops — are very sensitive to latency, and so providers of these services will tend to locate in or near large markets. Users who are further away will tend to experience lower-quality services and face higher data transport costs.

Most digital goods and services are produced in a small number of countries. Related innovation activities are similarly concentrated. This can be seen in proxy measures such as patents.⁴ The United States, China, Japan, Korea and Taiwan dominate digital technology patents, while Australia and New Zealand contribute a small, and declining, share. ICT-related patents in Australia and New Zealand, as a proportion of total national patents, are also below OECD averages (figure B.4).

Although there are centres of expertise in other countries (e.g. London and Toronto for machine learning and artificial intelligence), the largest digital goods and services firms are based in the United States and China. The world’s large platform firms are concentrated in cities in these two countries (table 1.3).

⁴ Patents are only a partial proxy for the level of innovation and invention in an economy. This is especially the case for digital services, because firms and entrepreneurs may prefer to use other, non-public means of protecting their ideas (e.g. trade secrets). Other proxy measures include research and development expenditure and academic citations (as a measure of scientific influence) (OECD 2017b).

Table 1.3 **Top 10 headquarter cities of platform firms, 2016**

<i>Headquarter city</i>	<i>Country</i>	<i>Number of platform firms</i>	<i>Total firm market capitalisation (US dollars)</i>
San Francisco Bay Area	United States	44	\$2 229 billion
Seattle	United States	4	\$767 billion
Beijing	China	30	\$246 billion
Hangzhou	China	6	\$242 billion
Shenzhen	China	5	\$191 billion
Tokyo	Japan	5	\$109 billion
Walldorf	Germany	1	\$97 billion
Cape Town	South Africa	1	\$63 billion
Norwalk	United States	1	\$62 billion
Shanghai	China	14	\$55 billion

Source: Evans and Gawer (2016).

F1.4

Digital technologies have not eliminated the ‘curse of distance’ that affects Australia and New Zealand. Rather, they have reinforced the economic value of being close to large markets and to other innovative firms. The production of digital goods, services and technologies has become concentrated in a small number of countries.

Agglomeration effects, increasing returns to scale, and network effects pose challenges for small firms. Such firms may see their profitability eroded by larger competitors and they may not have the risk tolerance, capability and access to capital to embrace digital technologies themselves. However, some forms of innovation may be easier for SMEs than larger, established enterprises — for example, innovation that requires cannibalising existing products and services, or changing an enterprise’s culture. Larger enterprises sometimes create smaller separate business units for this reason.

Start-ups exemplify the advantages of small organisations in the digital economy. They meet the SME size criteria but have characteristics that separate them from more typical SMEs. Start-ups actively experiment in technologies, products, culture and business models. Multiple start-ups pursuing similar business goals operate like a natural experiment to find a workable or better combination of business model, internal culture, production system and product. Larger enterprises are less able to run such parallel experiments and they often adopt the tactic of purchasing successful start-ups.

Digital start-ups differ from typical SMEs in other ways. They tend to grow faster and have a higher propensity to export than other small firms (Ejmont 2017; Skala 2019). While many SMEs look across the Tasman as their key market for expansion (Stats NZ 2016), we heard that this is not necessarily the case for digital start-ups (EY 2017). When expanding overseas, digital start-ups often seek access to venture capital, business support and other specialised inputs, and to be close to sophisticated customers. Many of these factors are concentrated in relatively few global locations, especially on the west coast of the United States. Also, digital service providers often ‘export’ by establishing a commercial presence in their target country (NZTech 2016).

F1.5

Digital start-ups have different characteristics from other SMEs. They are more likely to export than other small firms, and Australian and New Zealand digital start-ups are more likely to look beyond Australasia to expand.

Digital ‘laggards’ are not always what they seem

Recent work by the OECD used measures of ‘digital intensity’ to show the relative levels of digital technology adoption across industrial sectors. The study (of 12 countries including Australia) showed that intensive use of digital products and services has expanded outside the early adopters of ICT (IT, finance and telecommunications firms) into sectors such as law and accountancy, scientific research and development, and other business services (table 1.4). For example, the increase in measured digital intensity in accountancy could be reflecting the growth of cloud-based services such as MYOB, Xero and QuickBooks.

Different rates of diffusion and uptake of digital technologies may reflect some of the economic forces at work in the digital economy, such as increasing returns to scale and network effects.

But there is no reason to believe that technology should diffuse to different industries at the same rate. The rate of diffusion will reflect a number of factors, including the type of digital technology and its application to the industry in question, its costs and benefits relative to existing technologies, and existing industrial structures.

Table 1.4 Sectors by quartile of digital intensity 2013–15^a

Sector	Intensity	Sector	Intensity
Agriculture	Low	Arts and entertainment	Medium-high
Construction	Low	Computers and electronics	Medium-high
Electricity, gas and steam	Low	Electrical equipment	Medium-high
Food products	Low	Machinery	Medium-high
Hotels and food services	Low	Other manufactures	Medium-high
Mining	Low	Public admin and defence	Medium-high
Real estate	Low	Publishing and broadcasting	Medium-high
Transport services	Low	Wholesale and retail	Medium-high
Water, sewerage and waste	Low	Wood and paper	Medium-high
Basic metals	Medium-low	Admin and support services	High
Care and social work	Medium-low	Finance and insurance	High
Chemicals	Medium-low	IT services	High
Coke and petroleum	Medium-low	Law and accountancy services	High
Education	Medium-low	Other business services	High
Health services	Medium-low	Other services	High
Pharmaceuticals	Medium-low	Scientific R&D	High
Rubber, plastics and minerals	Medium-low	Telecommunications	High
Textiles and apparel	Medium-low	Transport equipment	High

^a Sectors are ranked by their value as an average across countries and years. Data was sourced from sectors in Australia, Austria, Denmark, Finland, France, Italy, Japan, the Netherlands, Norway, Sweden, the United Kingdom and the United States.

Source: Grundke et al. (2018).

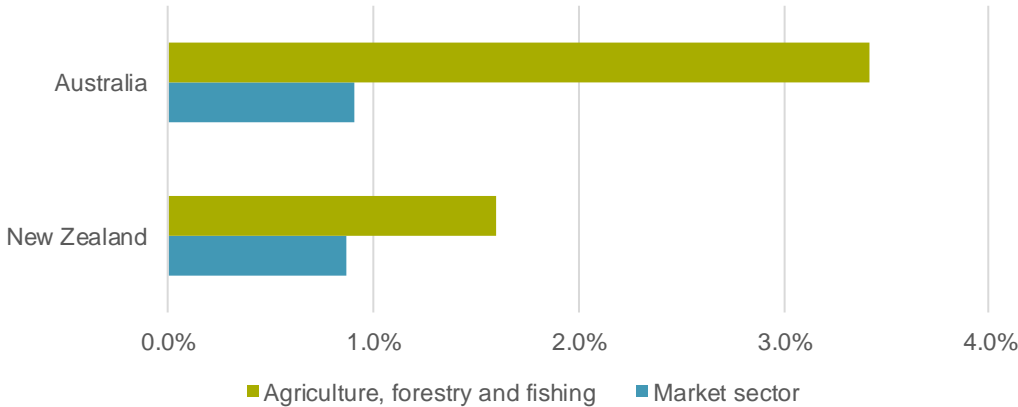
OECD research (table 1.4) suggested low uptake of digital technologies in agriculture — an industry of particular economic significance to Australia and New Zealand. Other research supports the conclusion that the use of digital technologies in agriculture is low. For example, using data from Stats NZ’s Business Operations Survey, the Ministry of Business, Innovation and Employment (MBIE) reported that agricultural firms were much less likely to use the internet to receive orders or have email and a webpage. Agricultural firms in New Zealand were also much more likely to be ‘low-intensity ICT-use’ businesses (71% of agricultural firms, as opposed to the economy-wide average of 36%). Based on this work, MBIE concluded that the ‘subindustry [represented by ANZSIC code A01] as a whole could be characterized as having mostly digital laggards and very few firms at the digital frontier’ (2017b, p. 56).

Surveys by the ABS (2018) similarly found that only 14% of Australian firms in the agriculture, forestry and fishing sector had a web page (compared with 51% of all firms) and 17% used the internet to receive orders (versus 37% of all firms).

Yet these measures may not be good indicators of the level of innovation nor of the use of digital technologies within agriculture. The agricultural industries in Australia and New Zealand have historically been anything but laggards. Both industries have experienced strong productivity growth over the past two decades (figure 1.2). This has been built on the uptake of new technologies, beginning with the application of superphosphate and the introduction of new cultivars from 1900, mechanisations in the middle of the 20th century, and continuing with further advances in the later part of that century, such as genetic technologies.

Figure 1.2 Multifactor productivity growth in agriculture, forestry and fishing, 1995–96 to 2016–17^a

Long-term average annual growth in multifactor productivity



^a The market sector includes all industries except public administration and safety; education and training; and health care and social assistance. Stats NZ refers to the market sector as the measured sector.

Sources: Calculations based on ABS (*Estimates of industry multifactor productivity, 2017–18*, Cat. no. 5260.0.55.002) and Stats NZ (*Productivity Statistics: 1978–2017 – inputs and outputs by industry tables*).

Farmers in both countries also make extensive use of data in their day-to-day operations, such as applying fertiliser efficiently, managing run-off and measuring soil moisture levels.

An apparent low uptake of digital technologies is likely to reflect rational decisions by firms (NZPC 2014a). A farmer may have little need for a website if they have a single customer (e.g. a dairy factory, meat processor or suppliers’ cooperative). There is evidence of wider digital innovation and exploration within the agriculture and horticultural industry (box 1.4).

Box 1.4 **Robotics in the agriculture, horticulture and forestry industries**

Difficulties attracting labour and rising costs in agriculture and horticulture, and high accident rates in forestry, are driving interest in robotics in Australia and New Zealand.

Robotics Plus is a New Zealand-based agricultural robotics company that is developing robotics and automation products for highly variable tasks and agricultural environments. It is part of the wider Plus group of companies, which provide specialised services (i.e. soil fertility, pollination, orchard management) to local and international horticulture industries. Capabilities currently being developed by Robotics Plus include:

- a robotic apple packing cell, which can pack up to 120 apples per minute, 24 hours a day
- multipurpose orchard robots, which can automatically harvest crops such as kiwifruit
- the QuadDuster, which can be attached to farm vehicles to ‘evenly distribute dry kiwifruit pollen into the flowering canopy ... to help remove human variability and increase application efficiency’ (Robotics Plus 2018).

The University of Sydney’s Australian Centre for Field Robotics has been developing autonomous robots for the agriculture industry called ‘agbots’, such as:

- the Robot for Intelligent Perception and Precision Application, which can be used for real-time fruit detection and high-speed spot spraying of weeds
- SwagBot, an electric ground vehicle that can monitor livestock health using temperature sensor and movement recognition
- Mantis and Shrimp, autonomous rovers that can monitor crop conditions, including automatically detecting and counting flowers and fruit.

New Zealand forests are often challenging environments with steep terrain and uneven ground, and the industry has the country’s highest occupational fatality rate (56.7 per 100 000 workers). Robots are one means of improving safety (and could also improve productivity). For example, Scion (a Crown Research Institute) and the University of Canterbury have recently developed a prototype radio-controlled ‘tree-to-tree swinging harvester’. Influenced by animals such as gibbons, the harvester’s claw

grips a tree while another claw reaches out to grip another tree. It can then release the first tree, swing to a third tree and grip it. The machine would not touch the ground and could operate in steep or rough conditions. (Harvie 2018)

Sources: Bloomer (2017); Harvie (2018); Hutching (2018); Robotics Plus (2018); Southern Phone (2018).

F1.6

New technologies do not diffuse to different industries within an economy at the same rate. The rate of adoption of a technology in an industry will reflect the balance of costs and benefits of that technology for individual firms in that industry.

1.4 Implications for governments

The trends we outline above have implications for how governments should set policy to support growth in the digital economy.

Approach digital ‘strategies’ with care

Governments in both Australia and New Zealand have programmes that aim to close ‘digital divides’ between leading and lagging firms. For example, in New Zealand, MBIE has trialled interventions targeted at small firms in specific industries that aim to improve the firms’ ‘digital capabilities’. These interventions were justified on the grounds that more productive firms make greater use of internet services (Glass et al. 2014).

The evidence on the link between internet use and productivity is very weak, and there is risk of confusing causation with correlation. There are many other factors that contribute to — or detract from — firm-level productivity, such as the firm’s management capability. As discussed above in the context of agriculture, firms’ decisions with respect to the uptake of digital technology will reflect their individual circumstances (SBDT 2018).

Interventions that target digital capabilities alone are unlikely to make much difference to firm performance. Moreover, OECD data shows that solely increasing firms’ use of high-speed broadband will not boost adoption of other digital technologies. Rather, to broaden the diffusion of digital technology, governments need to pursue structural policies that reduce barriers to entry and do not restrict the reallocation of labour and capital to innovative industries (Andrews, Nicoletti and Timiliotis 2018). Such policies are likely to generate benefits across the economy.

Not all technology adoption will be positive for every firm. Governments should focus on building and strengthening environments that enable firms to make their own choices about which technologies will benefit them, and which ones will not. Attempting to lift laggards may just delay the inevitable processes of creative destruction, which creates substantial gains but also losses as some skills, goods and markets become obsolete (Aghion and Howitt 1990).

As the example of agriculture illustrates, measures of ‘digital intensity’ or the use of specific digital technologies in an industry can be poor proxies for productivity and innovation. But even if policy makers were able to make meaningful distinctions between ‘leader’ and ‘laggard’ industries, policies that target laggard industries for intervention would likely suffer from the same shortcomings as policies that target laggard firms.

F1.7

Policy interventions to lift digital ‘laggards’ that target digital skills or capabilities alone are unlikely to make much difference to firm performance.

More broadly, there is a question about the ability of countries outside the ‘core’ of digital production to build distinctive and sustainable niches in particular technologies. Some countries are attempting to do this through industrial policies. Many of these policies aim at the same technologies and have similar goals. For example, in 2018, Germany, France, the United Kingdom and Canada all announced separate plans to make large-scale investments to support research and development of artificial intelligence technologies. The planned investments range up to €3 billion in Germany over the next seven years (Hansen 2018). The current powerhouses of digital production (such as China, South Korea, Japan and Taiwan) also have large-scale national strategies to invest in these sectors.

Small, distant economies with few scale advantages, such as Australia and New Zealand, are likely to struggle to compete. Given the underlying forces of agglomeration, increasing returns to scale and network effects — which are concentrating activity in a few global locations — public spending on building particular digital industries in Australia or New Zealand could well have little to no effect. Nonetheless, both countries should remain cognisant of global developments, and remove any barriers to the efficient adoption of new technology.

F1.8

Strategies to build national digital niches or champions may struggle to succeed, given competition between countries and the countervailing forces of agglomeration, increasing returns to scale and network effects. Governments should focus on building and strengthening environments that enable firms to make their own choices about which technologies will benefit them, and which ones will not.

Global technologies and firms are testing regulators and national boundaries ...

Governments operate within geographic limits, but few digital technologies and firms are constrained by borders. Individuals in Australia and New Zealand can sign up to drive for Uber, carry out specific tasks sought through TaskRabbit by people in Europe, Asia or North America, buy and sell goods over eBay, and search the

internet for restricted or prohibited items. The ease of these interactions, and the difficulty of monitoring them, can create problems for governments. These include:

- collecting revenue to fund public services. Task-based and other forms of non-standard employment, payments through encrypted channels, and transfer pricing within branches of digital multinationals are difficult to police. Their popularity risks erosion of the tax base (OECD 2018b).
- maintaining level playing fields in domestic markets. While greater access to goods via platforms such as Amazon and eBay has clear benefits for consumers, the lack of GST payments on international transactions (until recently) put local retailers at a competitive disadvantage.⁵
- protecting the community from harmful goods or activities. Governments face problems controlling the distribution of harmful goods (e.g. violent, explicit or other objectionable material) or punishing specific conduct (e.g. hate speech and promotion of terrorism) when movements of goods or data across borders cannot be easily policed, or the source of harmful conduct is offshore.

... and governments are still trying to find the right level at which to respond ...

Governments are responding to some of these challenges, including through greater international cooperation. For example, over 115 countries and jurisdictions (including Australia and New Zealand) are working together through the OECD's Base Erosion and Profit Shifting (BEPS) programme to manage the risks posed to domestic revenue bases by corporate tax strategies. Governments and international bodies such as the United Nations are seeking a larger role in the governance of the internet, recognising the network's importance to social and economic life.

In other areas, however, governments have struggled to find the right mechanism and lens through which to tackle problems. Particular problems include overreach (i.e. where governments attempt to regulate outside their borders without the agreement of other jurisdictions, such as the European Union's General Data Protection Regulation) and underreach (i.e. where governments attempt to control borderless behaviour solely through domestic laws).

Some governments are pre-empting the BEPS programme and taking steps to seek more revenue from large digital firms. The UK Government recently announced it

⁵ New tax laws introduced in Australia applied the GST to goods purchased from overseas retailers from 1 July 2018. New Zealand is looking to introduce similar legislation effective from October 2019, which will apply to retailers whose total sales to New Zealand customers exceed NZ\$60 000 per annum.

would introduce a digital services tax, applying a 2% levy to all revenue earned from the online activities of UK users of search engines, marketplaces and social media. The tax would only apply to firms with global sales of over £500 million (HM Treasury 2018). The European Union is considering the introduction of a similar tax.

... but governments still have important roles to play

Governments have important roles to play in supporting the beneficial diffusion and use of digital technologies. These include:

- investing in essential public infrastructure and setting a welcoming environment for investment in private infrastructure networks
- encouraging ongoing skill acquisition and supporting life-long learning
- establishing and backing institutions that support adjustment by individuals and firms to new technologies (e.g. open and competitive markets, flexible labour markets, low trade barriers, proportionate regulation and robust social safety nets).

Governments should perform these roles as efficiently and effectively as possible, and digital technologies can assist. Chapters 2 and 3 consider the role of governments in detail.

1.5 Where this report fits in

In August 2018 we were asked to ‘examine priority areas for growing the digital economy, in particular opportunities for SMEs’, and ‘focus on areas that offer the greatest potential benefits to both economies’. This followed a commitment, made by the Prime Ministers of Australia and New Zealand in March 2018, to commission reviews into barriers to growth in the digital economy and opportunities for SMEs in the trans-Tasman economy.

There is a long history of economic and regulatory cooperation between Australia and New Zealand, which contributed to the creation of a trans-Tasman economy. This research project coincides with the 15th anniversary of the Single Economic Market (SEM) initiative, announced by the Australian and New Zealand Governments in 2004. The SEM has four broad aims:

- reducing the impact of borders
- improving the business environment through regulatory coordination
- improving regulatory effectiveness

-
- and supporting business opportunities through industry and innovation policy cooperation (SCFADT 2006).

We reviewed progress made towards these goals, and identified options for further reforms that would increase economic integration, in our 2012 joint study (APC and NZPC 2012). Since then, momentum towards greater integration and joint work in some areas has slowed. For example, in the case of business law coordination, the Australian and New Zealand Governments observed that:

With the high degree of existing market integration, momentum in some areas is slowing, including in financial services policy, business reporting, corporations law and intellectual property law. (Australian Government and New Zealand Government 2014b, p. 2)

The emerging opportunities and challenges presented by the digital economy can create renewed momentum in the SEM agenda. This is already evident in some initiatives, such as the development of joint standards (chapter 4). This report identifies areas where the Australian and New Zealand Governments can best play to their strengths, and adjust their regulatory, service delivery and international roles to maximise the opportunities from digital technologies.

- Chapter 2 discusses the challenges that digital goods and services create for government regulation (and vice versa) and identifies desirable features of regulatory regimes in the digital era.
- Chapter 3 describes the importance of efficient government services with low transaction costs for participants. The chapter examines experiences with using digital technologies to improve services for firms and offers some lessons for future government projects.
- Chapter 4 presents criteria for assessing future trans-Tasman policy initiatives for the digital economy, and outlines areas where joint or coordinated action by the Australian and New Zealand Governments could be beneficial.

2 Regulation in the digital economy

Key points

- Digital innovation is putting many regulatory regimes under pressure by:
 - creating new goods and services that the regime’s designers did not (and could not) anticipate
 - creating new goods and services where regulatory coverage is unclear or overlapping
 - making some regulation redundant
 - enabling cross-border transactions that are not adequately covered by domestic regulation
 - moving at a faster pace than regulators can manage.
- Firms seeking to introduce digital goods and services face challenges, including the potential for regulators to be captured by incumbents, risk-averse regulators and unduly restrictive existing standards. Regulators, and governments more generally, face the problem of balancing costs and benefits of privacy and other regulation.
- Australia and New Zealand’s regulatory frameworks exhibit some flexibility and openness to innovation. However, some regulatory regimes are too slow and cumbersome and provide insufficient support for cross-border transactions.
- To maximise the benefits from digital goods and services, regulatory regimes should be designed to be technology-neutral and nimble, and should strike the right balance of ex ante and ex post interventions. Governments should take the opportunities provided by digital technologies to rethink the need for — and scale of — regulation.
- There is a need for greater international cooperation over consumer protection and data access policies.

Regulation affects the ability of new firms to enter markets and for new technologies to spread throughout the economy. Regulation can also help to prevent or manage harms from new technologies. Setting regulation that is fit for purpose is therefore important for maximising the benefits and opportunities of the digital economy for the community. This chapter discusses the challenges that digital goods and services create for government regulation (and vice versa), assesses how well Australia and New Zealand’s regulatory frameworks are responding to digital goods and services, and identifies desirable features of regulatory regimes in the digital era.

2.1 Why governments regulate

For the purposes of this report, regulation is defined as ‘the promulgation of rules by government accompanied by mechanisms for monitoring and enforcement’ (Black and ESRC Centre for Analysis of Risk and Regulation 2002, p. 8). Governments regulate to pursue three broad sets of policy goals — economic, environmental and social (table 2.1).

Markets can and do provide protections to consumers on their own (e.g. many firms offer no-questions-asked return policies, or have the quality or provenance of their goods independently verified). However, there are circumstances where markets may fail to provide mutually beneficial transactions or protect consumers. Examples include: where there is little competition; where there is potential for opportunism based on asymmetric information; where there are multiple parties to a contract; or where it is difficult to write a contract to fulfil all possibilities that might have significant future consequences. Small to medium enterprises (SMEs) can face particularly high costs where there are market failures, as they are less likely to have countervailing power in their interactions with large firms. Regulation often attempts to offset or correct these (and other) potential market failures.

Regulation is not the only means available to achieve the policy goals outlined in table 2.1. For example, New Zealand does not impose local content quotas on free-to-air broadcasters, but promotes local culture through ownership and funding of some broadcasters, and contestable funding of content development.⁶ In some countries governments have moved away from solely regulatory mechanisms for delivering access to essential services, such as telecommunications, towards more contestable arrangements (APC 2017c).⁷

⁶ Whereas Australia takes a regulatory approach. The *Broadcasting Services Act 1992* (Cwlth) requires all commercial free-to-air television license holders to broadcast at least 55% Australian content between 6am and midnight.

⁷ For example, Austria, Hungary and Portugal have systems in place in which the central government tenders the right to be the universal telecommunications service provider. The right lasts for a specified period of time and is generally awarded to the lowest bidder for universal service subsidies (Australian Productivity Commission 2017).

Table 2.1 **Objectives for, and examples of, regulation**

	<i>Policy objective</i>	<i>Examples</i>
<i>Economic</i>	Promoting competition in markets and/or limiting the exercise of market power	Prohibitions on arrangements to fix prices Limiting the prices charged by monopolies Setting minimum quality standards
	Reducing transaction costs	Prohibitions on fraudulent or misleading sales Design and enforcement of trading standards
	Offsetting or correcting information asymmetries or inadequacies	Mandatory disclosure requirements for products (e.g. of ingredients or energy efficiency)
<i>Social</i>	Protection of minors and vulnerable people	Age restrictions on the sale of or access to violent or sexually explicit publications or video games
	Control of potentially harmful substances or activities	Age and time of day limits on the sale of alcohol or gambling services
	Access to essential services for disadvantaged or high-cost groups	Universal service obligations on telecommunications and postal operators
	Fair and equitable treatment of all citizens	Prohibitions on discrimination
<i>Environmental</i>	Promotion of local culture	Requirements on broadcasters to devote a certain portion of their airtime to local content
	Control negative externalities	Limits on the amounts and types of pollution a firm can emit into the air
	Prevent overconsumption of limited resources	Allocation of property rights (e.g. quotas for fisheries). Require permits for use of resource
	Protection of endangered species or areas	Prohibition on the exploitation of designated areas (e.g. wetlands) or sale of designated species

Private actions also contribute to the achievement of these policy goals. Firms and industry organisations set private standards that guide the design of products and services (e.g. the Android and iOS smartphone operating systems), reducing transaction costs for consumers and improving coordination between firms. Legal cases taken by private individuals or firms can clarify property rights and liabilities. For example, Metallica successfully sued the website Napster in 2000 for infringing the band’s copyright by allowing the unauthorised distribution of their songs (BBC News 2001).

2.2 How do digital technologies affect regulation?

New products and services can supersede the technologies upon which regulation is based

Digital goods and services can supersede standard business models or make the distinctions between older business models less relevant. Yet regulatory regimes are often specified in terms of older technologies and specific business models. The entry of video streaming in New Zealand illustrates the problems that arise when new services emerge that do not easily fall within existing regimes (box 2.1).

Box 2.1 Falling between the gaps: video classification and streaming services in New Zealand

Classification (e.g. age and content ratings) of video content in New Zealand differs, depending on the medium:

- free-to-air television programmes are classified under the Broadcasting Standards Authority (BSA), an industry self-regulatory body, while
- films and DVDs are rated by the Office of Film and Literature Classification (OFLC), a statutory office.

The entry of video streaming services such as Netflix, Lightbox and Neon highlighted gaps in these regimes. Inconsistent advice and a lack of clarity about legal obligations led some services to seek OFLC classifications, incurring significant costs in the process. Lightbox reportedly paid \$250 000 to have its material classified (Macdonald 2015), while Netflix's regulatory costs were 'less than \$150 000' (OFLC 2015, p. 17). Meanwhile, Neon sought a voluntary arrangement with the BSA to handle complaints about its programmes in the same way as free-to-air television. Government agencies ultimately concluded that 'on-demand content, whether available for free or subscription, does not fall within the provisions of the *Broadcasting Act* or the labelling provisions of the *Classification Act*' (Ministry for Culture and Heritage 2015, p. 13).

Following a review of content regulation, the New Zealand Government (at the time) decided in 2016 to introduce legislation to extend the scope of the BSA to cover on-demand content and clarify that the Classification Act did not apply. However, this Digital Convergence Bill was put on hold by the new Government in late 2017, to 'seek greater consensus and ensure the Bill is fit for purpose' (Curran 2017).

Similarly, the emergence of video streaming services revealed gaps in Australia's local content quotas, which currently apply only to commercial free-to-air television broadcasters (HSCCA 2017).

Digital goods and services can span multiple regulatory regimes, creating confusion and costs

The often industry-specific nature of regulation can mean that digital goods and services are covered under multiple regulatory regimes, increasing costs and complexity and creating the potential for confusion.

For example, at least four regulatory regimes in New Zealand cover cryptocurrency.

- Exchanges that issue their own cryptocurrencies to facilitate trading, or that allow cryptocurrency trading, are regulated under the *Financial Markets Conduct Act 2013* (FMCA). Wallet providers that store cryptocurrency on behalf of others and facilitate exchanges between money and cryptocurrency are also regulated under the FMCA.
- Cryptocurrency exchanges are considered by the Department of Internal Affairs to be money changers for the purposes of anti-money laundering/countering the financing of terrorism (AML/CFT) regulation (Sims, Kariyawasam and Mayes 2018).
- Organisations or firms that provide transaction services in relation to cryptocurrencies that are financial products may qualify as ‘brokers’ under the *Financial Advisers Act 2008*.
- New Zealand-based organisations seeking to make an initial coin offer must be registered on the Financial Service Providers Register. Depending on the nature of the cryptocurrency or token, it may also be regulated under the FMCA.
- Public communications related to initial coin offers that do not involve financial products or financial services are covered by the ‘fair dealing’ requirements of the *Fair Trading Act 1986*.

The introduction of driverless vehicles in Australia is a further example. A review of regulation identified 716 legislative barriers that would need to be overcome (National Transport Commission 2016). This large number of barriers was due to multiple layers of regulation, at State/Territory, national and international levels, and the fact that many of the Australian laws explicitly require a driver to be present in a car and able to take over controls.⁸

⁸ New Zealand’s driving and road safety laws do not have this requirement.

Digital technologies may make some regulation redundant

Some digital goods and services include features that achieve some or all of the goals sought by regulation. Uber's ridesharing app provides information to potential customers about the estimated cost of a trip, the likely route, and the driver's reputation before they decide to request a ride. Once the ride is complete, Uber charges the customer directly. These features deal with many of the problems usually cited as grounds for regulation of taxi services, such as information asymmetries, price gouging and fare evasion. In addition, as (Minifie and Blowers 2016, p. 11) observed, services such as Uber 'give drivers and passengers strong incentives to behave well: they know they will be rated after each trip, and that prospective ride partners will see their ratings before the next one'.

Reliable and unbiased online rating systems could also replace other forms of occupational regulation, especially where these cover low-risk tasks (APC 2016b). Indeed, draft legislation in Washington State sought to replace licensing of occupations such as auctioneers, landscape architects, and manicurists with an internet-based public rating system (Clodfelter 2017).

Digital technology creates problems for regulation across national borders

Digital technologies reduce barriers to cross-border transactions, increasing choices for consumers and sales opportunities for firms and producers. Yet regulation is generally limited to national borders. This can make it difficult for people that experience an unsatisfactory cross-border transaction to obtain redress — for example, where a product purchased from an offshore retailer is faulty. It can also limit the ability of national regulators to enforce their decisions on firms and platforms that are based in other countries.

Digital technologies enable the production of some goods to be distributed across borders. For example, the New Zealand firm Ponoko produces on-demand manufactured goods in 15 'making hubs' in the United States, United Kingdom, Germany, Italy and New Zealand, based on designs uploaded by individuals. Such distributed production raises questions about with whom liability for a faulty product would lie — with the designer, the owner of the 3D printer or the customer? It is similarly unclear which jurisdiction's laws would apply (APC 2017b).

In some cases, it is possible for firms to maximise their profit by 'segmenting the market', charging different prices for the same product according to consumers' willingness to pay. Such price discrimination can be harmful to consumers where it

occurs in combination with monopoly power, and is particularly challenging for regulators when the market segmentation occurs over national boundaries.

‘Geoblocking’ is technology that restricts access to internet content based upon the user's geographical location. This allows a copyright holder to segment the market and charge different prices — or offer different services — based on location (APC 2016c). For example, Netflix offers a much smaller selection of programmes to Australian and New Zealand customers than it does to its customers in the United States.

Research by the Australian Parliament found that Australians face significant price discrimination (referred to as the ‘Australia tax’) on some digital goods as a result of geoblocking (HSCIC 2013). This included professional software important to smaller firms, such as Adobe and Autodesk design programs and Microsoft Word, which were significantly more expensive in Australia than in the United States.

In some cases, services are completely withheld from a potential market. For example, the government-owned Australian Broadcasting Corporation restricts its online iView service to Australia-based internet protocol addresses, making it unavailable to New Zealand audiences or to Australians overseas.

Other digital technology — such as virtual private networks (VPNs) — can circumvent geoblocking, reducing the need for regulation. The legal status of geoblocking is currently unclear in Australia and New Zealand, despite recommendations from the APC that circumvention of geoblocking technology be made explicitly permissible (APC 2016c). A 2015 legal case in New Zealand taken by major media firms saw the exit of several VPN services, which had allowed users to circumvent geoblocking.⁹

Technology is fast-moving, but regulation can be slow

New products and services based on digital technologies can emerge quickly, but some regulatory regimes can take much longer to adjust and update. For example, the most recent substantive update of New Zealand’s copyright laws to reflect new technologies took 15 months to pass through Parliament. In Australia, the APC reviewed intellectual property regulation in 2016 (APC 2016c). In response to the inquiry report, the Australian Government has been consulting on changes to copyright regulations and policy since mid-2017.

⁹ An out-of-court settlement was reached, whereby several ‘global mode’ geoblocking circumvention services were withdrawn from the market.

Slow adjustment and update of regulatory regimes has three effects.

- Slow regulatory adjustment can create barriers to the entry of new services or otherwise increase the costs of entry. For example, the different paces of regulatory responses to crowdfunding across the Tasman led the Australian firm Equitise (2014) to launch its equity crowdfunding platform in New Zealand before offering services in its home country.
- Slow-moving regulatory regimes can create an uneven playing field, where incumbents face higher burdens than new entrants. Taxi services in many countries have complained that the lack of regulatory coverage of Uber and other ridesharing services placed taxis at a competitive disadvantage. Australian consumers can avoid long-standing restrictions on the parallel importation of books written by Australian authors by downloading e-books or buying physical books from overseas services such as Amazon and Book Depository. Rather than enhance the incomes of Australian publishers and authors (as initially intended),¹⁰ the parallel importation restrictions now limit the ability of Australian booksellers to compete effectively with other services.
- Fast-moving technologies can create harms that are not addressed by existing laws. For example, the risks that drones can pose to privacy and to the safety of aircraft are still being worked through in many countries.

Where governments expect technology to change quickly, they can design flexibility into regulatory regimes (see section 2.5).

Existing competition regulation may not be adequate for digital markets

A core objective of regulation in many countries is to maintain competitive markets. Some characteristics of digital goods and services can make achieving this objective challenging.

- An important measure of market power used in many competition policy analyses is whether dominant players could profitably increase prices above competitive levels, but many digital services (e.g. Google Maps, Facebook and Outlook.com) are zero-priced to some customers. Some scholars have questioned whether competition law can or should be applied to zero-price

¹⁰ Although the policy intent of book parallel importation restrictions is not publicly stated, the (APC 2009, p. xiv) found that, by limiting the ability of booksellers to source cheaper editions, the restrictions placed 'upward pressure on book prices', with much of the benefit accruing to publishers and authors. Most of the costs were met by consumers. The APC's study took place before competition from services such as Amazon and Book Depository had become significant.

transactions (Bork 2012; Tucker and Marthews 2012). The German Government studied the impact of digital technologies on competition policy and made consequential changes to its laws, including clarifying that zero-price transactions can constitute a ‘market’ for the purposes of competition analysis (Bundeskartellamt 2016; Bundeskartellamt and Autorite de la concurrence 2016).

- Digital platforms can exhibit network effects, which may entrench incumbents or lead to ‘winner-takes-most’ markets. For example, buyers will want to use the platform that has the most sellers, and vice versa. Greater numbers of users can provide other competitive advantages, such as access to more data, which in turn enables better predictions and more personalised advice and marketing (Tirole and Rendall 2017). Some argue that this dynamic creates an incentive for platforms to pursue growth over profits, and engage in predatory pricing (Khan 2016).
- Some platforms may have competing incentives when the firm running the platform also produces goods and services sold on the platform. An online marketplace may give preference in its rankings to its own products, or an internet search engine may prioritise related-party firms and services in its search results (box 2.2) or placement of advertising.
- Price-setting by algorithms could lead to anticompetitive outcomes, which may be difficult to detect and may be legal under current laws (because they do not involve an agreement to fix prices) (Every-Palmer QC 2018).
- Data is an increasingly important business input and may be a source of market power. Yet data access issues are often treated separately (e.g. under privacy laws) from competition policy. Traditional controls on market power (e.g. merger restrictions based on market share) may not fully capture the significance of mergers that give firms access to substantial datasets. Recent changes to German competition law have clarified that the monopolies regulator can consider access to competitively relevant data when assessing market power in digital markets (Cleary Gottlieb Steen & Hamilton LLP 2017).¹¹

¹¹ Other factors the German monopolies regulator can now take into account include network effects, economies of scale, the role of innovation, and the ability of consumers to switch to alternative services.

Box 2.2 Google vs. the European Union

In June 2017, the European Commission fined Google €2.4 billion, following an investigation that found the internet company had favoured its own services in internet search results. The investigation was prompted by complaints from smaller web companies that their products and services were being downgraded in Google searches.

The European Commission's investigation found that Google had systematically positioned and prominently displayed its comparison-shopping service in its general search results pages, irrespective of its merits, and exempted its own service from penalties applied to competitors. The Commission concluded that this conduct had a negative impact on consumers and innovation, because:

- users did not necessarily see the most relevant results in response to their queries, and
- rival firms' incentives to innovate were lowered, as they knew that however good their product, they would not benefit from the same prominence as Google's service.

Google is appealing the judgment, but has separated out Google Shopping Service into a distinct company with its own revenues and profits (although the Service remains part of the Alphabet group) to comply with the ruling.

Sources: European Commission (2015); Statt (2017).

Most of these issues are not new to competition policy. But digital goods and services are moving 'issues that were at the fringe of competition analysis to centre stage' (King 2018, p. 2). Governments in other countries have taken steps to update their regulatory regimes to reflect digital goods, services and markets. The Australian Government is currently legislating for a consumer data right (box 2.3), with elements of both competition and data access policy.

Competition policy in the digital era is evolving, dynamic territory. Many previously dominant technology firms (e.g. IBM, Myspace, Nokia and Blackberry) were dethroned by new entrants and there is vigorous competition between some platform services (e.g. Uber vs. Lyft, Apple Music vs. Spotify). In addition, while some argue that market power can suppress innovation (Federico, Langus and Valletti 2018), major firms such as Apple, Google and Facebook continue to invest heavily in research and development.

However, if 'winner-takes-most' markets do end up prevailing, competition regulators may need to consider extending tools such as essential service access regimes to digital services. Governments have implemented such tools in industries where economies of scale are significant and competitive advantages are persistent.

Box 2.3 **The Australian consumer data right**

The consumer data right (CDR) is being introduced in Australia to give ‘consumers the right to safely access certain data about them held by businesses’. It will also allow consumers to direct that their information be transferred to ‘accredited, trusted third parties of their choice’ (Australian Treasury 2018a, p. 1). Both individuals and firms will be entitled to the CDR.

The data right was first proposed by the Australian Productivity Commission in its *Data Availability and Use* report (2017a). The proposal aimed to:

- build a stronger social license for data use by offering individuals greater abilities to access and re-use their own data, and
- create greater opportunities for competition.

The CDR will be regulated and enforced by the Australian Competition and Consumer Commission to promote competition and customer-focused outcomes, with support from the Office of the Australian Information Commissioner, which will build privacy protections into the CDR’s design.

The CDR will be rolled out incrementally, on a market-by-market basis. The Australian Government has announced that the first three sectors to which the CDR will apply will be banking, energy and telecommunications.

F2.1

Digital innovation is creating challenges for regulators, by:

- creating new goods and services that current regimes did not anticipate or where regulatory coverage is unclear or overlapping
- making some regulation redundant
- enabling cross-border transactions that are not adequately covered by national regulation
- moving at a faster pace than regulators can manage, and
- complicating the assessment of competition in markets.

2.3 How does regulation challenge digital firms and services?

Conversely, firms built on digital technologies may face challenges from regulators and the process of regulation-making. These challenges can prevent the entry of new, innovative firms or make their expansion unnecessarily slow and costly.

Regulation can be captured

Designers and implementers of regulation may be prone to capture by incumbent firms under threat from new technologies, by interest groups that wish to achieve specific social or economic goals, or by combinations of the two (so-called ‘Bootleggers and Baptists’ coalitions — box 2.4). Captured regulation and regulators promote the interests of incumbents or pressure groups, rather than consumers or the wider citizenry.

Box 2.4 **Bootleggers and Baptists in regulatory capture**

The ‘Bootleggers and Baptists’ theory of regulatory capture refers to circumstances in which apparently opposing forces (e.g. industry and labour representatives; or business and environmental organisations) both support the introduction or extension of regulation. The theory was originally developed by Bruce Yandle, who had been working at the US Federal Trade Commission and was struck by ‘a number of instances where seemingly odd interest-group alliances supported the same regulation’ (2010, p. 2). Yandle explained that the theory

gets its name, of course, from a common phenomenon in the United States in regions that restrict the sale of alcoholic beverages on Sunday. Baptists lobby for the associated regulations; they prefer a world where less alcohol is consumed. Bootleggers, the illegal sellers of alcoholic beverages, support the laws as well. Sunday closing laws shut down legitimate sellers, giving an open field in which bootleggers can sell their wares. (2010, p. 3)

There are many examples of incumbents attempting to prevent the entry of digitally-enabled goods and services through regulation. These include hotel associations and hotel worker unions in the United States, United Kingdom, France and Australia that have advocated for strict regulation of the Airbnb peer-to-peer accommodation platform (Guttentag 2017).

We heard, in the course of this project, arguments from firms in favour of government procurement policies that explicitly favour local digital goods and services. Such policies tend to reduce the choice and range of services available to governments, increase their costs, and are contrary to the objectives of the *Australia and New Zealand Government Procurement Agreement* (Australian Government and New Zealand Government 2014a).

Regulators may be excessively risk-averse

Regulators are prone to overly risk-averse stances, which can discourage innovation and choke off unexpected, but potentially highly beneficial, goods and services. Excessive risk aversion can occur where:

- the longer-run impacts of new technologies are difficult to determine

-
- concern with one objective overrides other considerations and benefits (e.g. an overriding concern with anti-money laundering compliance ultimately closed New Zealand’s first real-money prediction market — box 2.5)
 - there is public or political pressure to increase regulation beyond what might be justified under an objective risk assessment.

Box 2.5 How regulator risk aversion killed iPredict

iPredict was an online prediction market run by Victoria University of Wellington between 2008 and 2015. The market was created largely for academic purposes, and was not intended to be a commercial, gambling or investment platform. People could buy and sell contracts that would pay out based on particular events (generally political or economic, such as the Reserve Bank of New Zealand’s regular decisions setting the official cash rate, Stats NZ’s quarterly GDP or inflation announcements, or political poll results). Participants would bet using real money and could deposit up to NZ\$10 000 in their trading account (although in practice, many traders kept very small balances). Prediction markets can provide high-quality sources of information, and iPredict’s betting odds were cited by political commentators and the Reserve Bank of New Zealand, amongst others.

New Zealand’s former financial sector regulator (the Securities Commission) approved iPredict in 2008. The introduction of a new financial regulatory regime and agency (the Financial Markets Authority) in 2013 was a significant change in the prediction market’s operating environment. iPredict incurred growing legal costs as it sought to work its way through compliance with the new *Financial Markets Conduct Act 2013*. These costs increased significantly when iPredict was expected to comply with anti-money laundering/countering the financing of terrorism (AML/CFT) legislation. AML/CFT compliance was not expected when the Securities Commission first authorised iPredict; indeed, one Securities Commission official reportedly joked about the unlikelihood of it occurring.

iPredict sought an exemption from AML/CFT requirements, on the grounds that the risks were low and other internal controls (such as the maximum trading account cap and limits on multiple accounts) were sufficient. However, the Ministry of Justice and the Financial Markets Authority declined to issue an exemption on the grounds it was a ‘money laundering risk’. Facing hundreds of thousands of dollars in compliance costs, Victoria University of Wellington decided to close iPredict in 2015.

Source: Crampton et al. (2017).

One type of restrictive or risk-averse regulation that affects digital goods and services is data localisation, which requires the storage of data within national borders and often limits the transfer of information across borders. Data localisation rules are often promoted on security or privacy grounds, but domestic data storage is not necessarily more secure from breaches than overseas alternatives (APC 2018b). They can also significantly increase the cost of providing or using digital services, especially for smaller firms. Chapter 4 discusses data localisation rules in more detail.

National security policies may also reduce the potential benefits from digital goods and services, and increase their costs. Governments need to address national security risks, but often there is very little visibility of the costs. While security measures often necessitate secrecy, this should not preclude a careful consideration of the benefits and costs of such measures (APC 2018b).

Regulators need to balance costs and benefits

Privacy regulation has costs and benefits for consumers

The desire for privacy is a longstanding concern, and this desire is reflected in many countries' laws and constitutions. However, the digital revolution has heightened interest in privacy, because of the ease with which information can be copied and transported, the difficulties of monitoring and controlling its use, and the potential for notionally anonymous data to be combined in a way that identifies individuals. People have differing levels of concern, depending on the nature of the data and who uses it (Acquisti, Brandimarte and Loewenstein 2015). In Australia and New Zealand, ownership rights over data are unclear. Privacy is a fraught area, and policy makers and regulators can struggle to find the right balance.

Privacy regulation can be both an enabler of and a barrier to digital transactions. Some minimum level of privacy is necessary to conduct transactions online, and inadequate controls on the use of personal data could cause harm through the theft and use of data by unscrupulous actors. By setting minimum standards, privacy regulation can also correct or override incomplete or highly complex contracts that consumers may otherwise be unable to fully understand or assess the risks of (Tirole and Rendall 2017). However, overly blunt or restrictive privacy regulation can limit innovation, raise costs, prevent beneficial transactions from occurring, or allow unscrupulous actors to cover their tracks. The costs of privacy regulation also tend to fall disproportionately on small and new firms, because they often lack the resources necessary to navigate and comply with complex or ambiguous rules (Goldfarb and Tucker 2012). Studies of the European Union's digital privacy regulations have found that their costs particularly harm smaller firms and benefit larger platform firms (Castro and McQuinn 2014; Grelf 2018).

Privacy regulation is often misunderstood, leading to unnecessary costs and barriers to competition. In Australia, the APC found 'a level of misinterpretation of the *Privacy Act 1988* and its accompanying Privacy Principles by data collectors and custodians that, in turn, leads to an overly cautious and risk averse approach to data management' (2017a, p. 137). Such misunderstandings limited 'the ability of consumers to access data about themselves' from telecommunications and utility

providers (2017a, p. 138).¹² The New Zealand Privacy Commissioner reported that the New Zealand Parliament had ‘needlessly enacted’ 22 legislative information-matching provisions ‘that are not being used by agencies’, even though the existing *Privacy Act 1993* has mechanisms to authorise information matching (2018b, p. 2).

Privacy laws may also discourage beneficial data sharing or matching. Miller & Tucker (2009) explored the impact of state privacy laws on the uptake of electronic medical records (EMRs) by US hospitals and found that such laws reduce EMR adoption by more than 24%. In later work, they estimated that ‘adoption of basic EMRs’ would lead to a reduction of 1.6 infant deaths per 1000 live births, and would have particularly beneficial effects for historically disadvantaged groups (Miller and Tucker 2011, p. 320). In its inquiry into data availability and use, the APC was told of medical researchers waiting five years to receive de-identified data on computed tomography (CT) scans and cancer notifications, because of cumbersome privacy approval processes. This slow response delayed the discovery of an increased cancer risk for young people undergoing CT scans and the development of improved CT guidelines (APC 2017a).

Depending on the circumstance, privacy rules can be either positive or negative for consumers. On the plus side, tight privacy rules can limit the ability of retailers to determine how much an individual is willing to pay for a good or service, thereby protecting the consumer from adverse price discrimination. On the other hand, restrictive privacy rules limit the ability of digital providers to provide personalised services and advice that best meets a consumer’s preferences. These varying and context-specific impacts of privacy rules make it difficult to set optimal privacy regulation, as do differing individual preferences for privacy. People typically claim they want more privacy than they actually seek in practice. This has prompted some scholars to talk of a ‘privacy paradox’ (Norberg, Horne and Horne 2007).¹³

One-size-fits-all approaches are therefore likely to lead to over- or under-regulation. More promising alternatives are those that give consumers more control and choice over the use of their data. One version of this is the consumer data right outlined in box 2.3.

¹² We heard similar stories about access to electricity consumer data in New Zealand.

¹³ The idea of a privacy paradox is not universally accepted. (Acquisti, Taylor and Wagman 2016, p. 477), for example, argued that attitudes are generic while behaviours are specific, and that people carry out a context-specific ‘privacy calculus’ of costs and benefits.

The benefits of a regulatory intervention should outweigh its costs

It is often difficult for regulators to quantify costs and benefits. For example, the Australian Competition and Consumer Commission is undertaking an inquiry into the impact of digital platforms on competition in media and advertising services markets. Box 2.6 sets out the review's preliminary findings and illustrates the importance of fully understanding a market, and of making a full assessment of the costs and benefits faced by consumers in that market, and of the costs and benefits of regulatory proposals to mitigate potential harms.

Box 2.6 The digital platforms inquiry — protecting the consumer or regulatory overreach?

In December 2018 the Australian Competition and Consumer Commission (ACCC) released the preliminary report of its inquiry into the impact of online search engines, social media and digital content aggregators (digital platforms) on competition in the media and advertising services markets (ACCC 2018b). The report reached the preliminary conclusion that global digital platform firms — specifically Google and Facebook — have large market shares in two zero-priced markets, search and social media respectively. Based on these market shares, the ACCC inferred these platforms have substantial market power in a wide variety of markets, not just the media and advertising services markets that are the subject of its inquiry.

The preliminary report identified potential harms arising from this market power, including those to:

- advertisers, who find it difficult to assess the cost-effectiveness of online advertising
- news publishers, through adverse effects on their brand, audience and revenue
- competing firms, as platforms may favour related interests
- consumers, through platforms collecting, using and sharing data in ways that work against the interests of those consumers, and through undermining consumers' ability to select products that best match their privacy preferences
- the public, through greater exposure to less reliable news and potential 'filter bubbles', and through the decline of 'traditional media' and the number of journalists it employs.

The report acknowledged consumer benefits from digital platform services: '[they] are clearly valued by Australian consumers as demonstrated by their frequent and widespread use' (p. 7). Yet the report treated targeted advertising, for example, simply as a cost to consumers. An alternative interpretation is that both consumers and advertisers benefit when consumers see fewer advertisements that are irrelevant to them.

While the report did not quantify the potential benefits and harms of digital platforms, it proceeded on the basis that the potential harms are significant and canvassed wide-ranging regulatory responses to limit those harms. For example, it sought feedback on a proposal that platforms, apps and websites require every Australian consumer to opt-in to targeted advertising. It further recommended that suppliers of operating systems for mobile devices, computers and tablets be required to provide consumers with options for internet browsers (rather than providing a default browser), and that suppliers of internet browsers be required to provide consumers with options for search engines (rather than providing a default search engine).

(continued)

Box 2.6 (continued)

Such regulation imposes costs on firms, consumers and governments, and these costs may outweigh the harms they might reduce. For example, Castro and McQuinn (2014) found that the costs of the European Union's requirements for 'click here to accept cookies' popups substantially outweigh any benefits. Moreover, complying with complex technical and legal requirements can create barriers for smaller firms and new entrants, further entrenching the dominance of large players.

Other proposals to mitigate harms included tax incentives for news media firms and obligations on platform providers to delete user data. The report also considered a general prohibition that 'could deter digital platforms and other businesses from engaging in conduct that falls short of societal norms' (p. 17).

The disruption arising from digital platforms is complex and uncertain, and while there may be some adverse consequences there are also transformational benefits for consumers and firms. There is a risk that the preliminary report is underestimating the costs and consequences of proposed interventions.

Inappropriate standards

Common standards reduce switching costs for consumers and support economies of scale in production (Shapiro and Varian 1999). However, digital goods and services markets may be subject to inappropriate standards that entrench the interests of incumbents or do not provide the best foundation for innovation. One example of a standard that arguably entrenched an incumbent in the past is the proprietary Microsoft Windows operating system.

Government-issued standards may be insufficiently flexible or excessively risk-averse. The European Union's General Data Protection Regulation (GDPR), which was introduced in 2016 and came into effect in 2018, may become a dominant world standard for data protection. This is because the GDPR applies to all organisations that offer goods and services to EU citizens or monitor the behaviour of EU data subjects, regardless of the organisation's or citizen's physical location. This means that Australian and New Zealand-based firms wishing to sell to EU citizens must comply with GDPR requirements.

Some aspects of the GDPR are controversial. For example, it includes a 'right to be forgotten', which obliges data holders to erase data in certain circumstances. This provision of the GDPR has been criticised as unworkable, unrealistic, harmful to innovation and contrary to freedom of expression (Chadwick 2018; Greenland 2016).

F2.2

Regulatory capture, excessive risk aversion by regulators, privacy rules that are unclear or unbalanced, and inappropriate standards can prevent the entry of new, innovative goods and services or make their diffusion unnecessarily slow and costly.

2.4 How do Australia and New Zealand's regulatory frameworks stack up?

Some openness to innovation ...

A few regulators in Australia and New Zealand actively accommodate and facilitate the entry of innovative and digitally-enabled goods and services. Although their approaches differ, the Australian and New Zealand financial regulators are a case in point. The main Australian regulator (the Australian Securities and Investment Commission, or ASIC) has established a 'regulatory sandbox', in which a select group of services and products are temporarily exempted from a number of regulatory requirements and can be offered to specified customer groups.

In its original form, the regulatory sandbox was open to services such as

- deposit and payment products
- general insurance products
- simple managed investment schemes
- Commonwealth debentures, stocks or bonds
- certain consumer credit products (limited to a value of A\$2000 to \$25 000 and with a term of up to four years) (APC 2018a).

Eligible firms wishing to test their products and services in the sandbox must notify ASIC of their intent. They need no further approvals. Firms or persons who have been banned from providing financial services, who already hold an Australian financial service license, or who are related to or representatives of a license-holder are not permitted to participate in the sandbox. There are also limits on the total number of retail clients and the value of exposure.

This 'lighter touch' regulatory environment allows innovators to test and adjust their services and business models before deciding to fully enter the market, thereby reducing risks and barriers to entry. The sandbox has been adjusted and expanded in response to a formal evaluation.

In New Zealand, the Financial Markets Authority (FMA) was one of the first financial service regulators in the developed world to explicitly license equity crowdfunding. Equity crowdfunding is a means of raising money for firms or entrepreneurs, usually using digital platforms. Typically, large numbers of investors each put in small amounts of money towards a company, project or the development of a product. For firms, equity crowdfunding offers a faster and lower-cost fundraising alternative to an initial public offering. For investors, crowdfunding provides an easy way to take a stake in a high-growth or innovative firm.

The FMA introduced the equity crowdfunding regulatory regime in 2014. The FMA's ability to enact a licensing system in relatively short order has been attributed to two main factors. The first was that New Zealand had recently updated its financial market legislation, and the new law clearly prioritised innovation.¹⁴ This meant that, unlike regulators in other countries, the FMA did not have to develop inefficient 'workarounds' to older, less flexible legislation. The second factor was a deliberately 'spare and light-handed' approach by the FMA, which had a strong focus on efficiency (Schwartz 2018, p. 920).

... and some regimes have built-in flexibility ...

In dynamic and rapidly changing markets, regulatory regimes should have systems in place to check whether restrictions are still required and efficient. Some Australian and New Zealand regimes have built-in features that require regular reviews.

Flexible regulatory regimes are particularly notable in telecommunications, a sector known for fast technological change. New Zealand's former *Telecommunications Act 2001* is one example. Schedule 3 of the Act established the procedures for altering regulated services. The statute specified particular services as regulated, but placed an obligation on the regulator to consider, 'at intervals of not more than five years', whether there are 'reasonable grounds' for investigating whether these services should be deregulated entirely (Schedule 3, Part 1, subclause 3). The Act also enabled the Commerce Commission to investigate, either on its own volition or at the request of the Minister, whether a new service should be regulated or the type of regulation currently applied to a service should be changed. Since the Act was passed in 2001, the Commerce Commission has conducted nine studies or investigations into telecommunications services.

The New Zealand Government recently reviewed the Telecommunications Act, and a new Act was given royal assent in late 2018. This new law retains the Schedule 3

¹⁴ Section 4(d) of the Financial Markets Conduct Act 2013 cites the promotion of 'innovation and flexibility in the financial markets' as one of its purposes.

powers and process, with some improvements to streamline investigations and reduce incentives for regulated parties to “game” the process or proceed slowly for strategic reasons’ (MBIE 2018c, p. 6 in Appendix 2).

In Australia, the *Telecommunications (International Mobile Roaming) Industry Standard 2013* (Cwlth) included a clause that required the Australian Communications and Media Authority to conduct a review of its operation within a five-year period. This standard was introduced in the wake of public debate about trans-Tasman mobile prices (see discussion below) and placed obligations on mobile telecommunications providers.¹⁵ The standard is currently under review, with public consultation having closed in September 2018. The consultation webpage noted that there had been

a number of changes in the market, which may impact how consumers use mobile devices when travelling overseas. These include

- specialised service offerings for consumers, such as international roaming supplements or packages
- free public internet access has become more widely available overseas, which reduces the need for consumers to rely on IMR [International Mobile Roaming] services
- alternatives to conventional messaging and voice services have emerged, providing potentially cheaper options for making voice calls and sending messages. (Australian Communications and Media Authority and ACMA 2018)

... but other regimes are slow to respond or update

Other regulatory regimes have been slow to respond to technological change. This can create uncertainty about the application of regulation to new technologies and can be a risk for users, firms and investors.

Copyright is an example of regulation that lags behind technological advancement in both Australia and New Zealand. As a result, some commonly used technologies operate in legal ‘grey areas’ (table 2.2).

¹⁵ These obligations included warning customers of higher charges for roaming services, providing pricing information, allowing customers to stop roaming, and offering customers tools for managing their roaming costs.

Table 2.2 New technologies and year in which copyright law was changed to accommodate them

<i>Technology</i>	<i>United States</i>	<i>Australia</i>	<i>New Zealand</i>
VCR	1984	2006	1994
Reverse engineering	1992	1999	2008
Internet search	1999	.. ^a	Law unclear
Hyperlinking	2000	Law unclear	Law unclear
Digital video recorders	1999	2008	Law unclear
Cloud services	2008	NA	Law unclear

^a Not applicable.

Source: InternetNZ (2018, p. 25).

The lack of principles-based ‘fair use’ exceptions in Australia and New Zealand’s copyright laws has meant that statutes have been progressively ‘patched’ with narrow exceptions that are soon overtaken by new technological developments (APC 2016c; Crampton et al. 2017). For example, InternetNZ (2018) showed how current exceptions in New Zealand’s copyright law limit ordinary uses of cloud services (table 2.3).

Table 2.3 Use of cloud services and New Zealand copyright law

<i>Section</i>	<i>Permitted act</i>	<i>Comment</i>
43	Fair dealing for research or private study	Unclear that a third-party cloud provider may copy on a user’s behalf.
43A	Transient reproduction	Allows the basic operation of the Internet, but not more persistent cloud copies authorised by a user.
80	Back-up of a computer program	Does permit copying on behalf of a user, but suppliers can override by notice. In practice, users may be unable to backup apps, games and software.
81A	Copying sound recording for personal use	Allows ‘format-shifting’ of sound recordings to enable use on new devices. Does not allow a third-party to copy on behalf of the user.

Source: InternetNZ (2018, p. 12).

Research conducted for Google by Deloitte Access Economics (2018) indicated the current New Zealand copyright regime does not allow some of the activities that underpin machine learning and artificial intelligence technologies, such as data and text mining, and other non-expressive uses of copyright material. The Australian Productivity Commission (2016) inquiry into intellectual property arrangements similarly noted innovative activities that were arguably prohibited under Australian copyright law, including cloud computing, creative and transformative works such

as mashups, and data and text mining. The inquiry also found that the current, overly-restrictive ‘fair use’ provisions were limiting the ability of local higher education providers to deliver massive online open courses (MOOCs) and compete in the cross-border delivery of education.

F2.3

Current intellectual property arrangements in Australia and New Zealand limit many beneficial applications of digital technologies.

Regulation provides insufficient support for cross-border redress

Australian and New Zealand consumer and data protection laws currently provide limited opportunities for consumers to seek redress for unfair or misleading conduct that results from a cross-border transaction or misuse of personal information held about them overseas (MBIE 2017a). Case law¹⁶ has confirmed that the Australian Consumer Law (ACL) applies to overseas-based firms that sell goods or services to consumers in Australia, and the New Zealand Commerce Commission is currently suing a Swiss-based online ticket resale firm for alleged breaches of the *Fair Trading Act 1986* (Nadkarni 2018).

However, Malbon (2013, p. 42) commented that ‘in reality it is difficult, if not near impossible, for a consumer to pursue their rights under the ACL in the face of a seller’s objections’. In New Zealand, the Commerce Commission reported that 24% of fair trading complaints over 2017–18 were about online retail and a common theme in these complaints was ‘consumers being unable to make contact with overseas-based traders to resolve concerns about product delivery or quality’ (2018, p. 6).

Although some Australian and New Zealand free trade agreements (FTAs) include provisions about cross-border consumer protection and electronic commerce, these are generally aspirational in their framing or are subject to ‘domestic policy’ exceptions. Chapter 4 discusses this matter in more detail.

F2.4

Although some Australian and New Zealand regulations and regulators are flexible and open to innovation, other regulations and regulators have been slow to adapt.

¹⁶ Valve Corporation v Australian Competition and Consumer Commission [2017] FCAFC 224.

F2.5

Australian and New Zealand regulations provide inadequate protections for consumers purchasing goods and services across borders.

2.5 Designing regulatory policy for the digital era

The dynamic nature of digital technologies requires new regulatory responses that emphasise nimbleness and appropriate targeting.

Design regimes to be nimble and technology-neutral

Regulatory regimes need to be, as far as possible, technology-neutral and able to respond promptly to new developments. Designers of regulatory regimes can build in flexibility and nimbleness by:

- being explicit about principles and desired outcomes
- adopting risk-based enforcement
- creating obligations on regulators to regularly evaluate policy and review the need for controls on activities, goods or services
- delegating rights to authorise new activities to regulators, rather than requiring Parliamentary updates of underlying legislation.

Delegation of decision rights to regulators may not always be appropriate for regulation that seeks to achieve social policy goals, or for decisions that require significant value judgements, involving trade-offs that are not readily amenable to analysis (NZPC 2014b). In these circumstances, decision rights can be allocated to politically accountable actors, such as ministers, to provide regulatory flexibility.

Rethink the need for regulation

New technologies can provide non-regulatory means of achieving policy goals. They can also offer more and better options for managing risks of harm than universal, one-size-fits-all regulation. For example, platforms such as Google give users control over their privacy settings, allowing them to decide who can see their information. And many providers of digital goods and services differentiate themselves through the strength of the privacy protections they offer. Where

platforms offer such options to consumers, governments should actively review whether regulation is still required.

In general, more permissive approaches create space for innovation and more choice. One of the reasons Trade Me¹⁷ was able to successfully establish itself and expand in New Zealand was that the trading platform initially sat in a regulatory grey area, falling outside the definition of an ‘auction’ or ‘auctioneer’ under the *Auctioneers Act 1928*. The Government later recognised the benefits of this grey area, choosing not to extend the scope of auction regulation to cover the platform when it reviewed consumer protection laws in 2010 (Office of the Minister of Consumer Affairs 2010).

Consider the balance of ex ante and ex post interventions

Regulatory regimes can involve ex ante interventions (e.g. standards that must be complied with, or prohibitions on specified activities), ex post interventions (e.g. fines, prosecutions or civil actions against individuals or firms for harms they have caused) or a mixture of both (box 2.7).

The threat of regulation can lead to better outcomes

Regulation is not the only way for governments to change behaviour. In some circumstances, the threat of regulation may be sufficient on its own. One case is trans-Tasman mobile roaming, where the decision by the Australian and New Zealand Governments to prepare legislation to allow competition regulators to impose price caps led telecommunications providers to reduce their prices. The legislation was not ultimately introduced to the Australian and New Zealand Parliaments.¹⁸

¹⁷ Trade Me is an online auction platform/marketplace in New Zealand, like Gumtree and eBay in Australia.

¹⁸ As we discuss above, however, Australia did introduce disclosure standards for providers of international mobile roaming.

Box 2.7 E-scooters and share bikes — ex ante or ex post control?

The emergence of share/hire services for electric scooters and dockless bicycles has prompted a debate over the relative merits of ex ante and ex post controls. Both the scooters and share bikes are distributed throughout the cities they operate in, and can be unlocked and hired using smartphone-based apps and a registered credit or debit card. The scooters have electric motors that allow riders to travel over 20 km/h.

The entry of these services in Australian and New Zealand markets have provoked public debate, particularly regarding their costs and harms. In Australia, the proliferation of share bikes on footpaths and their tendency to fall over, blocking foot traffic, led to public complaints. In New Zealand, concerns about accidents caused by scooter riders hitting pedestrians have prompted calls for the scooters to be banned from footpaths. However, both services also provide benefits, including convenience, physical activity and health impacts (for bicycles), and — where they substitute for other forms of motorised transport — reductions in greenhouse gas emissions.

Arguments can be made either way for ex ante or ex post controls on these services. Ex post interventions target harms but are only effective where there is a reasonable probability of offenders being caught and penalties are sufficiently high. Ex ante rules (if enforced) provide greater certainty but may be too strict, discouraging use and leading to lower overall benefits.

Some Australian states and cities have taken strict ex ante stances against these services. Powered scooters are illegal under New South Wales law; in Victoria, meanwhile, motorised scooters that travel faster than 10 km/h must be used on the road and require a motorcycle license. Some jurisdictions have targeted ex post harms. Victoria's Environmental Protection Authority imposed an A\$3000 fine for each time a share bike blocked a road for more than two hours, or each time the provider failed to remove damaged or vandalised bikes within a set period. This ultimately led to one provider (oBike) exiting the market.

The threat of regulation has also led to private responses. In New Zealand, the e-scooter company Lime sets terms and conditions that are stricter than national traffic rules and shares usage data with the Auckland Council. In Australia, e-scooter company Bird pledged to pick up scooters every evening and redeploy them in the morning, manage the numbers of scooters deployed to reduce footpath clutter, and share revenue with host cities to build and maintain bike lanes.

Sources: Buckingham-Jones (2018); Koob (2018); Pojani & Corcoran (2018); Sipe & Pojani (2018); Te (2018).

In dynamic fields where ex ante rules can struggle to keep pace with technology, a greater reliance on ex post intervention is more likely to be efficient and effective, provided the thresholds for regulatory action (e.g. prosecution) are clear. Ex post rules are also generally easier to make technology-neutral.

Basing regulatory regimes on ex post interventions encourages policy makers to clearly identify the harms that the regime is intending to prevent. Liability rules are one example. Rather than controlling or prohibiting activities per se, liability rules focus on the harms caused by particular behaviours and trigger enforcement when harms occur.

Make closer connections with regulators in other countries, especially for consumer protection

There is scope for much closer cooperation between competition, consumer protection and data access regulators in Australia and New Zealand, and with their overseas counterparts. Past efforts to draw stronger links with overseas regulators appear to have been ad hoc. Work to strengthen cross-border consumer protection and data access should be given greater priority by the two countries and could be pursued jointly.

Cross-border consumer protection and data access could be enhanced through stronger and more binding clauses in new and revised free trade agreements. Chapter 4 discusses joint Australia-New Zealand action to promote greater international cooperation in more detail.

Give regulators the right tools

Governments should equip regulators with the tools necessary to carry out their objectives. This may involve refining enforcement powers or bringing existing regulatory regimes closer together — for example, data access, telecommunications, competition and consumer protection.

As technology changes, regulators may need to take on new roles. For example, consumer reviews are playing an increasing role in governing market conduct. This makes the accuracy and reliability of such reviews more important (box 1.2). Regulators may need to be more active in policing reviews or enforcing liability rules for fraudulent or misleading reviews.

Finally, where governments wish to promote innovation in regulated sectors or activities, they should clearly prioritise this goal in regulators' mandates and in statutory objectives.

F2.6

In designing regulation to suit the digital era, governments should:

- set regimes to be technology-neutral
- take the opportunities provided by new technologies to reconsider the scale of regulation required or whether regulation is necessary at all
- strike the right balance of ex ante and ex post controls
- remember that the threat of regulation can be as powerful as actual regulation
- make closer connections with regulators in other jurisdictions, and
- give regulators the appropriate tools to carry out their objectives.

3 Government services in the digital economy

Key points

- Governments interact with individuals and firms in many ways. The efficiency and effectiveness of these interactions can be improved using digital technologies. The transaction costs created by government interactions can fall more heavily on smaller firms than on larger ones, so reductions in those costs could be particularly beneficial for small to medium enterprises (SMEs).
- Governments in Australia and New Zealand have integrated ICT and digital technologies into their operations, delivering cost savings in back-office processing and, in many cases, lowering transaction costs for service users. However, implementation has been patchy.
- Governments should improve their use of digital technologies in designing interactions with individuals and firms. They should strive to design their systems from a user-centric perspective, so that users of digital government services — both individuals and firms — can carry out those interactions more easily. To achieve this goal, digital government interactions should:
 - be seamless for users. Users should not need to know, nor care, which government agencies supply and process the data that supports a service.
 - be helpful. Online information should be presented in ways that are accessible, interactive and helpful to users. Intermediaries that are trusted by users can assist in the delivery of information.
 - use digital-first design. New services should be designed from an explicitly digital perspective, rather than replicating old approaches.
- Governments can create greater value from public datasets, but they need to balance the benefits of rich information against the risks of re-identification.
- Digitalised public services can create opportunities for SMEs to participate in more markets, including export and government procurement markets.
- Over time, digital technologies are likely to shift the boundaries of government — that is, what government owns as opposed to rents, or produces as opposed to purchases.

Digital technologies can make interactions with governments — and the operation of governments overall — more efficient, effective and user-friendly. This can save time, effort and expense for firms and governments and result in higher productivity and a more efficient allocation of public funds. This is especially so when high frequency, low risk (and low-complexity) interactions are automated (Cornish 2018). The potential benefits are larger for small to medium enterprises (SMEs), which face

proportionately higher fixed costs in their government interactions than do large enterprises (APC 2013).

In Australia and New Zealand, governments have made significant progress in integrating information and communication technology (ICT) into their operations. However, governments in Australia and New Zealand are yet to realise the full potential of data and digital technologies for the delivery of public services.

This chapter discusses ways by which digital technologies can improve interactions with governments and the delivery of public services, particularly government services to SMEs. Section 3.1 provides examples of business-to-government interactions and summarises the progress made by the Australian and New Zealand Governments in the digitalisation of those interactions. Section 3.2 identifies attributes that governments should pursue in developing digital systems. Section 3.3 uses the trade compliance system as an example of the steps required to move from ICT to digital-first, user-centred design. Section 3.4 addresses how governments can create greater value from public sector datasets. Section 3.5 concludes by briefly considering some longer-term implications of digital technologies for the boundaries of government.

3.1 How are governments improving their interactions with firms?

Government interactions with firms cover a wide range of activities (APC 2013), including:

- informing (providing information and advice to SMEs on, for example, regulatory requirements and compliance)
- taxing (assessing liabilities; conducting audits; processing payments and refunds)
- licensing and approvals (assessing applications; issuing licences, registrations and accreditations; collecting fees)
- compliance and risk monitoring (assessing risks; collecting data to monitor compliance and outcomes; conducting inspections and audits)
- enforcement (imposing penalties for non-compliance; rewarding good compliance practices)
- procurement (offering opportunities for firms to bid on contracts; adhering to agreements; reporting on contracts granted)

-
- support (encouraging investment and innovation through grants or accelerator/incubator programmes).

Governments in both countries have made progress on digitalising many of these interactions. Governments also provide some of the supporting infrastructure that underlies these interactions, including electronic payment gateways and digital identities.

Both countries have seen successes and failures in ICT and digital projects

Public sectors in Australia and New Zealand have been working towards the coordinated delivery of consumer-facing services, via the use of a wide range of ICT and digital technologies, for well over a decade (box 3.1). In doing so, they have achieved cost savings in back-office processing, made many transactions more efficient, and implemented electronic payment for many services.

There are many examples of digital services in Australia and New Zealand that have improved firms' interactions with governments, including:

- Reporting income tax, through myTax in Australia and myIR in New Zealand. These online tax forms have much of the relevant data pre-filled, reducing the scope for erroneous or missing information and the compliance burden on taxpayers.
- Reporting payrolls and employer superannuation contributions, through Single Touch Payroll in Australia and Payday Filing in New Zealand.
 - In Australia, the Australian Taxation Office (ATO) offers a process for SMEs to streamline the payment of superannuation, whereby the firm can pay its total superannuation obligations to a Small Business Superannuation Clearing House (SBSCH) as a single electronic payment. The SBSCH then distributes the payments to each employee's individual superannuation fund, saving SMEs time and effort.
- Registering a firm, through business.gov.au (run by the Department of Industry, Innovation and Science) or nzbn.govt.nz (run by the Ministry of Business, Innovation and Employment (MBIE)). A data-sharing arrangement between the Australian Securities and Investments Commission (ASIC) and the New Zealand Companies Office (NZCO) means that firms expanding across the Tasman can register easily in the other country (ASIC 2017a; NZCO 2019; Poole and Reese 2015). ASIC and the NZCO have also created a smartphone app called NZAU Connect using this data, which enables users to view a firm's

registration, name and place of business in both countries simultaneously (ASIC 2018).

Box 3.1 A history of digital coordination initiatives in the Australian and New Zealand Governments

In Australia, the *Review of the Australian Government's Use of Information and Communication Technology* (Gershon 2008) led to the creation of the *Australian Government ICT Reform Program* under the Department of Finance and Deregulation (as it was then), and the launch in 2011 of the *Strategic Vision for the Australian Government's Use of Information and Communication Technology*.

In 2013, the Australian Government initiated an audit of all departments' and agencies' ICT spending and outcomes, pursuant to the *e-Government and Digital Economy* policy platform (SSCFPA 2018). This was followed by the 2015 launch of the Digital Transformation Office — a small agency focussed on the development of digital government services — which later became the Digital Transformation Agency. Most recently, the Department of Industry, Innovation and Science began consultation on a *Digital Economy Strategy*, to be launched in early 2019.

The New Zealand Government first launched community consultation on a *National Digital Strategy* in 2003, formally adopted the resulting Strategy as government policy in 2005 and updated it in 2008. This was followed by a *Government ICT Strategy and Action Plan* in 2013. Two of the target results of the *Better Public Services* programme (a government-wide strategy designed to improve cross-agency work, which ran from 2012 to 2017) were aimed at the digitalisation of government interactions. Result 9 set the goal that 'New Zealand businesses have a one-stop online shop for all government advice and support they need to run and grow their business', while Result 10 aimed for 'New Zealanders [to] complete their transactions with government easily in a digital environment' (SSC 2018). In 2015, a Digital Government Partnership of stakeholders from agencies across government was established to align the public sector with the *Government ICT Strategy* (NZ Government 2018).

Both countries have Government Chief Digital Officers, plus a Chief Data Steward for New Zealand and a National Data Commissioner for Australia, as well as ministers overseeing digital government services.

But there are also examples of government digital services malfunctioning or failing. Recent cases include the cancellation of the Australian apprentice management system project (SSCFPA 2018), and problems with both countries' first attempts at a digital census (Dashfield 2018; Head 2017). There are also examples of half-finished digitisation projects. For instance, New South Wales' historical land titles are still only partially digitised, with access to some title records requiring individuals to attend the single NSW Land Registry Services office in person (NSWLRS 2018) — eight years after the digitisation of these records commenced (NSW State Archives & Records 2016).

Despite the plethora of government policies and bodies in this space, the process of digitalising government services has not kept up with technological developments, nor with firm and consumer use of digital technology (APC 2016b, pp. 129–131). In both countries, individual agencies have introduced digital technologies in different ways and at very different rates (Gershon 2008). Consequently, digital government on both sides of the Tasman is something of a patchwork — some government services are highly digitalised, integrated and provide a good user experience, while others are confusing, siloed and still partly paper-based.

F3.1

Digital government service delivery in Australia and New Zealand is a patchwork of different approaches and technologies.

Why might governments fall behind the technological frontier?

Governments are often seen as being risk-averse, cumbersome and slow to implement change (Ritchie 2014). Governments typically have a monopoly over the services they deliver, and economic theory suggests that monopolies have weak incentives to pursue efficiency and improve customer service. Governments are also (rightfully) subject to public scrutiny of their policy and expenditure decisions. While this aids transparency, it can also create a desire to avoid risk above all else, lest the public react poorly. And the public sector tends to suffer from a lack of digital and data-management skills when compared with the private sector (APC 2016a). Individual agencies may have strong motivations to digitalise their services and interfaces (e.g. to promote higher compliance or revenue collection rates), but these motivations are not consistent across the public sector.

Governments are yet to realise the full potential of the digital revolution. Many of the features of the digital revolution are new, including: data-driven personalised services; the creation of digital platforms onto which third parties can add value; online social networks; reputational scoring; and trade in datasets as intangible assets. It remains an open question as to whether governments can (or should) implement such features in providing digital government services.

As chapter 1 notes, maximising the productivity benefits from digital technologies often requires fundamental skill, organisational and managerial changes. This applies to governments as well as firms.

F3.2

Governments in Australia and New Zealand have made progress in integrating information and communications technologies into their operations. But they are yet to realise the full potential of digital technologies for government services. To do so will require complementary investments including, in some cases, large-scale capability, cultural and organisational change.

3.2 How can digital improve government–firm interactions?

While efforts to date by the Australian and New Zealand Governments to digitalise services have achieved back-office efficiencies and some more user-friendly interfaces, they have yet to *systematically* improve user experience or approach system design from the perspective of customers.

Part of this gap may be due to the nature — or underlying structure — of government itself. Governments typically need to achieve multiple outcomes from any transaction (e.g. information collection, verification and risk minimisation) and have designed their interaction systems to address these needs — often on an agency-by-agency basis. As a result, separate log-in and application processes are often required for each government agency.

By contrast, the customers of private sector digital platforms, such as Google, need only one log-in to access many services (e.g. internet search, maps, cloud storage and video conferencing), including many supplied by third parties. This reduces transaction costs for users, not only in terms of time, but also by removing the need to manage multiple log-ins and passwords.

A customer-centric approach — one that pays more attention to the needs and capabilities of the user (whether an individual or a firm) — is needed. Achieving customer-centric government services will require:

- seamless access for users, who should not be required to provide the same data to multiple government agencies; neither should they need to know nor care which agencies supply and process the data that supports each service,
- accessible and understandable information for users, and
- digital-first design (also known as digital-by-design or digital-by-default); that is, services designed specifically for a digital context, rather than layering an online interface over existing systems.

The following sections discuss these requirements in more detail.

Meeting these requirements provides a springboard for governments to begin introducing other features of the digital revolution, such as ‘government as a platform’. Digitalised government services also create wider opportunities for interactions with the private sector, including procurement processes that are more accessible to SMEs.

Achieving seamless access for users

Digitalising government interactions like compliance and information-gathering can speed up processes for both firms and governments. But to further lighten the compliance burden for firms, the *number* of interactions required to complete processes should be reduced. In the short run, this requires greater interoperability (or an increased ability to link data) between the relevant databases and government agencies. Over the longer run, governments could make greater use of public and private digital platforms to deliver services to firms and individuals.

Silos in government increase the compliance burden on firms ...

There are many examples of business-to-government interactions needing to be repeated many times over with many different agencies, because those agencies do not (or legally cannot) transfer the relevant information to each other. While this is sometimes a result of privacy or secrecy provisions in legislation, more often it is due to a lack of interoperability between different agencies’ databases, meaning that a person’s or firm’s data cannot be linked, nor copied directly from one system into another (APC 2017a).

For example, 13 different Australian Government agencies (possibly along with State or Territory agencies) may issue export permits, depending on what the product to be exported is; and in New Zealand, there are 11 agencies that issue export permits (DHA 2018a; NZCS 2017). A firm in Australia intending to ship a consignment with multiple types of goods would need to submit their information to several agencies individually, obtain approval or accreditation from each agency individually, and then submit this information again to the Australian Border Force (ABF) for final approval to export. Approvals do not flow automatically from each agency to the ABF. And there are other steps in the process that may involve still more agencies: the Australian Parliament’s Joint Standing Committee on Trade and Investment Growth (2018, p. 12) noted that ‘at present, approximately 30 government agencies have regulatory touchpoints relating to border management’.

Sometimes, firms may even need to repeat interactions with the same agency. For example, the Australian National Audit Office found in 2015 that several database systems used by the Australian Department of Agriculture and Water Resources (DAWR) for the management of food importation data were not integrated, necessitating the repeated submission of the same information to different parts of the Department (ANAO 2015). DAWR itself noted (2016) that a range of its other data holdings at the time were not linked or integrated. The APC heard more generally during its Data Availability and Use inquiry that this phenomenon is not uncommon in large departments with complex structures.

Complexity and compliance costs can be especially high where interactions with many government agencies, or with multiple layers of government, are required. Smaller firms can be affected proportionately more heavily by these costs, as the time and effort to comply with multiple regulations can be the same as for larger firms. The licences and consents required by a small cafe, for example, are likely to be the same as those required by a much larger enterprise (box 3.2).

Box 3.2 Compliance costs: Lola's Cafe

Lola's is a Wellington cafe that also exports specialty food products to Australia. Lola's required 11 different permissions to operate, from both Wellington City Council and the New Zealand Government: building consent, resource consent, pavement license, indoor and outdoor liquor licenses, a food registration license, trade waste license, food import license, food control plan, special event license and commercial export license.

It took the owners of Lola's approximately 240 hours to prepare, submit and follow up these applications. This is close to seven working weeks dealing with governments instead of working on their business. Hundreds of thousands of firms each year face such costs.

Source: MBIE (nd, 2018b).

F3.3

Governments can use digital technologies to minimise the costs experienced by users of services involving multiple government agencies. In doing so, governments may improve compliance and reduce their own costs, and create efficiency gains for firms.

F3.4

The transaction costs created by government interactions can fall proportionately more heavily on smaller firms than on larger ones, so reductions in those costs could be particularly beneficial to SMEs.

... but achieving better data linkages will take time ...

In the short run, governments wishing to simplify these interactions and provide a seamless experience for users will need to consolidate disparate databases and enable automated data transfer and linkage between agencies. The Australian Government's *Public Data Policy* already requires government entities to ensure all new systems support data discoverability, interoperability and cost-effective access (APC 2016a). Consequently, the gradual replacement of systems over time should see technological issues posing less of a barrier to data transfer and linkage. There are also ongoing efforts in both Australia and New Zealand to link or integrate separate agencies' datasets together. However, given the scale and complexity of some agencies, these will not be simple or quick processes (especially where privacy regulations pose real or perceived barriers to data sharing) and are likely to be costly.

... and more 'top-down' coordination is not the answer

As the NZPC (2015) argued in its report on delivering more effective social services, the problem of information 'silos' in government is not merely a symptom of different government agencies failing to communicate with each other. It also reflects the architecture of government — in other words, where the delivery of services to a particular group is fragmented across different government agencies in the first place, efforts to 'join up' those agencies can only go so far:

Over the years, many in government have recognised the problems of silos and made numerous attempts to strengthen the horizontal 'glue' across agencies. These efforts have tended to focus on 'joining up' at the top — often through ministerial or chief executive working groups — with the hope that the connections between silos will filter down to critical points closer to the frontline. However, what such initiatives can achieve within the existing structures of government has a natural limit. (2015, p. 98)

The answer to these challenges is not further efforts to coordinate or join up government agencies from the top down. In New Zealand, there have been 'more than 25 initiatives launched since 2000 with the aim of improving coordination' within the New Zealand public sector (NZPC 2015, p. 87). Few last long and none appear to have lasting success.

Instead, governments should seek to emulate the seamless access to services offered by firms such as Google and Microsoft. Ensuring that agency databases are interoperable is but a necessary step in that process. The longer-term goal should be to also streamline the processes when individuals or firms *do* need to interact with multiple agencies. This might take the form of aggregating access to the relevant government services, by creating a single log-in for multiple services

(where a user only needs to log in once to perform several different interactions, such as Australia’s myGov system for accessing Centrelink, Medicare, My Health Record and the ATO). Alternatively, it could involve a single digital identity such as New Zealand’s RealMe, where a person or firm’s interactions with several agencies all link to the one unique and verified identity, thereby reducing the need for a person to prove their identity each time they engage with a government service (box 3.3).

Box 3.3 **Access and identity in digital services**

To use a digital service people may need to satisfy access or identity requirements. These requirements take different forms.

- A *log-in* provides access to a digital service for those who know the associated username and password, while excluding those who do not.
- A *single log-in* allows the same username and password to be used to access multiple services.
- A *digital identity*, which provides an assurance that you are who you say you are.

Governments’ needs differ depending on the service in question. For example, while a government cares that *someone* pays a vehicle registration renewal, they may not care *who* makes the payment. But identity verification matters for other government services, such as the issue of official documents and for tax assessments. The tax system might be compromised if one taxpayer could split their income across multiple identities.

Digital identities are typically less important for private platform operators. Google, for example, does not seek verification of a customer’s identity and is indifferent to whether a person has more than one log-in.

Examples of digital identities — which may or may not be linked to a single log-in — include RealMe in New Zealand and Digital iD in Australia (box 3.4).

Single log-in and digital identity projects have been in train for several years in both countries but have yet to reach their potential and substantially reduce transaction costs. In large part, this is because of limited adoption by agencies, poor connections between agency databases, and a lack of agreement across governments to use common standards or identities (box 3.4).

Using public and private platforms to deliver services to firms and individuals

A high-profile concept in recent discussions about digital public services is ‘government as a platform’ — a form of digital system that aims to connect service users, governments and third parties.

Box 3.4 **Competing government digital identities in Australia**

The Australian Government has been working on establishing a national system of ‘trusted digital identities’ since this was recommended by the final report of the Financial System Inquiry in 2014. In the 2017-18 Budget, the Government announced that it would invest A\$92 million in the Digital Transformation Agency’s (DTA) development of an identity framework called GovPass, which would ‘provide a simple, safe and secure choice for people to verify who they are and access government services online, reducing the need to visit a shopfront’ (DTA 2018a).

According to the DTA, GovPass would be piloted on up to eight ‘high-volume government services’ and then rolled out more widely. The DTA would set the rules and standards for the system, the Australian Taxation Office would be the ‘Commonwealth’s identity provider to verify people are who they say they are’, and the Department of Human Services would operate an exchange between services and accredited identity providers (DTA 2018a).

However, Australia also has a government digital identity called Digital iD, which was developed by Australia Post. At the time of the 2018 budget announcements, Digital iD was ‘accepted in licensed venues in the Australian Capital Territory, the Northern Territory, Queensland, Tasmania and Victoria, and by companies such as Travelex and Airtasker’ and an Australia Post product team was ‘actively selling access to the private sector’ (Hanson 2018, p. 6). The total cost of developing Digital iD was estimated at A\$30–50 million.

In addition to questioning the duplication of effort, critics have raised a number of concerns about GovPass, including poor communication with the public, the lack of clear limits about how the data could be used, weak oversight and possible security risks (Hanson 2018).

Government as a platform differs from a single log-in in its underlying architecture, in that it is designed to allow multiple parties to attach to the system at different points, rather than information only flowing between a user and a single government agency:

[Government as a platform involves] making certain data and decision rules of government open and available digitally and for use by others through an orderly and reliable platform. ... Incorporating a platform approach to service delivery enables civic and private sector actors to deliver additional convenience, function and service to meet the broad spectrum of public needs that government by itself could not. (SIL 2017, p. 3)

Government as a platform requires a consistent set of transparent digital ‘rules’ for software structure and standards, in order to:

- allow new services (developed by a range of software providers, either in the public or private sectors) to ‘plug into’ the platform over time
- ensure data transferability between those services
- offer individuals and firms a consistent service experience across multiple government agencies (or even, potentially, across multiple tiers of government).

The Business Connect initiative in New Zealand, for example, aims to create a digital platform for firms to apply for licenses, permits and other forms of government permissions — in the first instance export licenses, liquor licenses and food licenses. Doing so will bring together services offered by both local and central government agencies. Over time, the platform will expand to include other public services, such as the New Zealand Business Number and Land Information New Zealand property services. Early trials suggest possible productivity gains of up to 90% during the process of firms applying for and being granted liquor licenses, reflecting much faster processing times (MBIE nd, 2018b).

One existing example of a digital platform that simultaneously links individuals, governments and firms is the ATO's single touch payroll (STP) programme, where the ability for cloud accounting systems, like Xero and MYOB, to link into STP software allows data from individual firms' records to flow directly to the ATO. However, STP as a platform has a relatively narrow application, and it does not (as yet) incorporate options for other third parties to link into the platform and offer new services related to business accounting.

By contrast, the SmartStart programme in New Zealand offers the potential for private firms to link into the system. SmartStart is a programme for new and expecting parents to access government services relevant to the birth of a child. Parents can create a SmartStart profile, register their child's due date and sign up to have reminders sent for particular services at the appropriate time (depending on their due date and other information they may have provided, such as particular health conditions). These reminders cover activities such as finding a midwife, applying for government-funded paid parental leave, registering the child's birth and scheduling vaccinations (DIA 2017).

SmartStart could be organised to engage small firms more directly in the delivery of services — for example, pharmacies and medical centres could be notified (on an anonymous basis) that there is a child in their area who is due for a vaccination and allow those firms to make offers to the child's parents.¹⁹ Such a system would need to be designed to strike the right balance between being helpful and discouraging spam — for example, parents would need to have the ability to opt-out of contact and/or apply filters for the sorts of information they are interested in receiving.

¹⁹ SmartStart currently provides information on local services but does not explicitly link service providers to parents or actively encourage their interaction.

F3.5

Digital integration between public and private services can create a better experience and more choice for users, increase the efficiency of service delivery, and encourage innovation.

There are privacy concerns about government data collection

In recent years, parties in both Australia and New Zealand have expressed concerns about the privacy implications of centralised government storage, or linkage, of sensitive information (see, e.g., APC 2017a; Gulliver et al. 2016; SSCFPA 2018).²⁰ These concerns are primarily about *individuals'* privacy. However, where a high proportion of firms are non-employing or only employ a small handful of staff (as is the case in Australia and New Zealand), data about a firm may also reveal sensitive information about the owners, operators or staff of that firm.

Governments should actively address these concerns and build communities' trust in their ability to manage data appropriately. This includes explaining both the benefits and risks of data use. Section 3.4 discusses the issues of public data use and release in more detail. However, such privacy concerns also offer some potential lessons for the design of digital government services.

- Trust is context-specific (Acquisti, Brandimarte and Loewenstein 2015) and earned over time through positive personal experiences. Therefore, every digital service needs to be 'trustworthy' individually. Governments cannot rely on a wider 'public service' reputation.
- Risk management is necessary and risk mitigations (e.g. the stringency of access conditions) should vary depending on the nature of the dataset and the possible consequences of release. This type of 'risk-based' approach to data storage and access is frequently used by Stats NZ and the ABS.
- Data linkages, while increasing the efficiency of many government services, also carry risks. Not all data linkages across agencies have a net social benefit (Teague, Culnane and Rubinstein 2017).
- People have different experiences and expectations of the government agencies with whom they interact. Regularly assessing customers' perceptions of service performance and trustworthiness is important for maintaining and improving quality.

²⁰ A low level of trust in *private* sector organisations' ability to protect sensitive information also appears to be widespread in a range of countries (see, e.g., Frost & Sullivan 2018).

Making public information more understandable and accessible to firms

Greater use of digital technologies in government services can create opportunities to make information more useful and accessible to firms. It could include making greater use of intermediaries that are trusted by SMEs and using algorithmic tools to prompt decisions by firms.

Firms — especially small firms — have difficulties finding the information they need

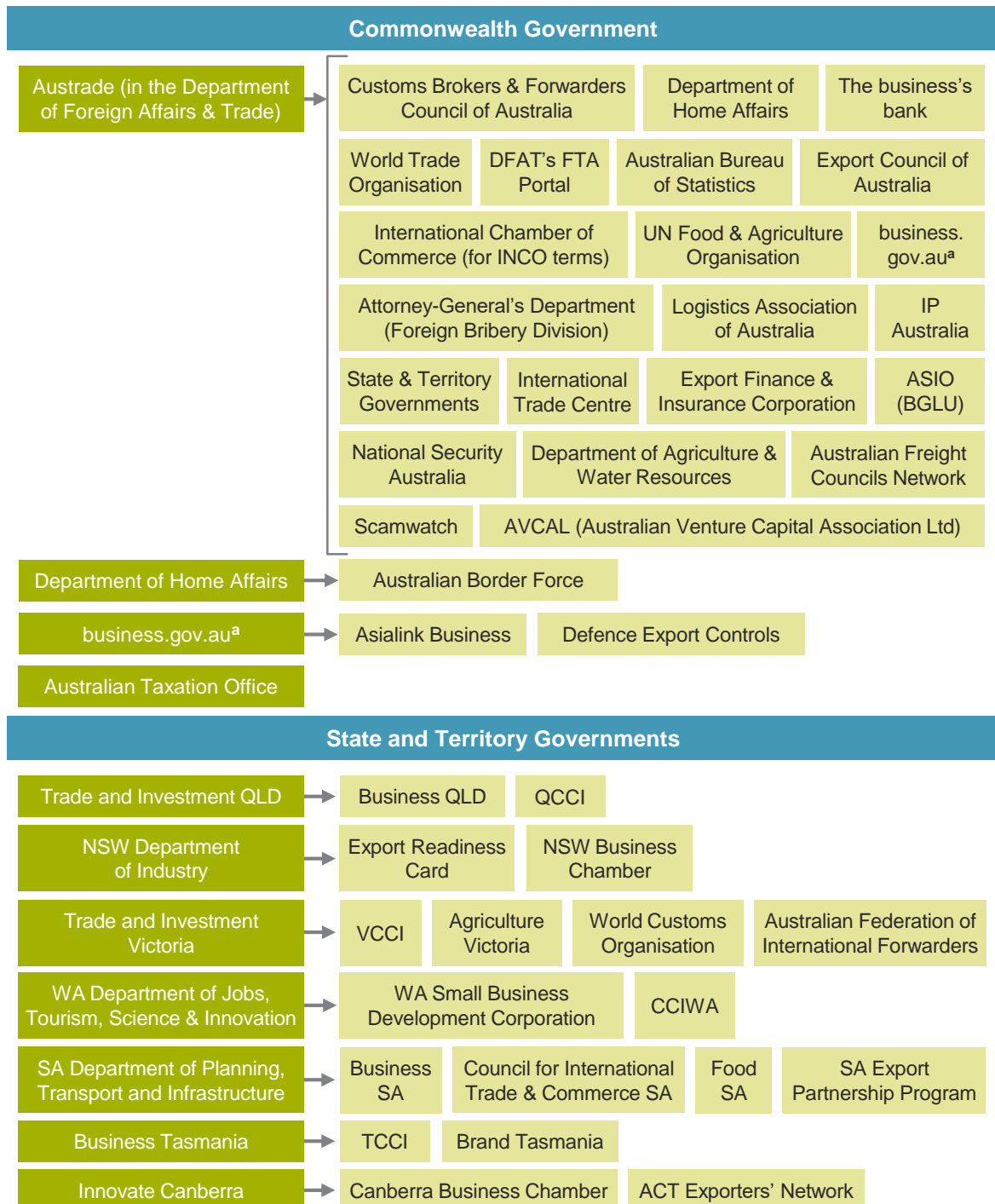
Both the Australian and New Zealand Governments (plus State and Territory governments in Australia) offer small firms a vast amount of information on digital engagement, international trade and other topics. However, this information is often scattered across multiple government websites (and sometimes duplicated in several jurisdictions); changes frequently; may differ between sources; and may be overwhelming in quantity, especially for very small firms inexperienced with digital technology or ‘starting from scratch’ with complex business processes like international trade (APC 2013; SBDT 2018).

For example, an Austrade webpage entitled ‘Guide to Exporting’ links or refers users to the websites of 22 different external organisations (figure 3.1). The other major Australian Government websites relevant to international trade — such as business.gov.au, the DHA, the Department of Foreign Affairs and Trade (DFAT) and the ATO — refer to still more external websites. Each State and Territory department responsible for small business and/or international trade does the same, as do the various chambers of commerce. As there is often little overlap in the information provided by these websites, a prudent user might need to consult them all.

Meanwhile, information on tariffs and non-tariff barriers (NTBs) — essential knowledge for potential exporters and importers — is divided between the websites of Austrade, DFAT and the DHA. By contrast, New Zealand’s Ministry of Foreign Affairs and Trade (MFAT) operates a streamlined, user-friendly website at tradebarriers.govt.nz, which provides information on NTBs and acts as a ‘clearing house’ for importing/exporting firms to report the NTBs they encounter to MFAT.

Figure 3.1 Exporting: information overload

The many destinations users are directed to when seeking government information on exporting from Australia



^a Operated by the Department of Industry, Innovation and Science.

Source: Austrade (2019a).

The difficulties involved in finding useful information were acknowledged by the Australian Parliament's Joint Standing Committee on Trade and Investment Growth (2018, p. xi) in the final report of its Inquiry into the Trade System and the Digital Economy:

The Australian Government has already developed initiatives and approaches that assist businesses to take advantage of these new opportunities, but too many of these are hard to find or access. A simple, industry-focused, single source of information will help Australian businesses — from the smallest to the largest — to identify new markets and expand their existing markets.

F3.6

Firms — especially SMEs — often have trouble finding all the government information they need. This includes both information about their legal obligations (such as compliance and reporting) and information about opportunities available to them.

How can governments make information more accessible to users?

Several external parties suggested that this 'information overload' can result in SMEs not seeking information from governments at all — rather, they turn to their accountants, industry associations, or (less frequently) their local, State or Territory chamber of commerce. These observations echo the findings of the Australian Small Business Digital Taskforce (2018). Reflecting the trust that many small firms place in these bodies, governments on both sides of the Tasman deliver some services via organisations such as chambers of commerce, accountants and industry associations.²¹

Digital technologies provide opportunities for governments to engage these trusted intermediaries more centrally in the provision of information to firms. This could include developing 'processes for government agencies to pass leads to the organisations best equipped to help [SMEs] — regardless of whether they are from the public or private sectors' (ECA 2018b, p. 9).

Rather than exclusively providing the information through their own agency websites, governments can provide the underlying data in machine-readable forms and allow other partners to present it in the manner they consider most effective. Such re-use of government information is currently feasible (e.g. through 'screen-scraping' tools) but has not been widely taken up by organisations such as

²¹ In New Zealand, for example, basic export training is delivered under contract by accounting and marketing firms, and business development services are provided by chambers of commerce and regional economic development agencies.

accountants and industry bodies. Making greater use of such intermediaries will require the development of viable business models and revenue streams for providing these services.

Additionally, government information sources can be simplified and better tailored to the needs of time-poor small business proprietors. Rather than simply maximising the amount of static information (not all of which will be relevant to most visitors) on government websites, governments could move towards interactive and responsive online information sources.

For example, at present, government websites in both Australia and New Zealand provide online quizzes that firms can use to measure their level of digital proficiency (Digital Journey 2016; MBIE 2017c) or export readiness (Austrade 2019b). But these quizzes are presented alongside enormous amounts of information and do little to simplify the user's experience. And quizzes are a second-best solution if they require users to enter data that agencies already hold about that firm. Artificial intelligence tools, such as chatbots and digital assistants, could provide a more responsive and user-friendly means of helping firms find the information they need based on their individual circumstances. Banks in both Australia and New Zealand make extensive use of chatbots to serve their customers, as does the ATO.

Using data and algorithms to prompt firm actions

Another way to reduce information overload for firms is for agency systems to direct firms to particular information sources or digital interactions, depending on information the agency already knows about the firm. In Australia, the ATO identifies firms to audit based on an algorithmic comparison of small firms' accounting data against benchmarks for different industry codes (ATO 2018a). A similar system could conceivably provide customised prompts to small firms. For example, when the proprietor of a new firm registers their first staff member's employment with the ATO (in Australia) or Inland Revenue Department (in New Zealand), they could be prompted to set the staff member's wage in their accounting software. Such prompts need not be limited to interactions with government — prompts could direct users towards registering a domain name for their firm, setting up an online storefront, or purchasing customer relationship management software.

Processes that incorporate algorithms can significantly improve and simplify user experience, and reduce transaction costs for both individuals and firms. A recent Australian survey (AIIA 2017, p. 3) indicated that 55% of respondents saw personalising the services they receive 'to improve the speed and convenience of how they deal with government' as a main benefit of governments using the latest technology to deliver services. However, algorithmic processes are likely to need

some dedicated checks and balances built in (including appeals processes and regular reviews of system operation), especially where their recommendations have high-stakes impacts (McLean 2018).

F3.7

Government agencies could better tailor information and service delivery to individual firms, using the data already held about them.

Smart government action can provide opportunities for SMEs

Governments affect private sector transactions by setting the rules for interactions between firms (including, when it comes to international trade, by setting rules for transactions between firms in different countries). As we discuss above, complying with these rules places a higher burden on SMEs relative to larger enterprises. But SMEs can also face other disadvantages, for example through having less bargaining power than large firms or being unable to take advantage of scale economies.

Consequently, where governments can enable broader participation in certain markets (such as government procurement) or go some way towards ‘levelling the playing field’ for participants in other markets (such as energy and telecommunications), they can stimulate innovation, growth and competition.

Putting competitive pressure on input costs through data rights

One means of reducing input costs for firms is to establish or clarify property rights for data and create low-cost means for consumers to exercise those rights (e.g. by enabling a small firm to easily access data on transactions between them and larger firms). The Australian and New Zealand Governments are working to increase the ability of SMEs to scrutinise their service providers and analyse their product or service usage (particularly in Australia, with the creation of the consumer data right). This includes the ability for an individual or firm to direct a service provider to transfer their service consumption data to a competing provider or to a comparison service.

These plans, once fully implemented, could mitigate suppliers’ market power and lower the costs of inputs for SMEs. For example, they would help SMEs to negotiate better deals with utilities and lenders (see box 2.3 and chapter 4 for more detail). Broad uptake of these data access regimes by SMEs, and appropriate enforcement by regulators, will be important factors in their success.

Maximising opportunities for SMEs in government procurement processes

Governments procure many goods and services from the private sector. Australian Government procurement was more than A\$47 billion in 2016-17 (ANAO 2017). New Zealand Government procurement is approximately NZ\$41 billion annually (MBIE 2018a).

Both the Australian and New Zealand Governments recognise that public procurement can provide valuable opportunities for small firms, and have explicit policies to encourage more SMEs to compete for public tenders. For example, the Australian Government has set a target of sourcing at least 10% of procurement (by value) from SMEs (Selling to Government 2019), and the New Zealand Government's new online tendering platform (see below for more detail) is partially aimed at making it easier for small suppliers to deal with government (CIO NZ 2018).

To maximise efficiency, government procurement policies should be firm size-agnostic and focus on value for money. However, even when this is the case, the choices that governments make about procurement *processes* can affect the ability of SMEs to compete for contracts. Where procurement practices are cumbersome or less open (e.g. where tenders are not publicly listed or are not accepted digitally) SMEs are more likely to miss out on potential contracts. This is because SMEs typically have tighter budgets and fewer professional connections than large firms. Government procurement should therefore be transparent and simple, and should facilitate on-time payment. Digital technologies can help with these goals and thereby expand access by small firms to the market for the supply of goods and services to government.

The Australian and New Zealand Governments have made their procurement processes more transparent and accessible, through digitalisation, over time.

- Australian Government tenders ('Approaches to Market', or ATMs) are chiefly listed on the Department of Finance's AusTender website, which also operates as a digital platform for potential suppliers to bid on government contracts and reports details of contracts awarded. The Digital Transformation Agency also operates Digital Marketplace, an online procurement panel specifically for digital goods and services (including training and specialist staff), which is heavily targeted at SMEs (DTA 2018b).
- New Zealand also has two main government procurement portals. GETS is a single source of information on government tenders, allowing firms to view all available opportunities and view details of contracts awarded. It does not currently enable firms to pitch directly to purchasers through the portal. The recently-launched Marketplace is a complete online tendering platform,

currently only for public cloud services. The goals of Marketplace include removing barriers to new firms entering the market and providing more opportunities to SMEs (Earnshaw 2018).

Governments have also simplified procurement through the use of standard contracts, so that firms do not need to spend time and money having legal representatives draft contracts from scratch each time they tender.

- AusTender provides the 'Commonwealth Contracting Suite' (standardised ATM and contract templates) for non-ICT contracts valued at up to A\$200 000, and the 'ClauseBank' (a set of pre-drafted contract terms that can be used within existing contract templates or in bespoke contracts as required) for higher-value contracts (Department of Finance 2018, 2019).
- MBIE (through procurement.govt.nz) provides 'model contracts' (standard templates) for government agency tenders and procurement contracts. While there is no minimum or maximum contract value for using these templates, some types of procurement (e.g. construction or social services) have their own more specialised template (MBIE 2019).

On-time payment is another area that disproportionately affects SMEs. SMEs are typically heavily dependent on cash flow, yet are often cash flow-poor, often as a result of extended payment times imposed by larger firms (see, e.g., ASBFEO 2017; Connolly and Bank 2018; Iles 2018; Pullar-Strecker 2016). Governments can therefore support SME participation in government procurement by using digital channels to pay invoices promptly. For example, the Australian Government has a policy encouraging instant payment via credit card for low value contracts (less than A\$10 000) where suppliers are able to accept credit card payment.

In its response to the Australian Small Business and Family Enterprise Ombudsman's *Payment Times and Practices Inquiry Report* (2017), the Australian Government indicated that it would move towards a maximum payment time of 20 calendar days for all contracts valued at up to A\$1 million (Australian Treasury 2017), due to take effect from July 2019 (Department of Finance 2017).

While the New Zealand Government has not yet implemented any specific rules for public sector payment times, the Minister for Small Business has indicated that MBIE is open to doing so in the future, pending the effects of the Australian Government's upcoming rule change (Nash 2018; Pullar-Strecker 2018). One development that should assist with reducing payment times is the introduction of trans-Tasman joint e-invoicing standards (chapter 4).

Another promising trans-Tasman development in the field of procurement is the Australia New Zealand Leadership Forum's Joint Infrastructure Pipeline, a website

providing information on upcoming public infrastructure activity across Australia and New Zealand (Infrastructure Partnerships Australia 2019). This aims to help investors and suppliers find potential projects across national borders and provides a channel for the dissemination of ideas across both the public and private sectors.

Expand understanding of the potential of free trade agreements

Free trade agreements (FTAs) can create opportunities for firms to deal with a much wider range of international clients, lower the final costs of exports and imports, foster freer investment flows, and promote regional integration. Alongside bilateral FTAs, both countries are also members of major multilateral agreements — such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership²² and the Association of South East Asian Nations (ASEAN), Australia and New Zealand Free Trade Area (AANZFTA) — as well as regional forums such as Asia-Pacific Economic Cooperation (APEC).

There is evidence that a significant proportion of exporting firms (especially SMEs) in Australia and New Zealand know little about FTAs that directly affect their trade, or about the benefits they could glean from those agreements (see, e.g., Agarwal et al. 2017; SBDG 2016; Skene 2017).

Governments and trusted intermediaries could organise and present trade information in more accessible forms (as we discuss above) and provide automated prompts to direct firms to government information on FTAs. For example, in Australia, DFAT operates an FTA portal, searchable by the type of good, where potential exporters can find the FTAs that apply to their product. However, few other government trade webpages link to this portal or steer current and potential exporters towards it.

F3.8

Digital technologies provide opportunities to raise SME awareness of free trade agreements, encourage their involvement in international trade, and raise participation by SMEs in government procurement markets.

²² The Comprehensive and Progressive Agreement for Trans-Pacific Partnership was agreed by 11 countries in 2018. The agreement is known as the CPTPP in New Zealand and as the TPP-11 in Australia.

3.3 From ICT to digital-first, user-centred design

Governments' use of digital technologies in service delivery is often patchy, and many compulsory interactions with government, even where partly or fully digitalised, are confusing, convoluted or excessively time-consuming for users.

To increase efficiency for governments and for users, digitalisation should not simply layer a website over existing bureaucracy. Ideally, new systems should be built from a digital-first perspective where the goal is for every step in the process to be done online. Such systems should seamlessly link with other government databases (see, e.g. Archer 2015); minimise the need for users to have different accounts to access multiple services; and have accessible and intuitive user interfaces.

This section uses the trade compliance system as an example of the steps required to move from ICT to digital-first, user-centred design.

Trade compliance is convoluted for importers and exporters

Convoluted non-digital era systems are particularly evident in licensing and compliance processes for importing and exporting. The Export Council of Australia described the current trade system as having been 'developed on 18th-century requirements ... and [having] just gradually evolved' since then (JSCTIG 2018, p. 29). Compliance costs for importing and exporting in Australia and New Zealand are generally above OECD averages (see appendix B — figures B.11 and B.12). These costs can have a proportionally larger impact on smaller firms.

ANZ Bank noted in its submission to the Australian Parliament's Inquiry into the Trade System and the Digital Economy that trade infrastructure is 'less digitised than processes and systems for many industries; most documents are issued in paper form [even though they are accessed online], creating inefficiencies for the importers, exporters and service providers facilitating trade' (JSCTIG 2018, p. 29). For example, many of the application forms (for licenses, permits and audits) required by the ABF or DAWR can be filled in online, but must then be printed and posted in hard copy. On the DAWR website there are over 50 different forms relating to export biosecurity alone, all of which need to be submitted in hard copy.

Some processes are still convoluted even in their digital form. For example, to request export permits online through DAWR's digital export documentation (EXDOC)

system, exporters need to purchase a specific software package to run the interface and may then be required to register multiple accounts to apply for different permits.

Such complex (and sometimes slow) processes could be overwhelming for some SMEs considering international trade (see, e.g., ECA 2018b).

There has been some progress in modernising trade compliance

The existence of major inefficiencies in trade compliance is well known, and both Australia's DHA and New Zealand's MFAT have been coordinating efforts among several departments to streamline the regulatory requirements for international trade.

- In Australia, DAWR is gradually updating EXDOC to a new system, which is aimed at reducing the need for duplicate data entries and multiple registrations, and at removing some of the current paper forms (DAWR 2018).
- DHA has committed to the development of a single digital trade window (SDTW) for export and import compliance. Traders would only need to interact with one secure, digital interface to obtain clearance or certification for their exports and imports, and to carry out all regulatory requirements for international trade (such as notifying the ABF of upcoming shipments). At present, the integrated cargo system (the ABF's portal) only gives traders access to ABF systems. By contrast, New Zealand's SDTW enables traders to submit information to and receive responses from NZ Customs, Maritime NZ, the Ministry for Primary Industries and the Ministry of Health.
 - DHA has mooted the potential for its SDTW, at its most advanced, to 'remove the need for reporting to government at all: the required information could be "pulled" from commercial data holdings at pre-defined points along the supply chain' (2018b, p. 5). This is an example of the government as a platform concept we explore above.
 - SDTW development projects are also in train in several Asia-Pacific nations, and both APEC and ASEAN are working to standardise aspects of their development in pursuit of international interoperability (APEC Policy Support Unit 2018; ASEAN 2018). This means that Australia and New Zealand's single windows could also speed up compliance at the other end of the shipment (i.e. at- and behind-the-border in the origin or destination country) if interoperability is achieved.
- Australian and New Zealand customs agencies have both introduced programmes to reduce the amount of compliance that firms need to perform once they pass an initial audit/certification of their supply chain, with firms'

programme membership recorded digitally and automatically coded onto each of their consignments. These programmes, called ‘Trusted Trader’ in Australia and the ‘secure export scheme’ (SES) in New Zealand, aim to reduce customs-related expenses and delays for approved firms (ABF 2016, 2018; NZCS 2018).

These efforts are important and should continue. The Australian Parliament’s Joint Standing Committee on Trade and Investment Growth (2018) not only reiterated the importance of a single trade window, but also highlighted the need for digital-first design when building these tools:

Reimagining of processes as digitally native processes will be as important as the technology delivering trade innovation. ... Similarly, a simplified, digitally based single-window trade system will allow more ready access to and from the global marketplace providing standards are kept open and interoperable. (2018, p. xi)

F3.9

The Australian and New Zealand Governments can reduce compliance costs for trans-Tasman importers and exporters through further digitalising border processes.

Involving the private sector in streamlining approval processes

There are also opportunities for the private sector to be involved in the creation of digital systems that streamline processes for firms. For example, private sector participants in Australia are collaborating to design an international online platform for sharing standardised data about containerised trade (box 3.5). The APC has previously noted other cases of private sector participants establishing international standards of their own accord:

Private participants in markets will often, over time, settle on a particular standard ... Such developments are often underpinned by voluntary, cooperative efforts on the part of industry participants. An example is the World Wide Web Consortium (W3C), in which an international community of member organisations, full-time staff and the public work together to develop the standards that enable the operation of the Internet. (APC 2016a, p. 247)

Box 3.5 **The Trade Community System: an example of private sector collaboration on data sharing and standards**

The Trade Community System (TCS), currently at the proof-of-concept stage, is a project to design and create a data-sharing platform for containerised trade that promises ‘trusted end-to-end visibility of the supply chain’. The architects of the TCS (PwC, Australian Chamber of Commerce and Industry and Port of Brisbane 2018, p. 6) argued that the existing inefficiencies are driven primarily by a lack of information sharing:

At the heart of the problem is the information asymmetry which currently plagues Australian supply chains. A lack of [digital] information exchange and interoperability between importers and exporters with their supply chain service providers creates inefficiencies and points of failure which ripple up and down the supply chain. Illustrative of this problem is the World Bank’s ranking of Australia’s trading across borders performance, where we have fallen from 34th (2011) to 95th (2018) in eight years.

According to ANZ Bank (2017), the inefficiencies and risks arising from a lack of digital information-sharing include:

- slower processing and cash flow — traditional processing requires physically checking documents, couriering the documents overseas and then the receiving firm or bank inspecting the documents
- fraud — paper-based documentation is susceptible to forgery, and can be altered to circumvent internal controls or sanctions and money laundering checks
- reduced access to finance — in open account trade (where goods are shipped and delivered before payment is due) suppliers send physical trade documents directly to an end buyer rather than using the banking system. Banks (and regulators) thus have less visibility of the transaction. Without a visible trade transaction history, SMEs may find it harder to access trade finance.

The goal is for the TCS to improve information flows by standardising data on all aspects and steps of the container-shipping process, and by creating mechanisms to move data between stakeholders (PwC, Australian Chamber of Commerce and Industry and Port of Brisbane 2018). They envision that, in the longer-term, the platform could provide:

- data analytics capabilities — for example, so that exporters and importers can benchmark their consignments’ movements along trade routes against other firms using the same routes, and compare logistics providers across and within routes
- fraud-resistant (e.g. blockchain-based) record management systems for vessel journey histories and container contents
- interoperability with Department of Home Affairs systems for smoother and faster reporting, and more up-to-date data for risk management
- interoperability with existing record management and scheduling systems, so that data input at one ‘spoke’ (e.g. the departure port) would flow to all other ‘spokes’ connected with the same route (e.g. the arrival port, the shipping line, the freight forwarder or the container owner)
- a logistics booking platform, with data feeding in live from the above sources, so that the availability of vessels, staff and ports would always be up to date.

3.4 Creating value from public datasets

Wider availability of public sector data can generate new digital goods and services, and new business models ...

Datasets can create commercial value. Data enables firms to create new products and services, enhance existing ones, and introduce entirely new business models. This is widely accepted about data on individuals' consumption of goods and services (such as search histories, purchasing habits and social networks), but is equally true for public sector data.

In its Data Availability and Use draft report, the APC (2016a, p. 61) noted that 'private sector data owners are leading the way in finding innovative uses for data. Governments across Australia also hold lots of data, but are typically not using it beyond the purposes for which it was initially collected.' The release of some de-identified government data (or data that was never personal in the first place, such as weather and topographical data) could therefore create new tradeable assets for the private sector to leverage, ultimately generating opportunities for the development of new digital goods and services.

... but the type of public data matters

Public sector data can be distinguished based on its degree of sensitivity — that is, its potential to harm an individual either physically, financially or emotionally if mishandled, or the possibility of revealing 'commercially confidential information that might, for example, cause reputational damage, void contracts or give a firm's competitors an informational advantage in the market' (APC 2017a, p. 56).

Broad categories include:

- non-sensitive data, which does not relate to individual people, households or firms (e.g. climate, traffic and mapping data), and
- sensitive data, which is about individuals, households and firms.

Sensitive data can be further broken down into:

- de-identified data, which poses no risks once de-identified (e.g. data aggregated over many individuals)
- de-identified but potentially re-identifiable data, and
- identified data.

The boundaries between the two types of de-identified data are not fixed, and will continue to move as technology develops (Tucker 2018). Release policies need to balance the benefits of providing rich datasets with the risk that this information could be combined with other datasets to re-identify individuals (box 3.6).

Box 3.6 Balancing dataset richness and re-identification risk

Quality datasets underlie the research and analysis necessary for good public policy and good business decisions. Dataset quality has many dimensions, including size, reliability, currency (being up to date) and richness (APC 2016a). Richness in this context means links between entities and observations allowing for the exploration of trends in time, space and, where feasible, cause and effect. Many of the datasets most useful for public policy and business decisions contain information about individuals, households and firms.

De-identification is an attempt to remove data from, or obscure data in, a dataset to make it impossible to re-identify the individuals, households, or firms present (Edwards 2016). De-identification necessarily makes the dataset less rich — for example, deleting names and addresses makes re-identification harder, but would also make some types of analysis unreliable or even impossible (such as a study of labour mobility). Similarly, dates of events can be obscured by removing the day and month, leaving only the year. Again, this reduces the utility of the dataset for some types of analysis (e.g. if researching a post-medical treatment effect that showed up in months rather than years).

Re-identification is based on finding common data points between two or more datasets. As an example, a public dataset of hospital visits (with no names and addresses) could be matched by time and location with data collected by a telecommunications firm (produced by a mobile phone ‘bouncing’ off towers), or the location history data recorded by a navigation app on a smartphone. A third party could then infer that someone had been to a hospital, and potentially make inferences about that person’s health. Moreover, this could happen without the knowledge of the person in question, or of the organisation that released the hospital visit dataset.

A large-scale re-identification episode took place in Australia in 2016, when the Australian Department of Health released (online) a de-identified dataset that linked 2.9 million records from Medicare and the Pharmaceutical Benefits Scheme. University of Melbourne researchers discovered that it was possible to identify individuals ‘through a process of linking the unencrypted parts of the record with known information about the individual’, such as whether and when they had given birth (Teague, Culnane and Rubinstein 2017).

Public dataset owners wanting to make their datasets more widely available face an inevitable trade-off between richness and re-identification risk. Closed data can maximise richness, but open data cannot. Dataset owners are not, however, constrained only to these two choices. They can operate a ‘trusted user’ approach to data access, whereby they screen researchers and research projects, arrange to provide data sufficiently rich for the researchers’ purpose, and use contracts to specify limits on researcher behaviour, including data sharing, storage and re-identification (see, e.g., APC 2017a). Such contracts have potential enforcement and monitoring problems, yet they are used widely to deal with this trade-off.

Data release can assist transparency

Transparency helps hold governments accountable for delivering the most effective public services, by making it easier for external parties to evaluate government programmes. Governments all over the world have made progress in recent years towards publishing their data through application programming interfaces, meaning that third parties' digital systems can more easily create lasting links with government data and receive regular or real-time updates (APC 2016a). However, not all public sector data is appropriate for open publication, given the sensitivity of much personal information. For some types of data, access by trusted users in controlled environments better protects individual privacy (box 3.6).

How do Australia and New Zealand perform on data openness?

The World Wide Web Foundation's most recent Open Data Barometer (WWWF 2018) measures national governments' progress on publicly publishing government information and allowing citizens to use that information. Australia and New Zealand are both ranked in the top 10 nations globally (third and eighth respectively). The Australian and New Zealand Governments are performing well on these rankings; but could further increase the extent to which they publish public sector data or make it accessible to trusted users. Both governments have recently taken significant steps towards further opening their data.

Legislation to reform data collection, use and release is in train in both countries. Since mid-2017, the Australian Government has been taking steps to implement the recommendations of the APC's Data Availability and Use report. The changes flowing from these recommendations include the introduction of a *Data Sharing and Release Act*, the appointment of a National Data Commissioner, and the creation of a consumer data right (see chapters 2 and 4) (DPMC 2018c). They also include mechanisms to encourage and accelerate the public release of datasets whose availability and use might generate significant community-wide benefits. This will likely sit alongside — and may complement — work on a commitment in Australia's *Open Government Partnership National Action Plan 2016–2018* to develop a framework for the identification and release of high-value datasets (DPMC 2016).

In New Zealand, Stats NZ is currently consulting on reforming the *Statistics Act 1975*, which has not seen a root-and-branch review since its creation. The Act currently does not mention the word 'data', nor contemplate Stats NZ as an

organisation for data sharing (Stats NZ 2018). The consultation paper (2018, p. 10) discussed the potential benefits of greater data sharing:

Greater data use has the potential to make a real difference by shining a light on complex problems and delivering innovative solutions. This could improve the quality and efficiency of services, and ensure action and resources are focused in the best places to achieve our society's objectives.

Stats NZ stated that these reforms should reflect community views on data access, use and protection, and that a robust consultation process is important to achieving this aim.

3.5 Looking forward

Digital technologies may shift the boundaries of government

The 'boundaries of government' — what it owns versus what it rents, and what it produces itself versus what it buys from external providers — are based, at least in part, on efficiency grounds. A consequence of the digital revolution is ongoing change in relative prices. This means that past decisions that set those boundaries — presumably optimal at the time — may no longer be optimal.

To maximise productivity benefits, firms need to embrace organisational and management change alongside technological change (chapter 1). This chapter demonstrates that this conclusion is equally applicable to governments. Digital technologies can create opportunities to reassess what governments produce or do themselves and what they choose to outsource.

For example, rather than developing and running a new internal booking system for New Zealand's major walking tracks in national parks, the Department of Conservation recently tendered out the design and operation of the system. This was anticipated to improve ease of use, reduce transaction costs and 'allow new commercial models', such as differential pricing. Being hosted on a cloud-based server, the service is now faster and better able to manage high traffic without 'slowing down or showing errors' (Department of Conservation 2018). The system operators have also added new features to improve the customer experience. For example, the system sends customers safety information before they begin their walks, 'including an update about the current condition of their chosen track' (Department of Conservation 2018). The Department intends to move all of its bookable assets and experiences onto this system over time.

Similarly, in both Australia and New Zealand, digital technologies allow some regulatory compliance activities — such as vehicle roadworthiness checks and building inspections — to be contracted out to private providers, with gains in convenience to service users. The required documentation can be transferred digitally to the monitoring government agency. In these examples, governments still set the rules and standards for the transaction in question (e.g. the required level of car maintenance, or the safety requirements for building approvals). But with trusted intermediaries, robust accreditation procedures and strong oversight, a government agency no longer needs to implement that standard itself.

Capturing these benefits will require changes to agency operating models and norms, and may require fundamental reconsideration of legislative frameworks to allow agencies to shift from being service providers to acting as system stewards.

4 The trans-Tasman relationship and the digital economy

Key points

- Australia and New Zealand have already achieved substantial harmonisation of policy and regulation.
- The digitalisation of the economy creates new opportunities for deeper trans-Tasman economic integration and joint policy development.
- Ways in which Australia and New Zealand can cooperate include:
 - pursuing initiatives that require minimal change to address the needs of both countries, such as the recent successful collaboration on e-invoicing
 - prioritising initiatives that build on the close trade and regulatory relationship between Australia and New Zealand, such as facilitating trans-Tasman e-commerce
 - advancing shared interests in the global debate on the future of digital trade, through cooperating in international forums and leading the development of international standards
 - learning from successful policies implemented on each side of the Tasman.
- We identify three policy areas that can advance the trans-Tasman digital economy, which are also likely to benefit small to medium enterprises (SMEs):
 - data sharing, where streamlining the flow of credit information across borders can improve SME access to finance
 - digital financial services, where joint work on open banking standards can support the development of a trans-Tasman banking sector
 - digital trade, where working together in international forums can assist in achieving outcomes consistent with domestic priorities, and in removing non-tariff barriers to digital trade.
- Beyond these policy areas, regulators and policy makers on both sides of the Tasman should continue to work together and share information, as they develop their responses to the challenges of the digital economy. They should lead by example in using data to develop better policy options, while balancing community expectations of privacy.

The trans-Tasman economic relationship has a long, and mostly successful, history. The first preferential trade agreement between the two countries was signed in 1933; the current agreement, the Australia–New Zealand Closer Economic Relations Trade Agreement (CER) is one of the most comprehensive in the world (DFAT nd). Much has been achieved under CER, and the subsequent Single

Economic Market (SEM) agenda, including elimination of tariffs on goods, and facilitating labour mobility (APC and NZPC 2012). There are also many examples of trans-Tasman collaboration across the public and private sectors.

The digitalisation of the economy is presenting new opportunities for trans-Tasman collaboration and integration. This chapter presents criteria for assessing trans-Tasman policy initiatives in the context of the digital economy (section 4.1). In line with this approach, three policy areas stand out as possibilities for further consideration by governments (section 4.2). Regulators and policy makers should broaden their ongoing trans-Tasman discussions to develop responses to the digital economy that deliver domestic benefits and advance joint interests (section 4.3).

4.1 Developing policy for a digital trans-Tasman economy

Regulators and policy makers in Australia and New Zealand have used different approaches to achieve a closer economic relationship. These fall into three categories:

- unilateral coordination, where one jurisdiction adopts the provisions of the other's laws or regulations
- bilateral legally binding commitments, such as joint institutions and mutual recognition of occupational licensing
- bilateral undertakings that are not legally binding, including information sharing and joint standards development (Department of Finance and Administration and Ministry of Economic Development 2007).

Much of the integration achieved between Australia and New Zealand has been based on unilateral coordination or bilateral legally binding commitments. Examples include New Zealand's adoption of Australia's safety standards for electrical appliances and the establishment of Food Standards Australia New Zealand.

In some cases, attempts to harmonise and integrate policy and legislation have failed or stalled after achieving some of their goals (box 4.1). Full harmonisation, particularly if it is legally binding, is difficult and costly to achieve:

Bilateral legally binding commitments ... significantly reduce each country's ability to determine its own policy and regulatory settings. Further, experience has shown that there can be practical difficulties in developing arrangements given differences in underlying legal frameworks and public sector management systems. (Department of Finance and Administration and Ministry of Economic Development 2007, p. 22)

Box 4.1 A joint regulator for therapeutic products — collaboration replaces attempted harmonisation

In 2014, the Australian and New Zealand Ministers for Health announced that work towards the establishment of the Australia New Zealand Therapeutic Products Agency (ANZTPA) would cease. This announcement came after 15 years of negotiations between the two countries.

The Ministers indicated that the decision to abandon harmonisation efforts ‘was taken following a comprehensive review of progress and assessment of the costs and benefits to each country of proceeding’ (DOH 2014).

Differences in regulatory approaches to issues that are important to the community are likely to have played a role in the failed discussions. For example, one of the major stumbling blocks in the negotiations on the ANZTPA has been ‘concern [in New Zealand] about the possible adverse effect of the new arrangements on complementary medicines in New Zealand, including Māori traditional medicines’ (ANAO 2011, p. 41). Such products were eventually removed from the proposed scope of the ANZTPA.

In their 2014 announcement, the Ministers declared that Australia’s Therapeutic Goods Administration (TGA) and New Zealand’s Medicines and Medical Devices Safety Authority (Medsafe) would continue to explore various options for trans-Tasman collaboration (DOH 2014). The TGA and Medsafe have in place mutual recognition arrangements (with each other, and with a number of other countries). There are also more informal collaboration efforts, including monthly teleconferences to share information and policy initiatives (TGA 2018).

An important aspect of successful collaboration initiatives is the domestic benefit that they can deliver in each country. There are examples of integration attempts that have failed where the benefits were not apparent on both sides of the Tasman. For example, in 2016, the New Zealand Government decided to abandon work towards a single trans-Tasman application and examination process for patents, which was part of the SEM business law reform agenda. This followed a report from the Parliamentary Commerce Committee (2016), which found that these processes were unlikely to provide significant benefits to New Zealand.

More recent initiatives set their sights on non-binding undertakings, such as joint standards development. Successful cooperation (based on established domestic benefits) has enabled the development of joint trans-Tasman e-invoicing standards. These e-invoicing standards will allow firms to exchange invoices electronically, regardless of the accounting software they use, reducing costs for small to medium enterprises (SMEs) and enabling faster payments (box 4.2).

Box 4.2 **Successful joint development of standards — the example of e-invoicing**

Australia and New Zealand share many of their standards — joint standards represent most of the standards in operation in New Zealand, and about 45% of Australian standards (Standards Australia 2017). Joint standards support cross-border economic integration and are a cost-effective way to reduce barriers to trans-Tasman trade (Standards New Zealand 2012).

Standards are usually developed through collaboration between private and public sector entities; governments have stepped in to facilitate standards development where there is an element of international regulatory collaboration (e.g. emerging standards for digital trade, as we discuss in more detail in section 4.2) or where standards have the potential to deliver substantial economic benefit. The standards for e-invoicing, developed by the Digital Business Council in conjunction with the Australian Taxation Office (ATO) and the New Zealand Government, are an example.

An e-invoicing standard allows firms to send and receive machine-readable invoices electronically — no matter which accounting software they use. This offers substantial benefits to firms, through lower administrative costs incurred in processing invoices, faster payment of invoices and fewer errors (ATO 2018b). Estimates put the benefit to the Australian economy at A\$28 billion over 10 years (ATO 2018c).

The development of the e-invoicing standard commenced in 2015, through the Digital Business Council in Australia. The ATO provided technical support for the Council's work. In 2018, the New Zealand Government decided to implement e-invoicing standards using the Australian framework, which was extended to support trans-Tasman use (ATO 2018b). Both governments have announced that they will use e-invoicing in dealing with their suppliers (ATO and MBIE 2018).

While government agencies played a role in the development of the standards, the ATO and New Zealand Business Number (part of the Ministry of Business, Innovation and Employment) are planning to hand over the operational control of the system to an industry-led body. Consultation on the specific structure of this body was conducted in late 2018 (ATO and MBIE 2018).

Focussing on collaborative regulatory approaches such as joint standard development is likely to help regulators in both countries deal with the challenges they face in the digital economy (chapter 2). Digital technologies can also allow policy makers to consider taking a trans-Tasman approach in areas where cooperation would have been too difficult in the past, such as streamlining trade compliance processes (chapter 3).

F4.1

Trans-Tasman policy initiatives based on joint standards development and mutual recognition create opportunities for growing the digital economy.

4.2 Where to next?

In 2012, we identified the characteristics of trans-Tasman policies that would likely deliver net benefits to both countries. Such policies should be outward-looking, take account of other bilateral and multilateral trade agreements, and complement domestic policies (APC and NZPC 2012).

Many current initiatives have these characteristics. To prioritise their efforts in promoting trans-Tasman collaboration, governments can draw lessons from recent experience — including the successes and failures of some initiatives in the SEM agenda, and the broader changes brought about by the digital economy.

Ways in which Australia and New Zealand can cooperate include:

- pursuing domestic initiatives that require relatively minimal change to address the needs of both countries, such that there is clear benefit on both sides. The recent success of e-invoicing exemplifies this approach (box 4.2). Other areas of potential benefit include sharing credit data across the Tasman, and expanding the open banking standards developed in Australia to New Zealand.
- prioritising initiatives that can build on the close trade and regulatory relationship between Australia and New Zealand. The two countries are already using digital technologies to facilitate trade. Such initiatives can provide useful blueprints for broader collaboration.
- learning from each other. Australia and New Zealand have approached some aspects of the digital economy in different ways, such as the ongoing community consultation on data issues in New Zealand and the introduction of a consumer data right in Australia. The exchange of opinions and experiences across the Tasman can lead to better government responses in both countries.
- building on the outward focus of the existing SEM agenda, and the demonstrated success of the economic relationship between the two countries, to advance shared interests in international forums. This can include promoting global standards in areas where Australia and New Zealand have common interests, such as a global rules-based trading system and the elimination of non-tariff barriers.

We propose three policy areas that can advance the SEM agenda in the immediate future: data sharing; digital financial services; and digital trade (table 4.1).

Table 4.1 **Suggested additions to the Single Economic Market agenda**

	<i>Action required</i>	<i>Expected benefit</i>
Data sharing		
Trans-Tasman sharing of credit information	Minor changes and clarification to privacy legislation	Improved access to finance for individuals and SMEs operating trans-Tasman
New Zealand researchers to be considered trusted users in Australia's new data sharing and release framework	The upcoming Australian <i>Data Sharing and Release Act</i> would include specific mechanisms to enable New Zealand researchers to become trusted users	More trans-Tasman sharing of data and collaboration in research
Digital financial services		
Joint open banking standards	Including New Zealand representatives in the open banking working groups in Australia	Improved trans-Tasman banking services; growth in the fintech sector
Currency conversion	New Zealand Government action to mirror the Australian Competition and Consumer Commission inquiry into foreign currency conversion costs	Lower costs of trans-Tasman payments and funds transfers
Digital trade		
Digitalising trade compliance processes	Completing trials for mutual recognition of supply chain security and a secure trade lane, and moving to full implementation Aligning standards for the data collected from importers and exporters, such that data is collected once and shared across borders	More efficient trans-Tasman trade; less paperwork; lower compliance costs for SMEs
Trans-Tasman recognition of digital identity services	Agreement between the Australian and New Zealand Governments to recognise digital identity services	Streamlined online trans-Tasman interactions between individuals, firms and governments
Cross-border consumer protection	Develop a consumer protection framework that encompasses cross-border transactions	More trans-Tasman digital transactions; more effective consumer redress for unsatisfactory transactions
Addressing barriers to digital trade, such as shortcomings in intellectual property legislation	Updating intellectual property legislation in both countries	Enable more innovation and trade as well as greater adoption of digital technology
Improving global digital trade rules	Collaboration between the Australian and New Zealand Governments in international forums	Reducing, eliminating or avoiding non-tariff barriers to international digital trade

Removing impediments to trans-Tasman data flows

Governments should address legal restrictions on data sharing that impede trans-Tasman data flows. We explore some examples below.

Trans-Tasman credit information — a murky legal framework impedes SME access to credit

Financial markets run on information. Credit providers base their lending decisions on credit history and other information, including that required to assess management quality and to understand business models and future expansion plans. It can pose difficulties for SMEs if such information cannot flow between providers and across borders. The difficulty in assessing intangible assets can make access to credit problematic for small innovative firms. Real estate — typically the proprietor's own home — is often used as collateral (OECD 2017a; APC 2018a).

These issues mean that access to credit to finance trans-Tasman expansion or export is likely to be challenging for SMEs.

Changes to credit reporting arrangements could improve access to finance for such SMEs. The legal frameworks for credit reporting are similar in Australia and New Zealand; and the same major firms provide the relevant services in both countries. Australia introduced legislation to enable mandatory comprehensive credit reporting (CCR) in 2018, whereas New Zealand created a legal framework for CCR in 2012 (New Zealand Privacy Commissioner 2018a).

However, trans-Tasman credit reporting is impeded by privacy legislation.

In Australia, credit reporting bodies are not permitted to share credit information with organisations [that do not have] an Australian link. In New Zealand, the regulatory framework recognises that information can potentially be shared extra-territorially, but the best mechanism to facilitate this is not yet clear. This lack of trans-Tasman cooperation in the regulation of credit reporting can affect cross-border credit decision-making. These restrictions mean that a New Zealand citizen resident in Australia has no way to allow an Australian credit provider to access their New Zealand credit history. (ARCA 2016, p. 23)

Although information about firms is not generally covered by privacy legislation, SMEs and sole proprietors may still be affected. This is because the line between information about the firm and about its owner may be harder to distinguish (e.g. where information about a firm owner's commercial credit activities is personal information). In such cases, privacy legislation can be a barrier to sharing credit information across borders.

The New Zealand Privacy Commissioner (2012, p. 3) commented on the effects this has on the trans-Tasman economy:

Individuals crossing the Tasman for work find it hard to obtain credit given the absence of cross-border credit reporting. Potential lenders to such individuals also face uncertainty and therefore risk ... in the absence of reliable credit reporting. Financial and non-financial credit providers that have lent to individuals who cross the Tasman may be disadvantaged by the inability to use the credit reporting system in pursuing bad debts. ...

I would encourage the finding of solutions which can ensure that businesses operating in the trans-Tasman market can take full advantage of credit reporting and that individuals taking advantage of labour mobility can benefit from having their credit history available to potential lenders.

Australian policy makers flagged this issue when introducing credit reporting legislation:

The credit reporting system is restricted to information about consumer credit in Australia and access to the credit reporting system is only available to credit providers in Australia. ... Consideration will be given to the sharing of credit reporting information with New Zealand, which has a very similar credit reporting system and close economic ties with Australia. (Attorney-General of Australia 2012, pp. 91–92)

However, the relevant legislation in Australia has not changed on this point and trans-Tasman sharing of credit information does not occur routinely. Pending changes to privacy legislation in New Zealand may allow trans-Tasman sharing of data, but the specific mechanisms for this are yet to be finalised.

Trans-Tasman sharing of credit reporting information has clear benefits and industry support (see, for example, ARCA 2016). These benefits will continue to increase as digital technologies enable the collection and exchange of larger volumes of data. There are costs as well, particularly concerning privacy. In this particular case, however, the legal privacy frameworks are generally aligned, and the information is already collected and shared within each country under its domestic legislation. For those individuals and SMEs looking to step into the trans-Tasman digital economy, cross-border sharing of credit data can help in securing the finance they require.

F4.2

Sharing of credit information between Australia and New Zealand could help trans-Tasman SMEs seeking finance. This would require changes to legislation in both countries.

Trans-Tasman learning from policy experiments

In both Australia and New Zealand, consumers and their agents have the right to access detailed electricity consumption data, which they can use to increase the efficiency of their consumption or negotiate better deals (AEMC 2014; Electricity Authority 2018).

In New Zealand, reforms in the electricity market, combined with public awareness campaigns, have resulted in a vibrant retail market. Switching rates are higher than in Australia, and there are innovative products and services available, such as a smartphone app that automatically switches consumers to better deals (The Brattle Group 2018).

In Australia there are more impediments to consumer data access, including inconsistent data formats and onerous application processes (HoustonKemp 2018). The Australian Energy Market Commission has argued that the introduction of the consumer data right will help Australian consumers find more suitable service offerings and increase competition in the retail energy market (AEMC 2018). The data right will also apply to SMEs, who will be able to access their data and use it in more flexible ways. The first step towards the implementation of the right is through open banking (see below), but it will be extended to electricity and other markets (ACCC 2018a). This is part of broader reform in data availability and use, which includes a *Data Sharing and Release Act* as recommended by the APC (DPMC 2018b).

Although there are differences between the two countries' electricity markets, empowering consumers is a common theme and one where regulators can learn from each other's experiences.

Better policy through trans-Tasman data sharing for researchers

To support better policy making, the Australian Government could consider broadening some aspects of the Data Sharing and Release Act to enable trans-Tasman data access and sharing. For example, New Zealand researchers could be eligible to become trusted users for access to public datasets in Australia, without the need for cumbersome approval processes. This would be in line with the 2017 Australia–New Zealand Science, Research and Innovation Cooperation Agreement, which promotes information exchange and open science (DIIS and MBIE 2017).

F4.3

The upcoming Australian *Data Sharing and Release Act* could make New Zealand researchers eligible to be trusted users, subject to general safeguards in the legislation. This would support trans-Tasman sharing of research data, more collaboration by researchers, and better policy making.

Digital financial services — towards a trans-Tasman financial system

One of the most vibrant parts of the digital sector in Australia and New Zealand is fintech — a broad range of start-up firms (which themselves are typically SMEs) that provide innovative financial services using only digital channels. Regulators on both sides of the Tasman have supported fintech development, and are attempting to cooperate and collaborate in this space (ASIC 2017b) (chapter 2).

Growth in fintech has expanded the sources of finance available to SMEs, particularly in Australia. The number of Australian fintech firms has more than doubled since 2015, to about 700 firms. Over a third of fintech firms develop services for SMEs and business credit dominates fintech lending in Australia. While fintech lending in New Zealand has grown substantially in recent years, it focuses almost exclusively on consumer credit (Claessens et al. 2018; EY 2017, 2018).

Current policy initiatives, including open banking in Australia and changes to payments systems on both sides of the Tasman, create opportunities for a stronger fintech sector and seamless provision of trans-Tasman financial services.

Open banking — an opportunity for collaboration

Open banking — creating protocols that allow greater consumer access and use of data collected about them by financial institutions — has the potential to support competition and growth in digital financial services, and to promote the development of new products and services (APC 2018a).²³

²³ While the scope of open banking differs in each of the countries that have introduced relevant legislation, its basic premise is to increase consumer access to financial data (PwC 2018). This report focuses on the approach to open banking taken by Australian regulators.

Trans-Tasman open banking could:

- make it easier for firms, particularly SMEs, to obtain finance for trans-Tasman trade activities
- broaden the market for emerging fintech firms
- support the emergence of new services for SMEs
- encourage increased competition in trans-Tasman financial services, which may bring down fees and charges.

Australia is progressing towards implementation of open banking, by giving consumers more control over their financial data, and allowing them to direct their existing financial institution to share their data with other trusted providers (Farrell 2017). Major banks will start offering this option from mid-2019, with full implementation from mid-2020 (Australian Treasury 2018b).

New Zealand has taken a different approach, focusing first on aspects of its payment system (see below) (RBNZ 2018). However, the New Zealand Government has indicated that it sees the guiding principles of the Australian approach to open banking as a positive starting point (Faafoi 2018).

Apart from the legislative changes required, the key component of open banking is the technical standards that determine how institutions share information. These standards are being developed in Australia by a committee comprising representatives from the CSIRO's Data61, the major banks and other financial institutions, as well as the Australian Competition and Consumer Commission (ACCC), the Office of the Australian Information Commissioner and the Australian Treasury (Data61 2018).

Australia and New Zealand could cooperate in developing joint open banking standards; at the very least, New Zealand could join the development committee as an observer. Coordinating open banking standards would enable better portability of data and the trans-Tasman provision of services, which is currently limited despite the same large banks dominating the provision of financial services in both countries.

Several factors bode well for successful collaboration between Australia and New Zealand on open banking standards. First, the two countries share many standards already and there has been recent experience in coordinating the technical standards for e-invoicing. Second, there are strong similarities between the banking sectors, including the same major banks, and a history of collaboration between financial regulators. Finally, the domestic benefits of open banking are well established on both sides of the Tasman, as is the benefit of collaborating in

standards development, which can lower costs and improve outcomes. Taken together, these factors make open banking a good contender for further exploration.

F4.4

Open banking could offer benefits for SMEs, particularly for those developing digital financial services. Standards for open banking are currently being developed in Australia, and New Zealand could participate in their development.

Innovation in payment systems could reduce cross-border costs

Australia and New Zealand have similar payment systems, characterised by high levels of debit and credit card usage and increasing adoption of innovative products and services (Payments NZ 2016; RMIT and TRPC 2016). There is scope for sharing the lessons learned by regulators and policy makers, and for taking a trans-Tasman approach to new initiatives. Such initiatives could support more competition in payment services, lowering costs for SMEs.

The organisation that governs New Zealand's payment system, Payments NZ, is developing standards that will simplify digital transactions, including initiating electronic transactions, verifying customer information and allowing third parties to view a consumer's account balance (with the consumer's consent) (Payments NZ 2018b, 2018a).

Australia's payment system is undergoing more substantial change, with the launch of the New Payments Platform (NPP), which was developed with the support of government. The NPP is likely to benefit SMEs, as it offers the ability to transfer and receive funds instantly and far more easily than the existing payments infrastructure. The NPP could also support the development of new services (known as overlay services), which could assist SMEs in managing their finances (APC 2018a).

Given that both the NPP and Payments NZ count Australasia's four major banks among their largest shareholders, there is potential for trans-Tasman collaboration. For example, the standards underpinning the NPP could be expanded to allow seamless cross-border bank transfers. Similarly, joint standards for payment gateways could make it easier to complete trans-Tasman e-commerce transactions (ECA 2018a).

Common payment standards could also facilitate more cost-effective cross-border fund transfers. Currently, transfers of funds from Australia to New Zealand (like all cross-border fund transfers from Australia) incur fees that are significantly higher than in other advanced economies (ACCC 2018c). This can have a substantial

effect on both individuals and SMEs seeking to operate trans-Tasman, as it imposes an additional cost on any purchase or transfer of funds (box 4.3).

Box 4.3 Trans-Tasman payments — a tariff on e-commerce?

Consumers and SMEs making small trans-Tasman purchases most often pay by credit card or international money transfer (IMT). In both cases, most banks and credit card firms charge fees (either a fixed fee or a percentage of the amount transferred) *and* they charge a foreign exchange margin on each transfer.

These fees and margins represent a substantial cost for consumers and SMEs (see table below), which is likely to have a substantial negative effect on trans-Tasman trade. Their effect is like that of a tariff.

These charges appear to be significantly higher than the underlying cost of providing the service. A money transfer is an update in a digital ledger, so small transactions are relatively costless to banks. The costs to banks of trans-Tasman transactions should be only a little more than the costs of domestic transactions.

High charges may be the result of limited competition or the costs of regulatory compliance. Past experience shows that increased competition and regulatory actions (including the threat of regulation) can bring down charges to consumers (chapter 2), and possibly benefit trans-Tasman trade.

The price of moving money across the Tasman^a

<i>New Zealand to Australia</i>			<i>Australia to New Zealand</i>		
<i>NZD</i>	<i>IMT^b</i>	<i>Credit card^c</i>	<i>AUD</i>	<i>IMT^d</i>	<i>Credit card^e</i>
\$100	10.9%	4.4%	\$100	10.0%	7.0%
\$1 000	2.8%	4.4%	\$1 000	4.6%	7.0%
\$10 000	2.0%	4.4%	\$10 000	4.2%	7.0%

^a Fees and margins (calculated from exchange rates) for digital transactions as at 11 January 2019.

^b International money transfer from ANZ (NZ) to Commonwealth Bank (Australia).

^c ANZ (NZ) VISA card used in Australia.

^d International money transfer from Commonwealth Bank to ANZ (NZ).

^e Commonwealth Bank MasterCard used in New Zealand.

The ACCC (2018c) has recently begun investigating these issues. In New Zealand, the Commerce Commission took action in 2007 against financial institutions involved in currency conversions, resulting in over NZ\$24 million paid in compensation to consumers (Commerce Commission New Zealand 2007). Given the ACCC investigation, it appears timely that the New Zealand Government assess the currency conversion market in New Zealand and its effect on consumers.

F4.5

High currency conversion costs and other fees have a negative effect on trans-Tasman trade. The New Zealand Government could investigate this issue, mirroring an inquiry commenced by the Australian Competition and Consumer Commission.

A trans-Tasman banking system

The banking systems in Australia and New Zealand have many similarities, and many individuals and firms use trans-Tasman services. It is a key enabler of the two countries' close economic relationship, facilitating the movement of people, goods and services across borders.

Nevertheless, the banking systems are still a long way from offering seamless trans-Tasman banking. Achieving this would require:

- addressing regulatory barriers to the delivery of trans-Tasman financial services (including, for example, comprehensive credit reporting), and
- creating an environment that facilitates trans-Tasman banking, such as joint open banking and payment standards, and recognition of digital identities.

Broader issues include security requirements, such as know-your-customer and anti-money-laundering regulation. Aligning these regulations would enable customers to open Australian accounts at a New Zealand subsidiary bank, and vice versa.

Taken individually, the observations we make in this report on financial services regulation and standards development are relatively minor changes to processes and legislation. Taken together, however, they have the potential to lay the foundation for a trans-Tasman banking system.

Creating a seamless trans-Tasman banking system would benefit SMEs in both countries, by making it easier to engage in trade, and would also simplify the transactions undertaken daily by individuals in both countries. For example, trans-Tasman payments could be completed as easily as domestic payments, and at a lower price than is currently the case. With banking becoming increasingly digital, and given existing commonalities between the two systems, banking appears to be an area where collaboration is both achievable and can yield benefits to consumers and SMEs.

F4.6

Joint open banking and payment standards, and removing impediments to sharing financial information, are useful steps towards a seamless trans-Tasman banking system.

Digital technologies can support global and trans-Tasman trade

Much of the trans-Tasman trade that occurs today is supported by digital technologies. They improve firms' ability to connect to their clients and make it easier for them to comply with regulatory requirements (chapter 3).

Digital technologies can support initiatives that would deepen the bilateral trade relationship between Australia and New Zealand. Such initiatives may open regional trade opportunities and further Australia and New Zealand's involvement in the global digital trade system.

Addressing non-tariff barriers to digital trade

Cooperation in international forums has been a feature of the relationship between Australia and New Zealand for many decades (APC and NZPC 2012). Such cooperation allows the two countries to have greater influence over the outcome of international negotiations, such that their domestic preferences are taken into account (Department of Finance and Administration and Ministry of Economic Development 2007). The two countries have numerous shared interests, which they can advance together without compromising their individual policy agendas.

Global efforts towards creating rules for digital trade open further opportunities for trans-Tasman collaboration. Rules that affect digital trade are negotiated both as part of the agreements made under the auspices of the World Trade Organisation (WTO), and in separate free trade agreements signed between individual or groups of countries (Gonzalez and Ferencz 2018).

At the WTO, Australia and New Zealand have signed agreements that facilitate trade in digital products and the digitalisation of trade processes. The Information Technology Agreement reduces customs duties on IT products, while the Trade Facilitation Agreement calls for countries to simplify their trade compliance processes, including endeavouring to create single windows for trade (chapter 3). New Zealand also joined the Joint Statement on Electronic Commerce Initiative, chaired by Australia within the WTO. This initiative, launched in 2017, aims to update trade rules so that they keep pace with technological change (DFAT 2018c; WTO 2017b).

More specific commitments that affect the digital economy are included in regional trade agreements (Gonzalez and Ferencz 2018). For example, the 2018 Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP or TPP-11) has a detailed chapter on e-commerce. This includes, among other things, commitments to avoid data localisation rules (which require data to be stored in the country where it is collected) and regulate digital content in the same way regardless of the country in which it was created (DFAT 2018e).

Nonetheless, there are numerous exceptions to these provisions, including allowing countries to introduce data localisation requirements to achieve ‘public policy objectives’ (DFAT 2018e). Further, some of the provisions are made on a ‘best endeavours’ basis and are not subject to dispute resolution, meaning that the approach to implementation can vary widely (Gonzalez and Ferencz 2018). This is not surprising, given the very different economic and political institutions that govern the countries signing these agreements.

As advanced economies with stable institutions and transparent processes, Australia and New Zealand should implement the agreements in the spirit in which they were signed — to facilitate free digital trade — rather than rely on exceptions and caveats to comply with the letter of the agreements without making meaningful progress. The successful bilateral relationship between the two countries can serve as a demonstration of what can be achieved with meaningful engagement, and the substantial contribution it can have to the wellbeing of both countries and their citizens.

In their future negotiations at the WTO and in regional forums, the Australian and New Zealand Governments should consider cooperating on reducing non-tariff barriers. The two countries already collect information from exporters on barriers they encounter (DFAT nd; NZ Customs Service nd). In future, they should share the information they have to coordinate their policy priorities.

Two non-tariff barriers that are of particular importance to SMEs are price differentials based on geographic location (geoblocking) and data localisation rules (both are discussed in chapter 2). Data localisation rules, which require data to be stored within national borders, impose substantial costs on SMEs:

While a major company may have sufficient revenues and scale to justify building data centres in multiple [countries], smaller firms can be shut out of the domestic and international internet economy completely if they cannot access affordable computing and data services. Past research has found that local companies would be required to pay 30-60 percent more for their computing needs from strictly enforced data localisation policies. Indeed, it has been observed that not only does the fragmentation of global online networks by data localisation laws result in delays, inefficiencies and higher costs from building or renting physical infrastructure in each jurisdiction, it also imposes the

need to operate in a ‘complex array of different jurisdictions imposing conflicting mandates and conferring conflicting rights’. (ECA 2018a, p. 36)

The CPTPP (TPP-11) touched on some of these issues, but its provisions are subject to caveats and exceptions. Other trade agreements under negotiation, such as the Regional Comprehensive Economic Partnership, can be clearer in their recognition of the effects non-tariff barriers can have on digital trade, and take a stronger stance in minimising them. Australia and New Zealand can collaborate in their efforts to reduce such barriers, in both trans-Tasman and Asia–Pacific trade.

At the same time, both governments should be cognisant of the possible effects new legislation can have on information flows. For example, concerns have been raised about the implications of Australian encryption laws passed in 2018. The new legislation allows law enforcement agencies to access encrypted communications in specific circumstances. According to Ai Group (2018, pp. 1, 3), such laws may ‘create a loss of trust between business and their customers’ as well as ‘impact Australia’s digital capability and competitiveness, ... discouraging business presence in the Australian market, and leaving Australia behind’.

Writing the rule book on global digital trade

The negotiations on digital trade rules touch on broader issues, such as privacy and intellectual property, where there are substantial differences in the approaches taken in different parts of the world. Australia and New Zealand should take an active part in these discussions and put forward balanced, evidence-based options for consideration. Otherwise, there is a risk that international outcomes simply reflect existing and dominant standards, like the General Data Protection Regulation introduced by the European Union (EU).

The EU’s privacy regulations are likely to have substantial effects on global cross-border data flows and on digital trade more broadly (chapter 2). Australia and New Zealand are currently negotiating free trade agreements with the EU, which will include discussions on rules for digital trade and data transfers (DFAT 2018b; MFAT 2018). This is an opportunity for both countries to influence the global conversation on data and privacy.

Standards Australia (2012, p. 2) reflected on this issue in the context of technical standards:

Where economic imperatives differ between countries, the harmonisation of standards can often prove challenging and avoiding a ‘race to the bottom’ is critical. However, the ... high rate of adoption of international standards both regionally and internationally is an excellent opportunity to achieve harmonisation. In order to maximise this opportunity, the continued participation in international standards development and

governance is required. This will be instrumental in ensuring that quality international standards continue to be developed and that the technical infrastructure exists to multilateralise relevant parts of the [Closer Economic Relations agenda].

The WTO (2018, p. 13) more recently emphasised the need for broad-based collaboration in the development of digital trade rules:

[T]he expansion of digital trade holds the potential to generate considerable benefits, in particular if it takes place under conditions that adequately address important public policy challenges. Issues concerning inclusiveness, privacy protection and cybersecurity are likely to figure prominently in debates on the future governance of digital trade. International cooperation has an important role to play in helping governments to ensure that digital trade continues to be an engine of inclusive economic development.

Negotiations on regional trade agreements and WTO statements can take a long time to complete. Nonetheless, this process lays the foundation for economic activity in the future. Both Australia and New Zealand have common interests in creating a global digital trade system that promotes free trade and the free flow of data, while balancing the need for cybersecurity and privacy. These interests should be pursued collaboratively in current and future negotiations.

F4.7

Australia and New Zealand can work together in international forums to advance shared interests, while maintaining their individual policy agendas. Possible areas for joint work include the creation of a rules-based global digital trade system and addressing non-tariff barriers that affect the delivery of digital services.

Many other relevant topics are debated globally, and Australia and New Zealand can join forces to strengthen their voice in these debates. For example, the two countries should take an active role in the global discussion on measurement issues pertaining to the digital economy. This is a challenging area that has attracted much interest from statisticians, academics and government agencies (chapter 1).

Facilitating trans-Tasman trade

As we discuss in chapter 3, the trade compliance system is complex and cumbersome, with many processes still paper-based, particularly in Australia. The close trading relationship with New Zealand has not overcome these difficulties. However, both countries are working towards digitalising trans-Tasman trade,

introducing mutual recognition of supply chain security and trialling a ‘secure trade lane’ for sea cargo, aimed at simplifying compliance for SMEs.

Although small in scale relative to the overall trade volumes of both countries, these trials are complex and require alignment between numerous private and public bodies.

In future, regulators on both sides of the Tasman could consider aligning standards for the data collected from importers and exporters, such that data is collected once and shared across borders.

Digital identities facilitate transactions by enabling firms and government agencies to establish who they are dealing with online (chapter 3). Trans-Tasman digital identity services would extend these benefits to cross-border transactions.

Digital identities are typically confined to national borders. In an effort to overcome this, the EU has recently implemented mutual recognition of national electronic identification systems. According to the European Commission, this will allow firms to identify customers online and interact with regulators across borders more easily — for example, checking customers’ age when selling wine or other restricted products online, and streamlining compliance processes (European Commission 2018).

The Australian and New Zealand Governments can cooperate in developing their digital identity services. The New Zealand Government has recently commenced a new research programme to develop rules and standards for its digital identity programme (Woods 2018). In Australia, the Digital Transformation Agency (DTA) is building an identity framework, based on a federated model. In effect, this will involve a group of trusted organisations that verify users’ identities via a central secure system (DTA nd). In future, New Zealand organisations could consider gaining accreditation for the DTA system, which would enable individuals and firms to use New Zealand credentials to verify their identity in Australia.

The Australian Digital Council, which comprises ministers from all Australian jurisdictions, is overseeing the development of digital identity services (DPMC 2018a). This may present an opportunity for sharing knowledge and experience with the New Zealand Government.

F4.8

Trans-Tasman digital identity services could support trans-Tasman trade and benefit firms and citizens of the two countries.

Protecting consumers in cross-border transactions

International cooperation between consumer protection authorities is important in addressing some of the challenges created by cross-border transactions (chapter 2). Substantial factors continue to hinder international cooperation in consumer protection, including restrictive data sharing practices — which limit the ability of regulators to share information across borders — and a lack of legal authority to engage in international cooperation (OECD 2018a).

The Australian and New Zealand consumer protection authorities (the ACCC and the NZ Commerce Commission) have long-standing, extensive cooperation agreements (ACCC nd). Nonetheless, differences between the two countries' legal frameworks remain, and may limit the efficacy of consumer protection in cross-border cases.

This may be addressed through the Legislative and Governance Forum on Consumer Affairs (CAF), which includes all Australian (Commonwealth, State and Territory) and New Zealand ministers responsible for fair trading and consumer protection laws. One of the forum's strategic goals is to develop a coordinated approach to consumer protection, including 'new issues that arise in existing and emerging markets' (CAANZ 2018). A review commissioned by the CAF in 2017 identified consumer guarantees for digital products and markets as a priority area of work in 2018-19 (CAANZ 2017). Such work would be valuable in creating fit-for-purpose trans-Tasman consumer protection frameworks.

F4.9

Australian and New Zealand policy makers could work together to develop effective remedies for trans-Tasman transactions with unsatisfactory consumer outcomes. Success with trans-Tasman transactions would provide a stepping stone towards dealing with the general issue of cross-border consumer protection.

Encouraging SMEs to think trans-Tasman

Digital technologies have enabled the creation of regional and global value chains, allowing different steps of a production process to be undertaken in different countries.

Yet, collaboration between Australian and New Zealand firms in developing regional value chains appears to be a rarity. There is very limited data on the collaboration of SMEs in Australia and New Zealand in production processes, and we found only a handful of trans-Tasman firms that are based on digital collaboration (see, for

example, Spokle nd). Overall, Australia and New Zealand are relatively small participants in global value chains (WTO 2017a).

There are numerous joint professional organisations and networking groups operating across the Tasman, along with bodies such as the Australia New Zealand Leadership Forum. Some of these organisations foster trans-Tasman collaboration but for many, it remains an ad-hoc activity. Such organisations can play an important part in encouraging SMEs to consider building trans-Tasman relationships and collaborations, making the most of the digital economy's ability to overcome some of the effects of geography and borders, as well as the enabling environment created by the SEM.

4.3 A strong relationship will support the digital economy

Policy with respect to the digital economy is evolving. In a fast-changing environment, the key principles of using strong evidence to inform policy making, and evaluating the costs and benefits of proposed government interventions, remain highly relevant.

The Global Economic Law Network wrote in its submission to the Australian Parliament's Joint Standing Committee on Trade and Investment Growth inquiry into the trade system and the digital economy:

The developments in the technology industry take new turns almost every few weeks, and taking a highly prescriptive approach to new digital innovations, without evaluating the pros and cons, can be counterproductive in the long run.

We think the Australian government will benefit immensely by remaining deeply committed to open markets for digital trade, and putting forward new policy initiatives to promote the digital economy, despite mounting pressure to control certain activities in the internet (2018, p. 3).

Such an approach applies equally to both the Australian and New Zealand Governments.

Many of the policy questions raised by the digital economy remain unanswered. As the two governments work through their responses, regulators and policy makers should develop and maintain strong and transparent relationships, and share their thinking. Keeping each other informed of policy developments on each side of the Tasman will offer fertile ground for joint work.

The SEM agenda provides the forum for Australia and New Zealand to explore the opportunities emerging from the digital economy and to work through the challenges as they arise.

A Consultation

Australian engagement meetings

Australia and New Zealand Leadership Forum
Australian Bureau of Statistics
Australian Small Business and Family Enterprise Ombudsman
Australian Taxation Office
Chartered Accountants Australia and New Zealand
Council of Small Business Organisations Australia
Department of Finance
Department of Foreign Affairs and Trade
Department of Home Affairs
Department of Industry, Innovation and Science
Department of Jobs and Small Business
Department of the Prime Minister and Cabinet
Digital Transformation Agency
Export Council of Australia
Office of the Australian Information Commissioner
Pia Andrews
Small Enterprise Association of Australia and New Zealand
StartupAUS

New Zealand engagement meetings

AI Forum
British High Commission, Wellington
Business NZ
Creative HQ New Zealand
Department of Conservation
Electricity Authority
Financial Markets Authority
Google
Ministry of Business, Innovation & Employment
Ministry of Foreign Affairs and Trade
MYOB
New Zealand Bankers Association
New Zealand Business Number
New Zealand Trade and Enterprise
NZ Rise
NZTech
Office of the Privacy Commissioner
Single Economic Market Senior Officials Meeting

United Kingdom engagement meetings

Department for Digital, Culture, Media and Sport
Department for International Trade

Conferences and seminars

Competition Policy: can it deliver in the New Digital Age? UniSA and ACCC
Competition Law and Economics Workshop 2018 — Adelaide
Data Summit 18 — Wellington
FST Government New Zealand 2018 — Wellington
Go Global Conference — Auckland
Implications of the Digital Transformation for the Business Sector, OECD and BEIS — London

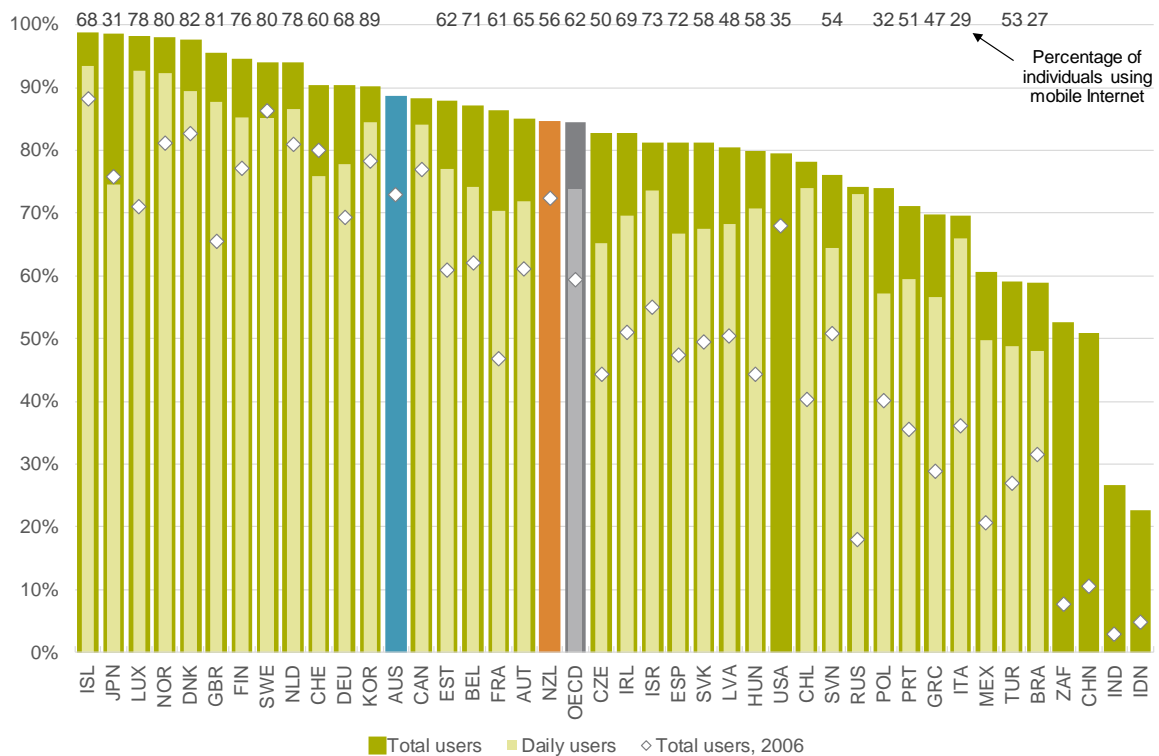
B Data: the digital economy, SMEs and trans-Tasman trade

B.1 The digital economy in Australia and New Zealand

Internet use is part of daily life

Australia and New Zealand have above average rates of internet use (figure B.1). Rates increased from 73% in Australia and 72% in New Zealand in 2006 to 88% in Australia and 84% in New Zealand in 2016. And 56% of individuals in New Zealand access the internet using a mobile device. For most individuals in OECD countries, internet use is part of daily life.

Figure B.1 **Total, daily and mobile internet users, 2016**
As a percentage of 16–74 year olds

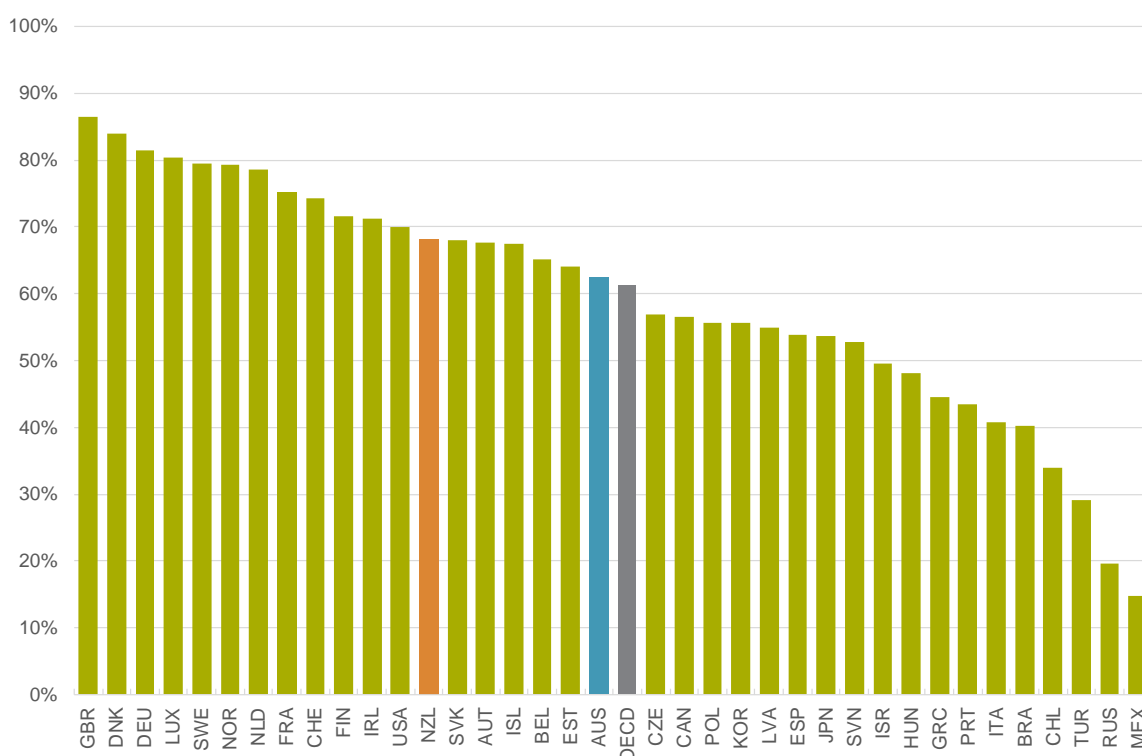


Source: OECD (2017b).

Consumers purchase online

Figure B.2 shows a high level of consumer use of digital technologies in Australia and New Zealand, with 68% of New Zealand internet users and 63% of Australian internet users purchasing online in the past twelve months. The percentage of individuals purchasing online, for both countries, is above the OECD average.

Figure B.2 Individuals who purchased online in the past 12 months, 2016
As a percentage of internet users



Source: Adapted from OECD (2017b).

Internet use varies by firm size

Internet access for firms in Australia and New Zealand is almost universal, with little difference between the various firm sizes (tables B.1 and B.2). Between 93% and 96% of firms in New Zealand use broadband. In Australia, 99% of firms use broadband as their main type of connection.

The data shows differences by firm size for fibre-based internet connections in New Zealand, web presence in Australia, and receiving orders online in both countries. Small firms are less likely to have a web presence or use fibre to connect

to the internet, and small and medium enterprises (SMEs) are slightly less likely to have received orders via the internet.

Table B.1 Measures of internet usage by Australian firms, 2016–17

<i>Firm size (employees)</i>	<i>Have internet access</i>	<i>Have web presence</i>	<i>Broadband as main type of connection</i>	<i>Placed orders via the internet</i>	<i>Received orders via the internet</i>
0–4	94%	40%	100%	53%	32%
5–19	97%	65%	99%	67%	44%
20–199	100%	82%	99%	75%	48%
200+	99%	94%	99%	84%	55%

Source: ABS (Summary of IT Use and Innovation in Australian Business, 2016–17, Cat. no. 8166.0).

Table B.2 Measures of internet usage by New Zealand firms, 2016

<i>Firm size (employees)</i>	<i>Using the internet</i>	<i>Use broadband</i>	<i>Use fibre</i>	<i>Used the internet to receive orders</i>
6–19	96%	93%	29%	49%
20–49	98%	96%	45%	52%
50–99	99%	96%	59%	52%
100+	100%	96%	69%	56%

Source: Stats NZ (Business Operations Survey: 2016).

Use of IT in business processes varies by firm size in Australia

Australian evidence on digital uptake by firm size (measured by number of employees) suggests that smaller firms are less likely to use information technology (IT) than larger firms across six common business processes (table B.3). The level of uptake may be related to the size of the firm, with a need for IT and automation of processes when there are a larger number of employees.

Table B.3 **Extent of IT use in business processes in Australia by firm size, 2015-16**

As a percentage of total firms^{a,b}

Employees	<i>Accounting</i>			<i>Production/service operations</i>		
	High	Low/moderate	Not at all or na ^c	High	Low/moderate	Not at all or na
0-4	59	26	15	28	20	52
5-19	69	17	14	32	22	46
20-199	81	14	5	50	29	21
200+	92	6	2	72	18	11
Total	64	22	14	31	21	48

Employees	<i>Stock control</i>			<i>Marketing</i>		
	High	Low/moderate	Not at all or na	High	Low/moderate	Not at all or na
0-4	9	14	77	20	24	56
5-19	20	20	61	29	30	42
20-199	31	24	45	42	33	25
200+	49	16	35	56	31	13
Total	15	16	69	25	27	49

Employees	<i>Human Resources</i>			<i>Invoicing</i>		
	High	Low/moderate	High	High	Low/moderate	High
0-4	34	21	45	54	20	26
5-19	58	19	23	61	17	23
20-199	74	14	12	70	16	14
200+	83	14	3	78	17	6
Total	45	20	35	58	18	24

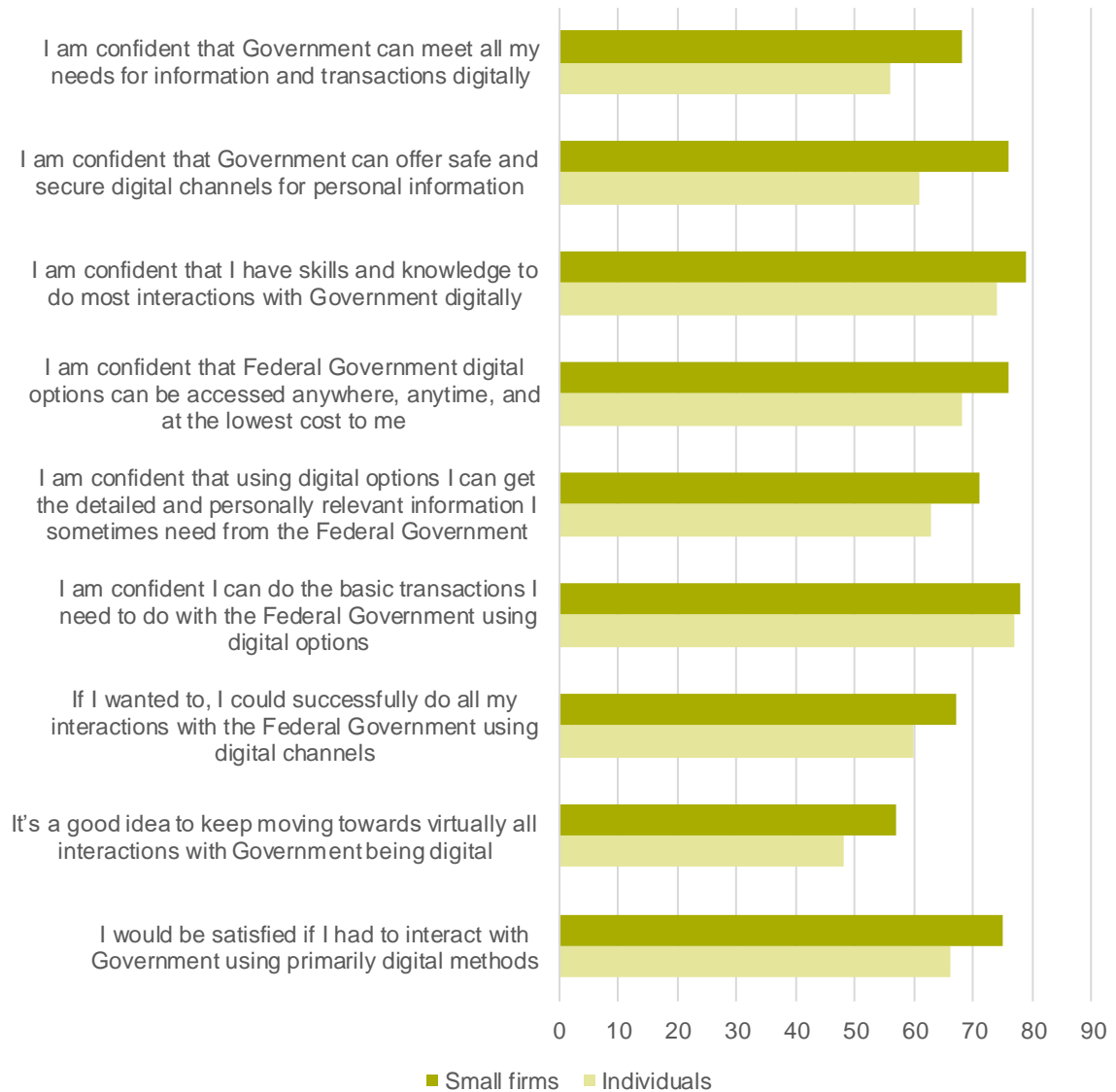
^a Self-reported extent of IT use by firms. ^b Due to rounding, not all processes will total 100. ^c na is a 'not applicable' response.

Source: ABS (*Business Use of Information Technology, 2015-16*, Cat. no. 8129.0).

Government is increasingly online

Consumers and firms are increasingly able to interact with government agencies online. Figure B.3 reports the results of a 2015 survey of small firms and individuals about their satisfaction with digital interactions with the Australian Government. A majority of individuals and small firms in the survey were satisfied with digital interactions with government, and small firms had greater levels of satisfaction on all measures of digital interaction with the government than did individuals.

Figure B.3 Australian small firm and individual opinions on digital government^a interactions, 2015
 Percentage of respondents answering 'strongly agree' or 'somewhat agree'



^a 'Government' in this survey refers to the Australian (Commonwealth) Government only.

Source: Bruce & Bruce (2015).

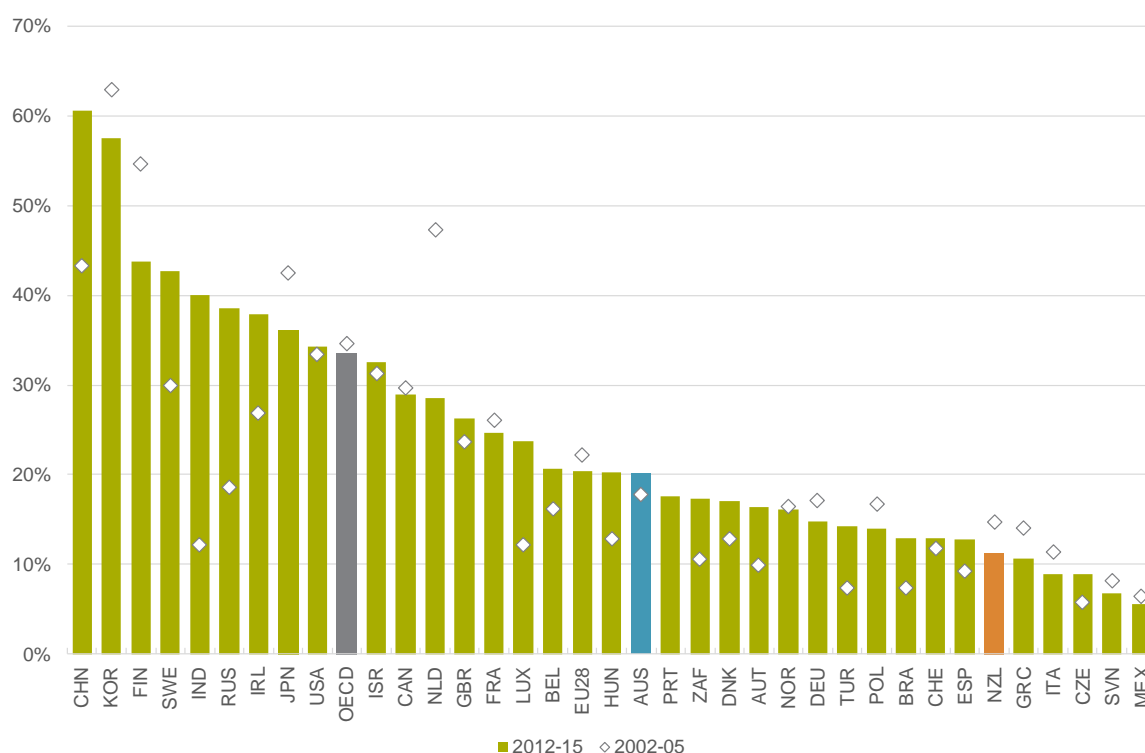
B.2 Australia and New Zealand in the global digital economy

Patents indicate where innovation is happening ...

In Australia and New Zealand, ICT-related patents as a proportion of total country patents are below the OECD average (figure B.4). Australia grew its share of ICT-related patents between 2002–05 and 2012–15 from 17.8% to 20.1% of all patents. New Zealand's share moved in the opposite direction, from 14.7% in 2002–05 to 11.4% in 2012–15. New Zealand was one of only a few countries to reduce its share.

Australia and New Zealand's share of total ICT-related patents across all OECD countries is falling. Between 2002–05 and 2012–15, Australia's share dropped from 0.74% to 0.45% and New Zealand's share dropped from 0.13% to 0.08% (OECD 2017b).

Figure B.4 ICT-related patents, 2002–05 and 2012–15
As a percentage of total IP5^a patent families owned by economies



^a IP5 is a collection of the five largest intellectual property offices in the world and covers 90% of all patents issued worldwide. Patents are classified by country using country of applicant.

Source: OECD (2017b).

... as does expenditure on research and development

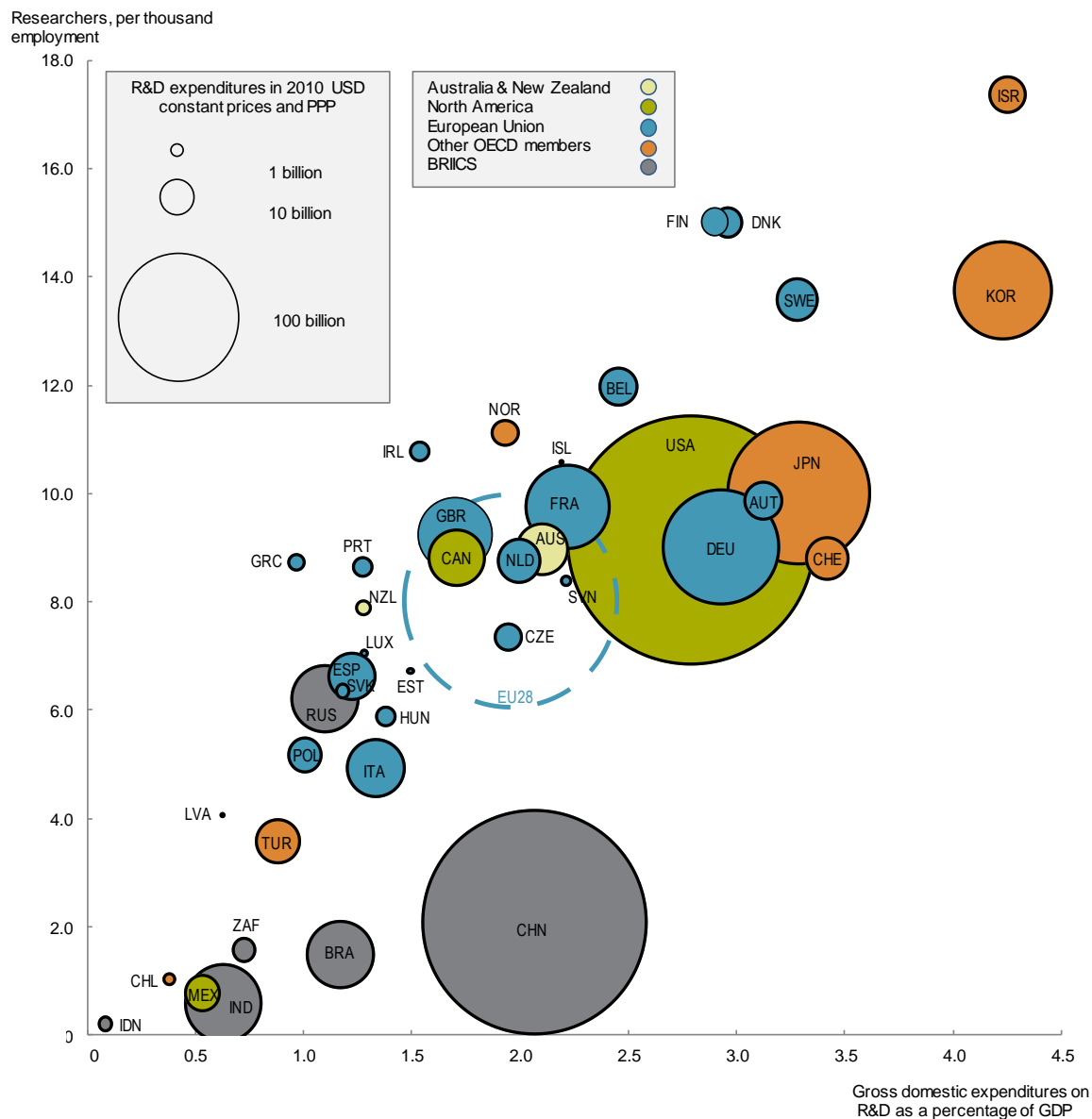
Figure B.5 presents a measure of research and development (R&D) by country. New Zealand has 7.9 people on average working as researchers per thousand people employed, and Australia has 9.0 researchers per thousand employed. Australia ranks slightly above average and New Zealand ranks below average.

The number of researchers per thousand employed in Australia and New Zealand is similar to levels in the United States (9.1) and Japan (10.0), and well ahead of China (2.1). However, both are well behind the top group of Israel (17.4), Finland (15.0), Denmark (15.0), Korea (15.0) and Sweden (13.6).

New Zealand lags Australia in expenditure on R&D as a percentage of Gross Domestic Product (GDP), representing 1.3% of GDP in New Zealand and 2.1% in Australia. The two countries have similar levels to China (2.1%), the United Kingdom (1.7%) and Ireland (1.5%). Israel and Korea spend the most on R&D (4.3% and 4.2% respectively). The United States and Japan spend 2.8% and 3.3% respectively.

But both Australia and New Zealand have small populations and small economies. Australia ranks 13th in total R&D expenditure and New Zealand 34th. The top two countries (United States and China) spend more in absolute terms than the other thirty-nine countries combined.

Figure B.5 Research and development in OECD and key partner countries, 2015^a



^a BRIICS is an acronym used by the OECD for Brazil, Russia, India, Indonesia, China & South Africa.

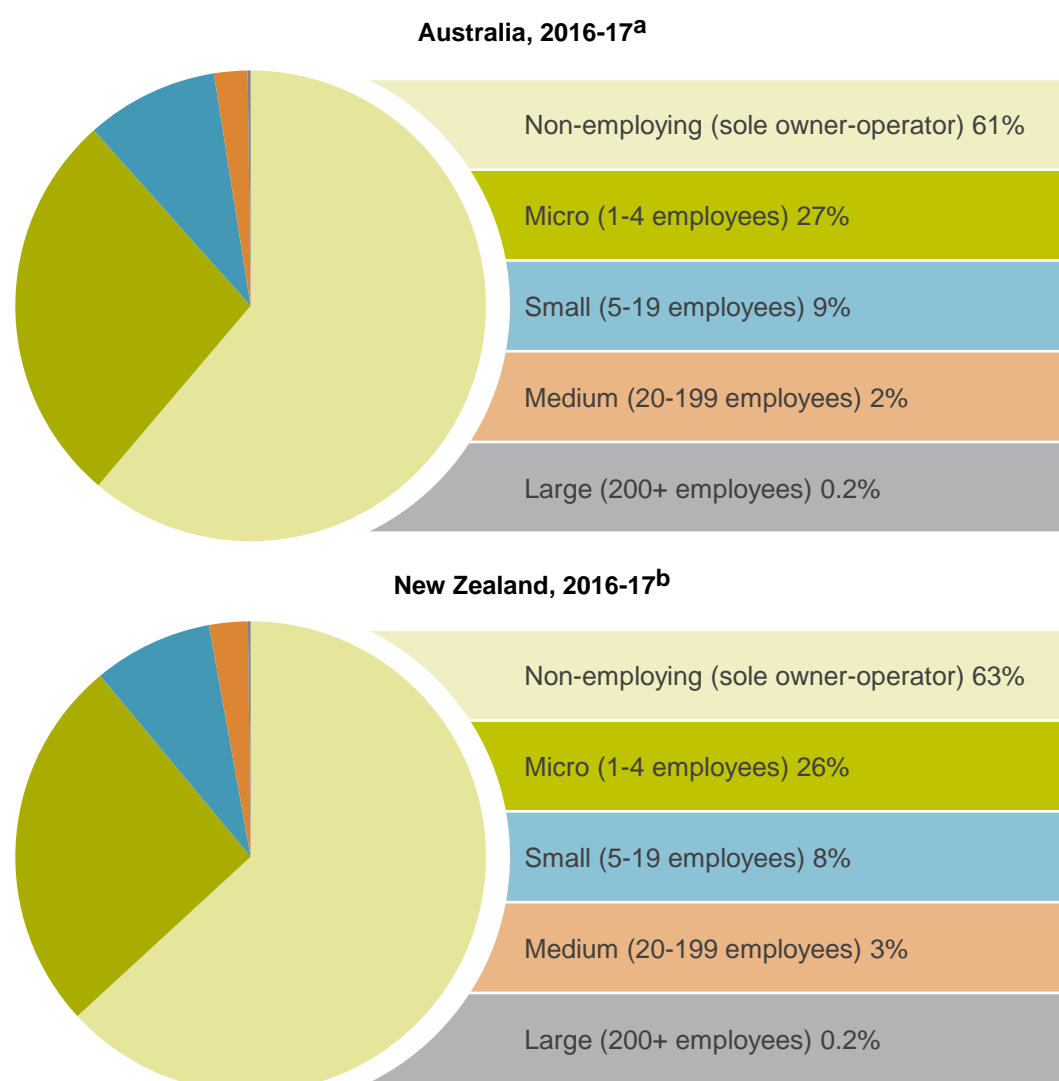
Source: OECD (2017b).

B.3 Firms in Australia and New Zealand

A high proportion of firms in Australia and New Zealand are SMEs

Australia and New Zealand have a similar proportion of firms by number of employees (figure B.6).

Figure B.6 **Firm size in Australia and New Zealand**
As a percentage of total firms, measured by number of employees



^a Firms trading as at 30 June 2017. ^b Firms active during a financial year ending between 1 October 2016 and 30 September 2017. Firms can select their own financial year and balance date in New Zealand.

Sources: ABS (*Counts of Australian Businesses, including Entries and Exits, 2017*, Cat no. 8165.0); Stats NZ (*Annual enterprise survey: 2017 financial year (provisional)*).

Over 60% of firms in each country are sole-trader or non-employing operators (with no employees) and there are similar proportions of micro, small, medium and large firms for the two countries.²⁴

Employment and SMEs tend to be in industries with low levels of digital intensity

Australia and New Zealand have a similar proportion of employment in small and medium firms by industry (figure B.7).

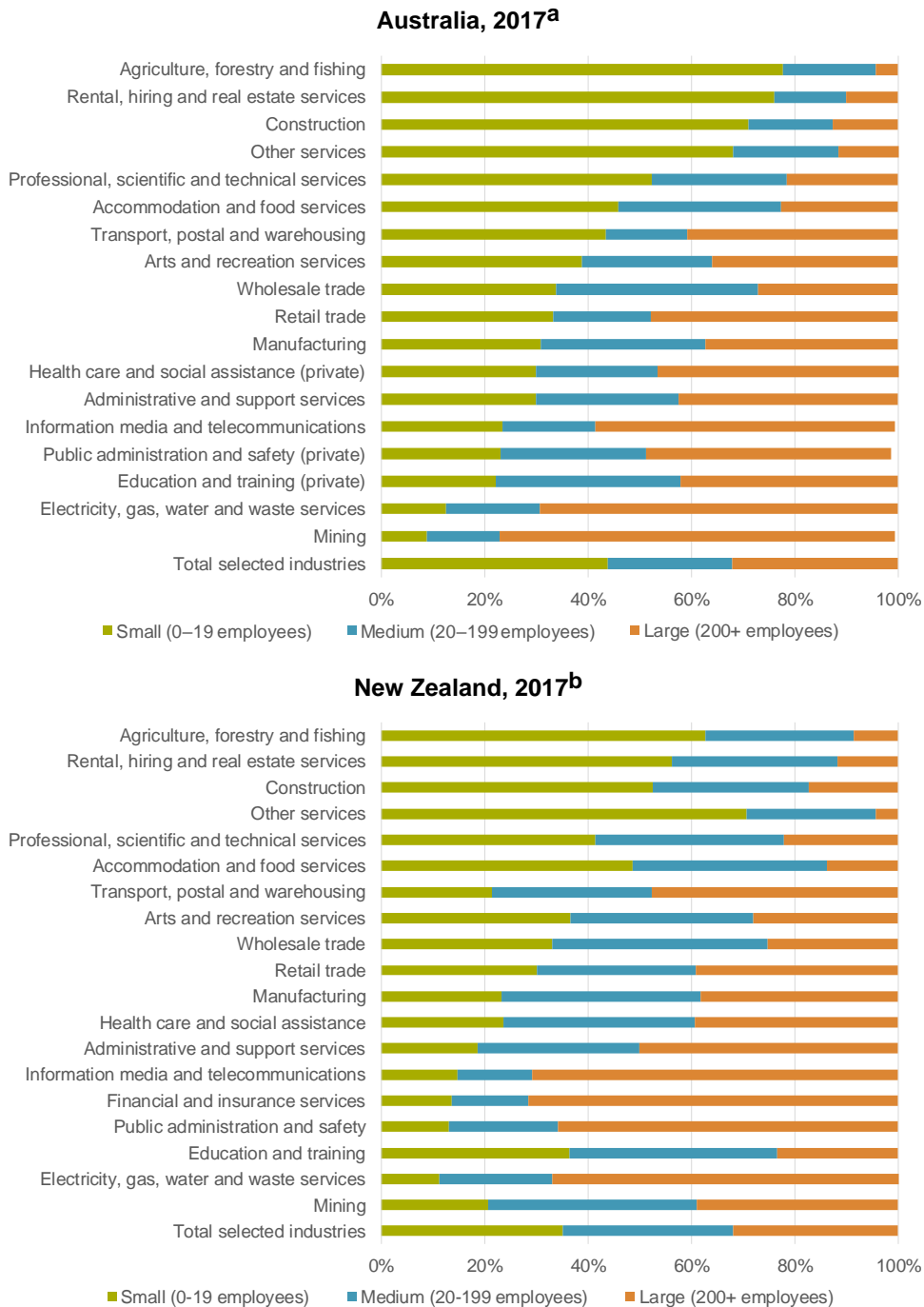
Both countries have a high proportion of employment in SMEs in industries that the OECD (2017b) classified as having a low level of digital intensity (see chapter 1). For example, figure B.7 shows a high proportion of employment in both countries in the agriculture, real estate and construction industries in small firms (less than 20 employees).

Correspondingly, there is a low proportion of employment in public administration, information media and telecommunications, financial services (New Zealand only) and utilities industries from SMEs. Financial services and information media and telecommunications are classified by the OECD (2017b) as digital-intensive industries. The public administration and utilities industries are characterised internationally by high levels of ICT investment and uptake of intermediate ICT products.

²⁴ The graphs in this appendix use the Australian Bureau of Statistics (ABS) definition of Small and Medium Enterprises, which break down small enterprises into micro (1-4 employees) and non-employing enterprises (zero employees). We use this definition in the absence of a consistent definition of SMEs in either Australia or New Zealand.

Figure B.7 Employment by firm size and industry in Australia and New Zealand

As a percentage of total employment in each industry



^a Employment in firms trading as at 30 June 2017. ^b Firms active during financial years ending between 1 October 2016 and 30 September 2017. Firms can select their own financial year and balance date in New Zealand.

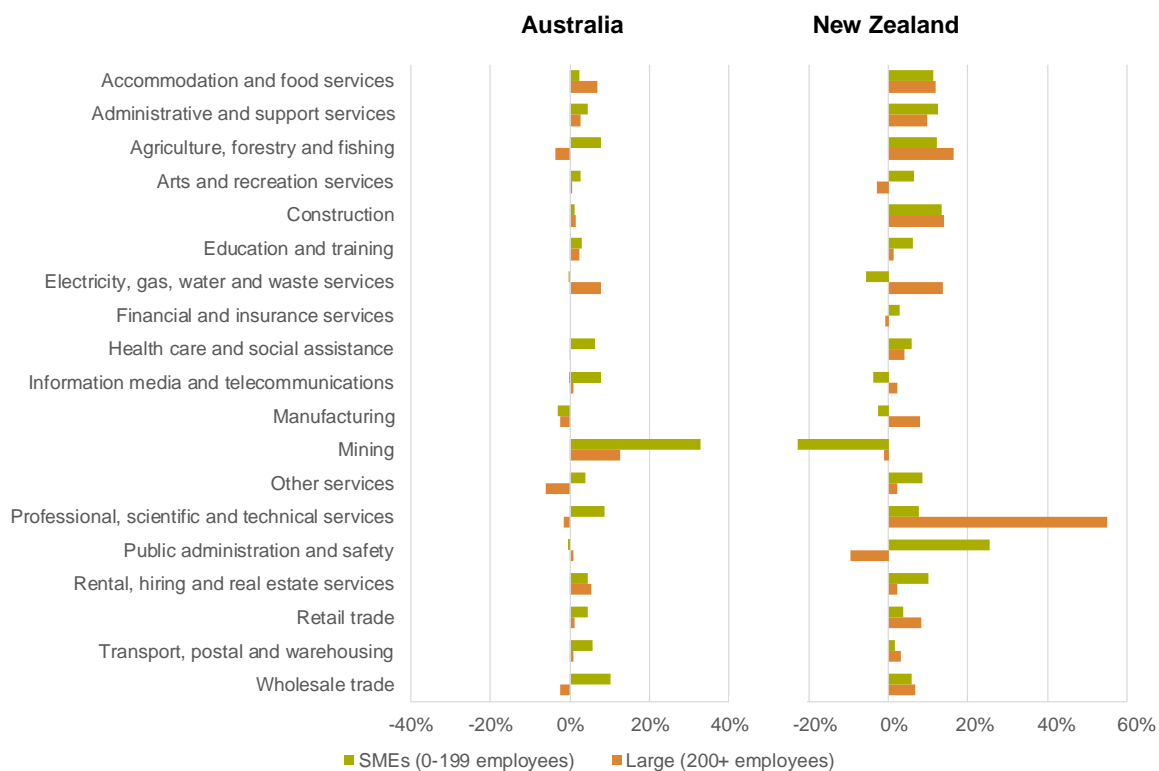
Sources: ABS (*Australian Industry, 2016-17*, Cat. no. 8155.0); Stats NZ (*Annual enterprise survey: 2017 financial year (provisional)*).

Revenue/income growth rates have varied by industry

Australian and New Zealand firms differ in their revenue/income growth rate profiles. Figure B.8 shows Australian SMEs have experienced slightly higher revenue growth rates than large firms in 12 of 19 industries. Large firms have higher revenue growth than SMEs in three of the top five industries by revenue in Australia (professional, scientific and technical services, retail trade and wholesale trade).

By contrast, large firms in New Zealand have experienced higher revenue growth in 11 out of 19 industries. Revenue growth was higher for large firms than SMEs in four of the top five industries (construction, manufacturing, retail trade and wholesale trade), and lower in the financial and insurance services industry.

Figure B.8 Revenue growth rates by industry^a and firm size, 2016 to 2017



^a ANZSIC industry divisions.

Sources: ABS (*Australian Industry, 2016-17*, Cat. no. 8155.0); Stats NZ (*Annual enterprise survey: 2017 financial year (provisional)*).

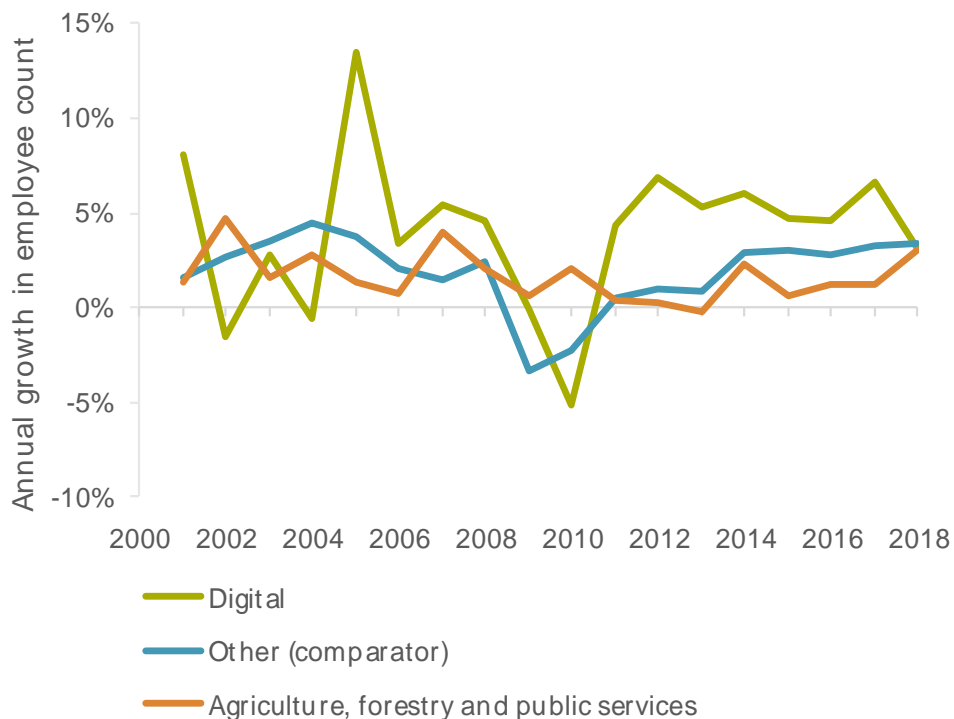
Digital firms are born smaller and die younger than other firms

A paper commissioned by the NZPC (Stephenson 2019) defined a ‘digital sector’ — firms in industries that produce digital and communications technologies or support their use by other firm and consumers, or that produce and sell digital content and media. It compares these firms with other firms.

Stephenson (2019) found that the digital sector in New Zealand had grown its share of business activity (figure B.9). In 2000 the digital sector comprised 1.9% of employment and by 2018 this share had grown to 2.8%. Employment in the digital sector grew by 3.9% per year, on average, between 2000 and 2018 (dominated by employment growth in computer system design firms). This is more than twice the average employment growth rate of other firms.

Digital sector firms tended to be smaller and were more likely to die young; however, surviving firms grew faster than firms in the comparator group (Stephenson 2019).

Figure B.9 Growth in the New Zealand digital sector



Source: Stephenson (2019).

B.4 International trade

The composition of trans-Tasman trade

Australia and New Zealand export quite different goods to each other (table B.4). Australia tends to export manufactured products to New Zealand, while New Zealand's exports to Australia are predominantly food and primary products.

Table B.4 **Top five categories of merchandise trade between Australian and New Zealand^a**

In millions of Australian dollars

	2017
<i>Top five merchandise exports from Australia to NZ</i>	
Medical instruments (incl. veterinary)	331
Computers	321
Medicaments (incl. veterinary)	286
Aluminium ores & conc (incl. alumina)	265
Telecom equipment & parts	233
<i>Top five merchandise exports from NZ to Australia</i>	
Edible products & preparations	786
Gold	541
Crude petroleum	541
Tobacco, manufactured	507
Alcoholic beverages	383

^a Australian categories and values are used to allow comparison between countries.

Source: Department of Foreign Affairs and Trade (2018a).

By contrast, Australia and New Zealand's service exports are very similar (table B.5). The largest service export for both countries is travel services, principally personal travel. Grundke et al. (2018) found low levels of digital intensity in tourism-related industries, such as hotel and food services. This may be due to the small size of firms in these industries. Adoption of digital technologies, such as automated self-service machines, has resulted in some changes in the tourism industry. An example is the SmartGate border control system in Australia and New Zealand.

Table B.5 **Top five categories of services trade between Australian and New Zealand^a**

In millions of Australian dollars

	2017
<i>Top five services exports from Australia to NZ</i>	
Travel services	2 359
Transport services	669
Other business services	556
Insurance & pension services	310
Financial services	231
<i>Top five services exports from NZ to Australia</i>	
Travel services	3 572
Transport services	768
Other business services	886
Financial services	151
Telecom, computer & information services	90

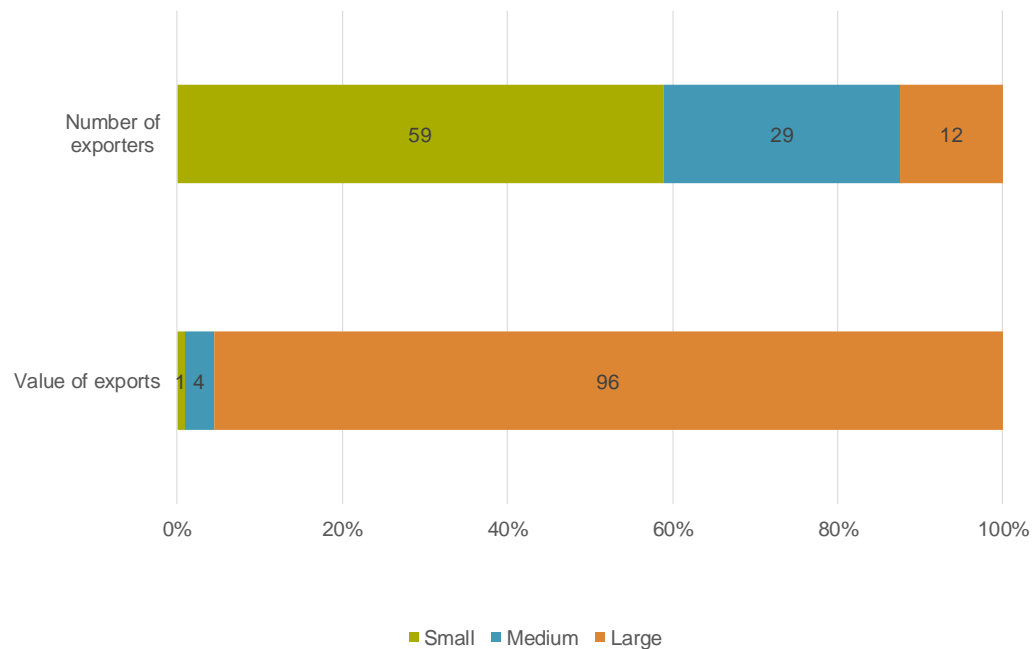
^a Australian categories and values are used to allow comparison between countries.

Source: Department of Foreign Affairs and Trade (2018d).

Exports by firm size

Australian data on exports by firm size shows SMEs represent 88% of all firms that export goods (figure B.10). However, SMEs represent less than 5% of the value of goods exported. Large firms dominate with 96% of exports by value.

Figure B.10 Goods exported from Australia by firm size, 2016–17^a



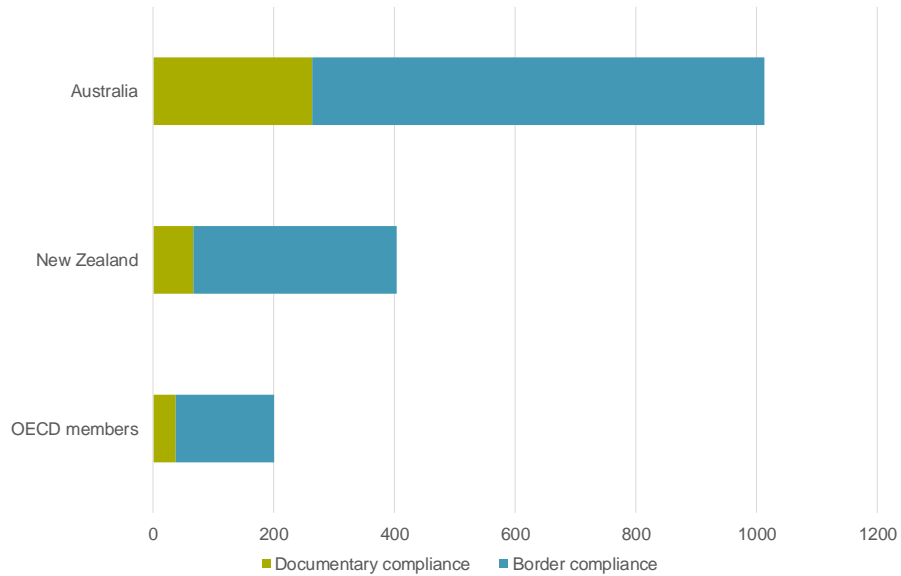
^a 51 992 firms exported goods in 2016-17 and the total value of these exports was A\$290.9b. The 'value of exports' bar adds up to more than 100% due to rounding.

Source: ABS (Characteristics of Australian Exporters, 2016-17, Cat. no. 5368.0.55.006).

Compliance costs of exporting and importing

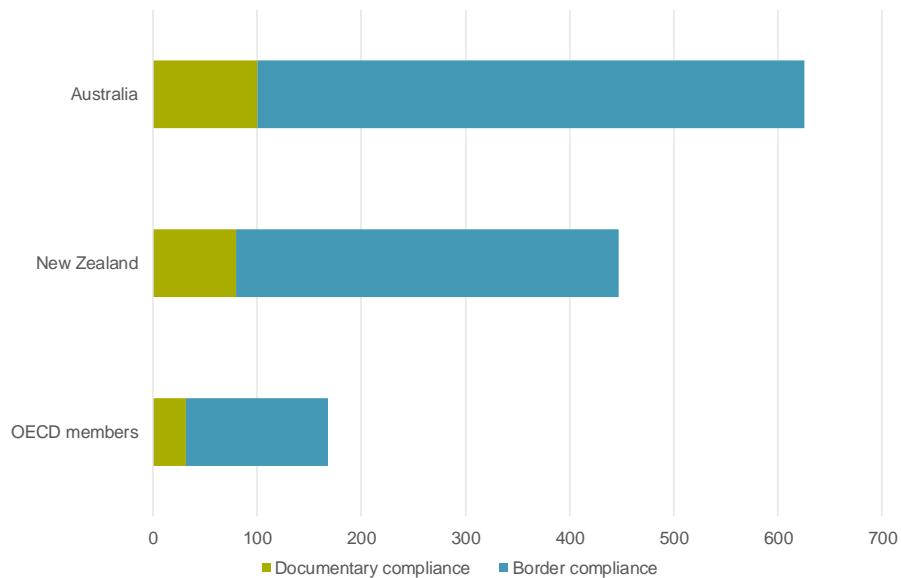
The compliance costs of trading across the Australian and New Zealand borders are high for New Zealand and particularly high for Australia. Figures B.11 and B.12 show that the estimated combined border and documentary compliance costs in Australia are five times higher than the OECD average to export, and 3.7 times higher than the OECD average to import. In New Zealand, the estimated compliance costs are twice the OECD average to export, and 2.7 times the OECD average to import.

Figure B.11 Average costs to export, 2017
In US\$



Source: World Bank (*Doing Business project*, ID: IC.EXP.CSDC.CD).

Figure B.12 Average costs to import, 2017
In US\$



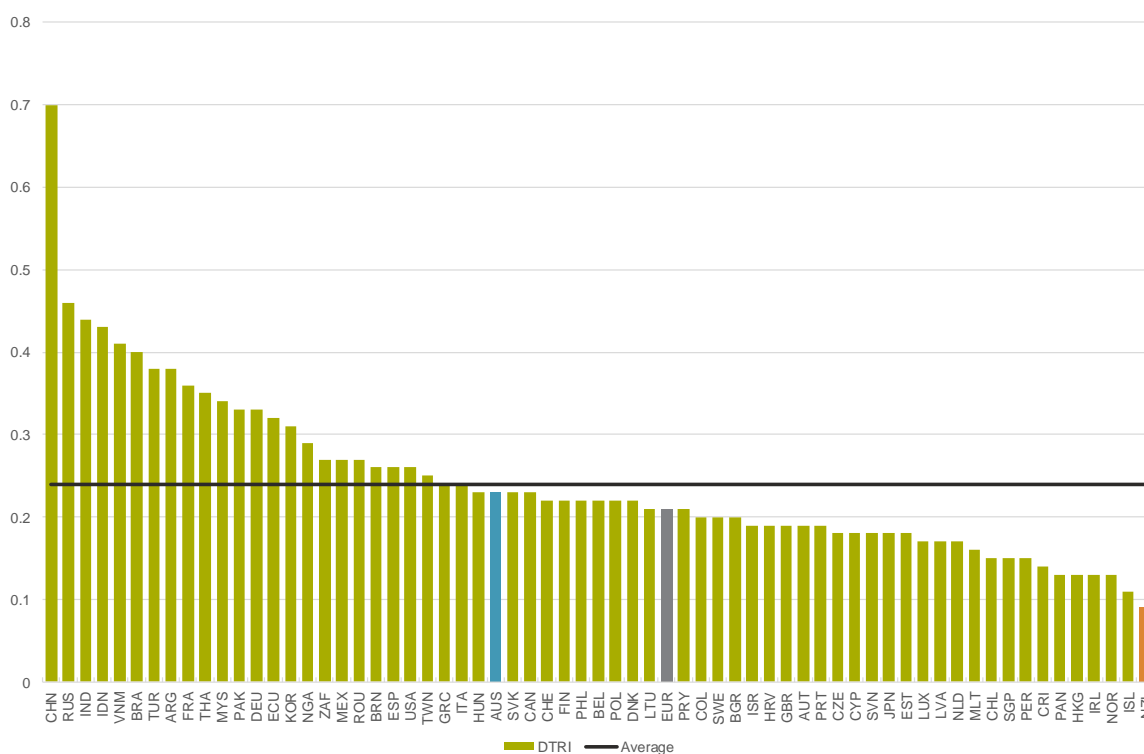
Source: World Bank (*Doing Business project*, ID: IC.IMP.CSBC.CD).

Openness to digital trade

New Zealand has been rated as the country most open to digital trade across 64 OECD and emerging economies (figure B.13). Ferracane, Lee-Makiyama and van der Marel (2018) analysed trade policy restrictions that may inhibit the growth of the digital economy, including tariffs on digital products, restrictions on digital services and investments, restrictions on the movement of data, and restrictions on e-commerce.

Australia's digital trade restrictiveness score is close to average, slightly more restrictive than the European Union average but less restrictive than the United States. China is rated as the most restrictive country for digital trade, with far higher costs associated with trading digital goods and services than any other country.

Figure B.13 Digital trade restrictiveness index, 2018^a



^a EUR is the average for European Union countries.

Source: Ferracane, Lee-Makiyama & van der Marel (2018).

References

- ABF (Australian Border Force) 2016, *Australia and New Zealand sign arrangement to streamline trade*, <https://newsroom.abf.gov.au/releases/australia-and-new-zealand-sign-arrangement-to-streamline-trade> (accessed 23 October 2018).
- 2018, *Australian Trusted Trader — Benefits*, Australian Border Force, <https://www.abf.gov.au/about-us/what-we-do/trustedtrader/benefits> (accessed 1 June 2019).
- ABS (Australian Bureau of Statistics) 2018, *Summary of IT Use and Innovation in Australian Business, 2016-17*, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8166.02016-17?OpenDocument> (accessed 10 January 2019).
- ACCC (Australian Competition and Consumer Commission) nd, *Treaties & agreements*, <https://www.accc.gov.au/about-us/international-relations/treaties-agreements> (accessed 17 December 2018).
- 2018a, *Consumer data and regulatory reform*, <https://www.accc.gov.au/speech/consumer-data-and-regulatory-reform> (accessed 30 October 2018).
- 2018b, *Digital Platforms Inquiry*, Preliminary Report, December, Australian Competition and Consumer Commission, Canberra, p. 378, <https://www.accc.gov.au/system/files/ACCC%20Digital%20Platforms%20Inquiry%20-%20Preliminary%20Report.pdf> (accessed 18 December 2018).
- 2018c, *Foreign Currency Conversion Services Inquiry — Issues Paper*, Australian Government, Canberra, <https://www.accc.gov.au/about-us/focus-areas/foreign-currency-conversion-services-inquiry/issues-paper> (accessed 31 October 2018).
- Acquisti, A., Brandimarte, L. and Loewenstein, G. 2015, 'Privacy and human behavior in the age of information', *Science*, vol. 347, no. 6221, pp. 509–514.
- Acquisti, A., Taylor, C. and Wagman, L. 2016, 'The Economics of Privacy', *Journal of Economic Literature*, vol. 54, no. 2, pp. 442–492.
- AEMC (Australian Energy Market Commission) 2014, *Customer access to information about their energy consumption*, <https://www.aemc.gov.au/rule-changes/customer-access-to-information-about-their-energy> (accessed 30 October 2018).

-
- 2018, *2018 Retail Energy Competition Review*, <https://www.aemc.gov.au/sites/default/files/2018-06/Final%20Report.pdf> (accessed 15 November 2018).
- Agarwal, R., Bajada, C., Green, R., Rammal, H. and Scerri, M. 2017, *Australia's International Business Survey 2017*, University of Technology Sydney, Sydney, <https://www.export.org.au/aibs/aibs-2017> (accessed 14 September 2018).
- Aghion, P. and Howitt, P. 1990, *A model of growth through creative destruction*, NBER Working Paper, 3223, <https://www.nber.org/papers/w3223.pdf> (accessed 2 January 2019).
- Ai Group 2018, *Commonwealth Government Consultation of the Assistance and Access Bill 2018 (CTH)*, <https://www.aph.gov.au/DocumentStore.ashx?id=380bde7a-b4e5-4f35-9217-85207381a140&subId=660760> (accessed 17 December 2018).
- AIIA (Australian Information Industry Association) 2017, *Technology and Government Study*, Research report, Canberra, https://www.aiia.com.au/__data/assets/pdf_file/0019/75034/gov-study.pdf (accessed 12 September 2018).
- AlphaBeta 2015, *Google Economic Impact Australia*, https://media.wix.com/ugd/f01257_178469dfca6e48ef9ae11f34efb2ff0b.pdf (accessed 30 October 2018).
- 2017, *Google Economic And Social Impact New Zealand*, https://www.alphabeta.com/wp-content/uploads/2017/05/Google-Economic-and-Social-Impact_NZ_Mar2017.pdf (accessed 30 October 2018).
- ANAO (Australian National Audit Office) 2011, *Therapeutic Goods Regulation: Complementary Medicines*, Audit Report 3 of 2011-12, Australian Government, Canberra, <https://www.anao.gov.au/sites/default/files/201112%20Audit%20Report%20No%203.pdf> (accessed 4 January 2019).
- 2015, *Administration of the Imported Food Inspection Scheme*, Audit Report 49 of 2014–2015, Australian Government, Canberra, <https://www.anao.gov.au/work/performance-audit/administration-imported-food-inspection-scheme> (accessed 10 November 2018).
- (Australian National Audit Office) 2017, *Australian Government Procurement Contract Reporting*, Information report 19 of 2017-18, 5 December, Australian Government, Canberra, <https://www.anao.gov.au/work/information/australian-government-procurement-contract-reporting> (accessed 4 January 2019).

-
- Andrews, D., Criscuolo, C. and Gal, P. 2016, *The global productivity slowdown, technology divergence and public policy: a firm level perspective*, Brookings Institution Hutchins Center Working Paper, 24, https://www.brookings.edu/wp-content/uploads/2016/09/wp24_andrews-et-al_final.pdf (accessed 15 November 2018).
- , Nicoletti, G. and Timiliotis, C. 2018, *Digital technology diffusion — a matter of capabilities, incentives or both?*, OECD Economics Department Working Papers no. 846, 1476.
- ANZ (ANZ Bank) 2017, *Submission to the Inquiry into the Trade System and the Digital Economy*, <https://www.aph.gov.au/DocumentStore.ashx?id=7f463662-fd48-4595-af9a-1329bea2ca7c&subId=561688> (accessed 14 September 2018).
- APC (Australian Productivity Commission) 2009, *Restrictions on the parallel importation of books: Productivity Commission research report*, Australian Government, Melbourne, <https://www.pc.gov.au/inquiries/completed/books/report> (accessed 10 September 2018).
- 2013, *Regulator engagement with small business: research report*, Australian Government, Canberra, http://www.pc.gov.au/__data/assets/pdf_file/0007/128338/small-business.pdf (accessed 20 December 2018).
- 2016a, *Data Availability and Use: draft report*, Australian Government, Canberra, <https://www.pc.gov.au/inquiries/completed/data-access/thedraft/data-access-draft.pdf> (accessed 19 September 2018).
- 2016b, *Digital disruption: what do governments need to do?*, Australian Government, Canberra, <https://www.pc.gov.au/research/completed/digital-disruption/digital-disruption-research-paper.pdf> (accessed 2 November 2018).
- 2016c, *Intellectual property arrangements: inquiry report*, 78, Australian Government, Canberra, <https://www.pc.gov.au/inquiries/completed/intellectual-property/report> (accessed 12 April 2018).
- 2017a, *Data availability and use: inquiry report*, 82, Australian Government, Canberra, <https://www.pc.gov.au/inquiries/completed/data-access/report/data-access-overview.pdf> (accessed 30 October 2018).
- 2017b, *Regulation in the digital age*, Supporting Paper No. 5, Shifting the Dial: 5 Year Productivity Review, Australian Government, Canberra, <https://www.pc.gov.au/inquiries/completed/productivity-review/report/productivity-review-supporting13.pdf> (accessed 30 October 2018).

-
- 2017c, *Telecommunications universal service obligation: inquiry report*, 84, Australian Government, Canberra, <http://www.pc.gov.au/inquiries/completed/telecommunications/report> (accessed 25 October 2018).
- 2018a, *Competition in the Australian financial system: inquiry report*, 89, <https://www.pc.gov.au/inquiries/completed/financial-system/report/financial-system.pdf> (accessed 30 October 2018).
- 2018b, *Trade & Assistance Review 2016-17*, Australian Government, Canberra, <https://www.pc.gov.au/research/ongoing/trade-assistance/2016-17/trade-assistance-review-2016-17.pdf> (accessed 16 September 2018).
- and NZPC (Australian Productivity Commission and New Zealand Productivity Commission) 2012, *Strengthening Trans-Tasman Economic Relations: final joint study report*, Canberra/Wellington, <https://www.pc.gov.au/inquiries/completed/australia-new-zealand/report> (accessed 9 January 2018).
- APEC Policy Support Unit 2018, *Study on Single Window Systems' International Interoperability: Key Issues for Its Implementation*, Asia-Pacific Economic Cooperation, Singapore, <https://www.apec.org/-/media/APEC/Publications/2018/8/Study-on-Single-Windows-Systems/218PSUStudy-on-Single-Windows-Systems.pdf> (accessed 13 November 2018).
- ARCA (Australian Retail Credit Association) 2016, *Submission to the Productivity Commission Inquiry on Data Availability and Use*, https://www.pc.gov.au/__data/assets/pdf_file/0020/203555/sub087-data-access.pdf (accessed 30 October 2018).
- Archer, G. 2015, *Evolving citizen portals to enable digital government*, CIO, <https://www.cio.com.au/article/576766/evolving-citizen-portals-enable-digital-government/> (accessed 8 January 2019).
- van Ark, B. 2016, 'The productivity paradox of the new digital economy', *International Productivity Monitor*, vol. Fall 2016, no. 31, pp. 3–18.
- ASBFEO (Australian Small Business and Family Enterprise Ombudsman) 2017, *Payment Times and Practices Inquiry — Final Report*, Australian Government, Canberra, https://www.asbfeo.gov.au/sites/default/files/ASBFEO_Payment_Times_and_Practices%20Inquiry_Report.pdf (accessed 16 October 2018).
- ASEAN (Association of South-East Asian Nations) 2018, *About ASEAN Single Window*, ASEAN Single Window, <http://asw.asean.org/> (accessed 10 September 2018).

-
- ASIC (Australian Securities and Investments Commission) 2017a, *Lodging documents as a New Zealand company*, Australian Securities and Investments Commission, <https://asic.gov.au/for-business/registering-a-company/steps-to-register-a-company/foreign-companies/lodging-documents-as-a-new-zealand-company/> (accessed 18 January 2019).
- 2017b, *The FMA and ASIC confirm trans-Tasman collaborative approach to fintech*, <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2017-releases/17-350mr-the-fma-and-asic-confirm-trans-tasman-collaborative-approach-to-fintech/> (accessed 24 October 2018).
- 2018, *NZAU Connect App*, ASIC, <https://asic.gov.au/online-services/search-asics-registers/nzau-connect-app/> (accessed 2 November 2018).
- ATO and MBIE (Australian Taxation Office and Ministry of Business, Innovation and Employment (NZ)) 2018, *Early thinking: Operational governance for trans-Tasman e-Invoicing*, <https://treasury.gov.au/consultation/c2018-t331468/> (accessed 29 October 2018).
- ATO (Australian Taxation Office) 2018a, *How we use benchmarks*, Australian Taxation Office, <https://www.ato.gov.au/Business/Small-business-benchmarks/How-we-use-benchmarks/?default> (accessed 4 January 2019).
- 2018b, *The Trans-Tasman e-invoicing Interoperability Framework*, https://softwaredevelopers.ato.gov.au/sites/default/files/resource-attachments/The_Trans-Tasman_e-Invoicing_Interoperability_Framework.pdf (accessed 29 October 2018).
- 2018c, *Trans-Tasman e-Invoicing initiative*, <https://www.ato.gov.au/General/Gen/Trans---Tasman-eInvoicing-initiative/> (accessed 29 October 2018).
- Attorney-General of Australia 2012, *Privacy Amendment (Enhancing Privacy Protection) Bill 2012 — Explanatory Memorandum*, https://parlinfo.aph.gov.au/parlInfo/download/legislation/ems/r4813_ems_00948d06-092b-447e-9191-5706fdfa0728/upload_pdf/368711.pdf;fileType=application%2Fpdf#search=%22legislation/ems/r4813_ems_00948d06-092b-447e-9191-5706fdfa0728%22 (accessed 23 October 2018).
- Austrade (Australian Trade and Investment Commission) 2019a, *Guide to exporting*, Austrade, <https://www.austrade.gov.au/australian/export/guide-to-exporting> (accessed 4 January 2019).
- 2019b, *International Readiness Indicator*, Austrade, <https://www.austrade.gov.au/Australian/Export/Guide-to-exporting/International-Readiness-Indicator> (accessed 4 January 2019).

Australian Communications and Media Authority and ACMA 2018, *Review of the International Roaming Standard*,
<https://www.acma.gov.au/Home/theACMA/review-of-the-international-roaming-standard> (accessed 21 November 2018).

Australian Government and New Zealand Government 2014a, *Australia and New Zealand Government Procurement Agreement*, Australasian Procurement and Construction Council,
<http://www.apcc.gov.au/ALLAPCC/2014%20NOV%20ANZGPA%20Sep%202013%20WEB%20VERSION.pdf> (accessed 15 January 2019).

— and — 2014b, *Australia and New Zealand government response to the joint Productivity Commissions' report on economic integration*,
https://www.productivity.govt.nz/sites/default/files/govt-joint-response-trans-tasman-may14_0.pdf (accessed 18 January 2019).

Australian Treasury 2017, *Payment times and practices: Government response to the Australian Small Business and Family Enterprise Ombudsman Inquiry*, Australian Government, Canberra,
https://static.treasury.gov.au/uploads/sites/1/2017/11/Government_Response_-_Payment_Times.pdf (accessed 12 December 2018).

— 2018a, *Consumer Data Right*, 9 May, Canberra,
https://static.treasury.gov.au/uploads/sites/1/2018/05/t286983_consumer-data-right-booklet.pdf (accessed 16 January 2019).

— 2018b, *Government Response to Review into Open Banking*,
<https://treasury.gov.au/publication/p2018-t286983/> (accessed 7 January 2019).

Autor, D., Dorn, D., Katz, L.F., Patterson, C. and Van Reenen, J. 2017, *The Fall of the Labor Share and the Rise of Superstar Firms*, Working Paper, May, 23396, National Bureau of Economic Research,
<http://www.nber.org/papers/w23396> (accessed 15 November 2018).

BBC News 2001, *Napster settles Metallica lawsuit*, BBC News,
<http://news.bbc.co.uk/2/hi/entertainment/1436796.stm> (accessed 10 January 2019).

Black, J. and ESRC Centre for Analysis of Risk and Regulation 2002, *Critical reflections on regulation*, Centre for Analysis of Risk and Regulation, London School of Economics and Political Science, London,
<http://eprints.lse.ac.uk/35985/1/Disspaper4-1.pdf> (accessed 25 October 2018).

Bloom, N., Sadun, R. and Van Reenen, J. 2012, 'Americans Do IT Better: US Multinationals and the Productivity Miracle', *American Economic Review*, vol. 102, no. 1, pp. 167–201.

-
- Bloomer, D. 2017, *Tree climbing robots in forestry*, *LandWISE*, 8 April, <http://www.landwise.org.nz/automation/tree-climbing-robots-in-forestry/> (accessed 21 November 2018).
- Bork, R.H. 2012, *Antitrust and Google*, *Antitrust and Google*, 6 April, <https://www.hudson.org/research/8861-antitrust-and-google> (accessed 1 November 2018).
- Boulhol, H. and de Serres, A. 2008, *Have Developed Countries Escaped the Curse of Distance?*, OECD Economics Department Working Papers, 15 May, 610, https://www.oecd-ilibrary.org/economics/have-developed-countries-escaped-the-curse-of-distance_241705110254 (accessed 14 November 2018).
- Bruce, D. and Bruce, J. 2015, *Transformation Index Monitor: Baseline Report*, Australian Government Digital Transformation Office, Canberra, <https://www.dta.gov.au/files/DTO-Transformation-Index-Monitor-Baseline-Report.doc> (accessed 10 June 2018).
- Brynjolfsson, E. and Hitt, L.M. 2000, 'Beyond Computation: Information Technology, Organizational Transformation and Business Performance', *Journal of Economic Perspectives*, vol. 14, no. 4, pp. 23–48.
- and Oh, J. 2012, 'The attention economy: Measuring the value of free digital services on the internet', presented at International Conference on Information Systems, Orlando, pp. 3243–3261, <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1045&context=icis2012> (accessed 30 September 2018).
- , Rock, D. and Syverson, C. 2018, *The Productivity J-Curve: How Intangibles Complement General Purpose Technologies*, Working Paper, October, 25148, National Bureau of Economic Research, <http://www.nber.org/papers/w25148> (accessed 15 November 2018).
- Buckingham-Jones, S. 2018, 'Dockless scooters are coming but may push their luck with the law', *The Australian*, 11 July, <https://www.theaustralian.com.au/national-affairs/state-politics/dockless-scooters-are-coming-but-may-push-their-luck-with-the-law/news-story/a9f588609ec0c0688e93b2ea7d16a5d6> (accessed 9 June 2018).
- Bundeskartellamt 2016, *The market power of platforms and networks*, June, https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Berichte/Think-Tank-Bericht-Zusammenfassung.pdf?__blob=publicationFile&v=4 (accessed 2 November 2018).
- and Autorite de la concurrence 2016, *Competition law and data*, 10 May, <http://www.autoritedelaconcurrence.fr/doc/reportcompetitionlawanddatafinal.pdf> (accessed 2 November 2018).

-
- CAANZ (Consumer Affairs Australia and New Zealand) 2017, *Australian Consumer Law Review*, <http://apo.org.au/system/files/93116/apo-nid93116-240116.pdf> (accessed 5 December 2018).
- 2018, *Strategic Agenda 2018-2022*, <https://cdn.tspace.gov.au/uploads/sites/86/2018/11/FINAL-Strategic-Agenda-2018-2022.pdf> (accessed 5 December 2018).
- Castro, D. and McQuinn, A. 2014, *The Economic Cost of the European Union's Cookie Notification Policy*, 6 November, Information Technology and Innovation Foundation, <https://itif.org/publications/2014/11/06/economic-cost-european-unions-cookie-notification-policy> (accessed 18 December 2018).
- Chadwick, P. 2018, 'Should we forget about the "right to be forgotten"?', *The Guardian*, <https://www.theguardian.com/commentisfree/2018/mar/05/right-to-be-forgotten-google-europe-ecj-data-spain> (accessed 12 October 2018).
- CIO NZ (CIO New Zealand) 2018, *NZ Government opens digital procurement channel*, CIO, <https://www.cio.co.nz/article/645054/nz-government-opens-digital-procurement-channel/> (accessed 7 January 2019).
- Claessens, S., Frost, J., Turner, G. and Zhu, F. 2018, 'Fintech credit markets around the world: size, drivers and policy issues', *BIS Quarterly Review*, pp. 29–49.
- Cleary Gottlieb Steen & Hamilton LLP 2017, *Germany adjusts Antitrust Law to Digital Economy and proposes new Regulatory Agency*, 28 June, https://www.clearygottlieb.com/~media/organize-archive/cgsh/files/2017/publications/alert-memos/2017_06_28-germany-adjusts-arc.pdf (accessed 22 September 2018).
- Clodfelter, P. 2017, *Bill analysis: HB 1361*, Washington State House of Representatives Office of Program Research, Olympia, <http://lawfilesexternal.wa.gov/biennium/2017-18/Pdf/Bill%20Reports/House/1361%20HBA%20BFS%202017.pdf> (accessed 22 January 2019).
- Commerce Commission New Zealand 2007, *Credit card users get over \$24m back*, [https://comcom.govt.nz/news-and-media/media-releases/archive/credit-card-users-get-over-\\$24m-back](https://comcom.govt.nz/news-and-media/media-releases/archive/credit-card-users-get-over-$24m-back) (accessed 5 December 2018).
- 2018, *Consumer Issues 2017/18*, NZ Government, Wellington, https://comcom.govt.nz/__data/assets/pdf_file/0017/108161/Consumer-Issues-Report-2017-18.pdf (accessed 7 January 2019).

-
- Commerce Committee 2016, *Patents (Trans-Tasman Patent Attorneys and Other Matters) Amendment Bill*, 13 July, Parliament of New Zealand, Wellington, https://www.parliament.nz/resource/en-NZ/51DBSCH_SCR69593_1/1e1992af26049752cd0eceb3899d13770ac3af8e (accessed 21 November 2018).
- Connolly, E. and Bank, J. 2018, 'Access to Small Business Finance', *RBA Bulletin*, September, <https://www.rba.gov.au/publications/bulletin/2018/sep/access-to-small-business-finance.html> (accessed 7 January 2019).
- Conway, P. and New Zealand Productivity Commission 2016, *Achieving New Zealand's productivity potential*, NZ Government, Wellington, <https://www.productivity.govt.nz/research-paper/achieving-new-zealands-productivity-potential> (accessed 15 November 2018).
- Cook, H. 2018, 'Cafe of English exam fame to sue education body', *The Age*, 1 November, <https://www.theage.com.au/national/victoria/cafe-of-english-exam-fame-to-sue-education-body-20181101-p50de6.html> (accessed 21 November 2018).
- and Webb, C. 2018, 'A Melbourne cafe's nightmare after being in the VCE English exam', *The Age*, 31 October, <https://www.theage.com.au/national/victoria/it-was-weird-vce-exam-sitters-asked-to-analyse-rant-about-hipster-cafe-20181031-p50d4h.html> (accessed 21 November 2018).
- Corrigan, J.R., Alhabash, S., Rousu, M. and Cash, S.B. 2018, 'How much is social media worth? Estimating the value of Facebook by paying users to stop using it', *PLOS ONE*, vol. 13, no. 12, p. e0207101.
- Crampton, E., Ting-Edwards, J., Harvey, D., New Zealand Initiative and InternetNZ 2017, *Analog regulation, digital world*, <https://nzinitiative.org.nz/reports-and-media/reports/analog-regulation-digital-world/> (accessed 26 October 2018).
- Curran, C. 2017, *Digital Convergence Bill put on hold*, <https://www.beehive.govt.nz/release/digital-convergence-bill-put-hold> (accessed 29 October 2018).
- Dashfield, W. 2018, *Digital First Census 2018 — what went wrong?*, 20/20 Trust, <https://2020.org.nz/blog/2018/07/12/census-2018-what-went-wrong/> (accessed 3 January 2019).
- Data61 2018, *Consumer Data Standards*, <https://data61.csiro.au/en/Who-we-are/Our-programs/Consumer-Data-Standards> (accessed 31 October 2018).
- David, P.A. 1990, 'The dynamo and the computer: an historical perspective on the modern productivity paradox', *The American economic review*, vol. 80, no. 2, pp. 355–361.

DAWR (Department of Agriculture and Water Resources) 2016, *Submission to the Productivity Commission Inquiry on Data Availability and Use*, Australian Government, https://www.pc.gov.au/__data/assets/pdf_file/0006/202992/sub037-data-access.pdf (accessed 1 April 2019).

— 2018, *Next Export Documentation System (NEXDOC)*, Australian Government, <http://www.agriculture.gov.au:80/export/certification/nexdoc> (accessed 18 January 2019).

Deloitte Access Economics 2016, *Economic effects of ridesharing in Australia*, <https://www2.deloitte.com/content/dam/Deloitte/au/Documents/Economics/deloitte-au-economics-economic-effects-of-ridesharing-australia-150216.pdf> (accessed 14 November 2018).

— 2018, *Copyright in the digital age: an economic assessment of fair use in New Zealand*, Auckland, <https://www2.deloitte.com/content/dam/Deloitte/nz/Documents/Economics/dae-nz-copyright-fair-use-final.pdf> (accessed 2 November 2018).

Department of Conservation 2018, *Sign up for Great Walks bookings*, NZ Government, <https://www.doc.govt.nz/news/media-releases/2018/sign-up-for-great-walks-bookings/> (accessed 17 December 2018).

Department of Finance 2017, *Pay on time policy*, Australian Government, <https://www.finance.gov.au/resource-management/spending/pay-on-time-policy/> (accessed 7 January 2019).

— 2018, *Procurement: ClauseBank*, Australian Government, <https://www.finance.gov.au/procurement/clausebank/> (accessed 7 January 2019).

— 2019, *Procurement: Commonwealth Contracting Suite (CCS)*, Australian Government, <https://www.finance.gov.au/procurement/commonwealth-contracting-suite/> (accessed 21 January 2019).

Department of Finance and Administration and Ministry of Economic Development 2007, *Arrangements for facilitating trans-Tasman government institutional co-operation*, Australia and New Zealand School of Government, Melbourne, <https://www.anzsog.edu.au/resource-library/research/arrangements-for-facilitating-trans-tasman-government-institutional-co-operation> (accessed 24 October 2018).

DFAT (Department of Foreign Affairs and Trade) nd, *ANZCERTA – its genesis and the present*, Australian Government, <https://dfat.gov.au/trade/agreements/in-force/anzcerta/Pages/anzcerta-its-genesis-and-the-present.aspx> (accessed 23 October 2018a).

-
- nd, *Is your business experiencing export barriers to trade?*, Australian Government, <https://dfat.gov.au/trade/exporters-and-importers/Pages/report-trade-barriers-and-non-tariff-measures.aspx> (accessed 31 October 2018b).
- 2018a, *Composition of Trade Australia 2017*, July, <https://dfat.gov.au/about-us/publications/Documents/cot-cy-2017.pdf> (accessed 22 January 2019).
- 2018b, *Summary of negotiating aims and approach*, Australian Government, <https://dfat.gov.au/trade/agreements/negotiations/aeufta/Pages/summary-of-negotiating-aims-and-approach.aspx> (accessed 7 November 2018).
- 2018c, *The future of digital trade rules discussion paper*, Australian Government, Canberra, <https://dfat.gov.au/trade/services-and-digital-trade/Documents/the-future-of-digital-trade-rules-discussion-paper.pdf> (accessed 31 October 2018).
- 2018d, *Trade in Services Australia 2017*, August, Australian Government, Canberra, <https://dfat.gov.au/about-us/publications/Documents/trade-in-services-australia-2017.pdf> (accessed 22 January 2019).
- 2018e, *Trans-Pacific Partnership Agreement Chapter Summary: Electronic Commerce*, Australian Government, Canberra, <https://dfat.gov.au/trade/agreements/in-force/cptpp/summaries/Documents/electronic-commerce.PDF> (accessed 7 January 2019).
- DHA (Department of Home Affairs) 2018a, *Importing, exporting and manufacturing: prohibited goods*, Australian Government, <https://www.abf.gov.au/importing-exporting-and-manufacturing/prohibited-goods/list-of-items> (accessed 10 November 2018).
- 2018b, *Submission to the Inquiry into the trade system and the digital economy*, Australian Government, <https://www.aph.gov.au/DocumentStore.ashx?id=5924f59f-f364-4b0d-81fd-1064b5bfe7e7&subId=563262> (accessed 9 February 2018).
- DIA (Department of Internal Affairs) 2017, *Birth of a Child Life Event*, NZ Government, Wellington, <https://www.ict.govt.nz/programmes-and-initiatives/government-service-innovation/easier-access-to-government-services/birth-of-a-child-life-event/> (accessed 3 January 2019).
- Digital Journey 2016, *Assessment — Embark on your digital journey*, Digital Journey, <https://assessment.digitaljourney.nz/> (accessed 4 January 2019).
- DIIS and MBIE (Department of Industry, Innovation and Science (Australia) and Ministry of Business, Innovation and Employment (NZ)) 2017, *The Australia New Zealand Science, Research and Innovation Cooperation Agreement*, <https://science.gov.au/scienceGov/news/Pages/Science-and-innovation-treaty-creates-new-opportunities.aspx> (accessed 25 October 2018).

DOH (Department of Health) 2014, *Joint statement by Hon Peter Dutton MP, Minister for Health for Australia, and Hon Dr Jonathan Coleman, Minister of Health for New Zealand, regarding ANZTPA*, Australian Government, <http://www.health.gov.au/internet/ministers/publishing.nsf/Content/health-mediarel-yr2014-dutton100.htm> (accessed 26 October 2018).

DPMC (Department of the Prime Minister and Cabinet) 2016, *Australia's first Open Government National Action Plan 2016–18: 2.1 — Release high-value datasets and enable data driven innovation*, Australian Government, <https://ogpau.pmc.gov.au/australias-first-open-government-national-action-plan-2016-18/commitments/ii-open-data-and-digital-0> (accessed 10 September 2018).

— 2018a, *Australian Digital Council Communiqué*, Australian Government, <https://www.pmc.gov.au/sites/default/files/publications/aust-digital-council-communicue-140918.pdf> (accessed 10 January 2019).

— 2018b, *New Australian Government Data Sharing and Release Legislation: Issues paper for consultation*, Australian Government, <https://www.pmc.gov.au/resource-centre/public-data/issues-paper-data-sharing-release-legislation> (accessed 30 October 2018).

— 2018c, *The Australian Government's response to the Productivity Commission Data Availability and Use Inquiry*, Australian Government, Canberra, <https://dataavailability.pmc.gov.au/sites/default/files/govt-response-pc-dau-inquiry.pdf> (accessed 16 November 2018).

DTA (Digital Transformation Agency) nd, *Digital identity*, <https://www.dta.gov.au/our-projects/digital-identity> (accessed 5 December 2018).

— 2018a, *Budget 2018-19 for the DTA*, Australian Government, <https://www.dta.gov.au/news/budget-2018-19-dta> (accessed 6 December 2018).

— 2018b, *Digital Marketplace Insights: December 2018*, Australian Government, Canberra, <http://marketplace1.zendesk.com/hc/en-gb/articles/360000141616-Digital-Marketplace-Insights-December-2018> (accessed 8 January 2019).

Duch-Brown, N., Martens, B. and Mueller-Langer, F. 2017, 'The Economics of Ownership, Access and Trade in Digital Data', *SSRN Electronic Journal*, <https://www.ssrn.com/abstract=2914144> (accessed 24 October 2018).

Earnshaw, A. 2018, *Marketplace launches*, Digital.govt.nz, <https://www.digital.govt.nz/blog/marketplace-launches/> (accessed 7 January 2019).

-
- ECA (Export Council of Australia) 2018a, *From resource boom to digital boom: Capturing Australia's digital trade opportunity at home and abroad*, Sydney, <https://www.export.org.au/publications/from-resource-boom-to-digital-boom-capturing-australias-digital-trade-opportunity-at-home-and-abroad> (accessed 31 October 2018).
- 2018b, *Trade policy recommendations — Increasing SME participation in international trade*, TPR #5, Sydney, <https://www.export.org.au/publications/trade-policy-recommendations-5-0-2018> (accessed 8 August 2018).
- Edwards, J. 2016, 'Privacy in the digital world', <https://www.privacy.org.nz/assets/Uploads/EMA-Supertech-speech-17-March-2016.pdf> (accessed 20 December 2018).
- Ejsmont, A. 2017, 'Cooperation and competition as tools which could improve leading startups all over the world', *European Journal of Social Sciences Education and Research*, vol. 11, no. 2, pp. 228–237.
- Electricity Authority 2018, *Access to consumption and tariff information*, NZ Government, <https://www.ea.govt.nz/operations/retail/retailers/access-to-consumption-data/> (accessed 30 October 2018).
- Equitise 2014, *About Equitise*, Equitise, <https://equitise.com/about-us> (accessed 7 January 2019).
- European Commission 2015, *Antitrust: Commission sends Statement of Objections to Google on comparison shopping service*, http://europa.eu/rapid/press-release_MEMO-15-4781_en.htm (accessed 3 December 2018).
- 2018, *eIDAS for SMEs*, <https://ec.europa.eu/digital-single-market/en/eidas-smes> (accessed 21 November 2018).
- Evans, P.C. and Gawer, A. 2016, *The rise of the platform enterprise: a global survey*, No.1, The emerging platform economy series, The Center for Global Enterprise, New York, https://www.thecge.net/app/uploads/2016/01/PDF-WEB-Platform-Survey_01_12.pdf (accessed 7 January 2019).
- Every-Palmer QC, J. 2018, *Regulation of new technology: institutions and processes*, New Zealand Law Foundation, Wellington, <https://ep.nz/s/Regulation-of-new-technology-study-280318-final-bynr.pdf> (accessed 9 September 2018).
- EY (Ernst & Young Global Limited) 2017, *EY FinTech Australia Census 2017*, <https://fintechauscensus.ey.com/> (accessed 31 October 2018).
- 2018, *EY FinTech Australia Census 2018*, <https://fintechauscensus.ey.com/2018/Documents/EY%20FinTech%20Australia%20Census%202018.pdf> (accessed 5 December 2018).

-
- Fafoi, K. 2018, *Speech to Payments NZ Conference 26 June*, <https://www.beehive.govt.nz/speech/speech-payments-nz-conference-26-june> (accessed 23 October 2018).
- Farrell, S. 2017, *Review into open banking: giving customers choice, convenience and confidence — final report*, Commissioned by the Treasury, Australian Government, Canberra, https://static.treasury.gov.au/uploads/sites/1/2018/02/Review-into-Open-Banking-_For-web-1.pdf (accessed 10 March 2018).
- Federico, G., Langus, G. and Valletti, T. 2018, 'Horizontal mergers and product innovation', *International Journal of Industrial Organization*, vol. 59, pp. 1–23.
- Fernald, J.G. 2016, 'Reassessing Longer-Run U.S. Growth: How Low?', *Federal Reserve Bank of San Francisco*, no. 2016–18, pp. 01–25.
- Ferracane, M.F., Lee-Makiyama, H. and van der Marel, E. 2018, *Digital trade restrictiveness index*, European Centre for International Political Economy, Brussels, <http://globalgovernanceprogramme.eui.eu/wp-content/uploads/2018/09/DTRI-final.pdf> (accessed 1 March 2019).
- Forster, S. 2018, 'In which Amazon goes to war with New Zealand bookstores', *The Spinoff*, <https://thespinoff.co.nz/books/04-12-2018/in-which-amazon-goes-to-war-with-new-zealand-bookstores/> (accessed 5 December 2018).
- Friedman, T.L. 2005, *The world is flat: a brief history of the twenty-first century*, 1st ed, Farrar, Straus and Giroux, New York.
- Frost & Sullivan 2018, *The Global State of Online Digital Trust*, White Paper, Santa Clara, CA, <https://www.ca.com/content/dam/ca/us/files/white-paper/the-global-state-of-online-digital-trust.pdf> (accessed 10 September 2018).
- Gali, J., Gretton, P. and Parham, D. 2004, 'The Effects of ICTs and Complementary Innovations on Australian Productivity Growth', *The Economic Impact of ICT*, OECD Publishing, pp. 105–130, https://www.oecd-ilibrary.org/economics/the-economic-impact-of-ict/the-effects-of-icts-and-complementary-innovations-on-australian-productivity-growth_9789264026780-7-en (accessed 20 December 2018).
- GELN (Global Economic Law Network) 2018, *Submission to the Inquiry into the Trade System and the Digital Economy*, University of Melbourne Law School, <https://www.aph.gov.au/DocumentStore.ashx?id=2ac77c43-3e28-4ece-aac2-dd9dd1c6f67e&subId=564496> (accessed 1 November 2018).
- Gershon, P. 2008, *Review of the Australian government's use of information and communication technology*, Australian Government Information Management Office, Canberra, <https://www.finance.gov.au/sites/default/files/Review-of-the-Australian-Governments-Use-of-Information-and-Communication-Technology.pdf> (accessed 20 December 2018).

-
- Glass, H., Davies, P., Hefter, E. and Blick, G. 2014, *The value of internet services to New Zealand businesses*, Sapere Research Group, <http://www.srgexpert.com/publications/our-people-publicat-514/> (accessed 21 December 2018).
- Goldfarb, A. and Tucker, C.E. 2012, 'Privacy and Innovation', *Innovation Policy and the Economy*, vol. 12, pp. 65–90.
- Gonzalez, L. and Ferencz, J. 2018, *Digital trade and market openness*, 217, OECD Trade Policy Papers, OECD Publishing, https://www.oecd-ilibrary.org/trade/digital-trade-and-market-openness_1bd89c9a-en (accessed 29 October 2018).
- Gordon, R. 2016, 'Off Its Pinnacle', *Finance & Development*, vol. 53, no. 2, <https://www.imf.org/external/pubs/ft/fandd/2016/06/gordon.htm> (accessed 19 October 2018).
- Greenland, J. 2016, *Privacy Week 2016 — A 'right to be forgotten'?*, New Zealand Law Society, 12 May, <https://www.lawsociety.org.nz/news-and-communications/latest-news/news/privacy-week-2016-a-right-to-be-forgotten2> (accessed 12 October 2018).
- Grelf, B. 2018, 'Study: Google is the biggest beneficiary of the GDPR', *Cliqz*, <https://cliqz.com/en/magazine/study-google-is-the-biggest-beneficiary-of-the-gdpr> (accessed 19 October 2018).
- Grundke, R., Marcolin, L., Nguyen, T.L.B. and Squicciarini, M. 2018, 'Which skills for the digital era?', http://jobsanddevelopmentconference.org/wp-content/uploads/2018/05/lmarcolin_s6r301.pdf (accessed 7 January 2019).
- Gulliver, P., Fanslow, J.L., Jonas, M., McIntosh, T., Waayer, D., Beck, G., Lawson, A. and Flanagan, M. 2016, 'Surveys, social licence and the IDI: a collaborative project between the University of Auckland and Statistics New Zealand', Auckland, <https://nzfvc.org.nz/sites/nzfvc.org.nz/files/surveys-social-licence-and-IDI-presentation-7-12-2016.pdf> (accessed 3 January 2019).
- Guttentag, D. 2017, 'Regulating Innovation in the Collaborative Economy: An Examination of Airbnb's Early Legal Issues', in Dredge, D. and Gyimóthy, S. (eds), *Collaborative Economy and Tourism*, Springer, Cham, pp. 97–128, http://link.springer.com/10.1007/978-3-319-51799-5_7 (accessed 31 October 2018).
- Hansen, H. 2018, *Germany plans 3 billion in AI investment: government paper*, <https://www.reuters.com/article/us-germany-intelligence/germany-plans-3-billion-in-ai-investment-government-paper-idUSKCN1NI1AP> (accessed 10 January 2019).

-
- Hanson, F. 2018, *Preventing another Australia Card fail: unlocking the potential of digital identity*, Australian Strategic Policy Institute, Canberra, <https://www.aspi.org.au/report/preventing-another-australia-card-fail> (accessed 1 February 2019).
- Harvie, W. 2018, 'Robots are coming to NZ forests', *Stuff*, 19 March, <https://www.stuff.co.nz/science/102182695/robots-are-coming-to-nz-forests> (accessed 21 November 2018).
- Head, B. 2017, *Australian government technology suffers failure after failure*, ComputerWeekly.com, <https://www.computerweekly.com/news/450410982/Australian-government-technology-suffers-failure-after-failure> (accessed 3 January 2019).
- HM Treasury 2018, *Budget 2018 — Digital Services Tax*, UK Government, London, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752172/DST_web.pdf (accessed 15 January 2019).
- HoustonKemp 2018, *Facilitating access to consumer electricity data: a draft report for the Department of the Environment and Energy*, Council of Australian Governments, Canberra, <http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Facilitating%20Access%20to%20Consumer%20Energy%20Data%20-%20Consultation%20Paper.pdf> (accessed 30 October 2018).
- HSCCA (House Standing Committee on Communications and the Arts) 2017, *Inquiry into the Australian film and television industry: Report*, Parliament of Australia, Canberra, https://www.aph.gov.au/Parliamentary_Business/Committees/House/Communications/AustralianfilmandTV/Report (accessed 5 December 2018).
- HSCIC (House Standing Committee on Infrastructure and Communications) 2013, *At what cost?: IT pricing and the Australia tax*, Parliament of Australia, Canberra, <http://apo.org.au/research/what-cost-it-pricing-and-australia-tax> (accessed 13 November 2018).
- Hutching, G. 2018, 'Forestry not agriculture is NZ's most dangerous job', *Stuff*, 19 August, <https://www.stuff.co.nz/business/farming/106306235/forestry-not-agriculture-is-nzs-most-dangerous-job>; (accessed 21 November 2018).
- Iles, J. 2018, *New database highlights effects on late payments on small business growth*, *Stuff*, <https://www.stuff.co.nz/business/103795744/new-database-highlights-effects-on-late-payments-on-small-business-growth> (accessed 7 January 2019).
- IMF (International Monetary Fund) 2018, *Measuring the Digital Economy*, IMF Policy Papers.

-
- Infrastructure Partnerships Australia 2019, *About ANZIP*, Australia & New Zealand Infrastructure Pipeline, <https://infrastructurepipeline.org/> (accessed 21 January 2019).
- InternetNZ 2018, *Getting copyright right in the information age: an InternetNZ position paper*, https://internetnz.nz/sites/default/files/Getting_copyright_right_in_the_information_age.pdf (accessed 30 October 2018).
- JSCTIG (Joint Standing Committee on Trade and Investment Growth) 2018, *Trade and the digital economy*, Parliament of Australia, Canberra, <https://www.aph.gov.au/~media/02%20Parliamentary%20Business/24%20Committees/244%20Joint%20Committees/JSCTIG/Digital%20economy/Financial%20Report.pdf?la=en> (accessed 2 November 2018).
- Khan, L.M. 2016, 'Amazon's antitrust paradox', *The Yale Law Journal*, vol. 126, no. 3, pp. 710–805.
- King, S. 2018, *Have 'big tech' platforms got too much power? Australian Financial Review Innovation Summit 2018*, <https://www.pc.gov.au/news-media/speeches/big-tech-power/big-tech-power.pdf> (accessed 24 October 2018).
- Koob, S.F. 2018, "No thought": EPA boss slams oBike rollout amid new crackdown', *The Age*, 30 May, <https://www.theage.com.au/melbourne-news/no-thought-epa-boss-slams-obike-rollout-amid-new-crackdown-20180530-p4zied.html> (accessed 9 October 2018).
- Macdonald, N. 2015, 'Is censorship dead in the digital age?', *Stuff*, 3 March, <https://www.stuff.co.nz/entertainment/film/66872326/is-censorship-dead-in-the-digital-age> (accessed 29 October 2018).
- Malbon, J. 2013, 'Online cross-border consumer transactions: a proposal for developing fair standard form contract terms', *University of Western Australia Law Review*, vol. 37, pp. 20–44.
- MBIE (Ministry of Business, Innovation and Employment) nd, *How Business Connect works*, NZ Government, <https://www.mbie.govt.nz/business-and-employment/business/support-for-business/better-for-business/business-connect/how-business-connect-works/> (accessed 14 December 2018).
- 2017a, *Briefing to the incoming Minister of Commerce and Consumer Affairs*, NZ Government, <https://www.mbie.govt.nz/about/who-we-are/our-publications/briefings-to-incoming-ministers/2017-bims/commerce-consumer-affairs.pdf> (accessed 2 November 2018).
- 2017b, *Business Information and Communication Technology (ICT) use and productivity growth in New Zealand*, NZ Government, <https://www.mbie.govt.nz/dmsdocument/3338-business-ict-use-and-productivity-growth-pdf> (accessed 21 December 2018).

-
- 2017c, *New tool takes businesses on digital readiness journey*, NZ Government, <https://www.business.govt.nz/news/new-tool-for-digital-readiness/> (accessed 4 January 2019).
- 2018a, *Achieving greater societal value from procurement spend*, NZ Government, <https://www.procurement.govt.nz/about-us/news/achieving-greater-societal-value-from-procurement-spend/> (accessed 7 January 2019).
- 2018b, *Better for Business: Business Connect Pitch Presentation*, NZ Government.
- (Ministry of Business, Innovation and Employment) 2018c, *Telecommunications (New Regulatory Framework) Amendment Bill: departmental report to the Economic Development, Science and Innovation Committee*, 20 April, Parliament of New Zealand, https://www.parliament.nz/resource/en-NZ/52SCED_ADV_74818_1178/915356ed60c1887e0a97662f0ce1d35e49bcd4e9 (accessed 17 January 2019).
- (Ministry of Business, Innovation and Employment) 2019, *Procurement: Templates*, NZ Government, <https://www.procurement.govt.nz/procurement/templates/> (accessed 7 January 2019).
- McLean, A. 2018, *NZ to perform urgent algorithm 'stocktake' fearing data misuse within government*, ZDNet, <https://www.zdnet.com/article/nz-to-perform-urgent-algorithm-stocktake-fearing-data-misuse-within-government/> (accessed 4 January 2019).
- Meehan, L. and Zheng, G. 2015, *Firm dynamics and job creation in New Zealand: A perpetual motion machine*, <https://www.productivity.govt.nz/working-paper/firm-dynamics-and-job-creation-in-new-zealand-a-perpetual-motion-machine> (accessed 14 January 2019).
- MFAT (Ministry of Foreign Affairs and Trade) 2018, *New Zealand-EU free trade agreement — What we are negotiating*, NZ Government, <https://www.mfat.govt.nz/assets/FTAs-in-negotiations/EU-FTA/Information-package/New-Zealand-and-EU-approaches-to-electronic-commerce.pdf> (accessed 7 November 2018).
- Miller, A.R. and Tucker, C.E. 2009, 'Privacy Protection and Technology Diffusion: The Case of Electronic Medical Records', *Management Science*, vol. 55, no. 7, pp. 1077–1093.
- and — 2011, 'Can Health Care Information Technology Save Babies?', *Journal of Political Economy*, vol. 119, no. 2, pp. 289–324.
- Minifie, J. and Blowers, D. 2016, *Peer-To-Peer Pressure: Policy for the Sharing Economy*, Grattan Institute, Melbourne, <https://grattan.edu.au/wp-content/uploads/2016/04/871-Peer-to-peer-pressure.pdf> (accessed 4 November 2018).

-
- Ministry for Culture and Heritage 2015, *Content regulation in a converged world*, NZ Government, <https://mch.govt.nz/sites/default/files/Content-Regulation-in-a-Converged-World-Discussion-Document-2015-08-25.pdf> (accessed 29 October 2018).
- Nadkarni, A. 2018, 'Commerce Commission taking online ticket resale website Viagogo to court', *Stuff*, 15 August, <https://www.stuff.co.nz/business/106282337/commerce-commission-taking-online-ticket-resale-website-viagogo-to-court> (accessed 17 January 2019).
- Nash, S. 2018, 'Speech to the SME LEAP Summit, Auckland', <http://www.beehive.govt.nz/speech/sme-leap-summit-auckland> (accessed 8 January 2019).
- National Transport Commission 2016, *Regulatory options for automated vehicles: Annex. NTC analysis of legislation in Australia*, Australian Government, Melbourne, [https://www.ntc.gov.au/Media/Reports/\(264DF9EA-6247-42C9-8D07-F39E76E95258\).pdf](https://www.ntc.gov.au/Media/Reports/(264DF9EA-6247-42C9-8D07-F39E76E95258).pdf) (accessed 13 November 2018).
- New Zealand Privacy Commissioner 2012, *Strengthening Economic Relations between Australia and New Zealand – consumer credit reporting: submission to the Productivity Commissions joint study*, NZ Government, <https://www.pc.gov.au/inquiries/completed/australia-new-zealand/submissions/submissions-test/submission-counter/sub016-transtasman-review.pdf> (accessed 30 October 2018).
- 2018a, *Comprehensive Credit Reporting Six Years On*, Review of the operation of Amendments No. 4 and No. 5 to the Credit Reporting Privacy Code, NZ Government, Wellington, <https://www.privacy.org.nz/news-and-publications/statements-media-releases/comprehensive-credit-reporting-not-fully-delivering-for-new-zealanders-privacy-commissioner/> (accessed 23 October 2018).
- 2018b, *Review of statutory authorities for information matching*, NZ Government, Wellington, <https://www.privacy.org.nz/assets/Files/Data-matching-Inform.-matching/Section-106-report-on-unused-information-matching-provisions-September-2018.pdf> (accessed 31 October 2018).
- Norberg, P.A., Horne, D.R. and Horne, D.A. 2007, 'The Privacy Paradox: Personal Information Disclosure Intentions versus Behaviors', *Journal of Consumer Affairs*, vol. 41, no. 1, pp. 100–126.
- NSW State Archives & Records 2016, *Land records available at NSW State Archives*, NSW State Archives & Records, <https://www.records.nsw.gov.au/archives/collections-and-research/guides-and-indexes/land-records-available-state-records> (accessed 21 January 2019).
- NSWLRS (NSW Land Registry Services) 2018, *Access titling information*, NSW Land Registry Services, http://www.nswlrs.com.au/land_titles/access_titling_info (accessed 20 November 2018).

-
- NZ Customs Service nd, *Non-tariff barriers*, <https://www.customs.govt.nz/business/tariffs/non-tariff-barriers/> (accessed 31 October 2018).
- NZ Government 2018, *Digital Government Partnership*, Digital.govt.nz, <https://www.digital.govt.nz/digital-government/leadership-and-governance/digital-government-partnership/> (accessed 3 January 2019).
- NZCO (New Zealand Companies Office) 2019, *How overseas companies set up as an NZ business*, NZ Companies Register, <https://companies-register.companiesoffice.govt.nz/help-centre/starting-a-company/how-overseas-companies-set-up-as-an-nz-business/> (accessed 18 January 2019).
- NZCS (NZ Customs Service) 2017, *Prohibitions and restrictions*, New Zealand Customs Service, <https://www.customs.govt.nz/business/export/prohibitions-and-restrictions/> (accessed 2 November 2018).
- 2018, *Fact Sheet #34: Secure Exports Scheme*, NZ Government, <https://www.customs.govt.nz/globalassets/documents/fact-sheets/fact-sheet-34-secure-exports-scheme.pdf> (accessed 5 January 2019).
- NZIER (New Zealand Institute of Economic Research) 2017, *The economic contribution of the screen industry*, https://nzier.org.nz/static/media/filer_public/d4/39/d439d26b-b775-4548-8c18-3f7d902c6039/nzier_screen_industry_study_november_2017.pdf (accessed 20 December 2018).
- NZPC (New Zealand Productivity Commission) 2014a, *Boosting productivity in the services sector: final report*, NZ Government, Wellington, <https://www.productivity.govt.nz/sites/default/files/services-inquiry-final-report.pdf> (accessed 23 September 2018).
- 2014b, *Regulatory institutions and practices: final report*, NZ Government, Wellington, <https://www.productivity.govt.nz/sites/default/files/regulatory-institutions-and-practices-final-report.pdf> (accessed 21 September 2018).
- 2015, *More effective social services: final report*, <http://www.productivity.govt.nz/sites/default/files/social-services-final-report-main.pdf> (accessed 30 October 2018).
- NZTech 2016, *From tech sector to digital nation: an analysis of the impact of the tech sector and technology on the New Zealand economy*, New Zealand Technology Industry Association, Auckland, <https://nztech.org.nz/wp-content/uploads/2014/10/from-tech-sector-to-digital-nation-2nd-edition-ebook.compressed.pdf> (accessed 10 June 2018).
- OECD (Organisation for Economic Co-operation and Development) 2017a, *Financing SMEs and Entrepreneurs 2017 — An OECD Scoreboard*, OECD Publishing, Paris, <http://www.oecd.org/employment/financing-smes-and-entrepreneurs-23065265.htm> (accessed 15 November 2018).

-
- 2017b, *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264268821-en> (accessed 7 January 2019).
- 2018a, *Consumer protection enforcement in a global digital marketplace*, OECD Digital Economy Papers, https://www.oecd-ilibrary.org/science-and-technology/consumer-protection-enforcement-in-a-global-digital-marketplace_f041eead-en;jsessionid=Q7Mn9wbHqXEWesW3tIUTJv6X.ip-10-240-5-179 (accessed 17 December 2018).
- 2018b, *Tax challenges arising from digitalisation — interim report 2018: inclusive framework on BEPS*, OECD/G20 base erosion and profit shifting project, OECD Publishing, Paris.
- Office of the Minister of Consumer Affairs 2010, *Consumer Law Reform: Paper for Cabinet Economic Growth and Infrastructure Committee*, NZ Government, <https://www.mbie.govt.nz/assets/7d1859ef73/clr-cabinet-paper-1.pdf> (accessed 17 January 2019).
- OFLC (Office of Film and Literature Classification) 2015, *Balancing freedom of expression with public safety in a digital age*, NZ Government, Wellington, <https://www.classificationoffice.govt.nz/assets/PDFs/submission-on-convergence-green-paper.pdf> (accessed 29 October 2018).
- Payments NZ 2016, *Benchmarking New Zealand's payment systems*, <https://www.paymentsnz.co.nz/resources/articles/benchmarking-new-zealands-payment-systems/> (accessed 31 October 2018).
- 2018a, *API framework workstream*, <https://www.paymentsnz.co.nz/our-work/payments-direction/api-framework-workstream/> (accessed 31 October 2018).
- 2018b, *FAQs — API framework*, <https://www.paymentsnz.co.nz/our-work/payments-direction/faqs-api-framework/> (accessed 31 October 2018).
- Pilat, D. 2004, 'The ICT productivity paradox: insights from micro data', *OECD Economic Studies*, vol. 38, 2004/1, pp. 37–65.
- Pojani, D. and Corcoran, J. 2018, *On no, OBikes are leaving Melbourne! But this doesn't mean bike sharing schemes are dead*, *The Conversation*, 14 June, <https://theconversation.com/oh-no-obikes-are-leaving-melbourne-but-this-doesnt-mean-bike-sharing-schemes-are-dead-98236> (accessed 10 November 2018).
- Poole, A. and Reese, M. 2015, *Doing business in NZ: starting up a business*, Lexology, <https://www.lexology.com/library/detail.aspx?g=fa569890-7b2e-477c-8c0e-050b54691361> (accessed 18 January 2019).
- Pullar-Strecker, T. 2016, *Only one in nine invoices from small businesses being paid on time, says Xero*, Stuff, <https://www.stuff.co.nz/business/industries/78026874/only-one-in-nine-invoices-from-small-businesses-being-paid-on-time-says-xero> (accessed 7 January 2019).

-
- 2018, *Late payments hurt NZ businesses, and weigh on NZ economy*, Stuff, <https://www.stuff.co.nz/business/industries/100658223/retrograde-payment-culture-a-drag-on-economy> (accessed 7 January 2019).
- PwC 2018, *Open Banking 101*, <https://www.pwc.com.au/banking-capital-markets/banking-matters-hot-topic-open-banking-101.pdf> (accessed 17 December 2018).
- , Australian Chamber of Commerce and Industry and Port of Brisbane 2018, *Proof of Concept for a National Trade Community System*, Brisbane, Australia.
- Quah, D. 2003, *Digital goods and the new economy*, Discussion paper, 563, Centre for Economic Performance, London School of Economics and Political Science, London, http://eprints.lse.ac.uk/2236/1/Digital_Goods_and_the_New_Economy.pdf (accessed 29 October 2018).
- RBNZ (Reserve Bank of New Zealand) 2018, *An open mind on open banking*, <https://www.rbnz.govt.nz/financial-stability/financial-stability-report/fsr-may-2018/an-open-mind-on-open-banking> (accessed 31 October 2018).
- Ritchie, F. 2014, *Resistance to change in government: risk, inertia and incentives*, 1412, Economics Working Paper Series, University of the West of England, Bristol, <https://www2.uwe.ac.uk/faculties/BBS/BUS/Research/Economics%20Papers%202014/1412.pdf> (accessed 31 October 2018).
- RMIT and TRPC 2016, *APEC Fintech E-payment Readiness Index*, https://www.rmit.edu.au/content/dam/rmit/documents/college-of-business/industry/apec/APEC_Fintech_E-payment_Readiness_Index_2016.pdf (accessed 31 October 2018).
- Robertson, G. 2018, *Fiscal Strategy Report: Foundations for the Future*, 17 May, Budget 2018, New Zealand Treasury, Wellington, <https://treasury.govt.nz/sites/default/files/2018-05/b18-fsr.pdf> (accessed 23 January 2019).
- Robotics Plus 2018, *Our work*, <http://www.roboticsplus.co.nz/our-work> (accessed 21 November 2018).
- SBDG (Small Business Development Group) 2016, *Small and Medium Businesses in New Zealand: Report of the Small Business Development Group*, NZ Government, Wellington, <https://www.mbie.govt.nz/assets/90fcb52f9f/small-business-development-group-2016-report.pdf> (accessed 12 November 2018).
- SBDT (Small Business Digital Taskforce) 2018, *Report to Government*, March, Australian Government, Canberra, <https://archive.industry.gov.au/smallbusiness/Documents/Small-Business-Digital-Taskforce-Report-to-Government.pdf> (accessed 9 February 2018).

-
- SCFADT (Joint Standing Committee on Foreign Affairs Defence and Trade, Trade Sub-Committee) 2006, *Review of Australia-New Zealand Trade and Investment Relations: Report*, Parliament of Australia, Canberra, https://www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=jfadt/nz_cer/report/finalreport.pdf (accessed 20 December 2018).
- Schäfer, M. 2018, 'The fourth industrial revolution: How the EU can lead it', *European View*, vol. 17, no. 1, pp. 5–12.
- Schwab, K. 2016, *The fourth industrial revolution*, First U.S. edition, Crown Business, New York.
- Schwartz, A.A. 2018, 'The Gatekeepers of Crowdfunding', *Washington and Lee Law Review*, vol. 75, no. 2, pp. 885–955.
- Selling to Government 2019, *Identifying opportunities to sell to government*, Department of Finance, Australian Government, <https://sellingtogov.finance.gov.au/guide/identifying-opportunities-to-sell-to-government> (accessed 7 January 2019).
- Shapiro, C. and Varian, H.R. 1999, *Information rules: a strategic guide to the network economy*, Harvard Business School Press, Boston, Mass, <http://ntst-aegean.teipir.gr/sites/default/files/forum/information-rules.pdf> (accessed 1 March 2019).
- SIL (Service Innovation Lab) 2017, *Government as a Platform – The Value Proposition*, Discussion Paper, Department of Internal Affairs, NZ Government, Wellington, <https://www.digital.govt.nz/assets/Uploads/Government-as-a-Platform-value-proposition-Final.pdf> (accessed 20 October 2018).
- Sims, A., Kariyawasam, K. and Mayes, D. 2018, *Regulating Cryptocurrencies in New Zealand*, New Zealand Law Foundation, Wellington, https://www.lawfoundation.org.nz/wp-content/uploads/2018/10/2016_ILP_Sims-et-al-ILAPP-Cryptocurrencies-Final-Research-Report-Oct-2018.pdf (accessed 26 October 2018).
- Sipe, N. and Pojani, D. 2018, *Can e-scooters solve the 'last mile' problem? They'll need to avoid the fate of dockless bikes*, *The Conversation*, 21 September, <https://theconversation.com/can-e-scooters-solve-the-last-mile-problem-theyll-need-to-avoid-the-fate-of-dockless-bikes-102633> (accessed 10 November 2018).
- Skala, A. 2019, 'Characteristics of Startups', *Digital Startups in Transition Economies*, Springer International Publishing, Cham, pp. 41–91, http://link.springer.com/10.1007/978-3-030-01500-8_2 (accessed 17 January 2019).

-
- Skene, D. 2017, *Exploring firm responses to the question of FTA benefits*, Austrade, <http://www.austrade.gov.au/News/Economic-analysis/exploring-firm-responses-to-the-question-of-fta-benefits/> (accessed 8 January 2019).
- Solow, R.M. 1987, 'We'd better watch out', *The New York Times Book Review*, p. 36.
- Southern Phone 2018, *How Agricultural Robots Could Be Essential to Australia's Farming Future*, *Southern Phone*, <https://www.southernphone.com.au/Blog/2018/Feb/agricultural-robots-australia-farming-future> (accessed 21 November 2018).
- Spokle nd, *Spokle App*, <http://www.spokle.com.au/> (accessed 31 October 2018).
- SSC (State Services Commission) 2018, *Better Public Services 2012-2017*, NZ Government, <http://www.ssc.govt.nz/bps-interaction-with-govt> (accessed 3 January 2019).
- SSCFPA (Senate Standing Committee on Finance and Public Affairs) 2018, *Inquiry into the Digital Delivery of Government Services: Report*, Parliament of Australia, Canberra, https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Finance_and_Public_Administration/digitaldelivery/Report (accessed 2 November 2018).
- Standards Australia 2012, *Standards Australia's submission to the Productivity Commissions of Australia and New Zealand, Issues Paper: Impacts and Benefits of Further Economic Integration*, <https://www.pc.gov.au/inquiries/completed/australia-new-zealand/submissions/submissions-test/submission-counter/sub044-transtasman-review.pdf> (accessed 31 October 2018).
- 2017, *2017 Annual Review*, Sydney, <http://www.standards.org.au/getmedia/6b2666b1-c1eb-4b85-9d82-bac48ed6d2a2/Annual-Review-2017.pdf.aspx> (accessed 29 October 2018).
- Standards New Zealand 2012, *Standards New Zealand's submission to the Productivity Commissions of Australia and New Zealand Issues paper: Impacts and Benefits of Further Economic Integration*, <https://www.productivity.govt.nz/sites/default/files/Trans-Tasman%20issues%20paper.pdf> (accessed 9 June 2018).
- Stats NZ 2016, *Business Operations Survey: 2015*, http://archive.stats.govt.nz/browse_for_stats/businesses/business_growth_and_innovation/BusinessOperationsSurvey_HOTP2015.aspx (accessed 10 January 2019).
- 2018, *Towards new data and statistics legislation: Public discussion document*, NZ Government, Wellington, New Zealand, https://s3-eu-west-1.amazonaws.com/landingi-editor-uploads/7E8Cj329/New_Data_and_Stats_Leg_Doc_WEB_2.pdf (accessed 11 February 2018).

-
- Statt, N. 2017, 'Google appeals record €2.4 billion antitrust fine over manipulated search results', *The Verge*, <https://www.theverge.com/2017/9/11/16291482/google-alphabet-eu-fine-antitrust-appeal> (accessed 3 December 2018).
- Stephenson, J. 2019, *Firm dynamics and job creation: revisiting the perpetual motion machine*, Research commissioned for the New Zealand Productivity Commission, Wellington.
- Te, M. 2018, 'Explainer: Where can you ride e-scooters and what are the rules?', *Stuff*, 25 October, <https://www.stuff.co.nz/auckland/108102534/explainer-where-can-you-ride-escooters-and-what-are-the-rules> (accessed 5 November 2018).
- Teague, V., Culnane, C. and Rubinstein, B. 2017, *The simple process of re-identifying patients in public health records*, *Pursuit*, <https://pursuit.unimelb.edu.au/articles/the-simple-process-of-re-identifying-patients-in-public-health-records> (accessed 6 December 2018).
- TGA (Therapeutic Goods Administration) 2018, *Therapeutic Goods Administration International Engagement Strategy Operations Plan 2018-19*, Australian Government, <https://www.tga.gov.au/publication/tga-international-engagement-strategy-operations-plan-2018-19> (accessed 26 October 2018).
- The Brattle Group 2018, 'Appendix 11: International experiences in retail electricity markets', *Restoring electricity affordability & Australia's competitive advantage*, Australian Competition and Consumer Commission, Sydney, <https://www.accc.gov.au/system/files/Appendix%2011%20-%20The%20Brattle%20Group%20-%20International%20Experiences%20in%20Retail%20El....pdf> (accessed 30 October 2018).
- Tirole, J. and Rendall, S. 2017, *Economics for the common good*, Princeton University Press, Princeton.
- Tucker, C.E. 2018, 'Privacy, Algorithms and Artificial Intelligence', *The Economics of Artificial Intelligence: An Agenda*, National Bureau of Economic Research, Inc., <http://www.nber.org/chapters/c14011> (accessed 11 December 2018).
- and Marthews, A. 2012, 'Social networks, advertising, and antitrust', *George Mason Law Review*, vol. 19, pp. 1211–1227.
- UNICEF 2018, 'Digital dangers: The harms of life online', *The State of the World's Children 2017: Children in a Digital World*, https://www.un-ilibrary.org/children-and-youth/the-state-of-the-world-s-children-2017_2c2603c1-en (accessed 5 December 2018).

-
- Van Reenen, J. 2018, 'Digital Technologies: Economic Growth and the Future of Work', presented at Implications of the Digital Transformation for the Business Sector, London, OECD/BEIS, 8 November, <http://www.oecd.org/sti/ind/digital-transformation-business-keynote-van-reenen.pdf> (accessed 24 January 2019).
- Varian, H.R. 2016, 'A microeconomist looks at productivity: a view from the Valley', <https://www.brookings.edu/wp-content/uploads/2016/08/varian.pdf> (accessed 15 November 2018).
- Woods, M. 2018, *Digital identity work underway*, <https://www.beehive.govt.nz/release/digital-identity-work-underway> (accessed 5 December 2018).
- WTO (World Trade Organization) 2017a, *Global Value Chain Development Report 2017*, https://www.wto.org/english/res_e/publications_e/gvcd_report_17_e.htm (accessed 31 October 2018).
- 2017b, *Joint Statement on Electronic Commerce*, https://www.wto.org/english/news_e/news17_e/minis_13dec17_e.htm (accessed 15 November 2018).
- 2018, *World Trade Report 2018 — the future of world trade*, https://www.wto.org/english/res_e/publications_e/wtr18_e.htm (accessed 24 October 2018).
- WWWF (World Wide Web Foundation) 2018, *The Open Data Barometer*, https://opendatabarometer.org/?_year=2017&indicator=ODB (accessed 29 October 2018).
- Yandle, B. 2010, 'Bootleggers and Baptists in the theory of regulation: Working Paper No. 9', *Jerusalem Papers in Regulation & Governance*, https://www.researchgate.net/publication/267785761_Bootleggers_and_Baptists_in_the_Theory_of_Regulation (accessed 21 October 2018).