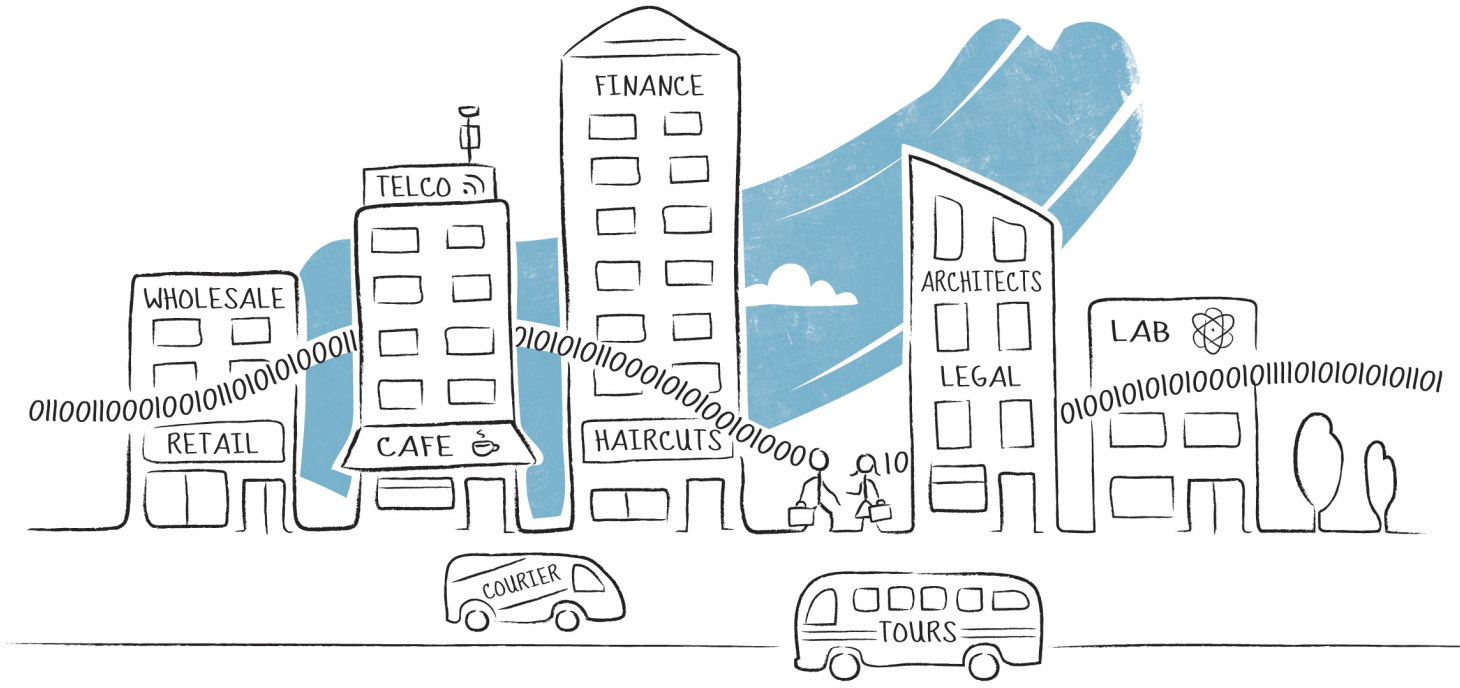
NEW ZEALAND
PRODUCTIVITY COMMISSION
Te Kōmihana Whai Hua o Aotearoa



Boosting productivity in the services sector

2nd Interim Report
Competition and ICT topics

January 2014

The Productivity Commission aims to provide insightful, well-informed and accessible advice that leads to the best possible improvement in the wellbeing of New Zealanders. We wish to gather ideas, opinions, evidence and information to ensure that our inquiries are well-informed and relevant. The Commission is seeking submissions on the questions and draft findings and recommendations contained in this report by 7 March 2014.

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Competition and ICT topics

January 2014

The New Zealand Productivity Commission

Date: January 2014

The Commission – an independent Crown entity – completes in-depth inquiry reports on topics selected by the Government, carries out productivity-related research and promotes understanding of productivity issues. The Commission's work is guided by the New Zealand Productivity Commission Act 2010.

You can find information on the Commission at www.productivity.govt.nz, or by calling +64 4 903 5150.

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Terms of reference

Boosting productivity in the services sector

Context

1. Services are often described as things you can buy or sell but cannot carry. From browsing the internet, dining out, buying and selling a home to receiving an education or medical treatment, services make up a wide and diverse range of activities that impact on the lives of all New Zealanders on a daily basis.

2. The services sector stands out in New Zealand's economy, accounting for over 70 percent of registered businesses, national output and employment. Services make up a critical part of New Zealand's export revenue. In 2009, New Zealand's services exports were valued at $12.7 billion and represented 22 percent of all exports. Travel and transportation services accounted for 77 percent of services exports.

3. Furthermore, services form a valuable input to many of New Zealand's exports. Nearly half of the value of New Zealand's exports can be attributed to value-added from the services sector.

4. Despite the clear importance of the services sector to the New Zealand economy, relatively little is known about the impact and drivers of service sector productivity. Measurement can be difficult, but overseas experience suggests that there is considerable variability in the degree to which countries have benefited from improved services productivity growth. In New Zealand, there has been considerable variation in productivity performance across the services sector.

5. Improving productivity in the services sector would contribute to a number of Government goals including to materially lift New Zealand's long-run productivity growth rate while maintaining our high rate of labour force participation, and to increase the ratio of exports to GDP to 40% by 2025.

6. Given the significance of the services sector to New Zealand's economy but the relatively small amount of study into the sector's productivity performance, the Government is commissioning a Productivity Commission Inquiry into Boosting Productivity in the Services Sector.

Purpose and Scope

7. The purpose of the inquiry is two-fold: to provide an overview of the role of services in the New Zealand economy and to provide policy options to lift productivity in the services sector.

A. The role of services in the New Zealand economy

8. This part of the inquiry should provide an overall assessment of the role and performance of the services sector in New Zealand. This assessment should:

   a) describe the recent productivity performance of the services sector, including the extent to which employment has shifted from high to low productivity sectors;

   b) assess the impact of the services sector on the New Zealand economy overall, including how it affects the performance of the primary and manufacturing sectors; and

   c) assess the performance of the New Zealand services sector against the experience of OECD and other small open economies.

B. Policy options to lift productivity in the services sector

9. Given the diversity of industries within the services sector, policy recommendations and lessons for lifting productivity are likely to be better informed by looking at selected issues or parts of the sector in more depth.

10. Informed by part A above, this part of the inquiry should provide detailed analysis on a selection of issues that are critical for lifting productivity in the relevant parts of services sector. This analysis should lead to policy recommendations to lift productivity in those parts of the services sector.

11. The Commission should have regard to the following criteria when determining the issues or parts of the sector on which it will undertake more in-depth analysis:

    a) whether the issues or parts chosen for further analysis have the potential to make a significant impact on New Zealand's overall productivity performance;

    b) the extent to which the analysis will be able to identify impediments to increasing productivity in the services sector and lead to concrete recommendations for changes to government policy which can overcome those impediments.

12. In applying the criteria above, the Commission should take into account the following aspects when determining the issues or parts of the sector on which it will undertake in-depth analysis:

    c) The increasing importance of services to GDP, to global trade, and as a contributor to the Government's goal of lifting the ratio of exports to GDP to 40% by 2025.

    d) The wide variation in the productivity performance of services subsectors and industries, and the ability to draw lessons from high performing subsectors (for example financial and insurance services) and to lift productivity in relatively poor performing subsectors (for example administrative and support services).

    e) The importance of information and communications technology in other OECD countries as a contributor to strong productivity growth and as an explanation for differences in productivity growth across countries.

13. The Commission should seek views from interested parties when determining the services sector issues on which it will undertake in-depth analysis.

Other matters

14. Consideration of productivity in the services sector should be limited to market-provided services and therefore exclude study of services provided directly by the public sector. The Government has a wide programme underway to improve public sector productivity, detailed consideration of this sector is not possible within the time available to the Commission, and measurement issues in this sector also make analysis difficult.

15. The Commission should prioritise its effort by using judgement as to the degree of depth and sophistication of analysis it applies to satisfy each part of the Terms of Reference. In making this prioritisation, the Commission should emphasise the importance of making concrete policy recommendations in part B that maximise the impact on New Zealand's overall productivity performance.

Consultation requirements

16. In undertaking this inquiry the Commission should consult with key interest groups and affected parties.

Timeframe

17. The Commission must publish a draft report and/or discussion paper(s) on the inquiry for public comment, followed by a final report, which must be submitted to each of the referring Ministers by 28 February 2014[1].

Referring Ministers

Hon Bill English, Minister of Finance
Hon Steven Joyce, Minister for Economic Development

[1] Subsequently extended to 30 April 2014

The 2nd interim report

This 2nd interim report contains the Commission's draft response to Part B of this inquiry's terms of reference: policy options to lift productivity in the services sector. The two topics the Commission chose for in-depth study were addressing barriers to successfully applying ICTs and stimulating competition in the services sector.

This report asks questions and then gives draft findings and recommendations. The Commission welcomes information and comment on any part of this report and on any issues that participants consider relevant to the inquiry's terms of reference.

Key inquiry dates

Submissions due on the 2nd interim report	7 March 2014
Engagement with interested parties on the 2nd interim report	February-March 2014
Final report to the Government	30 April 2014

Why you should register your interest

The Commission seeks your help in gathering ideas, opinions and information to ensure this inquiry is well informed and relevant. The Commission will keep registered participants informed as the inquiry progresses.

You can register for updates at www.productivity.govt.nz/subscribe-to-updates, or by emailing your contact details to info@productivity.govt.nz.

Why you should make a submission

Submissions provide information to the inquiry and help shape the Commission's recommendations in the final report to the Government. Inquiry reports will quote or refer to relevant information from submissions.

How to make a submission

The due date for submissions in response to this report is **7 March 2014**. Late submissions will be accepted, but lateness may limit the Commission's ability to consider them fully.

Anyone can make a submission. Your submission may be written or in electronic or audio format. A submission may range from a short letter on one issue to a substantial response covering multiple issues. Please provide relevant facts, figures, data, examples and documents where possible to support your views. The Commission welcomes all submissions, but multiple, identical submissions will not carry more weight than the merits of your arguments. Your submission may incorporate relevant material provided to other reviews or inquiries.

Your submission should include your name and contact details and the details of any organisation you represent. The Commission will not accept submissions that, in its opinion, contain inappropriate or defamatory content.

Sending in your submission

Web: www.productivity.govt.nz/make-a-submission

Email: info@productivity.govt.nz

Post: Inquiry into the Services Sector
New Zealand Productivity Commission
PO Box 8036
The Terrace
WELLINGTON 6143
New Zealand

The Commission appreciates receiving an electronic copy of posted submissions, preferably in Microsoft Word or searchable PDF format. Please email the files to info@productivity.govt.nz.

What the Commission will do with the submissions

The Commission seeks to have as much information as possible on the public record. Submissions will become publicly available documents on the Commission's website. This will occur shortly after receipt, unless your submission is marked "in confidence" or you wish to delay its release for a short time. Please contact the Commission before submitting "in confidence" material, as it can only accept such material under special circumstances.

Other ways you can participate

The Commission welcomes feedback about its inquiry. Please email your feedback to info@productivity.govt.nz or contact the Commission to arrange a meeting with inquiry staff.

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Commonly used terms and abbreviations

Term	Description
adjustment costs	The costs to a firm and its employees resulting from change, in for example, technology or business models.
allocative efficiency	Maximum *allocative efficiency* requires the production of the set of goods and services that consumers most value in the current period, from a given set of resources.
Australia New Zealand Standard Industry Classification (ANZSIC)	ANZSIC96 and ANZSIC06 refer to the 1996 and 2006 versions respectively.
capital deepening	An increase in capital intensity; that is, the amount of machinery and equipment for each worker.
cloud computing	*Cloud computing* lets businesses access computer infrastructure, software and data services remotely, including from overseas. See Chapter 9 for a more detailed definition.
competition	Rivalry among firms in a market, where businesses strive to attract or keep customers. *Intense competition* often leads firms to offer lower prices or better-quality products.
convergence	The proposition that the per-capita income of poorer countries should, over time, rise to meet that of the richest economies as capital and ideas flow from richer to poorer countries in search of higher returns.
demand-side	Market activity, influences or conditions related to customers, such as the effect of well-informed customers on economic outcomes.
DIA	Department of Internal Affairs.
diffusion	The process by which a new idea, technology or product is adopted across a society or economy.
dispersion	The amount of variation within members of a group. *Firm productivity dispersion*, for example, is the level of difference between high-performing and low-performing firms.
distributive industries	Service industries that focus on transporting people, and exchanging or moving goods. The industries in this group are wholesale trade, retail trade, and transport, postal and warehousing.
dynamic efficiency	*Dynamic efficiency* is achieved when optimal decisions are made on investment, innovation and market entry and exit, to create productive and allocative efficiency in the longer term.
economies of scale	Reduction of cost per unit as the volume of production increases, due to large up-front or fixed costs being spread across more units.
foreign direct investment (FDI)	An investment made from outside New Zealand into a firm based in New Zealand.
general purpose technology (GPT)	A revolutionary and far-reaching technology that enables further innovation across the economy. Historic examples are steam power, the internal combustion engine and electricity.
global financial crisis (GFC)	The economic downturn that started with a financial crisis in the United States in 2007 and peaked in 2008.

Term	Description
goods-producing sector	The part of the economy consisting of the manufacturing, construction, electricity, gas, water and waste industries. Industries in the *goods-producing sector* span varying degrees of transformation, from initial processing of primary produce (such as frozen meat) to elaborately-transformed manufactured items (such as electronics).
incumbent	The existing holder or an office or position. In economics, an *incumbent firm* is an established business with a strong position in the market.
industry	A group of businesses with the same main activity, as classified in ANZSIC; for example, retail trade.
information and communications technology (ICT)	Computers, audio-visual equipment, software and input devices that let users access, store, transmit, and manipulate information. Also includes radio, television and telephone networks.
information asymmetry	A market situation where one participating party has more or better information than the other party.
information industries	Service industries that focus mainly on managing or creating knowledge. These industries typically use ICT extensively and are highly innovative. The industries in this group are information media and telecommunications; finance and insurance; and professional, scientific and technical services.
information technology (IT)	Computer-based information systems, networks and software.
infrastructure-as-a-service (IaaS)	One of the three service models of cloud computing. *Infrastructure-as-a-service* lets users access computer hardware such as storage, processing power, server space and networking components.
innovation	A process that brings together ideas, products, services or technologies in a novel way and impacts society.
intangible assets	Non-monetary assets that are identifiable but are not physical, such as reputation and brand recognition, skills, market research and patents.
intermediate input	A good or service that is used to produce other products, rather than for consumption by households. One example is steel ingots that industries buy and sell as part of a manufacturing process.
labour productivity	Average output per unit of labour input (usually taken to be an hour of work).
latency	The delay incurred in transporting data over a distance.
market power	A firm with *market power* can vary what they charge for a good or service to maximise profit.
market-provided services	Services that are provided at economically significant prices, usually to generate a profit.
MBIE	Ministry of Business, Innovation and Employment.
monopoly	A situation where one firm is the only supplier of a product. A *monopoly* is characterised by an absence of competition, which often leads to high prices and inferior products.
multi-factor productivity (MFP)	Change 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	Two countries that agree to comply with each other's laws or regulations. (See also *unilateral recognition*).

Term	Description
non-market provided services	Services that are supplied for free or below economically-significant prices, typically by governments or non-profit organisations. Health care and social assistance, education and training, and public administration and safety are the three service industries with the highest share of non-market provision in New Zealand.
OECD	Organisation for Economic Co-operation and Development.
outward direct investment (ODI)	Investment by New Zealanders into firms or entities in other countries.
perfect competition	A theoretical market structure where no producer or consumer has control over prices. Buyers and sellers must be numerous and well informed.
person-centred industries	Service industries that are highly person-specific. The industries in this group are accommodation and food, rental hiring and real estate, administration and support, arts and recreation, and other services.
platform-as-a-service (PaaS)	One of the three service models of cloud computing. *Platform-as-a-service* lets users access the tools for building software applications over the internet, ranging from scripting environments to testing and deployment assistance.
primary sector	The part of the economy made up of the agriculture, forestry and fishing, and mining industries. These industries use natural resources to produce relatively unprocessed goods.
productive efficiency	Maximum *productive efficiency* requires that goods and services are produced at the lowest possible cost. This requires maximum output for the volume of specific inputs used, plus optimum use of inputs given their relative prices.
productivity	A measure of output per unit of input.
purchasing power parities (PPP)	The rates of currency conversion that equalise the purchasing power of different currencies. *PPPs* are indicators of price level differences across countries for the same good or service.
reallocation	The transfer of employees, 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.
research and development (R&D)	Creative work of firms or governments that is carried out systematically with the goal of increasing knowledge.
search costs	The time and effort needed to find a suitable supplier of a service or good. A business or individual will face high *search costs* if little information about potential suppliers is available, or if it is hard to identify which option best suits their needs.
sector	Statistics New Zealand classifies productive activities in the economy into one of three sectors: primary, goods-producing, and services.
services sector	The part of the economy made up of all the service industries.
small and medium enterprises (SMEs)	Defined (in New Zealand) as firms with less than 20 employees.
software-as-a-service (SaaS)	One of the three service models of cloud computing. *Software-as-a-service* lets users access software applications over the internet. Applications include accounting, sales tracking and business planning.
SSC	State Services Commission.
sub-industry	A group of businesses within an industry that have more specific main activities. This term corresponds to subdivisions, groups and classes in ANZSIC. For example, "legal and accounting services" is a sub-industry of "professional, scientific and technical services".

Term	Description
supply-side	Market activity, influences or conditions related to suppliers.
switching costs	The real or perceived costs incurred as a result of changing to a new supplier. *Switching costs* can include contract termination fees, the work needed to adjust to a new product or completing the process to terminate a contract.
tradable	A characteristic of a product, meaning that it can be sold in a location other than where it is produced. *Tradability* varies by product and crucially depends on the costs of transacting at a distance. *Perfectly tradable* products should cost the same (adjusted for currency) wherever they are bought.
transaction costs	Costs incurred by the parties making an economic exchange, other than the amount paid directly for the good or service purchased.
transport costs	The costs of transporting a product from the producer to the customer, the producer to the point of consumption, and/or the customer to the point of production.
unilateral recognition	Recognising compliance with another jurisdiction's laws or regulations. For example, if a product meets sale requirements in one jurisdiction it can be sold in the other jurisdiction without needing to meet that jurisdiction's regulatory requirements. (See also *mutual recognition*).
value-added	*Industry* value-added is the value of gross output of an industry less the costs of inputs that other industries provide. *Export* value-added is the gross value of exported goods and services less the costs of imported inputs used in their production.

Overview

This is the Productivity Commission's 2nd interim report as part of its inquiry *Boosting Productivity in the Services Sector*. The report focuses on two topics that are significant to raising productivity in the services sector:

- stimulating a more competitive environment in the services sector; and
- the successful application of information and communications technology (ICT) by New Zealand service firms.

The inquiry's 1st interim report – released in July 2013 – focused on developing a better understanding of the services sector, its recent performance, and its role in the New Zealand economy. That report sets out the vital role that services play in the New Zealand economy. For example:

- services account for nearly three-quarters of GDP; and
- the competitiveness of exports depends critically on the performance of the services sector. This is because the services sector contributes more than half the country's exports, primarily through embodiment in exported goods.

Services-sector productivity, therefore, strongly affects the productivity of the economy as a whole and the wellbeing of New Zealanders.

Yet the sector has underperformed relative to the best international performers. Productivity growth in the US services sector and that of some European countries has driven aggregate productivity growth in those countries. Most services industries in New Zealand have not experienced the same growth in productivity. Growth has been neither strong nor broad-based enough to achieve any significant productivity catch-up in the economy when compared with leading OECD countries. The productivity levels of most New Zealand services industries are below those in Australia and the United Kingdom.

Why focus on competition and ICT?

The terms of reference for this inquiry direct the Commission to analyse in detail selected topics that are critical for boosting productivity in the services sector, leading to concrete policy recommendations. The Commission chose to focus on competition and ICT for the following reasons:

- competition and use of ICT are important drivers of productivity growth;
- policy improvements have the potential to boost productivity across the services sector; and
- while competition and ICT are relevant to productivity across the whole economy, their effects are likely to be particularly important in the services sector.

How does competition affect productivity in the services sector?

Over the past two decades, evidence has mounted that intensity of competition is a key influence on the level and rate of productivity growth. Competition drives the efficient use of resources and the innovations that sustain productivity growth over time. Barriers that prevent new firms from entering a market (or prevent existing firms from exiting a market) dampen competition, and the contribution it makes to lifting productivity.

Competition varies across service industries because they are a diverse group. But there is a general pattern that service industries have less intense competition than industries in the goods-producing and primary sectors. This pattern is consistent with international experience, yet New Zealand's small domestic market and remoteness reduce competitive intensity across the board.

Certain aspects of services, in contrast to physical goods, can diminish the intensity of competition in markets for services. One is a tendency for sellers of services to have better information about what is on offer than potential buyers. While some information asymmetry between sellers and buyers is present in most markets, it tends to be more acute where the product is intangible as in the case of services. Where this occurs, it is less easy for the buyer to "check out" what they are buying before they buy, and it can be difficult to obtain remedies when things go wrong.

Some services need the buyer to be co-located with the seller. This happens for those services that can be delivered only in person, such as dental services. The cost to transport people is generally greater than the cost to transport goods, so markets for services that require this co-location tend to be more "localised" than markets for most goods. Where this is the case, service suppliers in one location are less exposed to competition from those located at greater distance. This reduces the overall intensity of competition in these markets.

Advances in ICT – in particular the internet – are changing the domestic and international landscape for delivery of some services. The internet has opened these services markets to competitors who deliver services from a distance, including from other countries. ICT is also changing services markets by increasing customers' access to information about available service providers.

The overriding message to take from analysing the links between competition and productivity, and from the empirical indicators of the intensity of competition across New Zealand industries, is that there is scope to sharpen competition in New Zealand's service industries.

Opportunities to lift competition in the services sector

The main opportunities to strengthen competition to help increase productivity in the services sector are:

- reducing barriers to trade in services domestically and internationally;
- enhancing the role that consumers play in driving competition in the services sector; and
- sharpening competition law.

Reducing barriers to trade in services

Lower levels of competition in New Zealand's service markets are partially explained by geographic remoteness and a small domestic market. Exposure to foreign competition is an important factor in the intensity of competition in New Zealand service markets. Barriers to such competition include restrictions on foreign firms establishing a local presence from where they can provide services in New Zealand. These include foreign direct investment screening requirements, and "behind-the-border" regulatory requirements where foreign firms must comply with New Zealand regulations as well as those in their country of origin.

New Zealand does not recognise some licences to practice held by foreign service providers even when these licences are based on equivalent or better standards than the corresponding New Zealand standards. Improving recognition of overseas qualifications would remove one barrier to competition. Where foreign standards fail to meet New Zealand standards in a narrow and specific aspect, New Zealand could reduce the barrier by confining its requirements to that aspect.

Consumer behaviour plays an important role in the competitive process

Most efforts to promote competition tend to focus on the number and composition of firms within a market, and their behaviour. Yet consumer behaviour also plays an important role in the competitive process. Confident and well-informed consumers who seek the best value (for the good or service they require) not only advance their own interests, but also signal suppliers about the type of product they prefer. Competition between suppliers who respond to these signals can lower costs, improve product quality, increase innovation and boost productivity.

The consumer role in driving competition in the services sector can be hindered if consumers find it hard to compare offerings of different service providers (search costs) or to switch between providers (switching costs). Search and switching costs are particularly pronounced in some service markets.

Should government intervene to reduce search and switching costs?

Search and switching costs are increasingly being addressed by private firms. One example is websites that compare prices or provide information about different products. Also, not all search and switching costs are necessarily bad for competition. For example, a firm might compete more fiercely to win customers if it believes that switching costs will help retain those customers for a relatively long time.

Before governments intervene to try to reduce search or switching costs, they should be clear about how those costs affect competition, and should undertake a cost-benefit analysis that considers, among other factors, the role that private enterprise can play in reducing search and switching costs. If governments are to fund, or provide, comparison websites to facilitate more competitive markets, adequate resources are needed to ensure that those websites are and remain accurate and accessible.

Information disclosure can increase transparency and competition in services markets. For example, KiwiSaver providers are now required to regularly disclose information about their performance and fees in a standardised form. While complying with information disclosure requirements entails some costs, the requirements are a relatively light-handed way to reduce search costs. For disclosure to be effective, the information must be presented in ways that consumers can access and understand.

Comparison websites and contract termination charges

Comparison websites are expanding how consumers access information about service providers. Yet comparison websites that are inaccurate or misleading can undermine efforts to increase transparency and competition in services markets.

Other countries have developed best-practice guidelines and accreditation systems as a form of oversight for comparison websites. A similar approach in New Zealand could usefully supplement the existing provisions around deceptive and misleading practices in the Fair Trading Act 1986.

Many services, such as telecommunications, are provided through contracts. While contracts can benefit consumers, they can create significant barriers to switching if they contain unreasonable terms that prevent consumers from ending the contract or switching to an alternative supplier. Recent legislation prohibits the use of certain "unfair contract terms" and should address this issue. Currently this law applies only to service consumers who are householders rather than businesses. Given how much businesses rely on services as inputs, it would be worthwhile in two years reassessing whether to extend the unfair contract terms provisions to business-to-business transactions.

There is scope to further reduce switching costs in some services markets

In 2010, an industry-led initiative introduced a streamlined process for switching banks. While the process appears to significantly reduce the barriers to switching banks, there is clear scope to publicise it further and make it more transparent.

In theory, switching banks could be further streamlined by making bank account numbers portable. This would let banking customers keep the same account number even if they switch banks. In practice, practical barriers currently make full bank account number portability prohibitively expensive. New Zealand officials should monitor international developments regarding bank switching and account number portability. If another country develops a workable approach, New Zealand officials should closely examine how it might apply to the New Zealand banking system.

Telephone number portability has markedly reduced switching costs for consumers and strengthened competition among telecommunications providers. The absence of email address portability is a remaining barrier to switching in the telecommunications industry. Some consumers who use an email address offered by their internet service provider will lose access to the address and emails to that address if they switch to a different internet provider. The industry, led by the New Zealand Telecommunications Forum, has scope to introduce measures so that consumers can switch internet provider without losing access to emails.

The role of occupational regulation and professional bodies in promoting competition

Occupational regulation regimes are common in the services sector (for example engineering, legal, accounting, and architectural services). Alongside the professional bodies that oversee them, regimes can help to mitigate problems that can arise from the complexity and information asymmetries of many service transactions. Yet the benefits of occupational regulation need to be clearly articulated, demonstrated, and balanced against the costs – which may include a dampening effect on competition. Applying entry restrictions to certain professions or pitching professional standards too high can limit supply and restrain competition, to the detriment of consumers.

Different approaches to occupational regulations lead to different trade-offs between regulating quality and promoting competition. Licensing regimes can be more effective than registration regimes in putting a floor under standards, but they are also more prone to "capture" by the interests of the profession's members. Conversely, more "open" certification/registration-type regimes can lower entry barriers and therefore be more conducive to competition and a wider range in the quality of services on offer.

The benefits of competition should be examined when considering existing or new arrangements for regulating providers of professional services. Where government considers that licensing is required to provide a minimum level of protection to all users of a professional service, the activity that requires licensing should be prescribed no more broadly than is needed to achieve that protection (such as confining the licensing requirement to prescribed areas of "restricted work").

Occupational regulation regimes also differ depending on whether they use a self-regulation or statutory regulation approach. Self-regulatory regimes are established and administered by a professional standard-setting body elected (mostly or entirely) by their members. In statutory regulation, the Government, or a predominantly government controlled or appointed body, usually performs these functions. Where the Government provides professional bodies with statutory recognition, what it expects and requires should be explicit in that recognition. There is scope for these expectations to include a greater focus on promoting competition as part of the traditional role of promoting the public interest.

Competition law could be improved

Competition laws and the institutions that implement them – the competition agencies and the courts – are an important influence on how firms behave. Accordingly they have an impact on the intensity of competition and productivity performance in the services industries. New Zealand's small market size, remoteness and the characteristics of many services (such as low tradability and high search and switching costs) mean that competition law must strongly support competition in the services sector.

The Commission focused on three particular areas of competition law (rather than attempting to review the entire competition law framework): preventing dominant firms from taking advantage of market power (section 36 of the Commerce Act 1986), collaboration among firms, and the power to conduct market studies.

Section 36 – taking advantage of market power

One key component of a competition regime is to prevent dominant firms from misusing their market power to damage the competitive process. Such damage may include improperly restricting the entry of new firms, preventing other firms from engaging in the market or eliminating competing firms.

Section 36 of the Commerce Act (s 36) aims to deter and prevent dominant firms misusing their market power. S 36 was drafted to be similar to the parallel section in Australian law, but New Zealand courts have diverged from Australian courts in interpreting it. New Zealand's highest court has developed a doctrine of sole reliance on a "counterfactual test". Using this test, a firm is only judged to have taken advantage of market power if it can be argued that the firm would have behaved differently in a competitive market.

Monopolisation provisions (as they are termed) are tricky to get right and contentious in many countries. There is not a settled best way to deal with monopolisation. In New Zealand, those in favour of retaining the status quo suggest that changes to s 36 or its interpretation would create uncertainty for large businesses that might discourage innovation and other legitimate competitive activity. Also, if changes to s 36 were to

significantly lower the threshold for anti-competitive behaviour, then large firms may be deterred from vigorously competing and striving to outperform their rivals – to the detriment of dynamic efficiency and long-term consumer benefit.

However, some commentators, including the Commerce Commission, argue for a reform of s 36. Four issues typically raised by this group are noted below.

- Risk of false negative outcomes. False negatives occur when the monopolisation test wrongly indicates that a firm has not taken advantage of its power and damaged competition. Critics of s 36 and its interpretation argue that the counterfactual test is too hard to satisfy because it is too easy to find reasons that a dominant firm, with its power removed, would have acted in a similar way to the alleged misconduct.
- Risk of false positive outcomes. A false positive occurs when the monopolisation test indicates the firm has taken advantage of its power and damaged competition when in fact it has not done so. False positives are harmful because they can deter large firms from undertaking initiatives to improve productivity that they could not otherwise achieve without having a degree of market power.
- The counterfactual test is complex, artificial and has a flawed logic. Constructing a hypothetical market where a firm lacks dominance and asking what that firm would do is hard because the features of such an artificial market are open to much debate. The counterfactual test is more complex than other provisions in competition law.
- Effects are of the essence. The counterfactual test puts the focus of investigation on the hypothetical conduct of a non-dominant firm. Conduct by a non-dominant firm in a competitive market is likely to be of no concern, or even favour competition. By contrast, the same conduct by a dominant firm may well be anti-competitive and cause harm. So an adequate assessment of economic harm from market power requires some examination of effects in the market.

The Productivity Commission finds much that is persuasive in the critiques of the interpretation of s 36 and the consequent unsatisfactory nature of the current situation. The Government should review s 36 to assess whether there are ways to improve its accuracy in identifying situations where firms take advantage of market power for anti-competitive purposes:

- The review should include a thorough legal and economic analysis of the extent and costs of any anti-competitive behaviour that the current interpretation of s 36 encourages or enables.
- The review should take into account the small domestic market and limited competition in the New Zealand economy.
- The Australian Federal Government is planning a "root and branch" review of its competition law, which includes whether to move in the direction of "effects" analysis and tests. Any New Zealand review of competition law should consider developments in Australia and aim to align with best practice within a single trans-Tasman market.

Competition law should not stifle collaboration that improves productivity

Competition law should allow collaboration among firms that enhances competition and efficiency. The Commerce (Cartels and Other Matters) Amendment Bill is currently progressing through Parliament. That Bill proposes some significant changes to the Commerce Act that will redraw the permitted boundaries between competition and collaboration. On the one hand, those responsible for collaborating to fix prices or quantities (indulging in cartel behaviour) will become subject to criminal sanctions. On the other, the grounds for pro-competitive collaboration will widen. The Commission supports these changes as long as sufficient oversight and clarity exist to ensure that the law is understood and does not have a chilling effect on pro-competitive collaboration among firms.

A sharper focus on competition in specific services markets is warranted

Competition authorities in many other countries have the power to undertake broad-ranging inquiries into the state of competition in different markets – commonly known as market studies. The Commerce

Commission does not currently have this power. However, several other organisations study competition in New Zealand using a variety of approaches.

There is a good case for a more deliberate approach to the study of competition in the sense of inquiries that deepen understanding of how industries, markets, or market practices are working. Yet market studies are not costless, so their net benefit would need to be established. Design questions include who initiates the study and sets its terms, who undertakes the study, and the status of any recommendations.

How does ICT affect productivity in the services sector?

ICT underpins a revolution in services. ICT is transforming many existing services and creating new services similar to how previous general purpose technologies – such as steam and electricity – transformed manufacturing and agriculture.

Research has established strong links between ICT and productivity in the services sector, both overseas and in New Zealand. For example, studies show that more effective use of ICT in some service industries was a key explanation for the superior productivity performance of the United States relative to European countries in the past two decades. New Zealand data is broadly consistent with international evidence that industries that produce ICT, or are relatively intensive users of ICT, have tended to show stronger productivity growth than less ICT-intensive industries.

The productivity potential of ICT arises from some specific economic characteristics that it possesses. These characteristics include strong economies of scale, non-rivalry and network effects. Of significant note, the costs of producing ICT have fallen dramatically while quality has improved dramatically. This process continues, driven by technology advances that have seen the number of transistors in microchips approximately double every two years. Such effects underpin ICT's strong current and potential future contribution to productivity, economic growth and wellbeing.

But ICT is disruptive. Its effects across the economy are pervasive and impact services industries significantly. Applying ICT often devalues existing assets while creating new opportunities for profit. Affected assets include firms, business models, brands, and human and physical capital.

Reallocation – putting assets to more productive uses – is the single largest contributor to productivity growth. It operates across firms, industries and regions. Adjustment costs – the costs incurred in redeploying devalued assets – discourage reallocation. Policies aimed at reducing adjustment costs can contribute to productivity growth. Firms, industries and countries will be better off to the extent that they can adapt quickly – and at lower cost – to the opportunities that ICT creates and destroys.

As with other countries, New Zealand faces the issue of how best to make choices about policies and institutions that influence the way it responds to, and takes advantage of, the ICT revolution. Such choices are best made deliberately. Making them by default risks getting an uncoordinated set of policies and institutions that work against each other and dissipate potential gains.

New Zealand's ICT investment is relatively lower and later

New Zealand creates a very small proportion of global ICT products. The main way New Zealand will benefit from ICT is from adopting and using ICT that is developed and produced overseas.

New Zealand's investment in ICT as a share of GDP is about average compared to a selection of OECD countries. Yet, because New Zealand's GDP is relatively low, a relatively higher proportion of GDP needs to be dedicated to ICT to achieve the equivalent ICT capability of other countries. ICT investment per person in New Zealand – when adjusted for international ICT prices – has historically been similar to Canada but lower than other advanced countries. It has been improving since the early 2000s and now matches Australia, but it remains significantly lower than in the United States and the United Kingdom.

There are common patterns in how new technology, including ICT, is adopted. These patterns are driven by changes over time in prices, quality, risks, adoption costs and expected benefits. Individual firms adopt

technology when it becomes available and its anticipated benefits exceed expected costs. The best time to adopt ICT will vary by technology and by firm.

A significant part of the costs in adopting ICT are fixed; they do not vary based on the size of the adopting firm or that firm's anticipated revenues. This favours larger firms adopting ICT. These firms are also favoured to the extent they can access lower-cost capital. New Zealand has few large firms in international comparison, implying the optimum time for firms to adopt ICT in New Zealand is later on average.

Survey results indicate that New Zealand's services firms are more likely to have significantly invested in ICT during the past two years than those in the goods-producing or primary industries. The most common reasons are to improve their services or to support new activities. The factors that discourage New Zealand services firms from investing in ICT include, in order of relative importance, the overall financial case, limited capital, limited information and limited access to skills.

Factors that affect ICT adoption and application

Ultimately, a business's decision about ICT adoption will be based on the firm's perceptions of risk, cost and returns. These perceptions of risk, cost and returns are influenced by the way the business operates and by government policies and regulations.

The mostly intangible nature of ICT investment provides one reason why small and medium enterprises (SMEs) find it difficult to get funds to invest in ICT. Software generally costs more than hardware and yet it has little if any value on the secondary market. Software cannot serve as collateral and SMEs rely on investment capital. New Zealand has few large firms and the investor market is small. Local investors cannot afford to specialise and distance makes it a challenge for overseas investors to monitor their investments in New Zealand.

People management practices are particularly important. Firms need to reorganise and redesign business processes to be effective to get the benefits of ICT investments. Managers need to promote and reward employees based on performance, and hire and keep the best employees, while allowing staff discretion in their work. Effective management of change also involves tracking what is going on inside the business, setting targets, tracking outcomes and taking action to correct problems.

While scant, evidence suggests that New Zealand management practices, particularly people management practices, are relatively poor.

ICT investments have better outcomes if a firm has ICT-savvy management and governance. Only a small proportion of New Zealand directors have an ICT background, though this is changing as a younger generation comes on board.

Entrepreneurial skills provide the spark that puts people, information, capital and technology together to conduct business experiments. The role of entrepreneurs is multi-faceted, from identifying and championing opportunities to managing their realisation.

Restrictive product market, labour market and land-use regulations can be a barrier to adoption of ICT, because they make it difficult for human resources and physical capital to shift to more productive uses enabled by ICT. New Zealand generally rates at the less restrictive end of the spectrum on these regulations. Yet review of regulation to ensure that it does not unnecessarily restrain ICT adoption is worthwhile, particularly given other disadvantages that New Zealand faces in terms of market scale and less intense competition.

The role of ICT in retail and wholesale trade

Internationally, the retail and wholesale trade industries are good examples of the role that ICT can play in boosting productivity in the services sector. ICT helped to stimulate significant labour productivity growth in retail and wholesale in North America and Australia during the 1990s.

Some of the main ways that ICT has facilitated productivity growth in the North American retail sector are noted below.

- ICT has enabled efficient retail chain expansion and economies of scale through scanning technology, radio frequency identification and enhanced data management. These facilitate real-time tracking of inventories and supply, international integration of supply chains, and pricing and advertising that is more responsive to customer demand.
- ICT has had a re-allocative effect as more productive retailers using ICT have expanded and replaced less productive stores. For example, the effect from reallocation accounted for 70% of the productivity growth in the Canadian retail sector between 1984 and 1998.
- ICT has also facilitated new business models, particularly online shopping.

The retail and wholesale industries in Australia and New Zealand have followed many of the trends apparent in North America, including intensifying their use of ICT over the last 25 years. Yet New Zealand's productivity levels in both industries is significantly lower than in Australia, and for the past 15 years has shown no sign of catching up.

The New Zealand market is small, competition is restrained and road infrastructure is less developed than in Australia, Europe and the United States. These factors, combined with New Zealand's geography, limit the gains from centralising distribution centres, integrating supply chains and intensifying use of transactions data for business decisions. Further, land-use regulation has sometimes prevented the siting of stores in preferred locations and has dissuaded at least one large international chain from entering the New Zealand market. Recent reforms to the Resource Management Act 1991 appear to have improved this situation.

What changes would help service firms to better harness the productivity potential of ICT?

ICT skills require attention

Demand for ICT professionals globally has continued to rise since the 1970s. Given the falling cost of ICT and its increasing use, this pattern is likely to continue.

Like many new technologies with great potential for wealth, ICT production has experienced economic bubbles. The dotcom boom and bust, economic conditions during the following decade and uninterrupted growth in the use of ICT combined to produce a sharp decline in ICT graduations at the same time as the number of jobs and people in ICT rose. The result has been an emerging worldwide shortage of ICT professionals. Internationally, ICT jobs are ranked by employers as the seventh most difficult to fill.

Skill shortages can lead to low investment in new ICT and less effective use of installed ICT. Firms will not invest in new technology if they expect employees with the required skills will not be available. Prospective employees will not invest in skills if they expect firms will not invest in technology.

New Zealand employers compete in an international market for ICT skills. Net migration of ICT graduates is an important contributor to balancing supply and demand. While New Zealand's immigration policy appears to be working reasonably well in making it easy for skilled migrants to fill ICT vacancies, scope may exist to further streamline the process. Also, negotiation of taxation arrangements with other countries may allow more efficient temporary transfers of employees between New Zealand and those countries to meet fluctuations in demand for specific ICT skills.

ICT is developing extremely rapidly and firms rather than academic institutions are driving ICT innovation. Unless these institutions have close links with business, it will be hard for ICT academics to keep pace with innovation. This makes it difficult for tertiary education providers to prepare students for careers in ICT.

Current funding arrangements for tertiary education providers do not provide strong incentives to establish and maintain links with firms. Student choices about their courses and tertiary education providers are the main drivers of funding.

Recently the Ministry of Education started publishing information on graduate employment and earnings outcomes by field of study, but not by education provider. If prospective students have better information

about the employment and earnings outcomes from qualifications gained from *particular providers*, this might sharpen incentives for tertiary education providers to tailor their programmes to industry needs.

Effective ICT use requires both skilled technicians and ICT-savvy mangers. Managers should be able to recognise the potential for ICT to transform their business, and to identify any complementary investments that are needed. Such investments include staff training and changes to business organisation and processes. Few ICT students have the opportunity to gain significant experience of a business environment during their studies, and computer science qualifications tend to focus on developing technical expertise within a scientific paradigm. Adding to this are course requirements and timetabling issues that sometimes make it hard for students to do a joint degree in computer science and business. The Commission welcomes further information about how degree structures, timetabling and other administrative arrangements could be made more accommodating for students to do joint degrees in business and ICT, including computer science.

Information systems majors are usually offered in business schools, and are more likely to appeal to students with an interest in a business career. The Commission understands that business students can sometimes skip technical ICT courses. This can result in graduates lacking the necessary foundation to become managers and CEOs who understand and are in skilled in ICT.

Tertiary providers sometimes offer graduates in one discipline one-year programmes in a second discipline. Encouraging business (and other) graduates to undertake a one-year programme in computer science would help the ICT industry to respond to changes in demand more quickly. Computer science graduates could also be encouraged to undertake a one-year programme in business studies. This would better prepare them for work in firms where ICT is closely integrated into business strategy.

Larger firms that use and produce ICT have the resources to employ and successfully induct ICT graduates into their business. By contrast, smaller firms have fewer resources to confidently take on the risks of employing graduates. There is scope for greater collaboration among small firms and tertiary education providers to improve the supply of "work-ready" ICT graduates. Adjustments to the way that funding is provided for ICT students could incentivise the development of collaborative arrangements, including internships for ICT students in small firms. The Commission is interested in learning more about any previous initiatives to improve collaboration between education providers and firms.

Cloud computing

Cloud computing is changing how ICT services are delivered around the world.

Although there is no single definition of cloud computing, it encapsulates many ideas. These ideas include that ownership of data can be separated from its physical location and direct control, data should be stored and processed where it is cheapest, services are best rented on an as-needed basis, and access to data should be seamless across devices and locations.

The shift involved in cloud computing – from the immediate physical control of data to control via contract – is as much psychological as technological. Overcoming barriers to adopting cloud computing will typically involve designing contracts and institutions to minimise and best allocate risk, and building trust in those contracts and institutions.

The trend towards cloud computing is driven by huge economies of scale and scope in the centralised storage and processing of data, falling data transport costs, near global internet connectivity and consumers placing a significant premium on mobility. These trends have reshaped the ICT world during the past decade and show no signs of abating in the near future. The effect of scale shows in the much lower prices that United States cloud providers offer consumers compared to New Zealand cloud providers.

What benefits does cloud computing offer?

Cost reductions and enhanced functionality from cloud computing potentially benefit all ICT users.

- Many cloud-based products and services are "scalable", in the sense that purchasers can buy exactly (or very nearly) the quantity they need and vary the amount over time. This is particularly beneficial to firms that are small and/or variable users of ICT.
- Cloud computing creates more product choices for firms. This increases their chances of finding a service more closely matched to their particular needs. Also, by creating a greater number of choices, cloud computing helps to improve competition and drive down prices.
- Renting cloud services in other countries lets New Zealand firms that export digital services have similar ICT costs to competitors based in those countries. This "levelled playing field" offers an overall cost advantage to New Zealand firms if other costs (such as labour) are lower than those of their competitors.

Adoption of cloud computing in New Zealand

Sixty percent of New Zealand businesses reported that they use, or intend to use in the near future, at least one type of cloud computing technology. Consumer-oriented cloud applications are most commonly used, followed by business-oriented cloud applications. The use of cloud technologies in the services sector is higher than use in the primary and goods-producing sectors.

The New Zealand Government has been a strong adopter of New Zealand-located cloud infrastructure services. Yet local services are dearer than similar overseas services, and there is no evidence to suggest they are any more secure. The Government's decision not to use overseas-hosted cloud services risks paying too much, and sends a poor signal to private firms about the suitability of cloud computing.

The Government should relax its requirement for agencies to ensure their data is stored solely in New Zealand. As a first step, the use of services located in Australia should be permitted. Any legal or privacy issues should be dealt with, as a matter of urgency, through negotiations with the Australian Government.

Barriers to adopting cloud computing

International connectivity

Full adoption of cloud computing requires reliable connectivity with the rest of the world. Two Southern Cross cables provide most of New Zealand's international data connectivity. There are some concerns about the capacity of these cables and the market power of their owner. The Commission is not aware of hard evidence to support concerns about demand for data capacity exceeding supply in the near future, or of inflated pricing. It welcomes submissions on this issue.

Concerns about limited capacity and competition should become less relevant if plans to build an additional cable between New Zealand and Australia come to fruition. This link would provide further competition on the trans-Tasman leg and into Asia and indirect competition for data traffic to the United States.

Regulatory barriers

The important role of ICT and its rapid rate of change creates regulatory challenges. Cloud computing further complicates these challenges, as it undermines assumptions about who owns data, and about the location of its production, transport, storage and consumption.

Cloud computing has made questions about data location harder to answer. In its purest form, data in the cloud is stored "everywhere and nowhere". Flexibility over where data is stored and processed allows cloud computing service providers to be more efficient – and ultimately to provide services at lower prices for their customers. Restrictions on where data is stored or the free flow of data between countries may be costly for those affected. They will have a disproportionately negative effect on smaller countries such as New Zealand, as such countries lack the scale to support a wide range of sophisticated, home-grown, digital services.

The Government should pursue free-trade-in-data agreements with other countries. A reasonable aim of such agreements should be that the rights and responsibilities of data owners are indifferent to the physical location of their data.

The widespread adoption of cloud computing creates challenges regarding taxation, since concepts of country of origin and country of consumption become blurred, and services provided across national borders are difficult to monitor. New Zealand should promote – and participate in – international forums with the aim of reducing the ability of multi-national firms that provide digital services to shift their profits to reduce the tax they pay.

Responding to the ICT revolution

The firms in New Zealand's services sector are responding to the ICT revolution as might be expected, given the underlying economics, and the overall framework of government policies in which they operate.

Because ICT is a general-purpose technology, the changes it is bringing in the services sector are extensive and far-reaching. They involve major changes in business, employment, and skills; and extensive reallocation of resources from old businesses to new businesses. Framework policies and institutions need to support and encourage flexibility, adaptability and experimentation. The choices will often be hard and uncomfortable, and will call for consideration of social and community issues as well as economic issues. Yet, with good design, New Zealanders have the opportunity to reap major gains from the ICT revolution.

The ICT revolution is a major global issue. The challenge for all countries is to find ways to lower the costs of the difficult transitions that firms, employees and communities face, and grasp the valuable opportunities that are there. The policies most likely to succeed in achieving this worthy aim will embrace change rather than resist it, and effectively support people through transitions.

Next steps

The Commission invites submissions and feedback on both interim reports by 7 March 2014. A number of questions are asked in this report. Submissions that respond to these questions are particularly welcome.

The inquiry's final report is scheduled to be presented to the Government by 30 April 2014.

1 About this inquiry

Key points

- The Government asked the Commission to conduct an inquiry into boosting productivity in the services sector.
- The inquiry's 1st interim report – released in July 2013 – addressed Part A of the inquiry's terms of reference. That report focused on how the services sector performs and its role in the wider economy.
- Part B of the terms of reference requires an in-depth analysis of selected topics, to identify specific opportunities to boost productivity in the services sector and contribute to New Zealand's overall productivity.
- The 1st interim report proposed three topics. Following feedback and submissions from inquiry participants, the Commission selected two topics:
  - the successful application of information and communications technologies (ICTs) by New Zealand service firms; and
  - stimulating competition in New Zealand service markets.
- The Commission decided not to proceed with the other topic – improving occupational licensing in the services sector. Scope exists to lift productivity through improvements to New Zealand's occupational licensing system; however the size and complexity of this topic make it better suited to a dedicated inquiry.
- This interim report (the second of two) addresses Part B of the terms of reference:
  - Chapters 2 to 4 consider ways to stimulate competition in services markets; and
  - Chapters 5 to 9 consider barriers that can prevent New Zealand service firms from successfully applying ICT.
- The Commission invites submissions and feedback on the inquiry's interim reports by 7 March 2014. The Commission is due to present the inquiry's final report to the Government by 30 April 2014.

1.1 What was the Commission asked to do?

The Government asked the Commission to conduct an inquiry into boosting productivity in the services sector. The two main aims of the inquiry are:

- to build a better understanding of the services sector, its recent performance, and the role it plays in the New Zealand economy (Part A); and
- to identify opportunities to boost the productivity of service industries and to contribute to New Zealand's overall productivity (Part B).

The inquiry released its 1st interim report in July 2013. That report focused on the first aim by assessing the role and performance of the New Zealand services sector. It considered the productivity performance of different service industries, how the services sector impacts the economy as a whole, and how its performance compares with other countries.

1.2 What is the role of this report?

This inquiry's terms of reference specify that the Part B topics should have the potential to significantly boost New Zealand's productivity performance, and to lead to concrete recommendations for Government policy.

This interim report (the second of two) addresses Part B of the terms of reference and provides an in-depth examination of the two chosen topics.

The Commission will revise the two interim reports and combine them into a final inquiry report for delivery to Ministers in April 2014. The report will likely be published in May 2014.

The Commission welcomes feedback on this report and the questions it raises. Feedback will inform the inquiry's final report.

1.3 Two in-depth topics in services-sector productivity

The inquiry's 1st interim report proposed to examine in-depth two of the following three candidate topics:

- How to improve occupational licensing in the services sector: Is there an appropriate balance between the costs and benefits that stem from occupational licensing regimes in the services sector?
- How to stimulate services competition: Is there a role for Government in stimulating consumers to drive greater competition in New Zealand services markets?
- How to reduce barriers to successfully applying information and communications technology (ICT): Are there policy changes that can improve the effectiveness of ICT adoption by New Zealand service firms?

The Commission chose the latter two topics after considering feedback and submissions from inquiry participants (Box 1.1).

Box 1.1 **Submissions on Part B topic selection**

Submissions on the 1st interim report included support for all three candidate topics. The ICT topic received the most support:

> MYOB believes the inclusion of 'addressing barriers to the successful application of ICTs to service industries' as one of the research topics focused on during the second phase of the inquiry is critical to ensuring local business operators benefit from the growth and development of a wide range of technology. (MYOB, sub. 102, p. 5)
>
> …the Commission should investigate the application of ICTs by New Zealand businesses more fully. We think this should involve a more detailed look at adoption of advanced ICT applications, such as online ordering and payment via websites, rather than uptake of basic technologies such as internet access and email. (Sapere & Covec, sub. 105, p. 1)
>
> The key challenge for New Zealand in terms of ICT utilisation … relates to the development and retention of human capital with the appropriate skills, knowledge and experience. (Stephen MacDonell, sub. 106, p. 1)
>
> In terms of credible evidence to support a policy initiative the highest priority topic for a future focus is the role of ICT in improving services productivity. (Alistair Sheat, sub. 109, p. 2)
>
> We agree that the issue of barriers to ICT diffusion is an important topic. We are less enamoured of the other two topics. (New Zealand Council of Trade Unions (NZCTU), sub. 113, p. 2)

Two of those submissions gave second-ranked support to the occupational licensing topic:

> With respect to the three topics proposed for in-depth analysis, and admittedly focusing on ICT and its more effective utilisation, the following topics are recommended: improving occupational licensing in the services sector… (Stephen MacDonell, sub. 106, p. 1)

> The topic of occupational licensing is not new and should be considered, therefore would rank second, but with a wider scope. (Alistair Sheat, sub. 109, p. 2)

Economics New Zealand supported improved occupational licensing and stimulating services competition, and assigned a lower ranking to ICT:

> For this inquiry the first two (improved occupational licensing, stimulating services competition) rank higher in my opinion than the third (barriers to ICT) … [t]he licensing and competition topics fit well with the research evidence from MBIE work that there appear to be low levels of competition and attendant low productivity in a number of markets in New Zealand and … there are too few advocates for competition in New Zealand, for a variety of reasons, and an authoritative body spelling out the productivity benefits in the services sector of competition, and identifying specific ways of increasing competitive pressures and widening consumer choice and voice, would be very helpful. (Economics New Zealand, sub. 108, p. 1)

Business NZ (sub. 115) was in favour of the occupational licensing and ICT topics. Porirua City Council supported a more in-depth investigation on stimulating services competition and addressing barriers to the successful application of ICTs because "these two topics have potential to generate specific policy recommendations with significant productivity benefits" (sub. 114, p. 1).

The Insurance Council of New Zealand supported the services competition topic:

> We believe the topic Stimulating Services Competition would rank most highly in relation to the selection criteria identified. This topic has the greatest potential to impact on New Zealand's overall productivity performance and lead to concrete recommendations for change to government policy. (Insurance Council, sub. 111, p. 1)

The Commission decided not to proceed with the other topic – improving occupational licensing in the services sector (although the effects that occupational licensing has on competition are examined as part of the competition topic). Scope exists to lift productivity through improvements to New Zealand's occupational licensing system; however the size and complexity of this topic make it better suited to a dedicated inquiry.

Services sector innovation policy

While preparing this 2nd interim report on competition and ICT, the Commission became interested in an additional subject: innovation (Box 1.2).

Box 1.2 **Are innovation policies suited to the services sector?**

OECD (2005) research suggests that factors important for innovation in the services sector, such as organisational change, human capital and non-research and development (R&D) expenditure on innovation, have received less attention than factors important to traditional manufacturing-based innovation. Policy on innovation in manufacturing tends to focus on the physical and tangible aspects of technological innovation, the manufacturing process, the consumption of physical goods, and on patents and R&D expenditure as indicators for innovation.

Because services account for such a large share of the New Zealand economy, and play an important role in the production and export of goods, New Zealand's innovation policy should reflect the importance of a broad range of innovative activities, not just manufacturing-based innovation.

Q1.1 Do current innovation policies adequately incentivise innovation in the services sector? If not, what changes are required?

Q1.2 Can you provide examples of innovative projects in the services sector that failed to launch because they did not qualify for innovation subsidies or grants?

The Commission's business survey

In late 2013 the Commission arranged a survey of New Zealand businesses. The survey focused on ICT investments and services purchasing behaviour (Box 1.3). The Commission received the survey results in late November 2013. This 2nd interim report includes results from that survey and a limited interpretation of those results. The Commission will refine the results and include an expanded interpretation in the final inquiry report.

Box 1.3 **The Commission's 2013 business survey**

Colmar Brunton was commissioned to conduct a survey of New Zealand businesses. The survey's aim was to gain further insights into their ICT investments and services purchasing behaviour. The survey was completed by 1,526 senior decisions makers in New Zealand businesses between 15 October and 7 November, 2013.

The sample was sourced from Colmar Brunton's dedicated online panel of businesses. The sample was analysed by industry type and business size (number of employees). Smaller businesses (1-5 employees) were under-selected and businesses with more employees were over-selected to allow more robust analyses of larger businesses. The survey excluded responses from sole traders to avoid numerous very small businesses distorting the results. Because the inquiry is about market-provided services, responses from those working in the public administration and safety industries were also excluded. The survey research report is available from www.productivity.govt.nz.

1.4 A guide to this report

Table 1.1 outlines the structure of this report. The chapters can be read in any order. Chapter 2 introduces and outlines the competition topic. Chapter 5 is the recommended starting point for the ICT topic.

Table 1.1 Report structure

Chapter content
Chapter 2 introduces the first topic – stimulating services competition – and discusses the links between productivity and intensity of competition.
Chapter 3 considers how search and switching costs can negatively affect services markets, and considers opportunities to reduce them.
Chapter 4 covers the role of competition law in competition policy, and discusses specific opportunities to improve competition law, including unilateral conduct (Section 36 of the Commerce Act 1986), market inquiries and productivity-enhancing collaboration.
Chapter 5 introduces the second topic – addressing barriers to the successful application of ICT. It explains how ICT is revolutionising service industries and boosting their productivity.
Chapter 6 covers ICT adoption by firms and the business and policy influences on their adoption decisions. It considers the "framework" policies and institutions to take best advantage of the ICT revolution.
Chapter 7 examines New Zealand's retail and wholesale industries to illustrate the opportunities and barriers that affect adopting ICT.
Chapter 8 covers ICT technical skills and ICT-savvy managers (an important complement to adopting ICT), and investigates the supply and demand of ICT skills.
Chapter 9 considers how cloud computing is changing how ICT services are delivered globally, and examines the drivers of cloud computing, its potential benefits and barriers to adopting it in New Zealand.

This 2nd interim report is a draft of Part B of the final inquiry report. Submissions are invited on this material and on the draft Part A material in the 1st interim report. The Commission will consider both when preparing the final report.

1.5 Next steps

Table 1.2 sets out the timeline for the rest of this inquiry. The Commission, with the agreement of the Government, deferred the original milestones by two months. The expanded timeframe is better suited to the multi-stage nature of this inquiry.

In addition to submissions and engagement meetings, the Commission may use published research notes, discussion forums, expert roundtables and other mechanisms to test its thinking on specific issues.

Table 1.2 Inquiry timeline

Date	Milestone
7 March 2014	Submissions on the 2nd interim report due
February–March	Engagement with interested parties on the 2nd interim report
30 April	Final report delivered to referring Ministers

2 Stimulating competition in the services sector

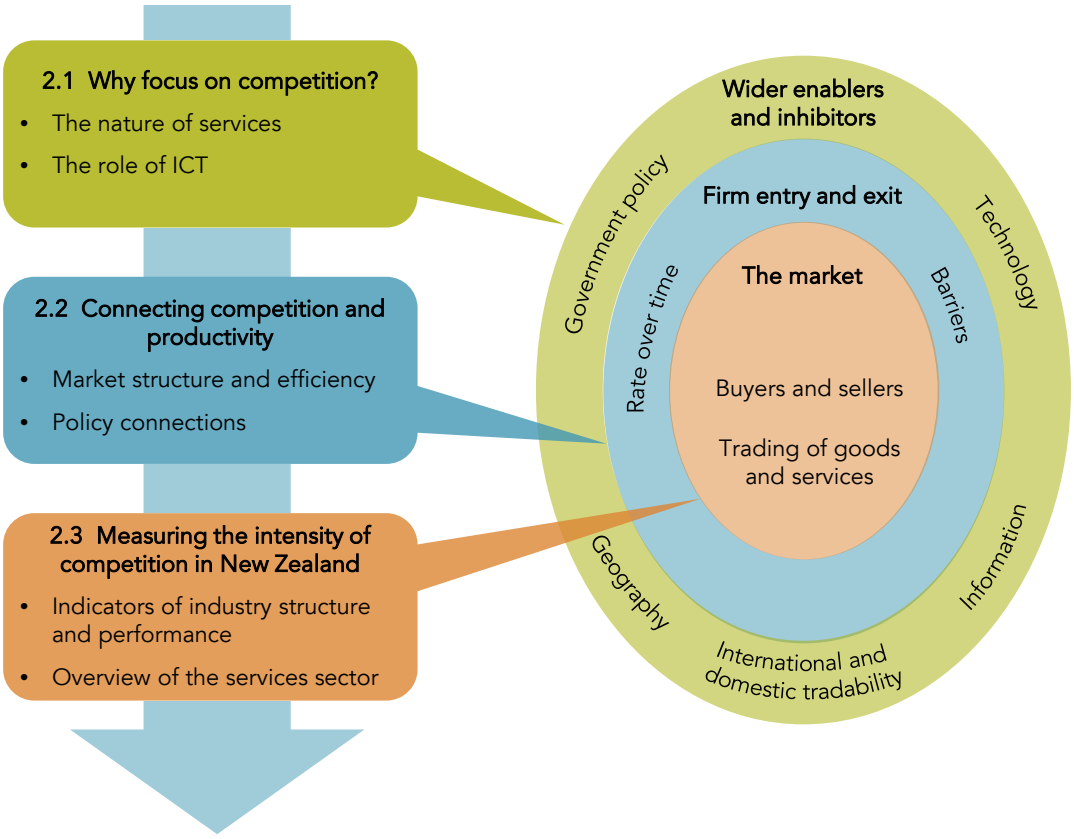
Key points

- Competition lifts the level and rate of growth of productivity. It drives efficient resource use (productive efficiency) and the innovations that sustain productivity growth over time (dynamic efficiency). Competition generates price signals that reflect relative scarcities and consumer preferences and helps to allocate resources accordingly.
- The links between competition and productivity are complex and multi-faceted. The industries within the services sector are also diverse in terms of the characteristics of the services they provide, industry structure, and the production technologies used. So there is a need to tailor competition policy analysis to each services market and industry.
- Even so, there are some general themes:
  - barriers to entry (and exit) can dampen competition and productivity. They generally work against competition and the contribution it can make to lifting productivity;
  - for markets to function well, buyers and sellers need a similar amount of information. If a substantial information imbalance exists in favour of sellers, buyers are less able to "shop around", which dampens competition;
  - information and communications technology (ICT) is transforming the competition landscape. ICT offers the potential to increase intensity of competition, leading to a corresponding boost in productivity across a range of service industries; and
  - most areas of economic regulation bear on, and have consequences for, the intensity of competition in markets.
- New Zealand is a small, remote economy. It is important to foster competition from overseas by avoiding foreign service providers facing unnecessary barriers to trade and foreign direct investment (FDI) and, where appropriate, implementing mutual, or even unilateral recognition of equivalent foreign regulatory standards.
- Overall, competitive intensity is lower in services industries in New Zealand than in goods-producing industries. This relativity is consistent with international experience.
- Of the industries in the services sector, industries where the intensity of competition is relatively weaker are:
  - rental, hiring and real estate;
  - financial and insurance services;
  - retail trade; and
  - professional, scientific and technical services.
- Based on research findings that competition in most circumstances is an important driver of productivity growth, and the specific finding of low intensity of competition in many service industries in New Zealand, scope exists to sharpen competition in these industries. Taking action to do so is desirable when opportunities arise that will yield net benefits.

This chapter introduces the Commission's analysis of the competition issues identified as bearing on productivity in New Zealand's services sector. First the chapter recaps on the relevant analysis in the Commission's 1st interim report (NZPC, 2013) and reviews the conceptual and policy links between competition and productivity. The chapter then presents some evidence on the comparative intensity of competition in New Zealand industries, including within the services sector.

Figure 2.1 is a schematic overview of the scope of this chapter. Sections 2.1 and 2.2 discuss the competitive market process and how it affects productivity. Section 2.3 presents empirical evidence on the intensity of competition in New Zealand service industries, using a range of available indicators.

Figure 2.1 Chapter overview



2.1 Why focus on competition?

Over the past two decades, evidence has mounted that intensity of competition is a key influence on productivity. In a large-scale survey of this literature, Ahn (2002) concluded that many empirical studies confirm that the link between product market competition and productivity growth is positive and robust. In a more recent review of the evidence on the relationships between competition, competition policy, and economic growth, the OECD (2013a, p. 3) concluded that:

> [I]t is clear that firms facing more competition experience faster productivity growth…this has been confirmed in a wide variety of empirical studies, on an industry-by-industry or even firm-by-firm basis…The main reason seems to be that competition allows more efficient firms to enter and gain market share, at the expense of less efficient firms. Regulations or anti-competitive behaviour preventing entry and expansion may therefore be particularly damaging for economic growth.[2]

Given that service industries make up over 70% of the economy, and that services are widely used as inputs to production in the primary sector and goods-producing sector, the intensity of competition in the services

[2] The empirical and conceptual links between competition and productivity have been studied mostly at the level of firms or industries, rather than at the level of the macro economy. One example of an empirical study, now a classic reference, is Nickell (1996). See also Ospina & Schiffbauer (2010) for more recent evidence on the empirical links between competition and productivity, and Vickers (1995) for a conceptual discussion.

sector has an important bearing on productivity in New Zealand's economy (NZPC, 2013, Bourles et al., 2010).

What is it about services that can diminish competition?

Certain characteristics of services, compared with goods, can diminish the intensity of competition in markets for services (NZPC, 2013).

Information asymmetry

One characteristic is a tendency for sellers of services to have better information about what is on offer than potential buyers. Economists refer to such an imbalance in knowledge and experience as information asymmetry. It can seriously impair the functioning of markets (Akerlof, 1970). As put by Vickers (2003, p. 5):

> Competition cannot work effectively unless customers are reasonably well informed about the choices before them. Uninformed choice is not effective choice, and without that there will not be effective competition.

While some information asymmetry between sellers and buyers is present in most markets, including in most goods markets, it tends to be more acute where the product is intangible, as in the case of services. Where this is the case, it is less easy for the buyer to "check out" what they are buying, and it can be difficult to obtain remedies when "things go wrong" (NZPC, 2013).

That may not matter much in the case of simple services that people buy routinely. In these cases, a bad experience is of limited consequence, and buyers can quickly adapt their choice of supplier. Consequently, sellers face strong incentives to maintain a reputation for providing value that is at least as good as that provided by rival firms. So intensity of competition is maintained, despite the imbalance in the information available to buyers and sellers. This is clearly evident in markets such as cafés and hairdressing services.

In the case of markets for things purchased infrequently, and that are more complex, an imbalance of information between buyers and sellers is a larger problem. One bad experience can have large consequences, such as poor service from a real estate agency. The market disciplines that come from buyers being able to switch between competing suppliers are less strong, such as in the case of legal services. Where a service is purchased infrequently, the buyer needs to establish the reputation of the seller. Occupational licensing can help, but licensing requirements can also create barriers to entry, and lessen competition within occupations that are subject to those requirements. By contrast, mechanisms that help disseminate information to the market about the price and quality of the service on offer can help buyers to compare value and also stimulate competition (Vickers, 2003).

F2.1 For markets to function well, there needs to be reasonable symmetry in the information available to buyers and sellers. If information is much more in favour of sellers, buyers are not well equipped to shop around, and this dampens competition.

Localised markets

Another characteristic of some services is a need for the buyer and the seller to be in the same place when the service is delivered. This occurs with services that can be delivered only in person, such as dental services. Face-to-face interaction between the buyer and seller tends also to be required in complex transactions, such as most professional services. Because the cost of transporting people generally is greater than for goods, markets for services that require this co-location tend to be more "localised" than those for most goods (NZPC, 2013). This means that complex services are less amenable to being traded over distance. Where this is the case, service suppliers in one location are less exposed to competition from those located some distance away. Even in a city, the size of the market can limit the number of service providers, such as airport services and specialised legal and engineering services. The markets for those services are likely to feature less intense competition than exists in goods markets.

Yet some services can be provided over distance, in some cases more readily than goods can be transported. Examples include most financial services (although loan applications may involve an interview, requiring face-to-face interaction), and telephone and internet services. Also, wholesaling and some

transport services, by their very nature, operate on a broader scale nationally and internationally. So, while some markets for services tend to be quite localised, others are wider in their geographic scope. Also, in some local service markets competition may be quite intense, such as the numerous cafés and takeaway outlets in most cities and large towns.

Geographic barriers also bear on international trade in services, not least for New Zealand given that it is a small and remote economy. As for most countries, New Zealand's recorded imports of services are low compared with imports of goods. Imports of services make up about 25% of total imports (Statistics New Zealand, 2013). Further, more than half of these imported services are travel and transport (tourism) that is purchased overseas, rather than foreign firms that compete directly with New Zealand firms. (Overseas transport and travel offer some competition for New Zealand-located providers of those services. But, given that local travel and overseas travel are, to some extent, substitutes, the real level of substitutability is quite low in some parts of the market.)

Two examples of services where service firms located overseas compete more directly with New Zealand service providers are the lending services of foreign banks to large New Zealand corporations,[3] and the provision of insurance and some business services direct to New Zealand clients. Of course, New Zealanders also use the services of foreign airlines, which on some routes compete with Air New Zealand. But overall, a large proportion of service providers located in New Zealand face relatively little competition from overseas firms.

One main way that foreign service providers compete in New Zealand markets is by establishing a FDI presence in New Zealand. Foreign firms need a domestic presence to be able to deliver many forms of service within New Zealand. For example, foreign firms need a local presence to provide domestic transport, postal and warehousing; accommodation and food; rental and hiring; and (most) health care and social services. They generally also require a presence to deliver services that rely on a national network, such as inter-bank payments and telecommunication services (Bourles, 2010). Data is not available on how many services purchased within New Zealand are sourced from foreign-owned establishments (Meehan, 2013). [4] Yet substantial foreign investment in New Zealand is evident in the financial and insurance; retail; and information, media and telecommunications industries. The OECD notes that, internationally, the value of services supplied by FDI affiliates is probably greater than the value of services traded across borders (OECD, 2013b).

Assessing how much service providers within New Zealand face overseas competition is not easy. Recorded imports of services overstate and understate the competition. They include travel services provided in foreign markets, and exclude services that FDI establishments provide in New Zealand.[5] They do not include the foreign services embedded in imported goods (OECD, 2013b). But if imports into New Zealand, like exports from New Zealand, have a high services content (NZPC 2013), then foreign service providers do in a sense compete indirectly with local service providers via that channel. OECD (2013a) observes that this indirect contribution of services to international trade "helps to resolve the long-lasting paradox on why services are only responsible for, at best, one quarter of OECD exports while they account for three-quarters of value-added and employment in OECD economies. The reason is that the majority of services exports go un-noticed in official trade statistics as they are included in manufacturing exports" (p.2).[6]

Even so, many New Zealand service providers are sheltered from international competition. This is a result of New Zealand's distance from foreign markets and the small size of the New Zealand market. For services that require face-to-face interaction, travel costs create a barrier to cross-border trade. And the small size of the New Zealand market makes it less attractive for foreign service providers to undertake FDI in New Zealand compared with in larger markets. Also, foreign firms that supply services cross-border or with an FDI presence face ongoing barriers "behind the border". These barriers arise from the costs of having to comply with different regulatory standards across countries. And where a domestic presence is needed to

[3] Although where foreign bank lending is syndicated through local banks it is as much a complement to, as in competition with, lending by local banks.
[4] The value of services provided by FDI establishments is not included in balance of payments data for imports. Rather, it counts as domestic output.
[5] See Box 2.4 and Figure 2.3 in NZPC, 2013, for an explanation of the different modes for international trade in services.
[6] Despite this, since the early 1990s, recorded services exports, globally, have been growing faster than the growth of manufacturing exports (OECD, 2013b).

deliver the service, FDI screening requirements and restrictions can create barriers to entry. So, while services use multiple modes to trade internationally (which mean they are more tradable than may first appear), multiple barriers exist to international trade in services. These barriers shelter domestic services markets from foreign competition, particularly in the case of New Zealand.

ICT is transforming the competition landscape in the services sector

Advances in information and communications technology (ICT) – in particular the internet – is changing the landscape for how some services are delivered domestically and across borders. The internet has opened up services markets in a variety of ways.

The internet has opened some services markets to competitors who deliver services from a distance. Retail trade and transactional banking services are two examples. It is now possible to shop and bank over the internet. This means users of those services located in Invercargill can buy banking services from a bank based in New Plymouth, or retail services from a shop in Auckland. Providers (of those services) located in Invercargill are exposed to competition from outside the region and so face greater competition.

Similarly, the internet is opening up some service industries to greater overseas competition. For example, firms providing business support and administration services face greater competition as New Zealand businesses can outsource and "offshore" back-office functions. Advances in ICT have created the ability to email documents, video-conference, and use "cloud computing" services. They also mean that some professional services are now provided from overseas.

Some retail services face increasing competition from foreign suppliers. Examples include retailers of books and music (which now can be bought or downloaded online), and retailers of clothing, footwear and other products. Just-in-time inventory management systems also now mean that foreign suppliers can provide some wholesaling services rather than local wholesalers.[7] These developments provide new sources of competitive pressure for the New Zealand retail and wholesale industries, and sources of productivity gain. For example, productivity gain is reflected by a marked fall over the past two decades in the ratio of inventories to value-added – from 1.8 in 1985 to 0.8 in 2005 (see Box 7.4).

These developments are also giving rise to some policy challenges, such as banks' outsourcing and "off-shoring" some operations, and the non-collection of GST on online overseas retail purchases. In addressing these kinds of policy issues, it is important to count in the relevant cost-benefit analyses the benefit of foreign service providers stimulating competition in New Zealand service markets.

ICTs are also changing service market landscapes by expanding consumers' access to information on service providers. Service providers are using internet sites to disseminate information on the services they provide and the fees they charge. These are often combined with online purchase or booking facilities, as in the case of many airline and accommodation sites. Other internet sites provide comparative information on the services provided by competing firms. By reducing the effort required to identify and compare firms, and sometimes making it easier to change providers, comparative websites help service consumers shop around for the best value. Some of these comparative sites also enable those who have used a service to provide feedback on their experience, or initiate, online, a switch from one service provider to another. These developments carry considerable potential for addressing the information asymmetries and transaction costs that inhibit competition in, and the functioning of, some service markets.

F2.2 The internet is transforming the landscape for the delivery of many services. These developments have considerable potential to address the information asymmetries, and search and switching costs that inhibit competition in, and the functioning of, a number of service markets.

[7] How much extra competition from foreign retailers and wholesalers (distribution centres) is leading to increased "imports" of those services is not captured in the data on imports of services. Rather, the value of those services is included in the cost of the imported goods (mode 5 in Box 2.4 in NZPC, 2013).

The remainder of this chapter examines further the links between competition and productivity, in the particular context of the services sector of the New Zealand economy. Two areas where the Commission has identified scope for the Government to take concrete policy steps – search and switching costs and competition law – are explored in Chapters 3 and 4. This chapter has already noted the strong interconnections between competition and the use of ICT. The role of ICT in boosting productivity in the services sector is addressed more comprehensively in Chapters 5 to 9.

2.2 Connecting competition and productivity

Competition relates to the intensity of the rivalry among firms in a market (Stigler, 1987). The scope of a market is defined in two dimensions: by its participants (buyers and sellers) and by its product (what is being bought and sold). Product markets can be defined narrowly (for example, taxi services) or broadly (for example, transport services). Similarly, the geographical scope of a market can be defined narrowly (taxi services in Wellington) or more broadly (taxi services in New Zealand). The markets of interest to competition analysis generally are for similar products that are closely substitutable, and markets within which buyers and sellers can actually transact. So the market for taxi services might be defined to include shuttle bus services, but not limousine services, and the markets for taxi services in Auckland and Wellington might be considered separate markets.

Productivity is defined as output per unit of inputs employed. Two widely used measures are labour productivity (output per unit of labour employed) and multi-factor productivity (output per combined unit of labour and capital employed). Competition contributes to higher levels of, and rates of growth in, living standards by increasing productive, allocative and dynamic efficiencies (See NZPC, 2013, Box 2.2 for further detail on these concepts of economic efficiency and how they relate to productivity). Competition does this by creating incentives for firms to operate at least cost (productive efficiency), by delivering price signals consistent with relative scarcities and consumer preferences (allocative efficiency) and by creating incentives to innovate.

The concept of competition is not one-dimensional. For example, competition can be understood in relation to the structure of markets, and how existing firms behave *within* those markets; and in terms of competition *for* a market. The following subsection explains these concepts of competition and their implications for the efficiency of markets and productivity.

Market concentration, competition and productive efficiency

A starting point for competition analysis is the textbook comparison of a perfectly competitive market with a market that has a single supplier – the case of monopoly. A perfectly competitive market is one with many competing firms, none of which has any market power. In other words, it is a market where all firms are price takers. Sufficient conditions for perfect competition are that firms sell an undifferentiated product, the market is fully informed, and there are no transactions costs or barriers to entry or exit of firms. A monopoly, by contrast, is a market where a single seller can set the market price. A firm with monopoly power maximises its profit by selling at a higher price, lower output, and a generally higher unit cost.

While real-world market structures invariably lie somewhere between perfect competition and monopoly, the textbook comparison provides a useful analytical benchmark. Intermediate market structures include oligopoly (markets dominated by a small number of sellers), monopolistic competition (a market comprising firms selling similar but differentiated products, giving each firm a degree of pricing power, but with low barriers to entry that temper that pricing power) and a dominant firm with a competitive fringe (again with the latter tempering the market power) (Carlton and Perloff, 2005).

How close actual markets come to having the attributes of these theoretical structures depends on the particular features of each case. In some circumstances, what appears to be a dominant firm (for example due to large market share) may actually have little market power. This can be the case where other firms could readily enter the market. Such a market is often described as being "contestable" rather than "competitive". Conversely, the intensity of competition in a market comprising many sellers may be lower than it appears. This can be the case where new entrants face high barriers to entry, or where participants are acting in ways that lessen competition. This action may take the form of price collusion or using

customer contract terms that limit a customer's ability to switch to another supplier. For these reasons, each market must be analysed on its merits (Davies et al., 2004).

Competition, allocative efficiency and dynamic efficiency

Further complicating any analysis of how competition promotes productivity is that the textbook models of different market structures adopt a "comparative static" approach. This means that the models compare the pricing and production behaviours of firms in one equilibrium with those in another. They focus on perfectly competitive and monopoly markets as alternative "states" of competition, rather than on competition as a process (Vickers, 1995). As such, the textbook models do not take account of how competition can affect firm behaviours dynamically, nor of how real-world economies display "flux, uncertainty and disequilibrium" more than a "tranquil equilibrium state" (Vickers, 1995, p. 7).

One way that competition creates dynamic change is by pressuring managers of firms to maintain efficiency in production (Nickell, 1996, Pilat, 1996). The closer a market is to being perfectly competitive, the more elastic is the demand facing any individual firm (Nickell, Nicolitas & Dryden, 1997). So firms in intensely competitive markets are pressured to keep up with the productivity leaders. These firms face greater exposure to loss of market share if, to cover their higher costs, they raise prices above the "going price". They also face greater exposure to financial loss if, due to intensity of competition, they are restrained from raising prices. Such outcomes are often called the *within firms* effects of competition (Syverson, 2011, Office of Fair Trading, 2007).

The pressures within a competitive market also drive productivity growth through another important mechanism – the reallocation of resources from less productive firms. These firms then lose market share while the more productive firms gain market share. This outcome is often called a *between firms* effect. The shifts in market share help to boost the level of productivity, in the aggregate, even without a boost in productivity within firms (Office of Fair Trading, 2007).

Markets that experience intensive competition are also associated with innovation. Firms that work in an intensely competitive market are incentivised to innovate to escape that competition (Arnold, Nicoletti & Scarpetta, 2008).

This innovation can take various forms. For example, a firm can innovate so as to reduce its costs, improve its distribution arrangements, or improve the quality of, or otherwise differentiate, its product. So competition need not always focus solely on price. And it can be a process that plays out over time, including as the result of firms adapting their innovation to answer competitor innovations (Davies et al., 2004). Increased competitive pressures provide opportunities and incentives for firms to upgrade capital stock and adopt new technologies (Arnold, Nicoletti & Scarpetta, 2008).

Markets that experience less intense competition (and where firms may earn higher rates of return or *rents*) can also be a source of innovation. As long as barriers to entry are low, non-incumbent firms could innovate and capture some of the market and so some of the available rents. In such cases new entrants and their innovations intensifies competition in the market. This is sometimes called competition *for* the market, as distinct from competition *within* the market.

A trade-off between competition within and for the market is possible. While greater competition and consequential reduction in market rents creates incentives for existing firms to innovate to escape competition, it can also reduce the incentives for new entrants to compete *for* the market. Using this analysis, the optimal intensity of competition to foster innovation is high but not too high (Office of Fair Trading, 2007; Syverson, 2011; Aghion et al., 2005).

Box 2.1 **Some competition concepts and terminology**

Rivalry between firms can manifest itself in different ways, and with different effects. This box explains some of the differences with a view to avoiding confusion.

Firms can compete **within** a market and **for** a market.

- Competition within a market refers to rivalry among its incumbent firms.
- Competition for a market refers to competition from new entrants. New entrants may be actual new entrants, or potential new entrants. Potential new entrants affect a market without actually entering it (such markets are often called "contestable" rather than "competitive").

The effects of competition can be evident **within** firms and **between** firms. Greater intensity of competition can result in:

- increased pressure within firms to reduce "slack" and improve productive efficiency; and
- shifts of resources from firms of low productivity to firms of high productivity in response to them offering better value for money to customers.

These concepts are not mutually exclusive; they overlap and can be useful in understanding the competitive forces at play in a market.

Source: Office of Fair Trading, 2007, p.12.

Policies that affect competition

The policy areas most directly connected with competition are the regulation of:

- mergers and acquisitions that could result in firms gaining excessive market power;
- contracts, arrangements or understandings that substantially lessen competition;
- natural monopolies; and
- anti-competitive behaviours (such as by a firm that has a dominant position in a market, or in customer contract terms that seek to lessen competition).

In New Zealand these areas of "competition policy" are framed mainly in the Commerce Act 1986 and administered and enforced by the Commerce Commission as competition regulator and the courts. Some issues relating to these policies are examined in Chapter 4.

Buccirossi et al. (2013) developed a set of indicators of the institutional and enforcement features used by the competition authorities of 12 OECD countries to deter anti-competitive behaviours. They found a significantly positive relationship between those indicators and multi-factor productivity growth.

Most other areas of economic regulation also influence the intensity of competition in markets in some way and to some degree. Often this happens by raising or lowering barriers to firms entering or exiting a market (OECD, 1997).

Examples of economic regulation that can have a bearing on the intensity of competition in markets are environmental regulation and occupational regulation. In environmental regulation, the New Zealand Resource Management Act 1991 was amended in 2009, with a new Part 11A to make it clear that the Act is not to be used to oppose or restrict competitors or potential competitors. Before Part 11A, firms commonly objected to any competitor's application for resource consents. They apparently did so not for environmental reasons, but to stifle competition. In another example, deregulation of the taxi industry in the late 1980s expanded the number of, and increased competition among, taxi service providers. Conversely,

the recent introduction of licensing requirements for real estate agents and financial advisers may result in some lessening in the intensity of competition in the markets for those services.

As already noted, government policies can also lessen the intensity of competition that domestic services industries face from overseas. Foreign firms that provide services to international markets may need to comply with different regulations in each country. This process can form a cost barrier, particularly in the case of small markets. Mutual, or unilateral, recognition of foreign standards, where these are substantially equivalent to or better than local standards, provides an approach to avoiding unnecessary barriers to competition from foreign service providers.

Box 2.2 **Perspectives on opening up New Zealand service markets to greater foreign competition**

Submitters to the inquiry have expressed a range of views on the desirability of New Zealand taking more steps to open its services markets to greater competition from foreign suppliers. Some arguments focus on a greater recognition of foreign qualifications; others focus on bringing New Zealand regulations more in line with overseas regulations to reduce barriers for foreign suppliers.

> The entry of skilled aviation personnel into New Zealand is very much determined by the Civil Aviation Authority. In general they do not operate a permissive environment. For example it is virtually impossible for a pilot or mechanic from the United States to gain entry into New Zealand. With Canadians and Australians there is much greater flexibility however all personnel hold international licences. Their training establishments are regularly audited by the regulatory equivalent of the Civil Aviation Authority so one wonders why there is this very different standard. (Aviation Industry Association of NZ, sub. 13, p. 9)
>
> There could be significant productivity benefits in looking to align particular regulatory developments in the Australian and New Zealand insurance industries, to help drive cross-border investment. (Insurance Council of New Zealand, sub. 11, p. 3)
>
> Just as it is in New Zealand's interests to achieve access to overseas services markets, unilaterally opening up New Zealand's domestic services industries to international competition will be beneficial to New Zealand. This would not only benefit consumers of domestic services but would make our services sectors more competitive and productive. (New Zealand Chambers of Commerce, sub. 14, p. 4)
>
> We could not support unilateral recognition of overseas occupational licences. Many occupational regulations embed local requirements (e.g. competency in earthquake engineering for structural architects, cultural sensitivity for carers). Each case has to be considered in context and requires broader consideration than purely commercial imperatives which appear to be the limit of the report. (New Zealand Council of Trade Unions, sub. 113, p. 3)

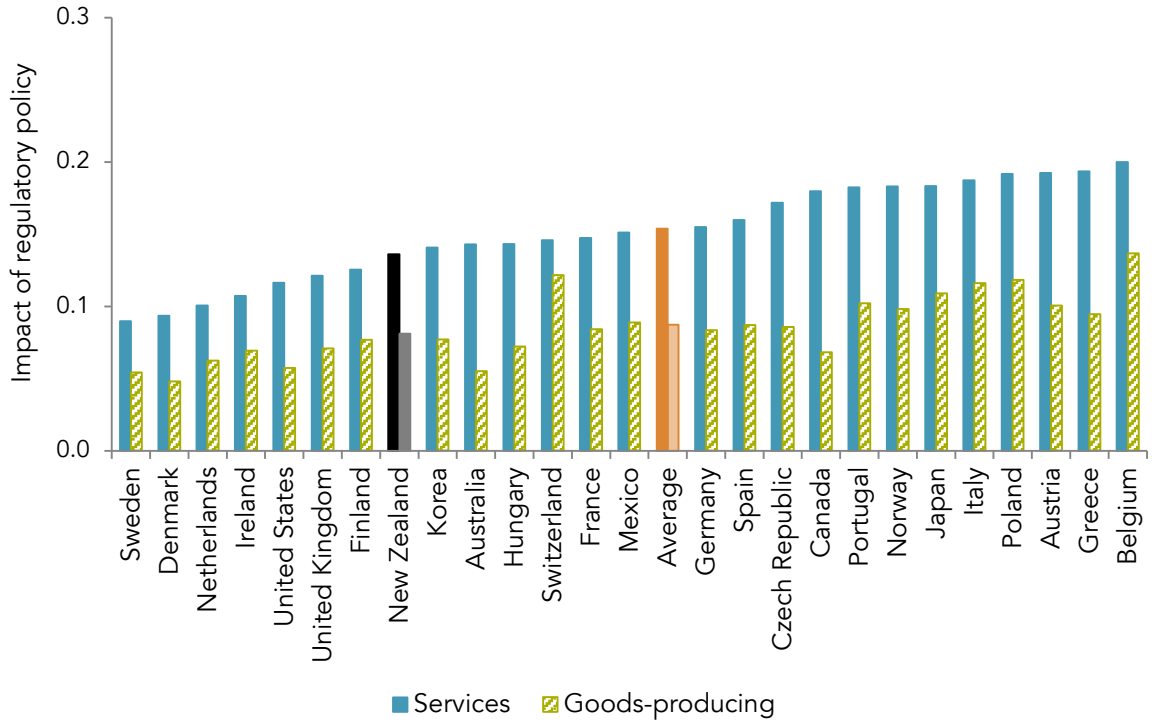
Restrictions on, or screening procedures that deter FDI in the New Zealand services sector may also negatively affect competition. Barriers to FDI in the services sector are, for trade in services, equivalent to tariff and quota barriers to international trade in goods. The Commission's joint study with the Australian Productivity Commission (APC) on Strengthening Economic Relations between Australia and New Zealand identified differences in regulation, and (in particular New Zealand's) FDI screening requirements as two main barriers to achieving greater integration of the trans-Tasman markets (APC & NZPC, 2012).

F2.3 Exposure to foreign competition makes an important contribution to the intensity of competition in New Zealand services markets. Barriers to such competition include barriers to foreign firms establishing a local presence from which to provide services in New Zealand (mainly foreign direct investment screening requirements, and behind-the-border regulatory barriers that foreign firms face from having to learn about and comply with New Zealand regulations).

F2.4 New Zealand does not recognise some licences to practice held by foreign service providers even when these licences are based on equivalent or better standards than the corresponding New Zealand standards. Improving recognition of overseas qualifications would remove a barrier to competition. Where foreign standards fail to meet New Zealand standards in a narrow and specific aspect, New Zealand could still substantially remove the barrier by confining its requirements to that aspect.

The OECD has constructed a composite measure of the "competition-friendliness" of economic regulation by OECD member economies. Conway & Nicoletti (2006), using this indicator, highlight various points from this international evidence that are relevant to the Commission's current inquiry into boosting productivity in the New Zealand services sector. They show that, across countries, the extent and type of regulations affecting the services sector consistently weigh more heavily on competition than those affecting other sectors of the economy (Figure 2.2 and Box 2.3).

Figure 2.2 Impact of regulatory policy by country and sector, 2007



Source: OECD International Regulation Database.

Note:

1. The OECD's indicators of regulation impact (RI) are sectoral indicators that measure the negative "knock-on" effects of regulation in non-manufacturing industries on competition across all sectors of the economy, and range from zero to one. The OECD calculated the most recent indicators for 38 ISIC rev3 subsectors in 29 OECD countries, with the impact of regulations weighted by input-output tables.

Box 2.3 **Measuring the restrictiveness of regulation**

The OECD has developed a range of cross-country indicators to assess how much policy settings promote or inhibit competition in areas of the product market where competition is viable. These indicators provide the widest coverage of industries and regulatory areas and the longest time-series currently available for comparing product market regulation across countries. They have been used extensively when analysing regulatory policies in OECD countries.

The indicators summarise information in four main areas: state control, barriers to entry, government

involvement in business operations and, in some cases, market structure.

The information summarised by these indicators is objective, as opposed to survey-based, and consists of rules, regulations and market conditions. All regulatory data is vetted by OECD member country officials and OECD experts. The indicators are calculated using a bottom-up approach where the regulatory data is quantified (using an appropriate scoring algorithm) and then aggregated into summary indicators. While this approach involves some discretion, notably in choosing scores and aggregation weights, it has the merit of transparency and makes it possible to trace each indicator value to the underlying detailed information about policies and market conditions.

The resulting indicators of non-manufacturing regulation cover the energy, transport and communications industries over the 1975-2008 period, and the retail distribution and professional services industries for 1998, 2003 and 2008. In addition, indicators of the "knock-on" effects of anti-competitive regulation in these sectors (and the finance sector) on sectors that use the outputs of these sectors as intermediate inputs are also calculated.

These indicators are complementary to the OECD's indicators of economy-wide anti-competitive regulation. All indicators are updated on a regular basis and their values and background documentation are publicly available at www.oecd.org/eco/pmr.

Source: Conway, Janod & Nicoletti (2005); Conway & Nicoletti (2006).

Conway & Nicoletti (2006) estimate that the OECD member countries with the least competition-friendly economic regulation forego nearly 25% of the benefit from a productivity improving shift in technology (compared with countries with economic regulation that restricts competition the least). They propose two channels that may explain this result: less ICT investment, particularly in the services sector; and curbs on establishing local affiliates by multi-national firms, through which much technology diffusion takes place.

Comparing the decades 1988-1997 and 1998-2007, OECD data shows that economic regulation in the services sector that is less competition-friendly is associated with lower labour productivity (Figure 2.3).

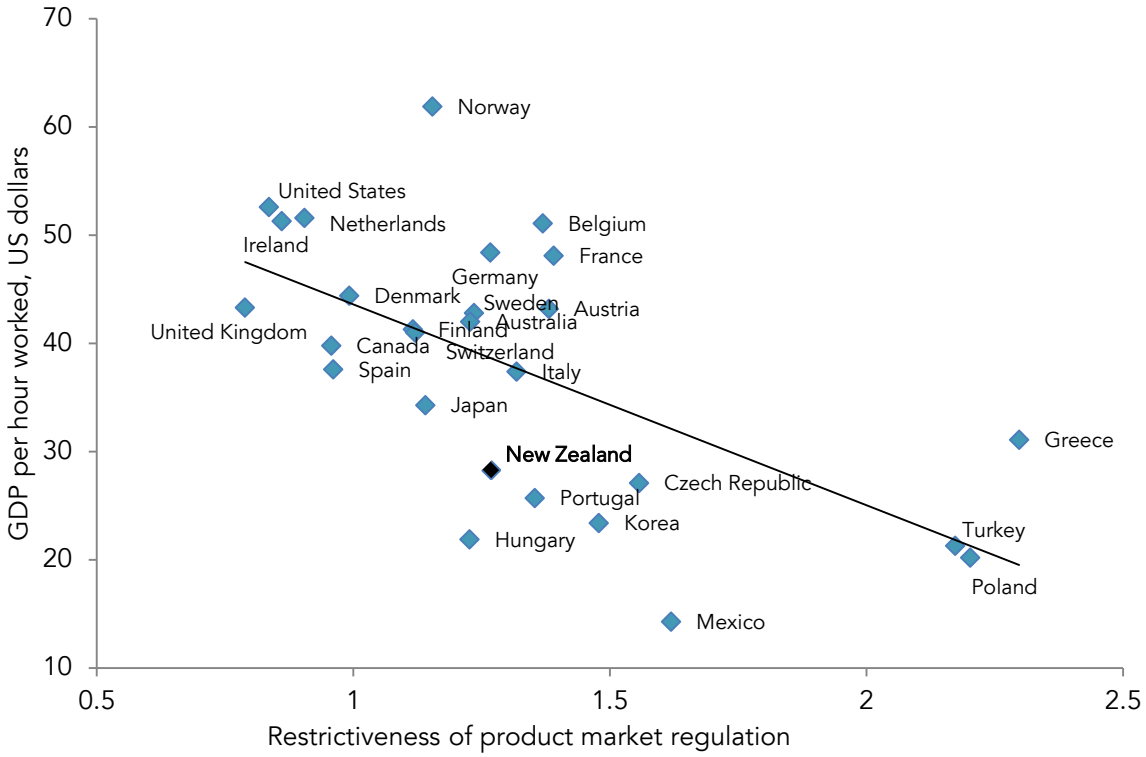
From this data, Conway & Nicoletti (2006) conclude that:

> …restrictive (ie, anti-competitive) product market regulation slows the process of adjustment by which positive productivity shocks diffuse across borders and new technologies are incorporated into production processes [and that] …in all the countries included in the study, the detrimental effect of anti-competitive regulation is larger in sectors that produce or use ICT intensively (notably retail distribution, banking and business services) (p. 40).[8]

That said, it bears emphasising that regulation that restricts competition is not always a "bad thing"; sometimes it can foster productivity and greater economic wellbeing. For example, patents can provide monopoly rights, for a time, to new technologies. In effect, this "prohibits some kinds of competition in production in order to stimulate competition in innovation" (Vickers, 1995, pp. 4–5). Vickers (2003) also notes that "it cannot be taken for granted... that product-market competition between firms is necessarily competition to serve consumers well". Vickers cites how firms use advertising to "compete" in making misleading representations as one example of where unfettered competition can harm market efficiency (p.5).

[8] Consistent with this evidence, the OECD advice to member countries generally recommends measures to increase the scope for competition across a broad policy front. A review of its policy advice across 18 countries for the period 2003–2005 has indicated that advice has spanned removal of remaining barriers to international trade and inward foreign direct investment; strengthening competition law; facilitating market access to the retail sector by easing zoning laws; abolishing reserved monopolies (for sales of tobacco and alcohol); limiting the scope of trade associations' self-regulation and easing residency or nationality requirements for professional services; and separating monopoly components from competitive activities in network industries, reducing public ownership, and clearly separating the Government's ownership and regulatory functions (Høj et al., 2007).

Figure 2.3 Restrictiveness of product market regulation and labour productivity, by country, 2008



Source: OECD Productivity Database and OECD International Regulation Database.

Notes:

1. The OECD measures the restrictiveness of product market regulation on a scale of 0 to 6, based on policy assessments of state control of business enterprise, legal and administrative barriers to entrepreneurship, and barriers to international trade and investment.
2. Labour productivity (the y-axis) is measured using OECD data on GDP per hour worked, US dollar, constant prices, and 2005 purchasing power parities.
3. The R^2 value for the trend line above is 0.37, and increases to 0.42 if Greece is removed.

Also, economic regulation is often motivated by concerns that do not relate to competition, such as protecting the public from unqualified or unscrupulous practitioners (for example, occupational licensing). Achieving those objectives may warrant accepting some lessening in the intensity of competition. But where that is the case, the trade-off involved – between the policy objective being pursued and any consequential lessening in intensity of competition – should be based, as far as possible, on an explicit weighing of the benefits and costs (Davies et al., 2004).

F2.5 Most areas of economic regulation bear on, and have consequences for, the intensity of competition in markets.

2.3 Measuring the intensity of competition in New Zealand

Section 2.1 described features of competition within the services sector in New Zealand. Against that backdrop, this section seeks to evaluate the intensity of competition within the sector, with a view to identifying the intensity of competition across service industries and how it compares with competition in non-service industries.

Competition, being multi-faceted and influenced by a number of factors, is difficult to measure (Høj et al., 2013; OECD, 2013a; Pilat, 1996). As already outlined, a number of channels link the intensity of competition to productivity. For these reasons it is important to look across a number of "indicators" of intensity of competition within markets.

This section draws on an important body of research of the Ministry of Business, Innovation and Employment (MBIE). MBIE used traditional and new indicators to investigate the intensity of competition in the New Zealand economy.[9] The Commission has continued MBIE's research by updating the measures with more recent data, and developing new indicators such as the tradability over distance of the output of different industries, and what that implies about the intensity of competition in New Zealand's services sector. The section steps through the various measures of competition intensity and ends by combining these measures to provide an overall picture of the intensity of competition across New Zealand service industries.

A caveat to the analysis that follows is that the statistical measures of intensity of competition relate to industries rather than markets. Although the analysis is based on reasonably granular data (generally at the 2-3-digit level of disaggregation within ANZSIC06), industries are invariably broader than the markets where competition actually occurs (including because industries are national in scope). For example, at the 3-digit level, taxi services are classified within the road passenger transport industry. This industry includes taxi services, and long-distance and urban bus services. Both types of bus service are different to taxi services, and provided in different markets. This means that industry-level indicators are only "broad brush" measures of intensity of market competition. Even so, they provide useful information and can point to where more detailed analysis may be needed.

The tradability of services

The intensity of competition in an industry depends importantly on how open it is to entry by those who can provide the best product at least cost. This applies to goods-producing industries and service industries.

One main barrier to domestic and international trade of some services is the cost of trading over distance. Where these costs are high, such as for services that require face-to-face delivery, markets tend to be localised and less open to competition that can boost productivity. The distance barrier to trade within a country dampens competition and productivity in much the same way as barriers to trade between countries. One motivation for the EU and trans-Tasman "single market" projects has been to better integrate markets across the European Union and Australasia respectively, to achieve greater competition (European Union, 2012, p. 15).

Domestic tradability

Figure 2.4 shows estimates of how much different goods and services are tradable across different locations within New Zealand. The measure is based on the geographic pattern of shipping between suppliers and customers across different regions. For each industry, where the product is consumed is compared with where it is produced.

A large contrast between the production and consumption locations, for example one or two regions supplying all New Zealand, indicates a significant volume of long-distance trade (high domestic tradability). Conversely, if most purchases in an industry occur in the area where the supplier is based, the product may require face-to-face contact between consumer and producers, or transport costs are high (low domestic tradability).

Figure 2.4 shows that services within New Zealand are, overall, less tradable over distance than goods. It also shows that how much service industries are tradable varies considerably. Finance and insurance, and information, media and telecommunications services are more tradable over distance than other service industries, but still fall short of manufacturing, mining and agriculture.

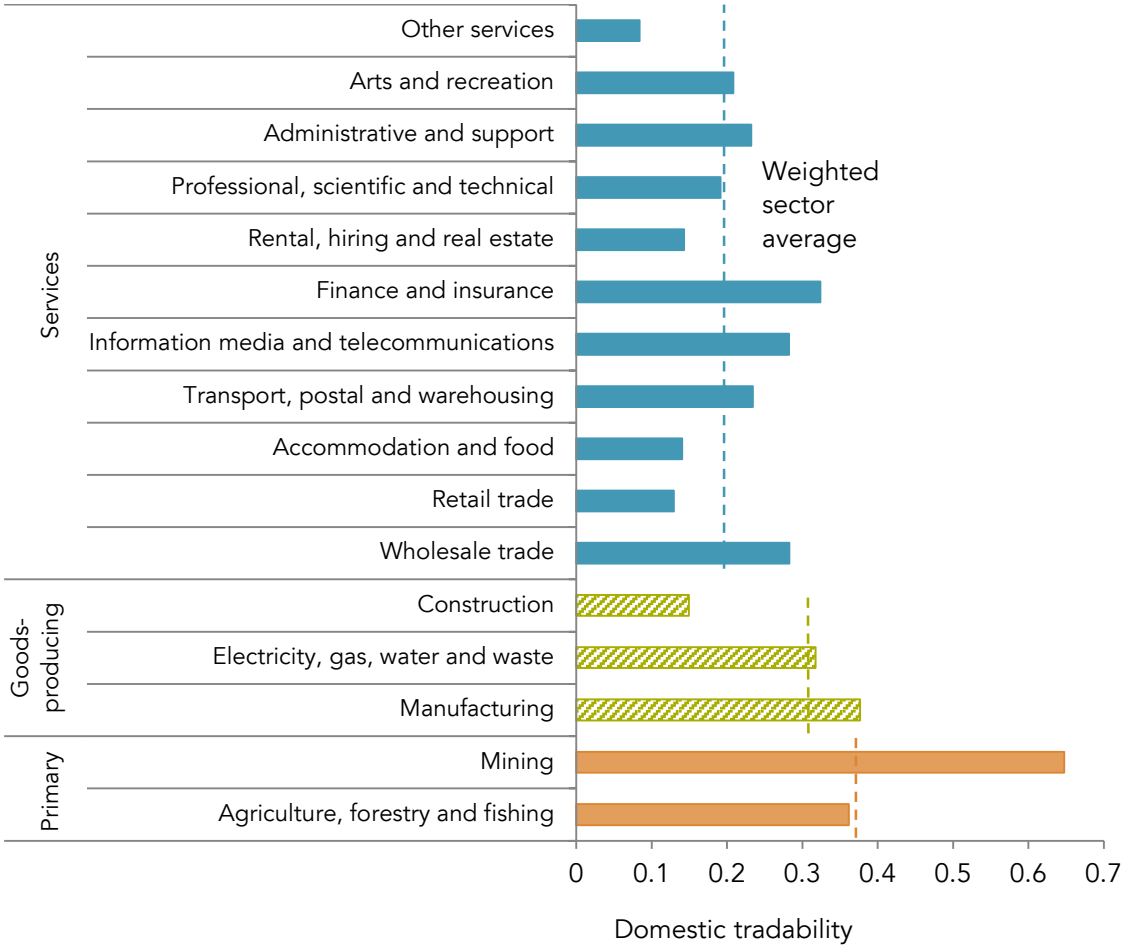
The least tradable industries are wholesale, accommodation and food, retail, and other services. This implies that the markets for these categories of service are quite local. The local markets for some of these industries (such as the accommodation and food industry) typically include many sellers and, in terms of market structure, might be regarded as competitive. Even so, competition is still confined to within that

[9] The MBIE research was funded from the Contestable Departmental Research Pool. The main papers are Devine et al. (2011), Doan et al. (2012) and Devine, Nunns and Stevens (2013). The Commission is grateful to the MBIE researchers for making their code available and for providing advice.

local market. This can lead to lower levels of efficiency or productivity than are evident in larger markets, not so much because they lack intensity of competition but because they lack scale.

As discussed in section 2.1, advances in ICT are significantly changing the landscape for providing many kinds of services over distance. For example, retail services and education services (distance learning) are increasingly available over the internet. In industries where increasing returns to scale prevail, market integration may reduce the number of firms. But these firms would produce a higher level of output at lower per unit cost (a higher level of productivity) (Bottasso, Anna, and Alessandro Sembenelli, 2001). Advances in ICT have implications for competition both within markets and for markets.

Figure 2.4 Domestic tradability by industry, 2007



Source: Commission analysis, New Zealand Longitudinal Business Database, Statistics New Zealand.

Notes:

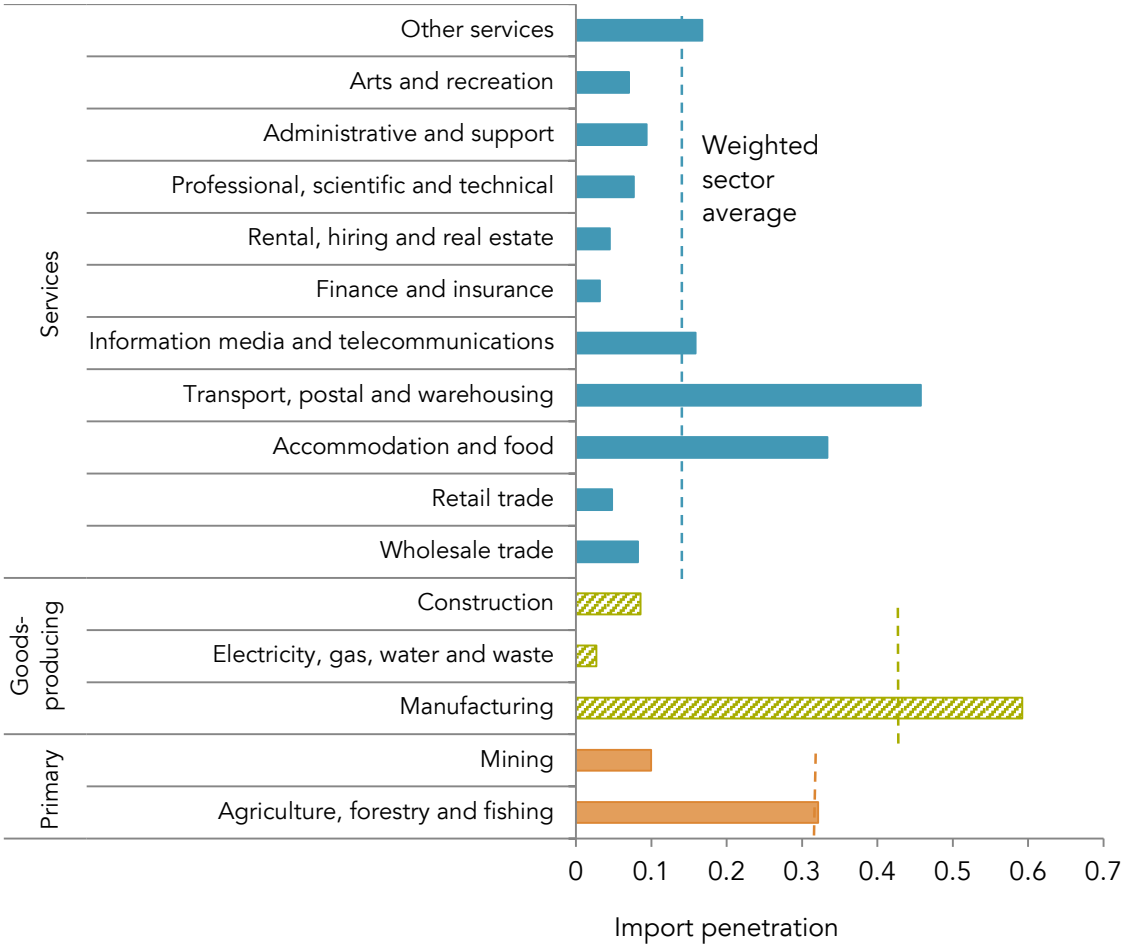
1. Geographic concentrations at 1-digit ANZSIC06 level are calculated as a weighted average of production-weighted concentrations at the 3-digit level. Sector averages are weighted by number of employees.
2. The analysis excluded proprietor-only firms.
3. The location of production is based on regional employment data. Measures of product consumption include final demand from households and intermediate demand from downstream firms.

International tradability

Figure 2.5 shows import penetration across New Zealand industries. Import penetration is measured by the value of imported goods and services in each industry as a proportion of the gross value of locally produced goods and services. The estimates indicate how much business and household users (of the output of an industry within New Zealand) can access overseas substitutes. Effectively this means the extent that imports compete with the domestic industry. Fewer imports in the local market is a sign that local producers face little competition from overseas firms.

It is evident that the penetration of imports into New Zealand's services industries, overall, is low compared with the penetration into manufacturing and agriculture, forestry and fishing. As noted above, to a large extent this result is inherent in the nature of services – most of which cannot be delivered in the New Zealand market without the service provider establishing a presence in New Zealand. The two main exceptions are, or are increasingly becoming, business services and retailing. The transport, postal and warehousing industry includes spending by New Zealanders on international air travel.

Figure 2.5 Import penetration by industry, 2007



Source: Commission analysis, Statistics New Zealand.

Notes:

1. Industry categories are based on 2–3 digit ANZSIC06 industry categorisations.
2. Input-output tables are used to identify the intermediate and final consumption of imports. Export spending is excluded from the calculations of gross domestic production.

In interpreting this low level of import penetration, one needs to take account of how much foreign firms with a local presence compete with domestic firms (for example, international finance and insurance companies with a subsidiary based in New Zealand). One also needs to examine how services are embodied in imported goods. A switch from sourcing wholesale and retail services from local firms to foreign firms is not reflected in the statistical measure of imports of services. Those imported services are embodied in, and recorded as part of, the import of a good.

Firm entry and exit

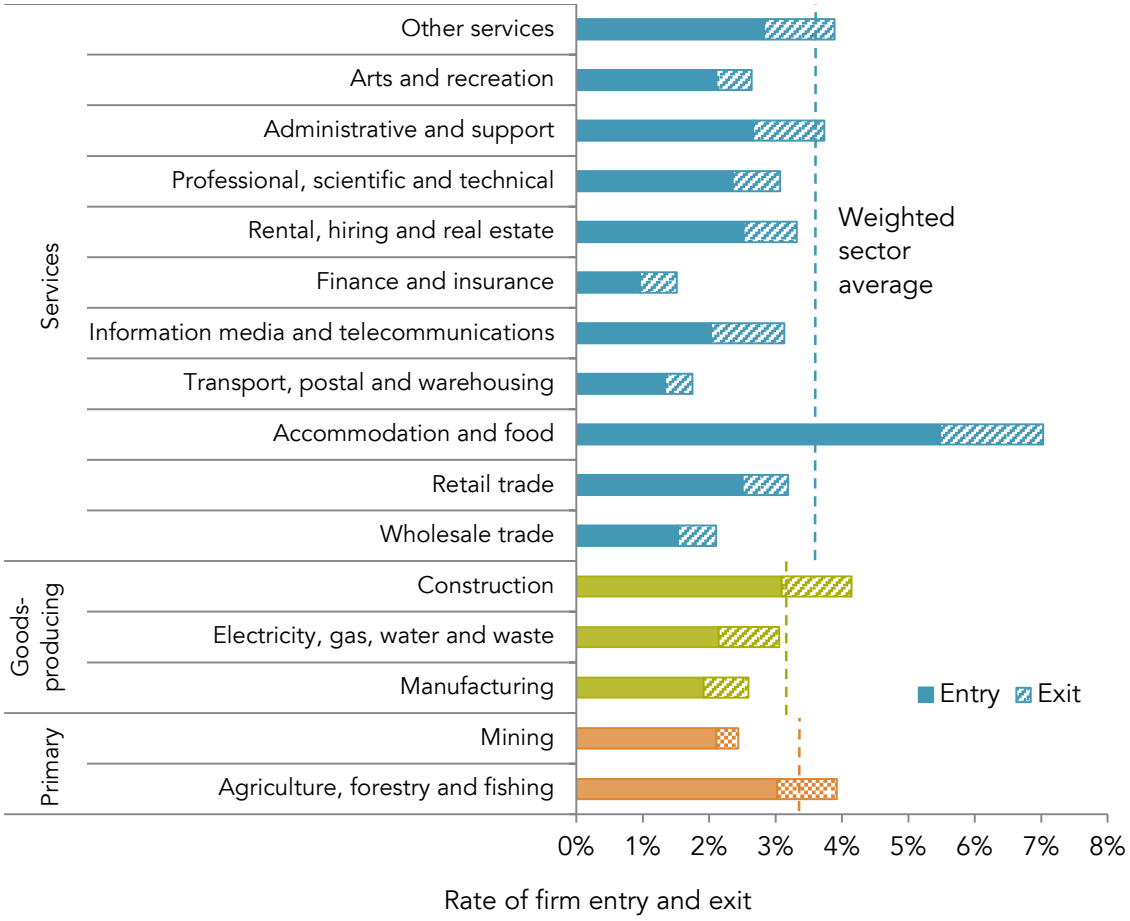
The rate that new firms enter into, and existing firms exit from, an industry is another indicator of intensity of competition. Low rates of entry can signify that barriers to entry are present. These barriers can take the form of licensing or official-approval requirements, or investment risk as a result of the firms knowing the costs of exiting an industry when they enter it. Firms with market power may also create barriers to entry. The firms have the resources to deter rivals from entering the industry (Nickell, 1996).

Low rates of exit can be a sign that competition is not sufficiently intense to force the least productive firms from the industry, or that there are barriers to exit. An example of a barrier to exit is where, if a firm is to cease providing a particular service, it must forfeit a licence that is valuable because the authorities limit the number of licences issued. Where this is the case, firms with low productivity may choose not to exit, and so deny firms with higher productivity the chance to enter the market.

A low rate of entry to and exit from an industry can also indicate low rates of innovation. Some innovation comes from incumbent firms as they try to outpace each other or at least maintain their market shares. But an important source of innovation comes from new entrants that innovate and compete with incumbents. Of course not every new entrant is an innovator, let alone a successful innovator. But low rates of entry and exit could indicate barriers to the vital processes of innovation and renewal.

Figure 2.6 provides data on the rates of firm entry and exit, by industry, over the period 2000-2010. Again, divergence is evident across industries. The services sector includes the industry with the highest rate of entry and exit (the accommodation and food industry) and the three industries with the lowest rates of entry and exit (finance and insurance; transport, postal and warehousing; and wholesale trade). Low rates of entry to and exit from the financial industries in part reflect the stability that customers and regulators expect. But the low rates of entry and exit for the distributive (transport, postal, and warehousing, and wholesale trade) industries are less easily explained and may point to low intensity of competition.

Figure 2.6 Average annual rates of firm entry and exit, by industry, 2000-10



Source: Commission analysis, New Zealand Longitudinal Business Database.

Notes:

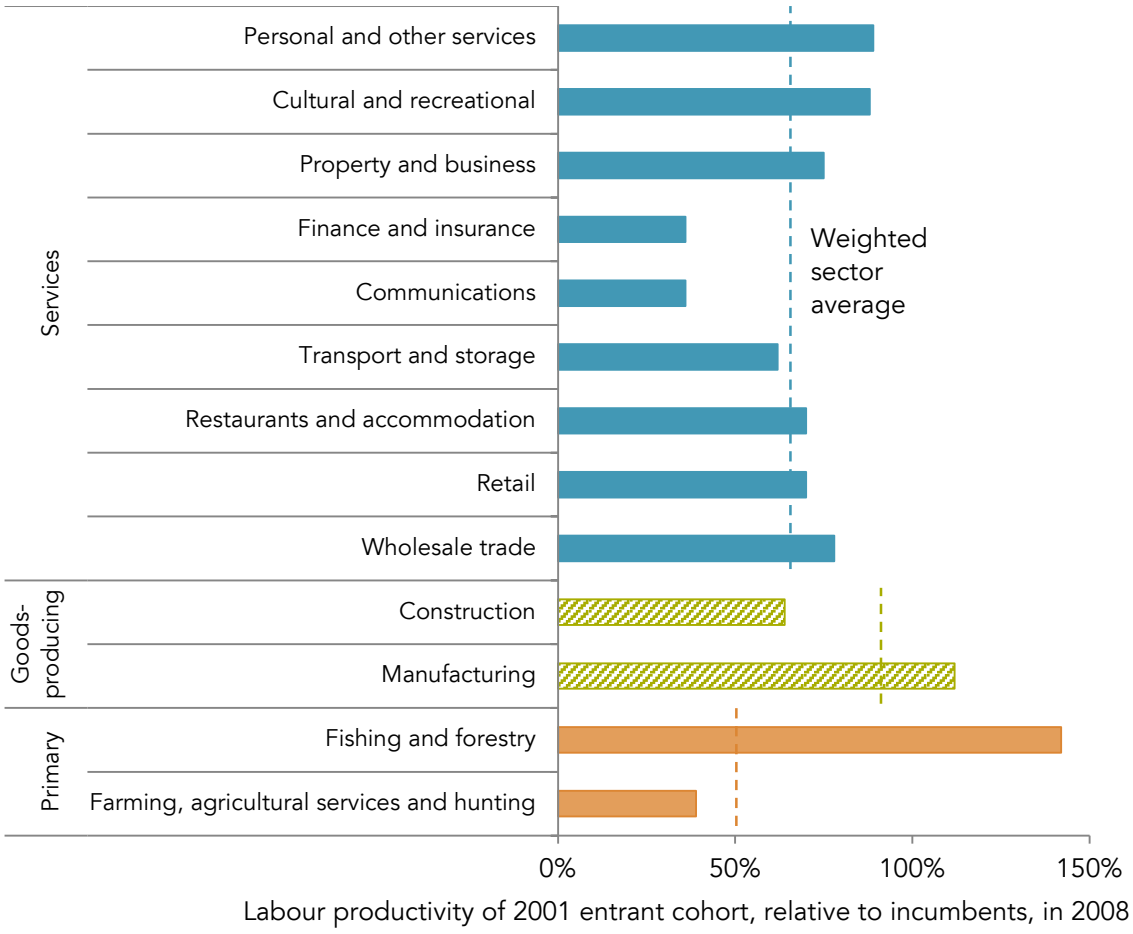
1. Based on 1-digit ANZSIC06 industry categorisations, 2000-2010. Data excludes proprietor-only firms.
2. Rates of entry and exit are adjusted for firm size (based on number of employees). So the above result is different to the findings of other New Zealand analysis where weighting is not used (such as Doan et al. 2012). Entering and exiting firms in the transport, postal and warehousing; and financial and insurance services industries tended to be tiny relative to incumbents.

Another feature of the New Zealand services sector is that new-entrant firms have been relatively slow to achieve levels of labour productivity commensurate with that of incumbent firms (Figure 2.7). Doan et al. (2012) show that, on average, firms entering New Zealand service industries in 2001 had not reached levels of labour productivity comparable to that of the incumbents by 2008. This contrasts with new entrants to manufacturing industries which caught up within the same period. (The construction industry has also been a relatively weak performer on this metric.)

Across countries, a feature of new-entrant firms is that they begin life with lower-than-average productivity, but the survivors gain in size and productivity faster than industry averages in their early years (Kocsis et al., 2009). In some countries these survivors often quickly catch up and surpass the average productivity of incumbents (Haltiwanger, 2011). The intensity of competition in many New Zealand service industries may not be strong enough to cause new entrants to either boost their productivity to industry-average levels or exit the market.

A number of reasons exist for the relatively slow productivity growth rate of new entrants to the services sector. One possible reason is that the chosen interval for measuring productivity is too short, particularly in industries where the average incumbent firm is highly productive. Scarpetta et al. (2002) note that new firms typically spend significant time learning and improving their productivity. US evidence indicates that new-firm levels of productivity pick up more strongly over ten years than over five. A second possible reason is that some entrants provide personalised rather than "mass" services. A third possible reason is that the strong, competitive reaction from incumbent firms has prevented new entrants from building on their base in the market.

Figure 2.7 Relative performance of young firms, by industry



Source: Doan et al. (2012).

Notes:

1. The relative productivity indicator above compares the performance of the 2001 cohort in 2008 (that is, after the firms have operated for seven years) against all firms in the industry.

2. The industry categorisation in this chart is based on ANZSIC96 due to the timing of analysis. The 1-digit industry results shown are a weighted average of calculations at the 4-digit level. The chart excludes working proprietor-only firms.

Productivity dispersion across firms within the same industry

A feature of most industries in most economies is a wide dispersion in the levels of productivity across firms within the same industry, even when an industry is narrowly defined (Syverson, 2011). Further, the variation persists over time (Foster, Haltiwanger & Syverson, 2008).

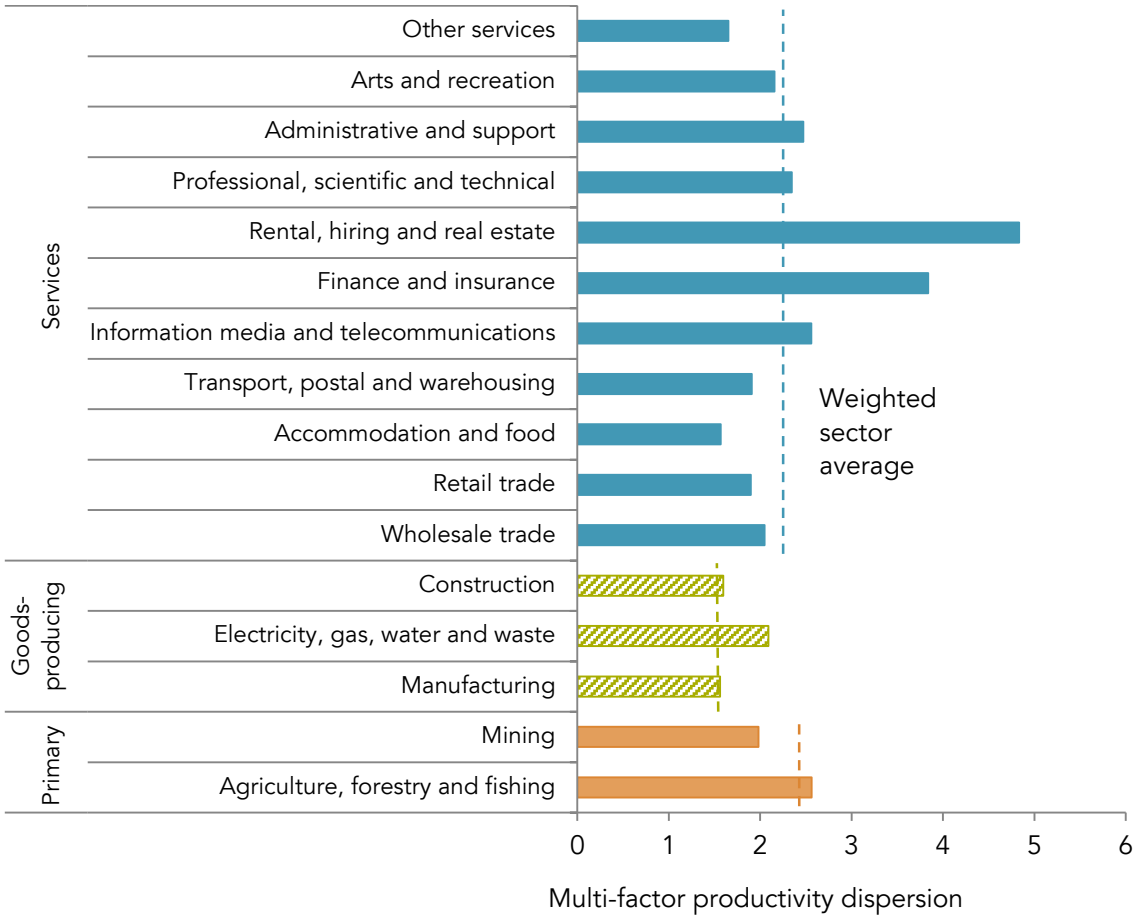
A potential cause of dispersion is barriers to competition that otherwise would result in resources being reallocated from lower-productivity firms to higher-productivity firms. Over time such reallocation would lead to reduced dispersion and higher average productivity. Several potential barriers exist on the demand side and supply side of the market. Examples include transport costs and product differentiation, which segment market demand. The supply side includes a firm's sunk (non-refundable) costs and fixed operating costs. Research shows that these factors correlate with the how much productivity is dispersed across firms in the same industry (Syverson, 2004). Search and switching costs that deter a customer changing from one provider to another, particularly noticeable in services, are also potential barriers to moving resources from lower-productivity firms to higher-productivity firms (see Chapter 3).

Wide dispersion in intra-industry productivity levels may also reflect – more benignly – the process of firm entry, growth and exit described in the previous section. Or it may reflect high levels of innovation, as firms out-innovate each other and open up gaps in productivity (Office of Fair Trading, 2007). Some studies have found that industries where firm-level productivity is widely dispersed have tended to be in industries with high-productivity growth (Scarpetta et al., 2002).

The uncertainty about how much low intensity of competition or other factors disperse productivity underscores how any measure of intensity of competition is no more than a partial indicator. A range of measures must be examined to get an overall picture. For example, the Office of Fair Trading (2007) recommends examining the rates of entry and exit to an industry (and whether the same firms account for a trail of low-productivity performers) as checks on whether a widely dispersed productivity is likely to be more indicative of low intensity of competition or rapid innovation.

Figure 2.8 shows how productivity is dispersed in New Zealand industries. Service industries where productivity dispersion is greatest are rental, hiring and real estate; finance and insurance; and information media and telecommunications.

Figure 2.8 Intra-industry dispersion of productivity



Source: Commission analysis, New Zealand Longitudinal Business Database.

Notes:

1. Dispersion measures the ratio of 90th percentile multi-factor productivity (MFP) to 10th percentile MFP, within each industry.
2. Based on 2–3 digit ANZSIC06 industry categorisations, 2000–2010. Sector averages are weighted using number of employees.
3. Data excludes proprietor-only firms so as to compare measures and avoid the inconsistent quality of data present in this group.

Price–cost margin measures

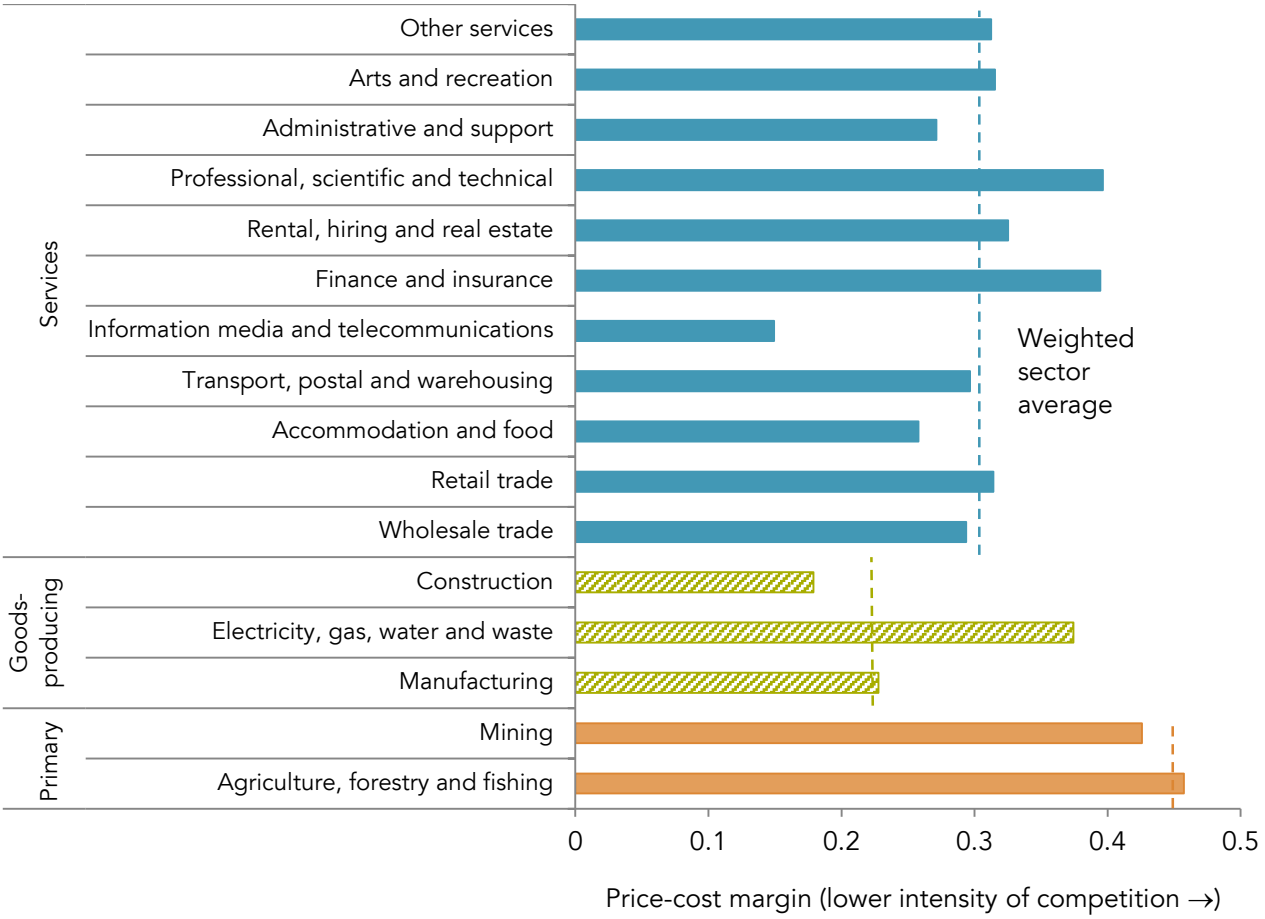
Core features of the textbook model of perfect competition are that a firm's prices equal their marginal costs and that these prices just cover the firm's average costs, including the cost of providing a normal rate of return on capital. It follows that, to the extent that firms can price above cost and generate "above-normal" profits, they can be thought of as having at least some degree of pricing, or monopoly, power. On this basis, estimates of a firm's price–cost margin (PCM) are commonly used as an indicator of the intensity of competition in an industry (the greater the margins, the weaker the competition).

International evidence is that PCMs generally are higher, and more variable, in service industries than in manufacturing (Høj et al., 2007). Figure 2.9 shows estimates of PCMs across New Zealand industries. On this measure, the service industries where competition is comparatively weak are professional, scientific and technical services; rental, hiring and real estate; and finance and insurance.

One limitation of the PCM measure is that the cost data sometimes include only a subset of total costs. Typically the data include labour and intermediate input costs, but not the cost of capital. This means that the measure can give a misleading picture between firms and industries of different capital intensity. This is likely why in Figure 2.9 the primary-sector industries have a high PCM (signifying low intensity of competition). These industries are almost entirely price takers that operate in intensely competitive markets. They are also capital-intensive and/or land-intensive industries. Their high measured PCM most likely results from not taking into account the cost of those inputs, rather than from low intensity of competition.

Another limitation of the PCM measure stems from the way, in a dynamically competitive industry, more innovative and efficient firms are likely to operate at higher margins than less innovative, less efficient firms. This means that innovative and efficient firms will likely gain market share at the expense of less innovative, less efficient firms. This leads to a higher PCM measure for the industry. Yet, misleadingly, this might indicate that intensity of competition had reduced. The elasticity of a firm's profits to its variable costs ("profit elasticity") is an alternative measure of the intensity of competition within an industry. Profit elasticity is unlikely to give this type of false signal, but it is not as well established or as commonly used as the PCM measure.[10]

Figure 2.9 Price-cost margin by industry, 2000-10



Source: Commission analysis, New Zealand Longitudinal Business Database.

Notes:

1. Price-cost margin is the difference between price and cost as a proportion of cost.
2. Based on 2–3 digit NZSIC06 industry categorisations, 2000–2010. Data excludes proprietor-only firms. Sector averages are weighted using number of employees.

Results from the Commission's 2013 business survey

As part of this inquiry, the Commission arranged a survey to gather information and views from senior decision makers in 1,526 New Zealand businesses (Colmar Brunton, 2013; Chapter 1, Box 1.3). The survey included questions about the experience of businesses buying services from other businesses, with a focus on what types of services firms buy (as inputs to their production); the intensity of competition in the markets for these services; and how firms make choices between, and switch between, service providers.

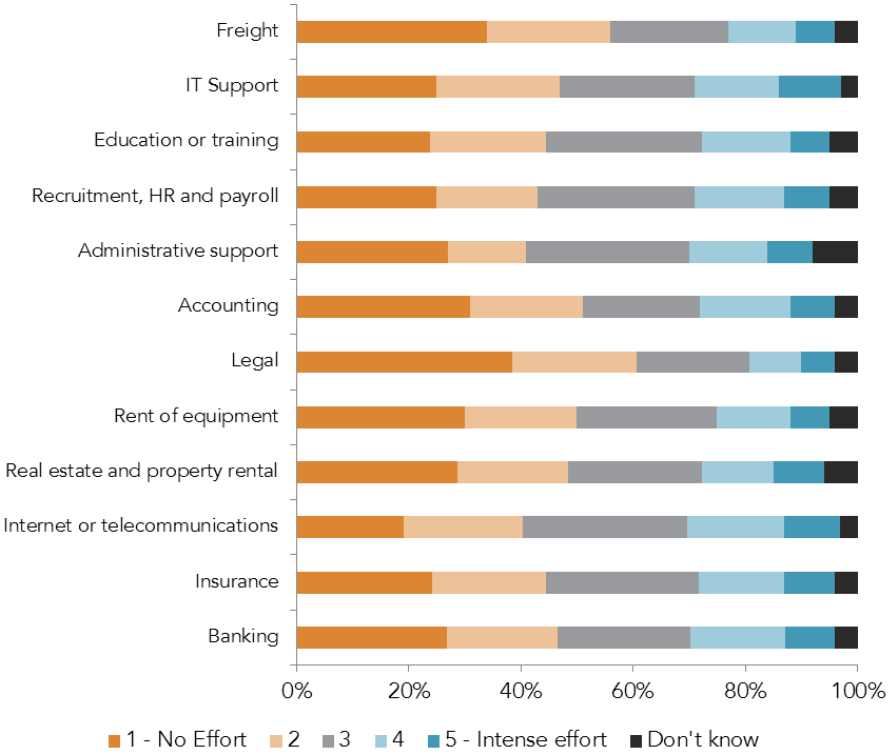
Based on this survey, New Zealand firms generally consider they have reasonable scope to choose among alternative providers of most business services. Overall, less that 15% believe they face a single supplier.

[10] Devine et al. (2011), Devine, Nunns and Stevens (2013) and Doan et al. (2012) are research studies that use profit elasticity to indicate intensity of competition.

Services where providers consider they have less choice are administrative support; education and training; recruitment, human resources and payroll; and rental of equipment.[11]

Respondents rated as "limited" the efforts of many service providers to gain or retain the respondent's business (see Figure 2.10). Across all categories of service provider, 28% of respondents considered their suppliers had made no such effort. Providers of legal services were perceived to put in the least effort (38% were rated as having made no effort), followed by freight, equipment rental, and accounting services. Among those who had actively sought to gain or retain custom, providers of banking, telecommunications and IT support services featured as having made the strongest efforts (25% of respondents considered these suppliers had made a reasonably intense effort).

Figure 2.10 Business perceptions of service provider intensity of competitive effort



Source: Colmar Brunton (2013).

Notes:

1. Survey participants were asked: Of the service providers that did, or could have, provided these services, how intense was their effort to gain or retain your business (on a scale of 1 to 5)?
2. Each row in the chart is based on the subset of survey participants whose business or organisation had purchased the service from another firm in the last two years. The sample size for each row ranges from 1,250 firms (internet or telecommunications) to 210 (recruitment, human resources and payroll).

Overall picture of competition in the New Zealand services sector

The "heat map" in Figure 2.11 gives an overall picture of competitive intensity across the industries of the New Zealand economy as provided by the various measures of competition. It is derived by scoring each industry on a scale of 1 to 10 on each measure outlined above. The industries are not ranked. This means a number of industries may be assigned the same score. The most intensely competitive industry or industries on each measure is shaded orange with a score of 10, and the least intensely competitive are unshaded with a score of 1.

[11] For this purpose, services that offer less choice is defined as services where fewer than two-thirds of respondents considered they had a choice between three or more service providers.

Figure 2.11 Intensity of competition across the New Zealand economy

	Indicators of intensity of competition, 1-10					
Service sector	Entry and exit	Productivity dispersion	Price-cost margin	Domestic tradability	Import penetration	Impact of regulations
Other services	6	7	4	2	4	8
Arts and recreation	4	6	4	4	2	8
Administrative and support	6	5	5	4	2	2
Professional, scientific and technical	5	6	2	4	2	8
Rental, hiring and real estate	5	1	4	3	2	6
Finance and insurance	3	3	2	6	1	5
Information, media and telecomms	5	5	7	5	3	3
Transport, postal and warehousing	3	6	4	4	8	3
Accommodation and food	10	7	5	3	6	8
Retail trade	5	6	4	3	2	3
Wholesale trade	4	6	4	5	2	3
Goods-producing sector						
Construction	6	7	6	3	2	8
Electricity, gas, water and waste	5	6	3	5	1	1
Manufacturing	4	7	6	6	10	8
Primary sector						
Mining	4	6	2	10	3	8
Agriculture, forestry and fishing	6	5	1	6	6	8

Source: Commission analysis, New Zealand Longitudinal Business Database; and OECD International Regulation Database.

Notes:

1. Scoring based on a linear scaling of each measure, relative to the maximum New Zealand score. Dispersion, PCM and regulations are inverted so that a higher number is equivalent to more intense competition. OECD regulatory impact data has been translated into NZSIC06 classifications, but the use of proxies and other approximations are necessary for some sectors.
2. Commission analysis is based on NZSIC06 industry categorisations, 2000–2010, and excludes proprietor-only firms.

The overall picture across industries that the various indicators of the intensity of competition provide is mixed. But there is a general pattern that service industries experience less intense competition than industries in the goods-producing sector and primary sector.

The mixed picture is consistent with service industries varying markedly in features such as tradability, import penetration and innovation. The heat map indicates that the service industries with less intense competition are finance and insurance; rental, hiring and real estate; and professional, scientific and technical services. Information media and telecommunications; and professional, scientific and technical services, show up as having intermediate intensity of competition across all indicators.

The Commission gleans an overall message from the research described in this chapter on the links between competition and productivity, and from these empirical indicators of the intensity of competition across New Zealand industries. This message is that scope exists to sharpen competition in service industries. Policy makers should seek policy changes to achieve this outcome and implement them when doing so would yield net benefits.

Subsequent chapters deal with search and switching costs, competition law issues and adopting ICT in service industries. In these chapters the Commission investigates specific opportunities to improve competition and drive better productivity performance in services. Consistent with the varied nature of services, the need and opportunities to take actions to improve performance will vary depending on the context and nature of each service industry or even sub-industry.

F2.6

Overall, New Zealand's service industries experience less intense competition than the goods-producing industries and primary industries.

Of the services industries, those that feature on most measures as having relatively weak competition are:

- rental, hiring and real estate services;
- financial and insurance services;
- retail trade; and
- professional, scientific and technical services.

F2.7

Competition in most circumstances is an important driver of productivity growth and low intensity of competition exists in many service industries in New Zealand. So scope exists to sharpen competition in these industries, and it is worth doing so when opportunities that would yield net benefits arise.

3 Addressing search and switching costs

Key points

- Confident and well-informed consumers play an important role in the competitive process. By seeking the "best" value, they advance their own interests and provide signals to suppliers on favoured product characteristics. Competition between suppliers who respond to these signals can lead to lower costs, improved quality, greater innovation and higher productivity.
- The costs of finding a supplier (search costs), and the costs of changing suppliers (switching costs) are particularly pronounced in some parts of the services sector. These costs can reduce competition in some circumstances by making it difficult for consumers to compare different service providers and respond to price and quality signals.
- Because businesses purchase over 50% of service outputs which they use to help produce other goods and services, initiatives to help stimulate demand-based competition in service industries should focus on business consumers and household consumers.
- Any government intervention to reduce search and switching costs should be based on a thorough analysis of the costs and benefits.
- Information disclosure is one approach that can increase transparency and competition in service markets. The recently introduced KiwiSaver periodic disclosure requirements are a good example.
- Privately-operated comparison websites are useful in the competition process as they reduce the search costs of consumers. These websites are relatively under-developed in New Zealand.
- Comparison websites that are inaccurate or misleading can undermine efforts to increase transparency and competition in service markets. Other countries have developed best-practice guidelines and accreditation systems as a form of oversight for comparison websites. Developing these in New Zealand could be a useful supplement to the existing provisions around deceptive and misleading practices in the Fair Trading Act 1986.
- If governments choose to fund, or directly provide, comparison websites in an effort to facilitate more competitive markets, adequate resources should be provided to ensure that websites are accurate and accessible.
- Contract termination charges often play a legitimate economic role. "Unfair contract terms" provisions should address contract termination charges that present an unreasonable barrier to switching.
- In 2010 the banking industry led an initiative to streamline the process of switching banks. Scope exists to make the process more public and transparent. A similar industry-led initiative in the telecommunications sector could address some remaining switching barriers, including email address portability.
- Regulating professional standards is of value to consumers. But professional standards can also lessen competition if entry standards are set too high or if licensing requirements hinder competition from service providers who offer a cheaper but less "gold-plated" service.
- Registration and certification regimes tend to be more pro-competition than licensing regimes.
- Recent policy reforms in the UK legal profession have made professional bodies responsible for promoting competition in the provision of legal services. There may be merit in New Zealand following the UK lead by including the promotion of a competitive market in the statutory objectives for professional bodies.

The previous chapter established some important findings about competition and its effect on productivity performance.

- Competition lifts the level and growth rate of productivity and economic growth.
- The intensity of competition in New Zealand is relatively low. Although competition varies significantly between different service industries, the services sector as a whole tends to experience less intense competition than the goods-producing sector.
- Service markets make up a large part of the economy and provide important inputs to other industries. So there are large potential benefits from policies that increase competition within the sector.

Commonly cited reasons for the relatively low levels of competition in New Zealand markets include small domestic markets that are somewhat insulated from international competition due to the country's geographic isolation. This makes domestic competition policy settings particularly significant.

Competition policy is a significant lever at the Government's disposal to try to improve competitive outcomes in New Zealand markets. Much of the focus of competition policy in New Zealand and internationally has been on supply-side issues such as removing unnecessary barriers to entry and provisions around monopolistic behaviour. However, demand-side behaviour also plays an important role in activating the competitive process (Waterson, 2003).

Confident and well-informed consumers who seek the "best" value (for the good or service they require) not only advance their own interests, but also provide signals to suppliers about the type of product they require. Competition between suppliers who respond to these signals can lower costs, improve product quality, increase innovation and boost productivity:

> Consumers drive competition through the choices they make. If they are unable to make or act on informed choices, then competition will be distorted. Consumer policy may empower consumers to drive competition, and therefore have productivity enhancing potential. (Office of Fair Trading (OFT), 2007, p. 7)

This chapter examines how consumer actions can strengthen competition in the services sector, and how search and switching costs can reduce consumer influence. The chapter starts by examining the range of different search and switching costs that can affect service transactions. It then considers various approaches and initiatives that are employed to reduce search and switching costs, drawing on examples from other countries. The chapter ends by considering how professional bodies might help consumers make informed choices that will help to drive competitive outcomes in the services sector.

3.1 The role of consumers in the competition process

There are two particular features of consumer behaviour that impact directly on competition. The first aspect is how consumers search for service providers. The second aspect is how consumers respond to the quality and prices that service providers offer (ie, whether or not they switch).

What are search and switching costs?

Search costs refer to the time and effort needed to find a suitable supplier of a service or good. Costs can increase if a wide range of choices means that consumers will take some time to identify which option best suits their needs. Or costs can increase because there is little information about other suppliers (OFT, 2003). Several submitters noted the important role that readily-available information plays in well-functioning markets:

> Providing consumers with as much information as possible to drive competition is paramount for a well functioning market. (BNZ, sub. 110, p. 2)

> For a market to operate efficiently, consumers require meaningful information about price and quality. (Miles Haywood-Ryan, sub. 117, p. 3)

Switching costs can be defined as "the real or perceived costs that are incurred when changing supplier but which are not incurred by remaining with the current supplier. … Switching costs reduce consumer flexibility

and lower the pressure exerted by the prospect of a consumer migrating to a competitor" (Xavier and Ypsilanti, 2008, p. 14).

Box 3.1 notes four of the more common types of costs that deter consumers switching between providers.

Box 3.1 **Different types of switching costs**

Financial transaction costs – This type of switching cost involves the loss of financially quantifiable resources. In a services context, these costs arise mainly from the structure of contracts (including marketing programmes) that the provider offers (Burnham, Frels and Mahajan, 2003). Typically, a consumer entering into a contract may see some up-front benefits (such as a discounted charge or provision of equipment), but there are penalties or fees for exiting the contract early. European survey data (BEREC, 2010) points toward contractual issues, particularly charges for ending a contract early, as the biggest single obstacle to switching providers in the electronic communications sector.

Procedural costs – These are costs that are incurred in the process of arranging a switch (for example, completing paperwork) and those associated with the timing of the switch. These costs are a barrier to switching if they make the process needlessly difficult or unnecessarily delay switching and transferring information (OFT, 2003). The costs that a customer incurs in becoming familiar with a new product can also be a barrier to switching (Harris, 2012).

Compatibility costs – These costs arise where the consumer's decision to purchase a service locks them into an ongoing requirement to use a complementary good or service or makes it hard for them to use an alternative supplier (Harris, 2012). One example would be where the consumer is reluctant to switch telecommunications providers due to the inconvenience of having to change their phone number.

Relational costs – Behavioural factors can deter consumers from switching. These tend to be more complex and relate to consumer perceptions and world views, rather than the underlying economics of switching (Castalia, 2010). For example, some consumers value the personal relationships that they build. This familiarity creates a level of comfort not immediately available with a new provider. Because many services are delivered on a face-to-face basis, it is likely that relational factors are particularly prominent in influencing consumer switching decisions in the services sector.

How do search and switching costs affect competition?

Search costs

If a consumer senses that search costs are high relative to the value of the purchase, they may not search for an alternative supplier, making their current supplier the "default" (Harris 2012).

The OECD sets out the impact that search costs can have on the competitive process:

> … in making well-informed choices between suppliers, consumers not only benefit from competition, but they exert the sustained pressure for providers to compete for their custom. Conversely, where consumers have too little information, poor quality information, or misinformation, they may end up misled and confused by the choices on offer, may pay too much or may buy the service which does not meet their needs. This may, in turn, inhibit and dampen the competitive process. (OECD, 2008a)

Not every consumer needs to be well informed and an energetic searcher. But having more rather than fewer such consumers helps to keep firms on their toes because they know consumers will not use them if their price-quality offering is not competitive. In this way the informed searchers provide a spill-over benefit to other consumers and to the market as a whole.

Businesses that seek to increase market share know the advantage in providing consumers with information that reduces search and switching costs. Businesses aim to show their service favourably and competitively, knowing that consumers are likely to compare them to similar providers. By contrast, in certain situations

businesses have an incentive to increase search costs – a process that is sometimes called "confusopoly" (Box 3.2).

Box 3.2 **Confusopoly**

In markets with a relatively small number of competitors, businesses have an incentive to increase search costs to reduce price competition. One way to achieve this is by using complex or non-transparent pricing structures. Such structures make it hard to compare prices, reducing the likelihood that consumers will get the best deal and increasing scepticism and inertia about switching. This reduces the impact of the "marginal consumer" – the active shoppers whose comparisons and switching behaviours might otherwise drive down prices for everyone.

There is a fine line between complex price structures that arise due to legitimate service differentiation, and those designed to deliberately mislead consumers. The first can generate benefits for consumers by enabling firms to tailor their offerings to meet a variety of preferences and by allowing prices to react to underlying cost drivers. Such complex price structures can also facilitate competition and innovation, by enabling new entrants to offer new products or tariffs.

Source: OFT (2007; 2013).

Switching costs

The potential for switching costs to negatively affect competition is well documented:

> If suppliers know that a proportion of their customer base will not switch, then their response to cheaper offers from their competitors will be less immediate and not as significant. In contrast, suppliers with highly mobile customers need to respond to competitive threats to maintain market share and profitability. (Castalia, 2010)

While switching costs can significantly affect how competition works in a market, they do not necessarily make markets less competitive. Indeed, in certain circumstances, the presence of switching costs can have a positive impact on competition. In growing markets with many uncommitted new customers, switching costs can be an extra incentive for firms to compete as intensely as possible to lock in as many customers as possible. Further down the track these customers might not experience quite the same intensity of competition, but effectively the earlier aggressive competition has already compensated them for this.

Where switching costs result in consumers being "tied" to a supplier, they can create a powerful incentive for innovation:

> It makes sense to spend money investing in new products and new business opportunities and in market share if success is likely to be rewarded by a stream of future profits. Switching costs increase and secure the returns from successful innovation. If, however, the firm had no way of locking customers in (or of protecting its invention such as by a patent) then an innovative firm that has invested and researched a product or service innovation may soon find the market swamped by 'me-too' imitators … The 'lock-in' caused by switching costs, however they arise, can consequently act like a patent in giving an incentive for risky investment. (OFT, 2003)

In addition, switching costs can also generate other benefits for consumers. For example, as discussed in Box 3.7, switching costs that tie consumers to a certain provider can create greater certainty for businesses about revenue and profit streams. This can enable businesses to provide services they might otherwise not have been willing to provide or to provide their services at a lower cost.

Although switching costs can strengthen the incentives to compete for new customers, they can be problematic for competition in mature markets with few new customers. In this situation, established firms may seek to increase switching costs so they can raise the prices they charge existing customers, rather than competing vigorously for a small number of uncommitted customers. Further, offering significantly lower prices to attract new customers (sometimes called "bargain rip-off pricing") can create inefficiencies. For example, if a product such as a razor is sold below cost, but with very expensive replacement blades, it will likely lead to more frequent changing of razors than is efficient (OFT, 2003).

Switching costs are also particularly problematic in markets where the up-front competition for customers is weak.

> Switching costs frequently arise in durable goods markets or in technically sophisticated products that are rarely characterised by perfect competition. Such markets are often characterised by a minimum efficient scale and sunk costs in production, so that there are barriers to entry. In addition, the products are often differentiated reducing the intensity of *ex-ante* competition. More generally, the foremarket may be highly concentrated, or one firm may have a first-mover advantage so that fierce *ex-ante* competition did not compensate for *ex-post* lock-in. (OFT, 2003, p. 120)

A barrier to switching between providers in a market can also be a barrier to a business entering the affected market. This occurs when new entrants are deterred from entering the market due to a belief that switching costs will prevent them from winning customers from their existing provider – further dampening the effectiveness of competition (OECD, 2008a).

Switching costs must be evaluated on case by case. They do not always cause competition problems, but they do tend to make competition more "fragile" (Farrell and Klemperer, 2007, p. 2005). This indicates that there can be a case for policy interventions to mitigate the effects of switching costs, but only in certain cases. Box 3.3 sets out how the case for government intervention might best be assessed.

Box 3.3 **Assessing the case for Government intervention to address search and switching costs**

Problem definition

Before any decision to intervene, an important step is to establish the nature and magnitude of the problem. As discussed in the previous section, switching costs can adversely affect competition, but not always. Often the dampening effect of switching costs on competition is compensated for by fierce up-front competition.

The case for government intervention to address search and switching costs is likely to be strongest in the following situations:

- In mature markets where there are few new customers.
- In markets for sophisticated products where information asymmetries reduce the ability of consumers to assess the offers of alternative suppliers.
- In concentrated markets with less intense competition.

Additionally, government intervention to provide information that reduces consumer search costs may be desirable on the grounds that information is a "non-rival" good – meaning that its use by one consumer does not reduce its use to other consumers. A private firm could be unwilling to invest in collecting information because once collected it is difficult to stop the information leaking widely and leave the firm unable to charge for it. Even if the firm can charge, this could be inefficient because the price is higher than the marginal cost of distributing the information (which is very close to zero). Of course, as noted in this chapter, some private firms do provide free access to comparison websites and make this work through advertising. But this does not always happen, or the information may be biased or incomplete in some way.

Option development

Where search and switching costs are seen as limiting or distorting competition and harming consumers, the options to address this problem need to be laid out. Typically the options will range from doing nothing, facilitating a private-market solution, to government action by way of regulation or direct provision. Three types of intervention are provision of information, reducing transaction costs and addressing compatibility costs.

Provision of information – this option can reduce switching costs caused because consumers find it hard to get information about alternative suppliers or to identify the product that best meets their needs. Governments can intervene by requiring businesses to disclose certain types of information to

consumers. A more aggressive strategy is to compile the information and present it in a comparative format (such as a comparison website that the government provides or subsidises).

Reducing transaction costs involved with switching – while it is impossible to eliminate transaction costs altogether, there can be a role for government intervention to minimise such costs. Developing guidelines that set out an appropriate process to conduct the switching process is one way to reduce transaction costs.

Addressing compatibility costs – where a purchase from a certain provider locks a consumer into future purchases from the same provider, there may be a case for an intervention that requires firms to change their products to enable consumers to switch more easily. An example of this is telephone number portability.

Option assessment

The final step is to estimate the costs and benefits of each option to assess which one offers the highest net benefit to society as a whole.

The main benefit from any intervention should be that barriers to consumer search and switching are reduced, resulting in greater intensity of competition, improved consumer welfare (due to lower prices, better quality or improved choice) and greater incentives for businesses to innovate and respond to consumer preferences. In addition to benefits from competition, interventions might increase consumer confidence in the market stimulating economic activity that would not otherwise have occurred.

All the costs of each option need to be identified and counted. Interventions will require the use of resources by both government and affected businesses. An important challenge is to identify and cost any unintended consequences of each option. There is also the risk that interventions can reduce investment in a market and dampen innovation. Government interventions might also crowd out the opportunity for effective private solutions to switching costs. The Government option could be better or worse and would need to be compared for cost, quality and meeting consumer needs.

Source: Productivity Commission; OFT (2003).

Search and switching costs in the services sector

Search and switching costs affect transactions in goods markets as well as services. Yet the nature of some service transactions makes them particularly susceptible to search and switching costs. For many services, such as legal or financial advice, the consumer knows considerably less about what they are purchasing than the service provider. These information asymmetries mean that consumers may face costs in learning about the service before making an informed decision about which provider will offer them the service that best meets their needs. The results of a large-scale survey of consumer behaviour in Europe show that 51% of consumers find it easy to compare services, while 63.5% find it easy to compare goods (European Commission, 2012).

Hazards and Compass (sub. 116, p. 1) note that information asymmetries are particularly acute:

> … when one party to the transaction (the service provider) has a high degree of domain knowledge and conducts many similar transactions, and the other party (the consumer) may only conduct one or two similar transactions in their lifetime. Examples include selecting a mortgage type and provider, making an investment or choosing a KiwiSaver plan, and choosing among bids to complete a job.

Service transactions are often highly complex, which might have the effect of locking in consumers to certain service providers. In addition, many services such as telecommunications and banking are provided on an ongoing basis with some form of contract. Such contractual arrangements can lock in the consumer, despite also providing them with benefits.

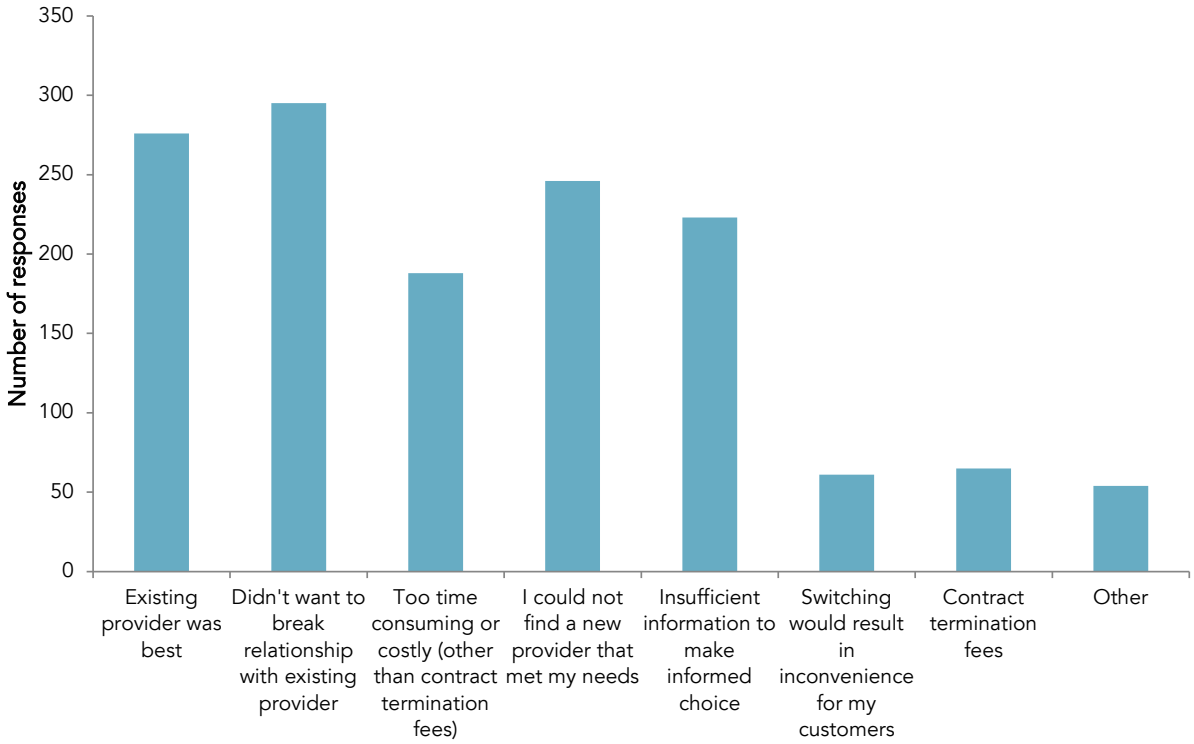
Switching behaviour of businesses

As noted in the Commission's 1st interim report on *Boosting Productivity in the Services Sector,* the services sector is tightly interlinked with the rest of the economy. More services are purchased by firms, as inputs into their production, than by household consumers. This means that business consumers play an equal role to household consumers in driving the competitive process.

Most literature on search and switching costs tends to focus on household consumers. Yet search and switching costs can be a real barrier for firms short on time and resources. Castalia (2010) notes that search costs can be particularly high for small businesses. Castalia uses electricity as an example, noting that electricity costs represent a small proportion of the total costs of a small-to-medium enterprise (SME), and that the time of such business owners has a high opportunity cost (SME owners are often described as "time poor"). Research on the UK financial services industry notes that SMEs infrequently switch their banking services, with 51% of SMEs having never switched their main banking arrangement (Accenture, 2011).

In the Commission's business survey, participants were asked to note instances where they had considered switching service providers but ultimately stayed with their existing provider. As shown in Figure 3.1, relational factors were the most common reason for staying with an existing provider. In many cases, businesses that considered switching concluded that their existing provider was the best available. Difficulty finding a suitable alternative, a lack of information and the switching process being time consuming or costly were also common issues.

Figure 3.1 Business reasons for not switching service providers



Source: Colmar Brunton (2013).

Notes:

1. Businesses were asked to identify services where they had considered switching but decided not to. Businesses were then asked what factors caused them not to switch.

3.2 Approaches to reducing search and switching costs

Comparison websites

The spread of the internet is significantly altering how consumers search for information about the availability, quality and price of goods and services. Websites that offer comparisons between different

service providers have multiplied in Europe and the United Kingdom and, to a lesser extent, in Australia. These sites help to reduce search costs by providing consumers with information that lets them compare competing service providers. Some of these websites also provide mechanisms to help the consumer switch. The three basic types of comparison website are:

- government operated or funded comparison websites;
- consumer organisation-funded comparison websites, funded by member or other independent source contributions; and
- private-sector comparison websites that operate under a business model.

Government funding for comparison websites in other countries

Governments have provided comparison websites in a number of countries to reduce search costs. A review of practices in Australia, the United Kingdom and Europe indicates that telecommunications and insurance are the service markets where governments are most proactive. Governments have also developed comparison websites for the retail electricity market.

The Australian Government through the Private Health Insurance Ombudsman (an independent government agency) runs a website where users can compare health insurance services. The site's objective is to address the challenges for consumers in comparing complex products (PHIAC, 2013). The site complements a number of regulations that streamline the switching process for consumers. For example, the Private Health Insurance Act 2007 regulates switching between schemes so that hospital cover transfers easily. The Government support of the comparison website occurs within the context of the Government being keen to encourage the uptake of private health insurance to reduce pressure on the public health system.

Ireland's Health Insurance Authority also operates a website that compares private health insurance providers. The site is part of a broader initiative to increase the levels of competition and the number of providers in the market. A recent survey of health insurance consumers conducted by the Health Insurance Authority (2012) found:

- 23% of policyholders have switched at some time while 20% of those who have not switched have considered doing so;
- 66% of those with private health insurance perceive switching to be easy; and
- a moderate increase in the percentage of consumers reporting that they shop around for their health insurance (16%, up from 11% in 2009).

Ireland also has a comparison website for mobile, home phone and broadband price plans. The objective of this site is to help consumers compare the cost of communications plans and improve price transparency in the market, so increasing competition between operators. Portugal's National Communications Authority operates a similar service for telecommunications services that lets private consumers assess and compare various tariff alternatives for mobile telephone services.

The approach in New Zealand

Currently New Zealand has two examples of government involvement to reduce search and switching costs through the use of comparison websites. The most well-known example is "Powerswitch", an interactive price comparison website covering electricity and gas suppliers for household consumers.

Powerswitch is owned and operated by Consumer NZ (an independent, non-profit consumer advocacy organisation), with Government providing funding through the Electricity Authority and the Ministry of Consumer Affairs (now part of the Ministry for Business Innovation and Employment). In 2011, the Electricity Authority launched the "What's My Number" campaign that promotes consumers to connect to Powerswitch. The Authority also provides a service for business consumers to gather quotes from different suppliers.

The Electricity Authority reported a 39% increase in switching in the first three months of the campaign, and significant effects on retail electricity pricing:

> …increased competition and consumer switching has been credited with electricity prices dropping during two consecutive quarters for the first time in almost 13 years. The Statistics New Zealand Consumers Price Index showed power prices dropped by 0.5 percent in the December 2011 quarter and by 0.3 percent in the previous quarter. These price reductions saved consumers another $8 million for the 6 months to 30 December 2011. (Electricity Authority, 2012, p. 1)

The TelMe website is a second example where government funding has helped to provide comparative information. TelMe is operated by Consumer NZ, with assistance from a Commerce Commission grant. TelMe lets users compare combinations of internet, mobile, landline and television. The Productivity Commission understands that telecommunications providers have strongly criticised TelMe, mostly out of concern that the information provided on TelMe is inaccurate or outdated. The Commission has also observed that the website is not widely publicised.

F3.1 Accurate and accessible comparison websites can help to reduce search costs and facilitate more competitive markets. Yet the complexity of some service markets can make accurate comparisons difficult.

Box 3.3 sets out a framework for assessing whether government should intervene to reduce search and switching costs. A thorough cost-benefit analysis of the framework is needed before adopting any intervention (and in many cases an intervention will not be needed). Cost-benefit analyses should realistically assess what costs will be incurred to implement an appropriate intervention.

For example, if the assessment determines that government could fund or administer a comparison website, then the website should be appropriately resourced so that the information presented is accessible and accurate. Also, any such initiative should be subject to the same disciplines that apply to privately provided comparison websites (oversight of privately-operated websites is discussed later in this chapter).

R3.1

- Before undertaking any initiative to try to reduce search and switching costs, it should be established that they do have adverse effects, and a range of intervention options should be assessed using a thorough cost-benefit analysis.
- If government decides there is a case to reduce search and switching costs in services markets (for example, by funding or developing comparison websites), then initiatives should be appropriately resourced so that the information presented is accessible and accurate.

The role of consumer advocacy groups

As noted above, Consumer NZ provides comparative information to consumers about different service markets. Besides being involved with the Powerswitch and TelMe initiatives, they regularly review insurance markets and sometimes conduct mystery shopper exercises in various markets (discussed in Chapter 4). Consumer NZ also performs advisory services by responding to consumer complaints (mostly related to the Consumer Guarantees Act 1993) and using their website to provide consumer rights information.

Consumer NZ was established as a government department in 1959 before becoming independent in 1980. The organisation was originally heavily subsidised and was able to provide information to a wide audience at very low cost. Since becoming independent, Consumer NZ's funding has mainly come from membership subscriptions, and much of the information it collects is limited to members. This business model is broadly consistent with that used by consumer advocacy groups in the United Kingdom, Australia and the United States.

Although membership rates in New Zealand compare favourably with consumer organisations in other countries, New Zealand's relatively small population makes it difficult for Consumer NZ to cover the fixed costs associated with testing products and compiling information. Revenue from Consumer NZ

subscriptions in 2012 was about $5 million (Consumer NZ, 2012), while the Consumers Union in the United States collected US$234 million in subscription revenue in the 2012/13 financial year (Consumer Union, 2013).

Consumer NZ has indicated a desire to develop further partnerships with government agencies in a similar vein to their work with the Ministry of Consumer Affairs and the Electricity Authority. However, they have noted that the government agencies charged with promoting competition are generally unwilling or unable to provide financial support to others to help achieve this aim. Chapter 4 sets out one option for making regular funding available, on a contestable basis, to consumer organisations that work to stimulate competition in New Zealand markets.

Information disclosure

Information disclosure regulation is another approach that can help to increase transparency in service industries. Information disclosure is a relatively light-handed form of regulation that can empower consumers to "make decisions on the price, quality and quantity trade-offs between alternatives and make judgements on the acceptability of the processes employed in delivery of those goods and services" (Ministry of Economic Development (MED), 2009).

Information disclosure has recently been introduced for providers of KiwiSaver financial services (Box 3.4).

Box 3.4 **KiwiSaver periodic disclosure requirements**

The KiwiSaver (Periodic Disclosure) Regulations 2013 require all KiwiSaver schemes to regularly report on funds in a standardised way. The disclosure is presented on a 2-page form and includes information such as fund performance, fees and asset allocation. Under the regulations, KiwiSaver providers will publish on their websites quarterly and annual disclosure statements for each of their funds.

Part of the rationale for introducing disclosure requirements was to increase transparency and let consumers compare different funds so they could make more informed decisions, and so help to facilitate a competitive market for KiwiSaver services.

The regulations came into force on 1 July 2013, and the first disclosure statements were published in October 2013.

Source: MBIE (2013a).

For mandatory disclosure to generate direct welfare gains, it is important that consumers can and in practice do take advantage of information disclosure to help them make informed decisions (MED, 2009). Hazards and Compass note that inappropriate information disclosure regimes can be counter-productive:

> Industry guidelines and legislation about disclosure are made to try and address these information asymmetries. The premise of these rules is that if enough information is provided to the consumer, the effect of the information asymmetry will be reduced. However, too much information has the opposite effect – it overwhelms the consumer and leads to incorrect weighting of information. (sub. 16, p. 2)

To ensure that KiwiSaver disclosure information is relevant for consumers, the disclosure regulations also require KiwiSaver providers to publish information in a standard spreadsheet that analysts, commentators and investor information services can access. This will enable the information to be aggregated and presented in ways that consumers can more easily access. For example, the Commission for Financial Literacy and Retirement Income (CFLRI) is using the information as the basis for a new tool on their website (sorted.org.nz) called *KiwiSaver Fund Finder*. The tool lets users easily compare management fees and how different KiwiSaver providers have performed. This information is supplemented with some CFLRI survey information about the range of services that each fund offers (Sorted, 2013).

The KiwiSaver periodic disclosure requirements and initiatives like Sorted's *Fund Finder Tool* have made KiwiSaver services more transparent, and should help to make the KiwiSaver market more competitive. BNZ's submission supports this view:

> The recent KiwiSaver reporting reform should help to ensure consumers are able to easily compare fees and returns for funds, enabling them to make more informed, performance based decisions about whether to remain or switch to another scheme (sub. 110, p. 2).

F3.2 Information disclosure requirements, in conjunction with accessible online presentation, can significantly improve the availability of information in complex service markets, and may generate net benefits in some situations. Information disclosure also involves costs, so the usual cost-benefit analysis should be undertaken when considering this option.

One shortfall of the current approach is that each disclosure statement is published separately on the relevant provider website. Given that disclosure statements contain more detailed information about each fund than that published on the Sorted website, gathering all disclosure statements in one online location would be a very low-cost way to give better access to existing information.

R3.2 To further improve access to KiwiSaver periodic disclosure statements, completed disclosure forms should be available in a single location, such as the Financial Markets Authority website.

New disclosure requirements are also being planned as part of the Consumer Credit and Financial Services Law Reform Bill (the Bill passed its first reading in September 2013). The reform is designed to provide better consumer protections against unscrupulous third-tier lenders (providers of personal non-mortgage credit who are not banks – sometimes referred to as "loan sharks"). Under the provisions in the Bill, lenders will be required to undertake the following disclosure requirements:

- disclosure of key information, and full terms and conditions of the consumer credit arrangements must occur before the contract is made (the present requirement allows for disclosure up to five working days after the contract is made);
- standard contract terms and key information must be on the lender's website;
- advice on dispute resolution and hardship provisions must be added to key information; and
- contracts must specify goods over which security for a loan is taken.

The disclosure requirements aim to allow consumers to make more informed decisions and to promote competition through disclosure that allows comparison of offerings (Office of the Minister of Consumer Affairs, 2012). Currently, New Zealanders can visit a number of online websites to compare lending rates among banks, building societies and credit unions. By contrast, the Commission is not aware of any sources of information on the lending rates of third-tier lenders.

F3.3 There is an absence of accessible comparative information about third-tier lenders (in contrast to the situation for personal loans or mortgage rates for banks).

R3.3 Reliable comparative information about third-tier lenders should be available to help consumers make informed decisions. If the Consumer Credit and Financial Services Law Reform Bill is passed, the information that the Bill mandates should be compiled in a user-friendly online format. Several privately-operated websites appear well equipped to do this.

Privately-operated comparison services

Privately-operated comparison websites are becoming increasingly common in New Zealand. These sites cover a range of services and take a variety of forms, with some just comparing on the basis of price and others incorporating quality dimensions or providing for consumer feedback and rating of service providers.

Privately-operated comparison websites tend to be less developed in New Zealand than in some other OECD countries. Because these websites generally rely on revenue from advertising or commissions from providers that are part of the website, it is likely that the small scale of the New Zealand market makes it difficult for comparison websites to attract enough traffic to be commercially successful. In saying this, there are no apparent barriers to entry for comparison website providers and quite a number have emerged in recent years. Examples include:

- Life Direct – a health, life and income insurance policy comparison site that provides price comparisons and a star system to compare quality of products and customer service;
- PriceMe – a website that provides price comparisons for a range of consumer products; and
- Canstar – a website that provides a star rating for various banking products, KiwiSaver, travel, pet and life insurance, travel bookings, mobile phone providers, petrol and diesel service stations, electricity retailers and some products.

Do comparison websites have a positive impact on competition?

Comparison websites certainly have the potential to reduce search costs in different service markets, but it is difficult to assess the extent to which this is increasing competition.

What is clearer is that comparison websites are having an impact on consumer behaviour. For example:

- a review of comparison websites in the United Kingdom found that 81% of consumers had used a price comparison website in the past 12 months, while 67% of consumers who bought or renewed car insurance in the last 12 months used a price comparison website (Consumer Focus, 2013);
- Canstar's Australian website noted 2 million hits to its site each year (Canstar, 2013); and
- in New Zealand, PriceMe's marketing director stated in July 2013 that the website was getting 700,000 hits each month and expected this to rise to 1 million hits by December 2013 (Jancic, 2013).

F3.4 Transparent and reliable privately-owned comparison websites can play a useful role in the competition process by reducing consumer search costs.

F3.5 Privately-operated comparison websites tend to be less prevalent in New Zealand than in other countries. There are no apparent barriers to entry in this market, and in recent years there have been a number of new entrants. Because these websites generally rely on revenue from advertising or commissions from providers that are part of the website, it is likely that the small scale of the New Zealand market makes it difficult for comparison websites to attract enough traffic to be commercially successful.

Standards for comparison websites

For comparison websites to have a positive impact on the competitive process, it is important that the information on them is complete, accurate and transparent. The European Commission (2013a, p. 6) notes:

> Comparison tools have a clear potential for empowering consumers. They can help save time and money and find deals that are best suited to each consumer's individual needs… Nevertheless, the rapid proliferation of comparison toolsites and the influence they can have on consumers' decisions have also given rise to concerns about their trustworthiness. If the transparency and reliability of comparison toolsites is not guaranteed, they can become a source of consumer detriment and risk undermining consumers' trust in the market as a whole.

As noted earlier, the Commission understands that some concerns have been raised about the accuracy of the comparisons on the TelMe website. There are also concerns about websites that allow users to post reviews of services such as accommodation and restaurants (Gillies, 2013).

In addition, in Australia some of these websites have been accused of providing misleading information (Box 3.5).

Box 3.5 **Potential for comparison websites to mislead consumers**

iSelect is an Australian website that provides comparisons of various insurance policies, household utilities and personal finance products. It is best known as a health insurance comparison website and its site notes that in 2012 it had 100,000 sales of health insurance products.

In 2007 the Australian Competition and Consumer Commission (ACCC) raised concerns that iSelect was misleading consumers about the range of insurance policies that were compared before a policy was recommended. In response, iSelect ceased making the alleged misrepresentations and also agreed to inform certain customers (who it arranged to purchase a health insurance policy) of the range of insurance policies that it compared for them.

At the time, the ACCC Chairman noted the following:

…recommendations by brokers or intermediaries can be of benefit to the public in their purchasing decisions. However, it is fundamental that such companies do not mislead consumers regarding the scope of the comparisons which they make when recommending a service provider.

Source: ACCC (2007).

Given the growing number and use of comparison websites in New Zealand, it is worth considering the rules and oversight that applies to them. There are no specific guidelines or rules relating to comparison websites, but they are covered by general provisions in the Fair Trading Act 1986. Part One of that Act prohibits misleading and deceptive conduct and false representations. With regards to service, the Act states that "[n]o person [or business] shall, in trade, engage in conduct that is liable to mislead the public as to the nature, characteristics, suitability for a purpose, or quantity of services".

The Fair Trading Act also contains a general prohibition on "unsubstantiated representations". This provision was introduced recently in the Consumer Law Reform Bill, and provides that traders cannot make representations (for example in advertising material) without having reasonable grounds for making those representations. Whereas previously the Commerce Commission would be required to prove that a representation was false, the burden has now shifted and businesses are required to show evidence to prove that statements are accurate.

The Financial Markets Conduct Act 2013 (which comes into force in April 2014) will apply to comparison websites that cover insurance and other financial products and services. Sections 19 to 33 of the Act prohibit misleading or deceptive conduct, the making of false or misleading representations, and the making of unsubstantiated representations. The Financial Markets Authority is responsible for monitoring compliance with this Act.

The Commerce Commission is responsible for monitoring compliance with the Fair Trading Act and providing guidance on the law and how it will be enforced. The Commerce Commission provides general guidance on how businesses advertise comparisons between products, but does not currently provide any specific guidance on online comparison sites.

F3.6 Comparison websites have the potential to undermine consumer confidence if the sites fail to provide reliable information or are not transparent about the number of service providers they are comparing, how the sites receive revenue, how the sites rank participants and how the sites receive information.

The Commerce Commission regularly updates its online guidance for businesses following court cases or settlements. The Commerce Commission has indicated that it will update its Fair Trading Act guidance after

amendments are introduced to the Consumer Law Reform Bill. Including information for comparison website providers would be a useful addition to the guidance.

R3.4 The Commerce Commission should include information in the updated Fair Trading Act guidance about the provisions in the Fair Trading Act that are relevant for providers of comparison websites.

In response to the increasing prevalence and use of comparison websites, other countries have adopted or recommended a number of safeguards over and above general consumer laws (Box 3.6).

Box 3.6 **Oversight of comparison websites – approaches in other jurisdictions**

United Kingdom – Research by Consumer Focus in the United Kingdom (2012) has identified seven different accreditation systems for price comparison websites. Five of these are industry-specific and two are multi-sector.

Government agencies provide three of the accreditation systems.[12] For example, Ofcom (the UK regulator and competition authority for the communications industry) launched an accreditation scheme for price comparison calculators in 2006. Ofcom determined that an accreditation scheme is the most effective way to ensure wide availability of independent price comparison information. To gain accreditation, websites must be accessible, accurate, transparent and comprehensive. The accreditation process involves an initial audit and then periodic audits about once every 18 months. Website operators are charged a fee for each audit.

Non-government agencies provided the remaining four accreditation systems. For example, the British Insurance Brokers Association (BIBA) offers accreditation for insurance comparison websites. Standards that must be met to obtain accreditation include the use of facts and not assumptions as the basis for quotations, explanations of what the policy does and does not cover and the differences between each insurance policy being made clearly visible (BIBA, 2008).

Research comparing the performance of accredited and non-accredited comparison websites found that accredited sites performed slightly better. For example, accredited websites were better at explaining how the site generates income and notifying consumers when prices were last updated. Accredited websites were also more popular among mystery shoppers, with 89% of users reporting a positive experience compared to 69% for non-accredited sites (Consumer Focus, 2012).

Europe – the European Commission held a Summit in March 2013 to discuss transparency and reliability of comparison websites. A key driver of this work is promoting consumer trust in digital and e-commerce. The Summit recommended that work be undertaken to establish guidelines on the transparency, impartiality and reliability of comparison websites (European Commission, 2013a).

Australia – Choice (an independent consumer organisation) has initiated a super complaint with the New South Wales Office of Fair Trading about inconsistent advice on commercial energy comparison websites. Choice has recommended that an accreditation system for commercial switching sites be introduced – similar to that operating in the United Kingdom – to help consumers identify the switching sites they can trust (Choice, 2012).

Currently in New Zealand no available accreditation options exist for comparison websites. Given that these websites appear to be growing in popularity, and increasingly influencing consumer behaviour, there may be merit in the introduction of some form of accreditation system to supplement the Commerce Commission's monitoring activity. The Commission is interested in views on whether accreditation for

[12] When Consumer Focus did the research, government agencies ran only two of the accreditation systems. Recently, the Office of Gas and Electricity Markets took over the accreditation system for energy comparison websites.

comparison websites would be useful, whether it should apply to both private and government websites, and what the best approach might be.

Q3.1 Is there a need for specific guidelines or an accreditation system for comparison websites in New Zealand? If so, what approach would be most effective and who would be best positioned to manage and run it?

Contract termination charges

The costs associated with the termination of a contract are common barriers to switching. Typically, long-term contracts allow the consumer to end their contract early and some contracts provide for early termination if a particular stated event in the contract occurs. When an early termination arises, the contract usually requires the consumer to pay an early termination fee which is, or is claimed to be, compensation for the losses the supplier will suffer because of that early termination (Consumer Affairs Victoria, 2010).

Although contract termination charges can have a "lock-in" effect (Vickers, 2003), most contract termination charges perform a legitimate economic function. Box 3.7 sets out three ways that contract termination charges can create benefits for consumers.

Box 3.7 **The role of early contract termination charges**

Consumer Affairs Victoria note that the costs consumers incur from contract termination fees need to be understood in the broader context of three main benefits that long-term contracts provide to consumers.

- Contract termination charges provide businesses with greater certainty over revenue and profit streams. This means that businesses can provide services they might otherwise not have been willing to provide or to provide their services at a lower cost.
- Contract termination charges allow businesses to recover the additional costs incurred from a customer terminating early from the customer directly rather than spreading those costs across its customer base. This means that customers who see out the term of their contract are not "penalised" by higher prices for those customers who decide to end their contracts early.
- Termination charges provide for a greater range of contracts offered to customers, by spreading the costs associated with the provision of services over the life of the contract without significant up-front costs. Also, longer-term contracts can create fierce competition at the point where suppliers compete for new customers.

Source: Consumer Affairs Victoria (2010).

Although contract termination charges can benefit consumers, they cause problems when fees are designed to prevent switching and reduce competition. Contracts may also include other terms that unfairly restrict a consumer's right to end a contract.

Addressing problematic contract termination fees

One approach to early termination fees and other restrictive contract termination terms is to consider whether they represent an unfair contract term. Consumer laws in Australia and the United Kingdom have provisions that prohibit unfair contract terms. Under Australia's Competition and Consumer Act 2010 the grounds for determining whether a term is unfair are:

- the term would cause a significant imbalance in the parties' rights and obligations under the contract;
- the term is not reasonably necessary to protect the legitimate interests of a party to the contract (the party seeking to rely on the term must prove that is it reasonably necessary); and
- the term would cause detriment to a party to the contract if it were to be applied or relied upon.

The ACCC and the Office of Fair Trading have used the provisions to remove from standard form contracts unjustifiable exit fees and other termination terms that affect a consumer's ability to switch service providers. Predominantly this has been done by providing advice to companies, through persuasion and negotiated agreements rather than court action.

Following the introduction of the Competition and Consumer Act in Australia, the ACCC reviewed compliance with unfair contract terms laws and worked with businesses to amend problematic clauses in contracts.

> Overall, the ACCC found a good level of cooperation from businesses during the reviews, leading to substantial changes by businesses to their standard form consumer contracts. This also led to some broader improvements to the general business practices in these sectors. (ACCC, 2013)

Sarah Court (a Commissioner at the ACCC) noted at the Commerce Commission *Competition Matters Conference* that the increased range of tools and remedies at the disposal of the ACCC (as a result of the 2010 Competition and Consumer Act) has moved Australia from lagging in the world to providing among the strongest protections for consumers.

In December 2013 the Fair Trading Amendment Act passed into law. This Act introduces into New Zealand similar unfair contract terms provisions to those contained in the Australian Competition and Consumer Law 2010. The unfair contract terms provisions will come into effect 15 months after passage of the Act and will apply to new, varied or renewed standard form consumer contracts. Standard form contracts are the type that cannot be negotiated. Consumer contracts are those related to the supply of goods or services of a kind ordinarily acquired for personal, domestic, or household use or consumption.

The Fair Trading Amendment Act provides that a term may be considered as unfair if it causes a significant imbalance in the parties' rights and obligations under the contract, is not reasonably necessary to protect the legitimate interests of the party who would be advantaged by the term, and would cause detriment (financial or otherwise) to a party if it were applied, enforced or relied upon. The Act also provides examples of terms that may be unfair, including a term that permits one party but not another to end the contract and a term that penalises one party for a breach or termination of the contract.

The Commerce Commission has indicated that it will provide guidance to businesses about unfair contract terms and that it will work with businesses to help them comply in the 15 months until the provisions in the new Act come into effect. It would be useful if this guidance included specific reference to terms about the termination of a contract that would be considered "unfair" under the Fair Trading Amendment Act.

The amendments to the Fair Trading Act will not apply to business-to-business contracts unless the contract relates to the supply of consumer goods or services (for example, a personal gym membership contract paid for by a business would likely be covered). This is in line with the Australian Competition and Consumer Act.

In the 1st interim report on *Boosting Productivity in the Services Sector*, the Commission examined the role that the services sector plays in the economy and the extent to which services act as inputs into other forms of production within the economy. This work showed that a greater share of the output from the services sector is used by other firms as an intermediate input than is purchased by household consumers. The volume of services that are purchased by businesses raise the question of whether there is any need to extend unfair contract terms provisions to business-to-business contracts. There has been some pressure from the Council of Small Business Australia for such a change to be introduced in Australia.

R3.5

The Commerce Commission should monitor and compile data on standard form contracts with terms that unfairly restrict a business's right to end a contract (and so present a barrier to switching).

Unfair contract terms provisions introduced in the Fair Trading Act should be reviewed within two years of coming into effect, with a particular focus on whether there is a case for these provisions to be extended to apply to business-to-business contracts.

The industry-led approach to reducing switching costs for banking services

In some service markets industry groups have been proactive in seeking ways to reduce switching costs for consumers. One example is the process for switching banks that Payments NZ has introduced (Box 3.8).

Box 3.8 **Bank switching process**

Payments NZ is a company set up by New Zealand's main banks to independently oversee banking regulations, rules and standards and to help standardise the way transactions are handled.

In 2010, Payments NZ introduced new rules to govern the process for switching banks. Under these rules a customer who wishes to switch banks fills in a standard 1-page form and gives it to their new bank. The new bank then contacts the old bank and together they organise the transfer of direct debit/credit orders within five business days.

The system is based on the premise that the most significant barrier to customers changing banks is the requirement to re-establish reoccurring payments. The switching process migrates all these payments without any customer action (beyond signing the 1-page form). The service is available for household banking and business banking.

The targeted 5-day turnaround time compares very favourably with bank switching processes in other countries. For example, bank switching processes in Ireland and the United Kingdom target 10 business days and seven business days respectively.

Source: Information provided by Payments NZ.

While the process for switching banks appears to be simple, the process is not well publicised. For example, a spokesperson for Kiwibank was reported as stating the following:

> … most people aren't aware of how easy it is now to switch and that they don't actually have to do the work themselves. Therefore of the about 80,000 new customers Kiwibank gets annually, most do the work themselves. (Vaughan, 2012)

Given that Payments NZ has already implemented the bank switching rules, it would be worth raising their profile. A relatively low-cost way to address this would be for Payments NZ to make the current account switching rules and process more transparent by publishing an accessible summary of the key rules on their website. Further advice for consumers, such as a fact sheet that gives consumers information about the switching process and the timeframes involved, would also be useful.

R3.6 Payments NZ should improve the transparency of the bank switching process by publishing a summary of the rules on their website. Publishing a fact sheet that gives information about the bank switching process and sets out the timeframes involved would also be useful.

Currently statistics on the number of consumers who switch banks are not collected. A further improvement to New Zealand's current bank switching service would involve Payments NZ collecting and publishing information about the rate of consumer switching and the average time that switches took. This would help demonstrate the effectiveness of the current switching process and give consumers greater confidence about the ease of switching banks – hence sharpening the overall level of competition between banks.

R3.7 Payments NZ should collect and publish statistics that show the number of current account switches each year and how long the switching process takes.

There is scope to reduce switching costs in some service markets

Compatibility costs arise where the decision to purchase a service locks in an ongoing requirement to use a complementary good or service or makes it hard for a consumer to use an alternative supplier. The following subsection examines compatibility costs that stem from barriers to portability.

Phone number portability

Since 1 April 2007, as a result of a determination by the Telecommunications Commissioner, customers have owned their telephone numbers and so can keep their existing number when switching service providers. Mobile phone number portability lets a customer change their provider but keep their number, including the cellular network access code (for example, 027, 021, 022). For landlines, local number portability lets a customer change their telecommunications provider but keep the same telephone number in the local calling area.

Telephone number portability has markedly reduced switching costs for consumers and strengthened competition among telecommunications providers. A report from the New Zealand Telecommunications Forum in December 2012 noted that more than 600,000 mobile phone numbers had been moved from one network to another, while almost 400,000 local numbers had been moved (Telecommunications Forum, 2012a).

The Commerce Commission recently surveyed consumer switching behaviour in mobile and fixed-line telecommunications markets:

> The Commission has historically focused on supply side indicators of the extent of competition. However, competition is also affected by demand side factors. If few customers are able and willing to switch their telecommunications service provider, this will hinder the ability of market participants to expand. (Commerce Commission, 2012)

Some of the main findings from the survey were:

- 9.4% of respondents had switched their fixed-line provider in the last 12 months (compared to 6.8% in Australia);
- nearly 14% of mobile consumers had switched in the previous 12 months, and 37% of mobile customers had switched service providers at any time, compared with 43% in Australia; and
- respondents who had switched mobile service providers overwhelmingly indicated a positive customer experience of switching (Commerce Commission, 2012).

Overall, the study concluded that the barriers to switching telecommunications provider are minimal.

F3.7 The introduction of telephone number portability has positively impacted competition in the New Zealand telecommunications sector.

Email address portability

Donal Curtin's submission suggests that the use of email addresses provided by an internet service provider (ISP) can create a barrier to switching:

> There is one impediment to switching … the absence of e-mail address portability. In many services (such as banking), and even in parts of the telco business (thanks to landline and mobile number portability), switching suppliers has become steadily easier. But not in the case of ISPs, where if a business has an ISP-specific e-mail address (eg smallbusiness@xtra.co.nz) it is a major headache to change supplier. Newer businesses are likely getting savvier about using non-ISP addresses (eg smallbusiness@gmail.com) or setting up their own domain names (eg owner@smallbusiness.co.nz), but there must still be a large legacy of SMEs for whom ISP switching costs remain excessively high. (Donal Curtin, Economics New Zealand, sub. 108, p. 3)

As noted in the submission, the number of internet users who feel "tied" to their ISP due to their email address is likely to be relatively small because people increasingly use email services that are separate from

their ISP. But for those customers who do use an ISP-provided email address, switching ISP could result in a significant inconvenience – particularly if their email address is used for business purposes.

The practice around ISP-provided email addresses varies. For example, Orcon provides an "email address for life" meaning that customers can continue to use their same email address even if they are no longer an Orcon customer. Other ISPs will cancel email addresses when customers switch providers. In this situation, the only way for customers to continue to access their email is to keep some form of plan with their original ISP. In most cases the cheapest option is to keep a basic dial-up internet package that costs about $20 each month.

The need to keep a dial-up has been criticised as an overly costly solution (Pullar-Strecker, 2012). Some other jurisdictions are considering legislative changes to address email address portability barriers. For example, the European Commission has proposed a legislative package that includes a number of measures targeted toward consumers including a requirement for ISPs to forward emails to a new address after consumers switch:

> End-users need to experience continuity when changing important identifiers such as email addresses. To this end, and to ensure that email communications are not lost, end-users should be given the opportunity to opt, free of charge, for an email forwarding facility offered by the transferring internet access service provider in cases where the end-user has an email address provided by the transferring provider. (European Commission, 2013b, p. 27)

It is unclear how many customers are affected by the lack of email address portability in New Zealand, and options do exist for people to migrate their emails to a non-ISP-provided email service (such as Gmail, Outlook or registering a domain name). As such, a legislated mandatory email forwarding system as the European Commission proposes looks to be an unnecessarily heavy-handed response. However, a lighter-touch option could be warranted. As noted earlier, the banking industry has made good progress in streamlining the switching process. A similar initiative would be beneficial for the telecommunications industry.

The New Zealand Telecommunications Forum (TCF) is one organisation that appears well-placed to lead such an initiative. TCF is a registered incorporated society made up of most of New Zealand's telecommunications providers. The Forum's goal is "to promote competition for the long-term benefit of end-users of telecommunications services in New Zealand" (TCF, 2012b). The Forum also operates an independent dispute resolution service that is available to residential and small business (less than 20 full-time employees) customers of telecommunications companies.

R3.8 The New Zealand Telecommunications Forum should develop industry guidelines to create a low-cost user-pays system that enables customers to access emails after they have switched providers.

Bank account number portability

Bank account number portability has been suggested as one approach to further reduce the costs of switching banks. In theory, this would work in a similar way to number portability in the telecommunications sector. Advocates of such an approach argue that portability would increase the ease of switching and increase competitive pressure among banks (Edmunds, 2013).

In 2011, the Australian Treasury commissioned a report into switching arrangements in the banking sector that specifically examined the feasibility of account number portability. The report was unequivocal in finding that bank account number portability would need very expensive new infrastructure, the costs of which are likely to far outweigh any competition benefits from greater switching:

> Full account portability is a deceptively simple concept … Implementation of full account portability, however, would be far from simple, and not at all analogous to telephone number portability as sometimes suggested. It would involve the replacement of the bank, state, branch (BSB) system of numbering, and wholesale revamping of the existing payments infrastructure and the systems of all the financial institutions which interface with it. It would be a major and costly undertaking. (Fraser, 2011).

The report also noted that developing a bank account number portability system is so complex no other country has fully achieved it. The closest system is a "watered down" arrangement in Sweden.

Inquiry participants have noted that the infrastructural changes needed to introduce bank account number portability in New Zealand would be similarly costly.

F3.8 Full bank account number portability is not available in any country. Currently there is no case to introduce it in New Zealand as the cost would very likely exceed the benefits.

Although full bank account number portability is not currently a viable option, it is plausible that alternative work-around options may be developed in future. New Zealand officials should monitor developments in other countries so it can consider how developments might be applied to the New Zealand market. For example, banks in Australia worked on an account switching project between 2007 and 2011. The project was called "me and my bank online" and aimed to issue individuals with biller numbers that would help to create a single identity for online payments. Such a system would mean that it would not matter if a customer moved banks or changed account numbers in the future. Ultimately the project was abandoned in 2011 after three of the four main banks withdrew their support, citing delays and cost overruns (Hopewell, 2011).

R3.9 New Zealand officials should monitor international developments in bank switching and account number portability. If another country develops a workable approach, New Zealand should closely examine how it might be applied to the New Zealand banking system.

3.3 The role of professional bodies in promoting competition

The following section considers:

- the role of professional licensing/registration regimes and of professional bodies in helping to support the functioning of competitive market-provision of professional services; and
- how those arrangements if not well designed can dampen competition.

In the 1st interim report, *Boosting Productivity In The Services Sector*, the Commission found that information asymmetries and the complexity of some service transactions prompt governments toward extensive regulation of service industries.

Issues stemming from information asymmetry and complexity are likely to be greater where:

- the product is purchased infrequently; and
- the service involves complex/technical matters, such that only a specialised consumer could assess the service provider ahead of time, such as in the case of most consumers of dental services.

These problems are not relevant to many services (such as restaurant services and hairdressing services). Most consumers buy such services frequently, can assess the quality of the service received at the time, and generally are reasonably equipped to do so. If there is a problem, the consequences are usually not significant. The consumer can simply choose a different service provider next time, and service providers are correspondingly subject to the disciplines of the marketplace.

In the case of professional services (such as engineering, legal, accounting, and architectural services), this is much less the case. Most professional services are complex and bought less frequently. Also, consumers can face constraints on switching suppliers. For example, in the case of accounting services the client and the service provider typically need to invest time and effort in setting up the client relationship. Also, some professional "transactions" stretch over an extended time, which means that it may not be feasible to switch to an alternative service provider part way through the "transaction". For example, it may not be sensible

for a person to change their accountant part way through a tax audit. This aspect of the relationships between providers of professional services and their clients tends to result in comparatively weak competitive forces in the markets for those services.

Licensed professions and trades make up a significant part of the New Zealand economy. Between 380,000 and 480,000 providers of professional and trade services are required to be licensed, certified or registered. This corresponds to about 16% to 21% of the total labour force[13] (Martin Jenkins, 2012).

Other considerations that point to the performance of the markets for professional services as being material for this inquiry are that:

- the data indicates that the professional, scientific and technical services industry has a low rate of productivity growth (Conway and Meehan, 2013); and
- professional services are an important intermediate input for firms across the whole economy.

Arrangements designed to uphold professional standards can be both enablers and inhibitors of competitive markets in professional services

One foundational condition that must be met for a market to be competitive is that buyers and sellers are well informed (Vickers, 2003). The information asymmetry and barriers to switching in the markets for most professional services means that competitive processes tend to be weaker than in many other markets. For these reasons, markets for most professional services are subject to a degree of "professional discipline", to make up for reduced "market discipline". Professional bodies and "licensing" requirements serve that role. Professions themselves face incentives to establish the professional disciplines needed to help the market work. Without them, the members of the profession would be less able to sell their services. Hence, there is a tradition in most professions of "self-regulation".

Where professional standards are pitched too high, they can unnecessarily constrain supply and stifle the competitive functioning of the market. Professional standards that are too high can result from government prescription of unnecessarily high standards. Or, where a profession is self-regulated, the governing professional body can face incentives to act more in the interests of its (incumbent) members, also by setting entry standards unnecessarily high (Vickers, 2003). As in any market, barriers to entry to markets for professional services can be a major impediment to market competition.

Similarly, professional bodies can face incentives to set post-entry standards on the low side. Those can be reflected in disciplinary and complaints procedures tilted in favour of incumbent members of the profession and against the interests of consumers, or minimal requirements for standards that apply at the time of entry having to be maintained after entry.

Achieving competitive markets in professional services that work well in matching the supply of services to the needs of consumers requires a balance to be achieved between professional standards that are too high and too low.

Because professional bodies can have incentives to prioritise the interests of their members, there is usually some degree of government involvement in professional regulatory arrangements. Most professional bodies are recognised by statute, which brings with it some degree of government involvement and oversight. One role of government is to see that an appropriate balance is struck. It represents the "public interest" in seeing to arrangements that best support the functioning of a competitive market.

Professional licensing arrangements can be categorised along two broad dimensions:

- self-regulation versus statutory regulation; and
- licensing versus certification or registration.

[13] This includes some trades that might be thought of as on the margins of constituting a licensed trade, such as bar managers and probably some double counting (where people hold more than one "licence"). But it does not include the members of a range of trades and professions where data was not available.

Self-regulation refers to where the standards that apply to a profession are established and administered by a professional standard-setting body elected (mostly or entirely) by its members. Statutory regulation refers to the same function being performed by the government or a predominantly government controlled, or appointed, body.

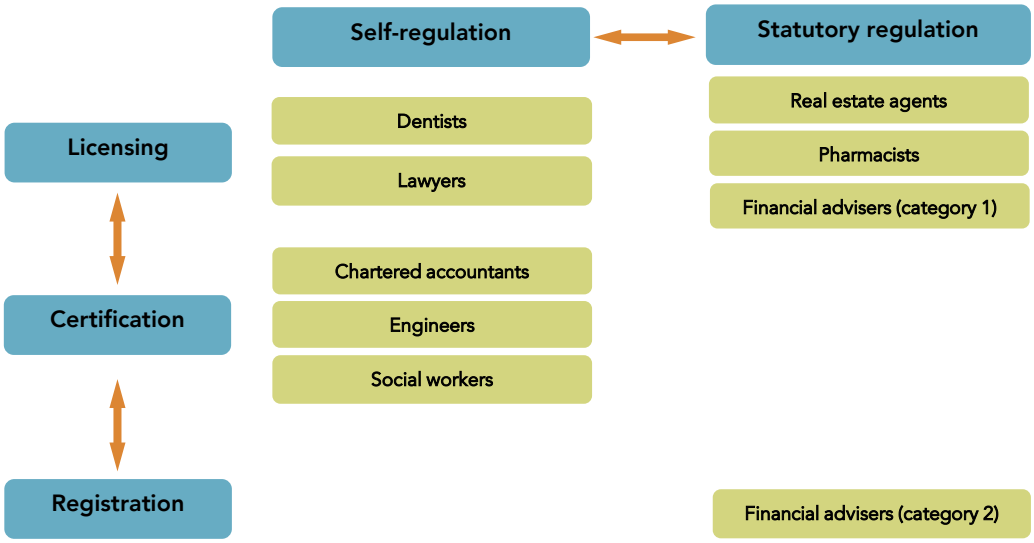
Licensing, certification and registration can be differentiated as set out below.

- Licensing refers to a legal requirement for a practitioner to have been approved as meeting prescribed standards of competence and conduct to practise in defined areas of work.
- Certification refers to where a practitioner is recognised as meeting prescribed standards of competence and conduct, but that is not a requirement to legally practise (for example, uncertified people can still practise, but cannot represent themselves as being certified).
- Registration refers to a requirement that those performing prescribed services be recorded as such, but without having to meet significant pre-registration requirements or standards. Practitioners can be removed from the register, and from practising, if they fail to meet base-level standards.

One main difference in the effects of these varied approaches is that a licensing regime creates a minimum level of quality that must be provided to all consumers. Certification and registration regimes provide users of services with scope to exercise some choice about the quality of service that they need, and are willing to pay for.

The boundaries between these different approaches to establishing professional standards are not precise. Yet, as illustrated in Figure 3.2, New Zealand professions can be categorised as falling (mostly) under one approach or another.

Figure 3.2 Classification of professional bodies (selected examples)



Source: Productivity Commission.

Each approach involves different trade-offs in terms of the support provided for the functioning of a competitive market in professional services. Licensing regimes can be more effective in putting a floor under standards than registration regimes, but are also more prone to "capture" by the interests of the incumbent members of the profession, particularly where the regime is self-regulatory. Conversely, more "open" certification/registration-type regimes create lower barriers to entry and therefore can be more conducive to fostering competition, and allow for a wider range in the quality of services on offer. In the case of some professional services (such as airline pilots), the latter may be viewed as an undesirable outcome. But, for many services, allowing consumers some range of choice in the standard of service they need, and are willing to pay for, can improve how the market performs.

From the standpoint of wanting to promote competitive markets in the supply of professional services, these considerations point to the following three broad principles.

- A registration/certification regime generally will be more conducive to fostering competition than a licensing regime.
- Where best to pitch a regime for any particular profession depends importantly on judgements about the extent to which all members of the community require a minimum level of service/protection. If that results in higher prices than otherwise, it should also be recognised that some people may not be able to access any level of service.
- The closer a professional standards regime is to a licensing rather than a registration regime, the greater the need for the Government to be involved as the representative of the "public interest".

Recent instances of reform of professional bodies in New Zealand have favoured a licensing approach rather than a registration approach. Examples are real estate agents and financial advisers (although the regime for financial advisers distinguishes between category 1 (complex) and category 2 (simple) products, with a registration regime applying to those who confine their advice to category 2 products).

F3.9 Recent regulatory regimes for professional service providers have adopted a licensing approach rather than a certification approach. Examples are the Financial Advisers Act 2008 and the Real Estate Agents Act 2008.

Where the Government provides professional bodies with statutory recognition, it should be explicit about the statute's expectations and requirements. These can span a range of matters, including:

- governance of the profession, including public/market interest representation on the governing body;
- the level of minimum entry and post-entry standards;
- processes for dealing with consumer complaints and with disciplinary matters;
- provision of information, and reporting, to the public; and
- promoting competition.

The last of these matters – promoting competition – has not been a traditional purpose of professional bodies. The next subsection expands on this aspect.

R3.10

- The Government should consider the competition benefits of a regime based on certification or registration rather than licensing when reviewing existing, or considering new, arrangements for the regulation of providers of professional services.
- Where the Government considers that licensing is required to provide a minimum level of protection to all users of a professional service, the activity that requires licensing should be prescribed no more broadly than is required to achieve that protection (such as confining the licensing requirement to prescribed areas of "restricted work").
- When the Government gives statutory recognition to professional bodies, it should be explicit (in legislation) about its expectations of those bodies, including: competency standards – both entry and ongoing; obligations in relation to supporting a competitive market for the services in question; and complaints resolution and reporting.
- Governing boards of professional bodies should include members who are appointed to focus on the interests of consumers and to foster a competitive market for providing the service in question.

The role of professional bodies in promoting competition – insights from the UK legal profession

The roles of professional bodies generally have been understood in terms of maintaining professional standards, representing the interests of the members of the profession, and a role in promoting the "public interest". Yet this last aspect has not typically included deliberately promoting a well-functioning and competitive market for the professional service.

Recent policy reforms in the United Kingdom have brought this aspect of the role of professional bodies more to the fore. A review of the regulation of the legal profession led to "promotion of competition in the provision of legal services" being included as one of the objectives of the Legal Services Act 2007.

An obvious question in relation to such an objective is how to give it meaningful effect. The United Kingdom has established an (independent) Legal Ombudsman and a Legal Services Consumer Panel. These bodies have taken an active role in promoting competition within the legal profession. The Legal Ombudsman has produced a fact sheet: *Ten questions to ask your lawyer about costs*. The fact sheet provides clear and direct information on what a consumer should ask about fees and charging before contracting a lawyer. It is aimed at new clients and those clients thinking of switching legal providers. It has also published *An ombudsman's view of good costs service, a guide for lawyers*. The work of the UK Legal Ombudsman has challenged some of the more traditional views of legal services (Box 3.9).

Box 3.9 **Changing views on the role of a profession in a competitive market**

The UK Legal Ombudsman, in its report on *Costs and customer service in a changing legal services market*, commented:

> We regularly are met with statements that people should have access to greater information to make them more effective consumers; possibly an easier challenge to meet in the context of swapping energy companies than in comparing costs for a bespoke legal service.
>
> This is only part of the challenge though. Traditional views of lawyers as experts, separated from other businesses by this notion of professionalism, still dominate not just the legal sector but also general perception about legal services provision. And nowhere is the battle between the traditional view of client and customer more marked than in the notion of cost and pricing. The term 'client' embodies the traditional view of the relationship between lawyers and those they represent.
>
> The notion of a consumer turns this relationship on its head. In most businesses, the consumer has the power and can choose which services to buy from which provider. The traditions of the law are different, though, and many lawyers have historically been able to treat the notion of customer service as somehow lesser than their professional obligations. What we are seeing now though are market changes forcing lawyers to face the possibility that their traditional view of how they go about their daily work may have to undergo a fundamental change. Those who adapt to the market, it appears, will survive: those who cannot may be doomed to disappear.

Source: Legal Ombudsman, United Kingdom (2012).

In another initiative the UK Law Society has developed a search-a-lawyer database. The database allows consumers to search by location and subject of interest. It is enhanced by a voluntary accreditation scheme that recognises expertise in specialist areas of the law. On the database if a lawyer is accredited, the specialist accreditation mark is alongside their name. The database has links to the websites of law firms.

Legal services comparison websites have also emerged in the United Kingdom. The Legal Services Consumer Panel has reviewed these websites as a form of "choice tool" for helping consumers to purchase legal services. Its review report notes:

> … there is debate over the suitability of comparison websites in legal services, but our starting point is that they are likely to have an increasing influence on consumer choice and so the focus as the market emerges should be on maximising the benefits whilst protecting consumers from the potential risks …. Comparison websites can help to more easily connect consumers to suitable providers and provide

> helpful guides on choosing lawyers and areas of law. Another potential benefit is to encourage greater competition on prices by offering a quick and convenient means for consumers to shop around and could be an incentive for providers offering good terms to disclose this information … [T]here is evidence that comparison websites which provide customer feedback can stimulate competition over quality and raise service standards. Although the profession fears that such sites may unfairly damage their reputations, research suggests people are actually more likely to leave positive than negative feedback. (UK Legal Services Consumer Panel, 2012, p. 1)

The Legal Services Consumer Panel identified 35 legal services comparison websites. It "road-tested" the 16 most visited sites with enquiries on making a will and conveyancing. Its overall conclusion is a role exists for legal comparison sites. The Panel notes the sites are at an early stage of development and would benefit from having guidance standards to follow and some form of industry self-regulation to promote their sound development. It recommended industry self-regulation involving the approved regulators (the various legal industry associations), the comparison website providers and consumer groups (UK Legal Services Consumer Panel, 2012).

Perhaps the most novel feature of these developments is the emerging channels that consumers can use to provide feedback on legal services. Feedback mechanisms can play a powerful role in supporting the functioning of a competitive market. Indeed, arguably, in the case of internet auction sites, like Trade Me, the market could not work without such a mechanism. It is this ability to give feedback that creates the incentive for sellers to represent their products accurately and for buyers to honour their payment obligations.

F3.10 Feedback mechanisms can play a powerful role in helping consumers to drive competition among providers of professional services.

Legal services in New Zealand

The New Zealand Law Society is responsible for regulating the legal profession in New Zealand. The Law Society's regulatory powers and obligations are set out in the Lawyers and Conveyancers Act 2008. While the Lawyers and Conveyancers Act does not contain specific reference to the promotion of competition (as in the equivalent UK legislation), its central purposes include:

- maintaining public confidence in the provision of legal services and conveyancing services; and
- protecting the consumers of legal services and conveyancing services.

One of the main ways that the Law Society gives effect to its role of protecting consumers of legal services is through the provision of a Lawyers Complaints Service which includes operating a telephone line dedicated to receiving and responding to complaint inquiries. In the 2012/13 year 2880 calls were made to the complaint line, 1766 complaints were received and 1947 complaints were closed (New Zealand Law Society, 2013).

Complaints are considered by the Lawyers Standards Committee who can impose penalties if they determine that a lawyer's conduct was unsatisfactory. In some cases, a summary of the complaint and the resulting penalty is published on the Law Society website. For the years 2012 and 2013, the website currently lists summaries of 67 cases. In 15 of these cases the name of the lawyer in question is included, while the remaining cases are anonymised (New Zealand Law Society, 2014). Most complaints do not result in the Lawyers Standards Committee taking any action; 68% of cases closed in 2013 did not result in any action being taken, and a further 12% of complaints were resolved through negotiation, conciliation or mediation (New Zealand Law Society, 2013).

The Law Society also provides a range of information about legal services both on their website and at community law centres. For example, the Law Society has published an advice brochure entitled "Seeing a Lawyer – What can you expect?" They have also published a number of brochures that provide advice on common legal issues such as buying and selling a property and making a will and estate administration. The Law Society website also includes a "find a lawyer" service which enables users to search for lawyers

specialising in certain fields or with specific language skills. However, the find a lawyer service does not note the instances where penalties have been imposed on lawyers as a result of consumer complaints.

Q3.2

Are there additional steps that the Law Society could take to further strengthen competition within the legal profession?

For example, would there be merit in following the UK lead and including the promotion of a competitive market in the statutory objectives of the Law Society?

What measures could be undertaken by other professional bodies to strengthen competition in their respective professions?

4 Improving competition law

Key points

- Competition laws and the institutions that implement them – competition agencies and the courts – have an important influence on the behaviour of firms and on competition outcomes.
- New Zealand's small market size, geographic isolation and the characteristics of many services such as low tradability and high search and switching costs make it important that competition law strongly supports competition in the services sector.
- A key component of a competition regime is preventing firms from misusing their market power to damage the competitive process. Misuse includes improperly restricting the entry of new firms, preventing others from engaging in the market or eliminating competing firms.
- S 36 of the Commerce Act 1986 aims to deter and prevent firms misusing their market power. It was drafted to be similar to the parallel section in Australian law, but New Zealand courts have diverged from Australian courts in interpreting it. The Australian Parliament has subsequently modified its statute. New Zealand's highest court has come to rely solely on a "counterfactual test". This sole reliance appears flawed because it poses too high a risk of false negatives and some risk of false positives to the detriment of competition outcomes.
- False negatives from the counterfactual test mean that some dominant firms get away with behaviour that suppresses competition and innovation. But any reform should not shift the balance so far that large firms cannot compete vigorously as part of the competitive process.
- False positives could arise when firms with substantial market power are prevented by s 36 from realising efficiencies unavailable to firms without market power. An example of an efficiency that could be prevented in this way is a firm setting supply-chain standards that cut transaction costs and raise productivity.
- Some oppose change because of loss of certainty and the risk of unintended consequences. Yet there does seem a strong case to reform New Zealand's idiosyncratic approach. The economy can ill afford large firms to suppress the competition and innovation that smaller or new firms offer. It can also ill afford the risk that large firms are unable to implement changes and improve efficiency.
- To help achieve alignment to best practice within a single trans-Tasman market, any review should take account of Australia's announced major review of its competition law.
- Competition law should allow firms to collaborate to become more competitive and efficient. The new Commerce (Cartels and Other Matters) Amendment Bill has a desirably wider exemption for collaborative activities and a clearance regime for firms to check the lawfulness of proposals. The Commerce Commission should continue to proactively educate non-specialist business people about these features.
- There is a good case for greater use of market studies in New Zealand to deepen understanding of how industries, markets, and market practices are working.
- Market studies would fill a gap between the general competition advocacy role of the Commerce Commission and the formal, narrowly scoped, Commerce Commission investigations. Studies could build knowledge about the nature of competition in specific markets. This knowledge would be particularly useful for markets that are new or fast-moving, or when there is public interest or concern about markets.
- Market studies are not costless and their net benefit would need to be established. Design issues include: who initiates the market study, sets its terms, undertakes it, and the status of any recommendations.

Competition laws and the institutions that implement them – the competition agencies and the courts – influence how firms behave. So they impact on the intensity of competition and productivity performance in service industries. This chapter examines some areas of competition law that the Commission believes have the potential to be improved: s 36 of the Commerce Act (the unilateral conduct of dominant firms), collaboration among firms, and the power to conduct market inquiries.

The Commission has not examined other topics that may also offer beneficial reform opportunities, such as Part 4 of the Commerce Act that regulates natural-monopoly industries. Even though some of these are service industries, the Commission decided to limit the scope of its inquiry by excluding this large and complex topic. Neither does the chapter examine the set up and practices of the competition regulator – the Commerce Commission. The topic of the Productivity Commission's other current inquiry is regulatory institutions and practices. That inquiry will make system-wide recommendations aimed at the operation of New Zealand's regulatory regimes.

4.1 The role of competition law

The 1986 Commerce Act created a comprehensive and coherent competition law framework for New Zealand (Berry, 2012). The framework derived from and remains similar to the equivalent Australian competition statute, what is now the Competition and Consumer Act 2010. In turn, the Australian legislation has similarities to US antitrust law and competition laws in the European Union (including the United Kingdom).

A long-standing and important question is whether a competition law framework based on large-country models is appropriate for a small, remote economy such as New Zealand's economy. The core challenge is making the best trade-off between two desirable features: enough competitors to provide healthy competition; and firms of sufficient size to maximise efficiency and effectiveness through economies of scale (Berry, 2012, Conway, 2011; Gal, 2007). This is an economy-wide issue, but one that is particularly important for the services sector given the relatively low intensity of competition in many service industries (Chapter 2).

The Commerce Act has four key provisions that promote competitive markets by prohibiting or severely constraining a number of behaviours:

- Section 27 – contracts, arrangements or understandings that substantially lessen competition;
- Section 30 – cartel conduct;
- Section 36 – taking advantage of substantial market power for anti-competitive purposes; and
- Section 47 – mergers that substantially lessen competition.

In relation to s 27 and s 30, the Commerce (Cartels and Other Matters) Amendment Bill is currently progressing through Parliament and is expected to be passed in early 2014. It proposes some significant changes to the Commerce Act that will clarify the permitted boundaries between competition and collaboration. Those responsible for collaborating to fix prices or quantities (indulging in cartel behaviour) will become subject to criminal sanction. Conversely, the grounds to collaborate legitimately for a pro-competitive reason, rather than to fix prices, will widen. The Productivity Commission supports these changes as explained in section 4.3 of this report.

S 36 prohibits firms with substantial market power taking advantage of that power for anti-competitive purposes. It has proved controversial in practice with much of the criticism focusing on how the jurisprudence has developed. In a number of high-profile cases, the highest appellate courts have found for defendant firms that the Commerce Commission saw as taking advantage of their market power. The Commerce Commission's view is that the court's threshold of proof is too high for s 36 to be effective. Section 4.2 below outlines the arguments in favour and against changing s 36. It also explains why the Productivity Commission believes that the right sort of reform will enhance competition and efficiency in service industries.

The Productivity Commission is unaware of major concerns with s 47 of the Act – the other key provision that focuses on promoting competitive markets. So it has not examined that section in any detail.

4.2 Section 36 of the Commerce Act

What does s 36 aim to achieve?

S 36 of the Commerce Act aims to prevent the taking advantage of substantial market power for an anti-competitive purpose. Taking advantage for such a purpose is also known as "monopolisation".

Some of the major cases under s 36 have involved service industries. For example a string of cases in the 1990s and 2000s involved Telecom, the dominant incumbent telecommunications provider and Clear, a relatively new entrant. These cases were each appealed to the Privy Council or the Supreme Court. In 2007 the Commerce Commission brought a s 36 action against Bay of Plenty Electricity Ltd over electricity metering services. In the mid-2000s Origin Pacific, a regional airline, complained to the Commerce Commission of anti-competitive behaviour by Air New Zealand (NZ Airports, sub. 118, p. 7).

Monopolisation provisions aim to prevent dominant firms[14] in a market from harming competition and preventing benefits to consumers that competition brings – efficiency, innovation and higher productivity. Monopolisation provisions are intended to allow large firms to exploit scale economies and to compete vigorously, so long as they do not harm the competitive process. A healthy, competitive process can take many forms. Two differing examples are:

- A robust contest for customers among many similarly-sized, smaller firms, with none having significant market power. This *atomistic* competition drives down prices and/or drives up quality in line with consumers' preferences, and results in sufficient product differentiation to cater for the varied tastes and needs of consumers.
- A single, or very few, large firm(s) dominate the market because these firms have succeeded in developing breakthrough technologies or processes that satisfy consumer preferences in superior ways to old technologies (such as smartphones replacing older mobile handsets). These firms enjoy temporary monopoly power as a result of a process that economists call *creative destruction* (Chapter 6). The lure of achieving this power and its associated profits is a potent incentive for firms to compete in races to innovate. This process is dynamically efficient and has high welfare benefits for consumers.

The second form of competition is sometimes tricky to distinguish from a situation in which a monopolist takes advantage of its power to harm competition. This is where monopolisation provisions come into play. As noted, it is desirable to allow large firms to exist and even charge monopoly prices for a while as a reward for exceptional innovative achievement. It is not desirable for them to use their market power to damage the competitive process. They could use their market power to exclude others from competing, perhaps by restricting the entry of new firms, preventing others from engaging in the market, or eliminating existing firms.

Large firms acting intentionally and anti-competitively to exclude others is not the same as competing vigorously (through offering superior price and/or quality to consumers) that happens to result in other firms failing or not launching.

Box 4.1 describes New Zealand's legislative provision on monopolisation and how it compares with parallel provisions in Australian law. Separate to the written law, the courts in each country interpret the provisions when disputes arise in legal cases. This generates each country's *jurisprudence*, which can vary because the written law differs and each country's courts may interpret it differently.

New Zealand's jurisprudence on monopolisation has been strongly criticised for diverging from Australia and even more from countries with broader criteria for determining violations, including the economic *effects* of a dominant firm's conduct (Adhar, 2009; Gavil, 2013).

[14] The language in s 36 is "firms with substantial market power" rather than "dominant firms". A 2001 amendment to the Commerce Act changed the "dominance" criterion to "substantial market power", the latter being considered a lower test.

Box 4.1 **Monopolisation provisions in New Zealand, Australia and the United States**

S 36 (2) of the New Zealand Commerce Act prohibits anti-competitive conduct by dominant firms:

> A person [for which read 'firm'] that has a substantial degree of power in a market must not take advantage of that power for the purpose of
>
> (a) restricting the entry of a person into that or any other market; or
>
> (b) preventing or deterring a person from engaging in competitive conduct in that or any other market; or
>
> (c) eliminating a person from that or any other market.

S 36 is essentially based on the monopolisation provision (s 46) in Australia's Competition and Consumer Act 2010. The provision in s. 46 was substantially amended in 2007 and 2008 with further considerations added to new subsections. Yet the main original part of s 46 remains very similar to s 36:

Section 46 – Misuse of market power (Australia)

> A corporation that has a substantial degree of power in a market shall not take advantage of that power in that or any other market for the purpose of:
>
> (a) eliminating or substantially damaging a competitor of the corporation or of a body corporate that is related to the corporation in that or any other market;
>
> (b) preventing the entry of a person into that or any other market; or
>
> (c) deterring or preventing a person from engaging in competitive conduct in that or any other market.

The Australian Trade Practices Act 1974 (now the Competition and Consumer Act 2010) was significantly influenced by the two key pillars of US antitrust legislation – the Sherman Antitrust Act 1890 and the Clayton Antitrust Act 1914. Both Acts aim to protect competition and the competition landscape, not competitors. This objective is also central to Australian and New Zealand competition law.

Australian and New Zealand jurisprudence

Australian jurisprudence, before the significant 2007 and 2008 amendments to s 46, developed a "counterfactual test". The High Court of Australia's foundation case for this test is Queensland Wire Industries Pty Ltd v Broken Hill Pty Co Ltd (1989). The majority judgment in this case considered that "a firm will not have taken advantage of its market power if it would have acted in the same manner in a competitive market".

This counterfactual test has played a central role in subsequent cases in Australia and even more so in New Zealand. Yet important differences and similarities have emerged in the jurisprudence of both countries.

- Australian jurisprudence developed tests in addition to the counterfactual test. These tests focus on the link between a firm's market power and its conduct, while the counterfactual test hypothetically assumes the firm lacks substantial market power. Yet even with the additional tests, controversies persist.
- New Zealand's jurisprudence on s 36 developed through two Privy Council cases and a Supreme Court judgment in 2010 (the so-called 0867 case). In each case, the court found against the Commerce Commission's contention that s 36 had been breached. The courts relied almost exclusively on the counterfactual test for determining whether the firm in question had "taken advantage" of its market power. The Supreme Court in 0867 noted:

  > Anyone asserting a breach of s 36 must establish there has been the necessary actual use (taking advantage) of market power. To do so it must be shown, on the balance of probabilities, that the firm in question would not have acted as it did in a workably competitive market, that is, if it had

not been dominant (Commerce Commission v Telecom Corporation of New Zealand Ltd, 2010, paragraph 34).

- The 2007 and 2008 amendments to Australia's s 46 make even clearer that "the court may have regard to any or all of [four tests]", only one of which makes "overt" use of counterfactual analysis to determine whether monopoly power is being used for an anti-competitive purpose.
- Australia and New Zealand stand apart from other countries in relying solely on purpose tests in their approaches to monopolisation – as opposed to also considering the *effects* on competition. Yet New Zealand, in relying only on a counterfactual test, stands even more apart.

The debate over how to deal with monopolisation

Monopolisation provisions are tricky to get right and contentious in many countries. There is no agreed best way to deal with monopolisation. Some key issues of contention are examined below.

Issues typically raised by supporters of s 36 and its judicial interpretation

Certainty

The prevention of anti-competitive behaviour must be balanced against advance certainty for large businesses so as not to discourage innovation and other legitimate competitive activity. The New Zealand Supreme Court has highlighted the importance of this certainty, noting that:

> It is important when addressing the statutory concept of use of market power to take an approach which gives firms and their advisers a reasonable basis for predicting in advance whether their proposed conduct falls foul of s 36 and risks a substantial financial penalty. (Commerce Commission v Telecom Corporation of New Zealand Ltd, 2010, paragraph 30).

The counterfactual test is simple and easy to apply and this makes for certainty.

Avoiding chilling pro-competitive behaviour by large firms

If the law creates uncertainty or sets a low threshold for judging that a dominant firm has acted anti-competitively, then large firms may be deterred from vigorously competing and striving to outperform their rivals, to the detriment of dynamic efficiency and long-term consumer benefit. The EU approach to monopolisation, that puts a "special responsibility" on dominant firms to behave with restraint, would likely have a similar detrimental effect.

Effects-based tests are costly and risky

A test relying on a comprehensive analysis of the economic effects in a market arising from how large firms behave requires onerous information gathering and analysis. This is the US "full rule of reason" approach. While the United States has the market size and resources to undertake such research, New Zealand does not. Further, there is a risk that an effects test will end up protecting weak and inefficient competitors rather than safeguarding the competitive process. Shutting down inefficient firms and redeploying resources to more valuable uses is an important part of the competitive process.

No compelling case to change

No one has made a compelling case for change based on empirical evidence. For change to be warranted, it needs to be shown which cases have not been brought because of too lenient a standard and what the costs to the New Zealand economy have been.

Issues typically raised by advocates of the need to reform s 36

Risk of false negative outcomes

A false negative outcome occurs when the monopolisation test indicates that a firm has not taken advantage of its power and damaged competition even when it has. Critics of s 36 and its jurisprudence argue that the counterfactual test is too difficult to satisfy because it is too easy to come up with reasons that a firm without power would have acted in a similar way to the alleged misconduct. The harm from false negatives is that large firms misuse their power and damage the competitive process. One consequence is

that new firms with the potential to drive innovation and dynamic change in in markets may not launch or survive.

Risk of false positive outcomes

A false positive occurs when the monopolisation test says the firm has taken advantage of its power and damaged competition when it has not. For example, some technology investments may be enabled or facilitated by market power. If the firm was "not in a dominant position but otherwise in the same circumstances" it would not have invested. Under the counterfactual test it could be found guilty of taking advantage of its market power despite its actions positively affecting economic outcomes. Another example might be a firm setting supply-chain standards that cut transaction costs and raise productivity where this could not be achieved by a non-dominant firm. The harm from false positives is that benefits from such actions of large firms are not realised.

The counterfactual test is complex, artificial and has a flawed logic

Constructing a hypothetical market where the defendant firm is not dominant and asking what it would do is hard because the features of such an artificial market are open to debate. It is much more complex test than other provisions in competition law that compare an actual firm or firms in a market with and without a permitted change (such as a merger). And the logic is flawed because the same conduct by firms with and without market power can have very different purposes and effects.

Effects are of the essence

The counterfactual test puts the focus of investigation on the hypothetical conduct of a non-dominant firm. Unilateral conduct by a non-dominant firm in a competitive market is likely to be of no concern, or even pro-competitive. In contrast, the same conduct by a dominant firm may well be anti-competitive and cause consumer harm. So the real assessment of harm from market power requires an examination of effects in the market. Indeed such an assessment is called for and is applied without undue difficulty under s 27 of the Commerce Act relating to arrangements between firms that substantially lessen competition. Examining questions about how a dominant firm would have acted in a hypothetical counterfactual competitive situation focuses in the wrong place.

Summing up the debate

Both sides raise New Zealand's small markets and isolation as reasons for favouring their views. Supporters of s 36 and its judicial interpretation argue that New Zealand has higher concentration in its markets which is to be expected and is desirable if firms are to achieve economies of scale. Overly zealous action against large firms risks them not prospering to the benefit of the economy.

Conversely, advocates of reform point to low intensity of competition and innovation as likely reasons for New Zealand's relatively weak productivity performance. New firms are a critical source of innovation in technology and business models. They can be a threat to large existing firms who use a variety of tactics to try to neutralise the threat. Monopolisation law needs to be effective to ensure that these tactics, while they may harm newer rivals, do not harm the competitive process itself.

The Commerce Commission's view

The Commerce Commission's view is that s 36 requires legislative reform to make it a workable tool for tackling the misuse of market power. It says that the court's threshold of proof is so high that it will only take on cases when the anti-competitive behaviour is egregious. Mark Berry, the Commission Chair, is unequivocal in his view of the need for reform:

> For the moment, New Zealand monopolization law sits in an unfortunate position. While the legislative provision itself demonstrates no particular problems, the judicial analysis of it has seriously narrowed its application. Pragmatically, the only way forward is for an amendment to section 36. Hopefully, any such legislative review will not be confined to the potential adoption of the revised monopolization provisions now contained in section 46 of the [Australian] Competition and Consumer Act. …. counterfactual analysis is unreliable and controversial in its application.
>
> The decision of the Supreme Court in *0867* has serious implications for section 36. The application of monopoly rules based on hypothetical thought experiments, involving the creation of make-believe

> market structures and predictions of behaviour in make-believe worlds, is highly problematic. Section 36 is in urgent need of amendment.
>
> A properly informed review of section 36 will require an international survey of the subject. There is no easy solution to the problem; indeed the history of antitrust reflects a "continuing, and perhaps never ending, search for an appropriate (monopolization) rule." In any such review, close consideration should be given to U.S. monopolization law which focuses upon the likely or actual competitive effects of the defendant's conduct. At the least, such a test endeavours to address the real-world harm that may attach to monopolistic conduct, and this is clearly preferable to hypothetical thought experiments. (Berry, 2012, pp. 27, 28, 39)

The Productivity Commission's view

The Productivity Commission finds the Commerce Commission's and other critiques of s 36 (jurisprudence and the consequent unsatisfactory nature of the status quo) persuasive. It agrees with the broad consensus among experts that dominant firms in New Zealand face a more lenient test than their Australian counterparts of whether they are taking advantage of their market power. This is unsatisfactory given that New Zealand industries, particularly service industries, tend to suffer from lower levels of competition. Further, the incidence of damaging conduct and its effects is likely to be higher in New Zealand compared with large economies. This is due to greater levels of concentration, a weaker tendency of markets to self-correct because of higher entry barriers, and consumers having fewer choices. The latter two features are a function of concentration and small market size.

The Commission also agrees with the analysis that New Zealand jurisprudence on s 36, in relying almost solely on the counterfactual test, is unique among comparable countries. It now differs from Australia's approach (which is not without its own controversies) where the jurisprudence and legislative amendments provide a range of tests for whether dominant firms are behaving to the detriment of competition in a market.

The Commission acknowledges that informed academics, lawyers and economists have varying views on the desirability of the provisions in the current s 36. In October 2013, the Commerce Commission held a conference (*Competition Matters*) on competition and regulation. Speakers and some of the discussion voiced this divergence, but most views were that New Zealand's approach is exceptional and unsatisfactory. The Commission found the analysis in the keynote address by Gavil (2013) persuasive.

Gavil used a decision-theory framework (or *error-cost analysis*, see Box 4.2) to critique the counterfactual test. He used the framework to analyse whether the test, or rule, acts as a good "sorter" of conduct by dominant firms. Gavil found this unlikely.

Box 4.2 The error-cost analysis approach to finding a good monopolisation rule

The Commission agrees with the approach of error-cost analysis (based on decision theory). The approach recognises the inevitable uncertainty in the effects of a dominant firm's behaviour on efficiency in affected markets. The best approach is to choose a rule that maximises the overall objective of the competition regime – in New Zealand's case this is the long-term benefit of consumers (largely a function of productive, allocative and dynamic efficiency). Such an approach would note the likelihood of errors (false negatives and false positives) that may arise from using alternative judicial rules. Also important are:

- the cost consequences of false positive and false negatives, including the costs of over or under deterrence of other firms;
- the transaction costs of operating the rule such as information that must be gathered and litigation costs;
- whether some decisions can be made before in-depth, costly information needs to be gathered (for example, quick-decision options); and

- the clarity and certainty of the rule so that firms know in advance where they stand.

While the framework is a standard micro-economic tool, and is neutral, it does not settle all debate. Typical topics of debate and disagreement include the probability of firms acting harmfully, the size of harms, the competence of courts and regulators to make correct decisions, and the power of markets to self-correct any errors that occur.

The framework is attractive because it can systematically assess how the rules arising from competition laws and their jurisprudence perform. The framework is also useful when evaluating prospective new rules.

Source: Beckner & Salop (1999); Salop (2006); Baker (2013).

The Productivity Commission's main concern – based on Gavil's error-cost analysis (Gavil, 2013) – is the counterfactual test appears to be an inefficient rule that runs a high risk of false negatives and some risk of false positives. These are likely to result in costly errors for the economy, including the services sector.

In the Commission's view, the argument that the current approach provides certainty to large businesses and so runs a desirably low risk of discouraging them from engaging in vigorous competition is not convincing. Supporters of the current s 36 see this as an important benefit. The current approach does achieve a high level of certainty, but only by setting a very high threshold for dominant firms before they are held to engage in anti-competitive conduct. The price paid for this certainty is the damage to competition from a too-lenient test that allows dominant firms to indulge in and behave in exclusionary ways.

In its 2012 freight inquiry on the issue of access to monopoly-owned infrastructure, the Commission noted that "significant difficulties remain in using s 36 to require access to infrastructure in order to provide a competitive service". (NZPC, 2012a, p. 264)

Any review of the current law should include a thorough legal and economic analysis of the extent and costs of any anti-competitive behaviour encouraged or enabled by the current interpretation of s 36. Essentially this takes Gavil's error-cost analysis further. It would put rough numbers on the probabilities and costs of the false negatives and positives at risk of occurring under both the current s 36 and potential alternatives. Some commentators have already proposed alternatives to consider, such as a multi-stage, composite test or a different version of the counterfactual test based on notion of an equally matched rival (Ahdar, 2009).

The review needs to acknowledge the small size of and limited competition in the New Zealand economy. The small size means greater market concentration in many New Zealand industries. This is appropriate as more firms can achieve the scale necessary to be efficient. So New Zealand's competition policy is more tolerant of such concentration than policy in most larger economies. The downside is that New Zealand suffers greater risk of damage from dominant firms behaving anti-competitively. New Zealand has a large number of dominant firms and market forces in a small economy are less likely to self-correct when faced with such behaviour (Gal, 2007). So the best monopolisation rule is likely to be more rigorous in detecting and enforcing action against anti-competitive conduct.

The Australian Federal Government is planning a "root and branch" review of its competition law. The terms of reference of the review are comprehensive and include the issue of whether to move in the direction of "effects" analysis and tests. Without ignoring the distinctive economic features of New Zealand, any New Zealand review of its competition law should take account of developments in Australia. A desirable aim would be for the two countries to align on best practice within a single trans-Tasman market. The benefits of doing so would be to:

- lower a "behind-the-border" barrier to trans-Tasman investment since trans-Tasman firms would need to be familiar with broadly similar competition regimes across Australasia; and
- enhance the existing spill-over benefits from sharing the knowledge and experience across countries with similar laws, institutions and judicial thinking.

The Commission is persuaded that a better balance is needed to achieve an effective monopolisation law for the small, competition-challenged New Zealand economy. This balance would still permit firms large and integrated enough to exploit scale economies where present, but would do more to ensure other firms are not denied legitimate opportunities to provide effective competition. The new approach would likely focus more on the market *effects* of dominant firms. Effective guidance material and mechanisms for quick decisions would help to mitigate uncertainties in simpler cases.

R4.1 The Government should review section 36 of the Commerce Act 1986 to assess how best to improve its accuracy in identifying situations where firms take advantage of market power for anti-competitive purposes.

R4.2 Any review of competition law on the misuse of market power should note the future review of competition policy in Australia to achieve a consistent approach that mirrors best practice and furthers the goal of a single trans-Tasman economic market.

R4.3 The Government should consider a reform of section 36 to achieve either:

- a more flexible approach where courts do not rely on a single counterfactual test for an abuse of monopoly power, regardless of the case; or
- more of an "effects" approach that aims to minimise the economic costs of decision errors, and in simpler cases uses appropriate guidance material and mechanisms for quick decisions to mitigate uncertainty.

4.3 Productivity-enhancing collaboration

The earlier sections of this chapter focus on the importance of robust competition as a driver of productivity in the services sector. One important way that competition can help to stimulate productivity growth is by creating an incentive for firms to innovate. Yet, while competition is an important driver of innovation, collaboration between firms is often a pre-requisite to achieving the necessary scale and mix of capabilities required to undertake innovation. A tension exists between the promotion of competition and collaboration. On one hand, policy settings should encourage firms to compete against one another, but on the other, the community can benefit when firms cooperate with one another in undertaking innovation.

This section examines how the trade-off between competition and collaboration is managed in New Zealand and considers whether initiatives exist that can help to foster higher levels of collaborative innovation without compromising competition.

Why does innovation matter?

An important motivation for promoting competition in the services sector is that when businesses face competitive pressure from a rival, it affects their incentives to innovate. In most situations, there is a positive relationship between competition and innovation. Certainly, firms in a monopoly position have weak incentives to innovate because they face no competitive pressure to do so (OECD, 2013a).

The importance of innovation is well documented:

> There is considerable evidence that innovation plays an important role in shaping the growth and competitiveness of firms, industries and nations (as well as regions). It is linked to increased welfare, the creation of new types of jobs and the destruction of old ones. (OECD, 2013a, p. 4)

Smith (2006) sets out three broad reasons why innovation is central to improving wide-ranging economic and social outcomes.

- Innovation generates qualitative improvements in products and processes, which increases productivity and output.
- Innovation shapes technical changes and so affects real incomes and economic welfare.
- Innovation is central to establishing and maintaining competitive trade positions that accompany and enable domestic growth strategies.

Traditional definitions of innovation have tended to focus on proxy measures such as research and development (R&D) expenditure and patent production, reflecting a view that innovation is synonymous with scientific and technological invention (NESTA, 2007). But innovation includes broader actions, including process innovations and new marketing methods; and new organisational methods in business practices, workplace organisation or external relations (OECD, 2005). Innovation is also about the process of putting new ideas or approaches to work – whether it is in the market, or through other channels that impact on the economy, society or environment (Department of Industry, Innovation, Science, Research and Tertiary Education, 2012). Lewis (2008) notes that this commercial application of new knowledge is an area of relative weakness in New Zealand.

Given the centrality of innovation to productivity performance, one important consideration in formulating competition policy and other regulatory settings should be to ensure that no unnecessary barriers prevent or discourage firms from undertaking innovation.

What role does collaboration play in the innovation process?

While the benefits associated with successful innovation are well acknowledged, the complexity and costs of engaging in innovation can be very high. Also, the outcomes from undertaking innovation are usually highly uncertain (Smith, 2006), which can make it particularly difficult to get the funding needed for its support (Hajimanolis, 2006). A further obstacle to innovation is a tendency for firms to focus on generating profits in the short term. This means that innovation projects, which often take a longer time to see rewards, are often crowded out (Loewe & Dominiquini, 2006).

Collaboration – which refers broadly to an agreement between two or more partners to share the commitment to reach a common goal by pooling resources and coordinating activities (Caloghirou, Ioannides & Vonortas, 2003) – can help firms to overcome these barriers.

Drawing on a range of literature, Faems, Van Looy and Debackere (2005) set out three main reasons why collaboration between organisations can increase the effectiveness and efficiency of the innovation process.

- Collaboration allows access to complementary assets needed to turn innovation projects into a commercial success.
- Working together with other organisations encourages the transfer of codified and tacit knowledge. This might result in the creation and development of resources that would otherwise be difficult to develop or mobilise.
- Collaboration helps spread the costs of R&D between different parties and so reduces the risks associated with innovation projects.

Of course collaboration also has its difficulties, and not all collaborative initiatives are successful. Common reasons that collaborations fail include diverging opinions on intended benefits and business partners not being flexible or able to adapt (Faems, Van Looy & Debackere, 2005). Despite these challenges, collaboration has been growing in popularity with a proliferation of a wide variety of different inter-firm agreements emerging since the early 1980s. In particular, cooperation that focuses on generating, exchanging or adapting new technologies has grown in popularity (Caloghirou, Ioannides & Vonortas, 2003).

Overall, the evidence points toward collaboration having a positive influence on the innovative performance of firms (Faems, Van Looy & Debackere, 2005). OECD survey results suggest that firms that collaborate on innovation tend to spend more on innovation than other firms. In addition, collaboration is increasingly being undertaken internationally – particularly in the car-making industry. The world's 24 largest carmakers operate some form of alliance or joint venture with another large carmaker and share research, vehicle designs, engines, and other components. For example, Nissan has established joint ventures with Dong Feng, Renault and Daimler, alongside:

- contract assembly alliances with Mitsubishi, Suzuki and Daimler;
- parts and technical alliances with Mitsubishi and Daimler; and
- cross-shareholding relationships – Nissan owns 15% of Renault and 2% of Daimler (Foy, 2013).

Results from Statistics New Zealand's Business Operations Survey provide some insight into how New Zealand businesses collaborate and innovate. The most recent results (2011) show that 46% of all businesses reported some form of innovation activity. While the survey does not include data about business productivity, it does show that the profit ($67,000) for each employee in a business that undertook innovation was higher than the profit ($55,000) for each employee in a non-innovating business. Of businesses that undertook innovation, 25% did so in a collaborative arrangement. The most common reasons to collaborate were to access new markets, share costs, access management skills and access work practices.

Results from the Business Operations Survey suggest that scale is an important enabler of innovation. The innovation rate increased with business size – from 44% for businesses with 6–19 employees, to 62% for businesses with 100 or more employees. Given the small size of many New Zealand firms, collaboration is likely to be a particularly relevant strategy in providing smaller businesses with the capacity to undertake innovation.

The relationship between competition and collaboration

In many cases collaboration between firms can generate benefits for consumers and the collaborating firms. A balance needs to be struck where anti-competitive collaboration is actively discouraged while also enabling collaboration that favours a competitive outcome.

During the course of this inquiry, the Productivity Commission has heard that some businesses are reluctant to enter into collaborative agreements for fear of breaching the Commerce Act. This concern is more apparent among smaller firms – presumably because they lack the legal expertise to confidently interpret competition law. One inquiry participant noted that the Commerce Commission "casts a long shadow" on collaborative business arrangements.

Part 2 of the Commerce Act

To promote competition in markets, Part 2 of the Commerce Act contains provisions that prohibit the following types of collective behaviour (behaviour by two or more businesses):[15]

- agreements that contain provisions that substantially lessen competition in the market;
- agreements that exclude competitors by containing provisions that prevent or limit dealings with a rival; and
- agreements that contain provisions to fix prices among competitors.

While these provisions do not explicitly rule out firms collaborating, it is easy to see how they might deter some firms from undertaking collaboration. However, the Commerce Act also contains three "partial exemptions" to the price-fixing rules. The exemptions are only "partial", because the Commerce

[15] Part 2 of the Commerce Act also includes provisions relating to unilateral behaviour (behaviour by a single business). These provisions are discussed earlier in this chapter.

Commission may still challenge an agreement if it believes will substantially reduce competition. The partial exemptions relate to:

- recommended prices where there are 50 or more parties to an agreement for a recommended price;
- joint buying or advertising arrangements; and
- joint ventures.

Recommended price arrangements are permitted so long as there are 50 or more parties to the agreement and they are genuine "recommendations" that parties can decide not to follow. More relevant for firms seeking to collaborate are the partial exemptions relating to joint ventures and joint buying or advertising arrangements. Joint ventures typically involve two or more firms pooling resources and supplying goods or services as if they were a single entity. Firms are also able to enter into joint buying or advertising arrangements. For example, firms may collectively purchase goods at a discounted bulk price.

The Commerce (Cartels and Other Matters) Amendment Bill

The Commerce (Cartels and Other Matters) Amendment Bill is currently progressing through Parliament and is expected to be enacted in early 2014. It proposes some significant changes to the Commerce Act that are likely to materially affect the balance between competition and collaboration. Its main features are set out in Box 4.3.

Box 4.3 **Features of the Commerce (Cartels and Other Matters) Amendment Bill**

The penalty regime – The Bill introduces criminal sanctions for individuals and companies who are found to have engaged in cartel conduct. For an individual, the maximum sanction would be seven year in prison – an increase from the penalties that currently apply, and a significant deterrent.

The prohibition – The Bill takes a new approach to defining hard-core cartel conduct. The prohibition defines illegal forms of conduct (such as fixing prices, restricting output, allocating markets, and rigging bids).

The exemptions – The Bill includes a "collaborative activity" exemption, which is intended to apply to all pro-competitive arrangements, not just joint ventures. It also contains exemptions for joint buying and promotion agreements, and for vertical supply contracts.

The clearance regime – The Bill introduces a clearance regime to help businesses manage any residual risk that their proposed collaborative activity might be in breach of the Commerce Act. The clearance regime aims to provide greater certainty for businesses by testing with the Commerce Commission whether planned collaborative arrangements raise competition concerns.

Criminalisation of cartel conduct aligns New Zealand's penalty regime with Australia as part of the Single Economic Market agenda. It also aims to enable the Commerce Commission to cooperate with overseas regulators to enhance the identification of and enforcement against global cartels.

Source: Commerce Commission (2013b); Power (2011).

Several submitters to the Commerce Select Committee (such as Air New Zealand, Buddle Findlay and Business New Zealand) raised concerns about the Commerce (Cartels and Other Matters) Amendment Bill having a chilling effect on commerce in New Zealand. Russell McVeagh noted that "that the claimed deterrent effect of criminalisation does not outweigh or compensate for the chilling effect it will have on pro-competitive behaviour and the increased costs of doing business in New Zealand" (Russell McVeagh, 2012).

These concerns were considered in the Commerce Amendment Bill's regulatory impact statement, and clarifying the prohibition and exemptions, and introducing a clearance regime were two ways to mitigate the potential chilling of pro-competitive behaviour (Ministry of Economic Development (MED), 2012). The

regulatory impact statement also notes that the sequencing of the criminal regime's introduction (the regime does not come into effect until two years after the Commerce Amendment Act comes into force) will provide greater certainty over how the Commerce Commission will interpret key terms. The regulatory impact statement also states that "activities such as advocacy and developing prosecution guidelines can also help to improve certainty and minimise costs" (MED, 2012, p. 21).

Is an appropriate balance being struck?

It is difficult to quantify, before the event, how the Commerce (Cartels and Other Matters) Amendment Bill will affect levels of competition and collaboration in the services sector. Yet the proposed regime includes new provisions aimed to help ensure an appropriate balance is struck. Most importantly, the clearance regime provides a mechanism that firms can use to gain certainty that the Commerce Commission does not consider unlawful any aspect of an arrangement. Businesses can also have pre-clearance discussions with the Commerce Commission. In these discussions the Commerce Commission can make non-binding indicative comments about likely competition issues (Commerce Commission, 2013).

The Bill contains measures that are intended to avoid unnecessary impediments to pro-competitive collaboration. However, perceptions that criminalising certain activities will have a chilling effect on pro-competitive business do remain. Active publicity and education about what the changes will mean for business are the two most appropriate ways to deal with these concerns. The Commerce Commission has already taken steps in this direction by publishing draft Competitor Collaboration Guidelines, which were presented for feedback at events in Auckland, Wellington and Christchurch. The Commerce Commission also conducts business surveys to monitor awareness of competition policy and conducts targeted awareness campaigns in specific markets.

Even so, the outreach capabilities of the Commerce Commission are limited, and ultimately the responsibility for adhering to the law should sit with business. As noted earlier, the chilling effect of competition law on pro-competitive collaboration is likely to be most acute among smaller businesses. Such businesses are less likely to engage with the Commerce Commission's existing awareness campaigns. As such, industry peak bodies may be able to mediate between the Commerce Commission and their members to help advise smaller businesses about acceptable conduct, and the benefits that can come with pro-competitive collaboration.

R4.4 The Commerce Commission should include smaller and younger businesses in its education campaign on pro-competitive collaboration.

R4.5 Industry peak bodies, in consultation with the Commerce Commission, should seek to ensure that businesses are aware of the benefits of pro-competitive collaboration, and guide businesses on what steps they can take to clarify the legality of collaborative arrangements.

4.4 Is there a case for market studies?

What are market studies?

Competition authorities in many other countries have the ability to undertake broad-ranging inquiries into the state of competition in particular markets – commonly known as market studies. There is no single definition of a market study, and it involves a variety of different practices and approaches. The International Competition Network sets out some of the more common features of market studies.

> Market studies are research projects conducted to gain an in-depth understanding of how sectors, markets, or market practices are working.
>
> They are conducted primarily in relation to concerns about the function of markets arising from one or more of the following: (i) firm behaviour; (ii) market structure; (iii) information failure; (iv) consumer

> conduct; (v) public sector intervention in markets (whether by way of policy or regulation, or direct participation in the supply or demand side of markets); and (vi) other factors which may give rise to consumer detriment.
>
> The output of a market study is a report containing findings based on the research. This may find that the market is working satisfactorily or set out the problems found. Where problems are found the market study report can include: (i) recommendations for action by others … and/or (ii) commitments by the competition (or competition and consumer) authority itself to take advocacy and/or enforcement action. (ICN Advocacy Working Group, 2010, pp. 4–5)

The primary purposes for conducting market studies include:

- as a lead-in to litigation when anti-competitive behaviour is suspected but competition authorities do not exactly know the nature and source of the competition problem;
- as a foundation for competition advocacy;
- to build technical expertise about markets (particularly useful for markets that are new or fast-moving, or to take account of recent developments;
- to address public interest or concern about markets, for example, where there are allegations of anti-competitive conduct or agreements that a market study can reveal to be unfounded;
- to reduce uncertainties about how the authority will apply competition principles – again this may be particularly useful in new or fast-moving markets, or those where there have been recent changes; and
- to develop thinking about proposals for future regulation so as to advocate to minimise adverse effects on competition (OECD, 2008b; ICN Advocacy Working Group, 2009).

Use of market studies in other countries

Box 4.4 sets out the approaches to market studies in the United Kingdom, Ireland, Australia and Japan. The approach in the United Kingdom is a relatively comprehensive and resource-intensive, while the Japanese approach sits at the other end of the spectrum, being relatively light-handed.

Box 4.4 **Market studies in other countries**

United Kingdom – The United Kingdom takes a two-pronged approach to market studies, with the Office of Fair Trading (OFT) and the Competition Commission (CC) dedicating significant resources to them. The OFT uses market studies to examine how a market is working, with a view to addressing any competition issues, consumer detriment, or issues stemming from government regulations. OFT selects the topics, but bears in mind feedback from stakeholders, including government departments. The Department for Business, Innovation & Skills is responsible for coordinating a government response when regulatory recommendations are made.

Outcomes of a market study may include a finding that nothing is wrong with the market, consumer-focused action, recommendations to business or the Government, investigation and enforcement action, and referral to the CC for a more detailed market investigation.

In conducting a market investigation, the CC examines whether features of a market prevent, restrict or distort competition. After establishing a competition problem, and identifying its causes, the CC is able to impose a range of legally enforceable remedies that typically focus on making the market more competitive. The CC can also recommend that other public organisations take remedial action. The CC does not choose topics for market investigations – the OFT or sector regulators refer topics to it. Ministers have the power to refer market investigations, but this power has not been used to date. The CC has the power to compel others to provide information and data, and the UK Government has committed to respond to any recommendation made to it within 90 days after the CC's final report is published.

Ireland – Since 1997 the Advocacy Division of the Irish Competition Authority has undertaken market

studies. Completed studies include solicitors and barristers, ports, and mobile telecommunications. Their main purpose is to evaluate competition in certain markets, with a view to advocating that Government remove any unnecessary distortions of competition. Studies may also contain recommendations to non-governmental organisations or lead to enforcement action where potential breaches of competition law are identified.

Topic selection is usually at the discretion of the Competition Authority, but the Minister for Jobs, Enterprise & Innovation may direct the Authority to undertake a specific study. The Competition Authority has the power to compel the provision of information for market studies but uses the power rarely, as participants generally provide information willingly. Since 2008 the Irish Government has published whole-of-government responses to the recommendations in market studies.

Australia – Under Part VIIA of the Competition and Consumer Act 2010, the Australian Competition and Consumer Commission (ACCC) can monitor prices, costs and profits in certain markets. As part of this process the ACCC may undertake "price inquiries". The Australian Minister for Competition Policy and Consumer Affairs must request or approve any price inquiry. The ACCC must report the results of any inquiry to the Minister before the inquiries are made available to the public. The ACCC also undertakes educational campaigns to provide information and advice to consumers and businesses to encourage compliance with competition law.

Japan – The Japan Fair Trade Commission (JFTC) undertakes "fact-finding surveys" which are a less complex form of market study. Fact-finding surveys are used to gain insight into specific markets, industries, and trade practices when competitive environments notably change and where unreasonable trade practices are apparent.

The JFTC can compel others to supply information, but it generally relies on voluntary cooperation from survey participants. Survey results are mainly used for advocacy purposes. If the results raise concerns about competition, the JFTC will point out the concern, encourage the parties to voluntarily improve compliance, and publish the survey findings.

Source: Competition Commission (2013); OECD (2008b); OFT (2010a).

F4.1 Market studies are a tool that competition authorities around the world commonly use. Practices vary significantly between jurisdictions.

Is there a case for introducing market studies in New Zealand?

The Commerce Commission does not currently have specific powers to undertake market studies of the type described above.[16] Two specific circumstances allow for market studies, but they are considerably narrower than the criteria typically applied in other countries:

- Sections 52H-52K of the Commerce Act allows *Commission inquiries*, but these are limited to the formal questions of whether and how goods and services markets should be regulated under Part 4 of the Act. One example is the 2003 gas pipeline inquiry (Commerce Commission, 2003).
- Section 9A (1) (b) of the Telecommunications Act 2001 as amended in December 2006 gives the Commerce Commission the power to proactively conduct inquiries, reviews and studies into any matter relating to the telecommunications industry or the long-term benefits of end-users of the

[16] Previously experts have debated whether the Commerce Act 1986 authorises the Commerce Commission to undertake market studies as it chooses. In 1991/2 the Commerce Commission, purporting to act under the Commerce Act, conducted an inquiry into the development of competition in the telecommunications industry in New Zealand and the extent to which the regulatory framework assists this. In December 1991 Telecom began a judicial review proceeding against the Commerce Commission, challenging the institution of the inquiry. The court found that the Commerce Commission had acted outside its powers (*Commerce Commission* v *Telecom Corporation of New Zealand Ltd*, 1994). Since then the Commerce Commission has taken a conservative approach to any studies not specifically provided for in the Commerce Act.

telecommunications services within New Zealand. This power enables the Commerce Commission to conduct market studies – but only on matters that relate to telecommunications.

Some commentators have suggested value in granting the Commerce Commission much broader powers to conduct market studies:

> … give the Commerce Commission the explicit power to conduct 'market studies', i.e. broad ranging inquiries into the state of competition in different sectors. In overseas jurisdictions these are commonplace powers for a competition authority to possess. It would involve a very simple amendment of the Commerce Act. (Donal Curtin, Economics New Zealand, sub. 108, p. 3)

> … the advocacy role of the Commerce Commission in promoting competition and the Commerce Act as means to an end – the enhancement of economic efficiency and welfare – could be improved. The Commission should also be able to conduct market studies without reference to a merger application or other investigation, as is the case in Australia. These changes would help strengthen the competition culture among policymakers and the public and reduce the inconsistencies in New Zealand's policy approach to competition. (Conway, 2011, p. 26)

Table 4.1 sets out an overview of market studies (based mainly on their use in the United Kingdom and Ireland) and summarises their costs, advantages and disadvantages.

Table 4.1 A summary of the advantages and disadvantages of market studies

	Market studies
Description	Research projects conducted by competition agencies to gain an in-depth understanding of how sectors, markets or market practices are working.
Current use in New Zealand	The Commerce Commission does not have explicit powers to conduct market studies.
Examples	Ireland's Competition Authority has been undertaking market studies since 1997. The aim of their studies is to assess competition in a particular market and recommend ways to improve it so that consumers benefit. Since 1997, the Authority has published seven market studies on different professional services (including legal and dental), and ten sectoral studies (including ports, banking, and mobile telecommunications).
Costs for government	The financial costs of undertaking market studies vary significantly across different jurisdictions, as different countries have adopted different approaches to market studies. Three examples are noted below. • The Irish Competition Authority study into the banking sector in 2008 was estimated to have cost €330,000 (based on fees paid to external consultants and staff salaries). • For a 2007 study on self-regulated professions, the Canadian Competition Bureau spent about four full-time person years and C$224,000. In the same year, the Bureau devoted C$117,000 and about three full-time person years for a study on generic drug pricing. • Market investigations conducted by the UK Competition Commission usually take about two years to complete, and involve 2–12 full-time staff.
Costs for business	The Business and Advisory Committee to the OECD notes that preparing proper responses to market studies can involve significant financial costs (internal and external advisers) and time costs for businesses. "A company's external costs in a typical … Competition Commission investigation can be over £4m and internal costs over £2.5m" (OECD, 2008b, p. 202). Ireland's Competition Authority conducts engagement meetings as part of their market studies and typically receives about 20 submissions from businesses for each study.
Advantages	In New Zealand's case, market studies might usefully fill a gap between the advocacy role of the Commerce Commission and formal enforcement activities. Benefits attributed to market studies are noted below. • Market studies can be a useful and effective tool in developing market knowledge. This is particularly beneficial when anti-competitive behaviour is suspected in a sector but competition authorities are unsure about the exact nature and source of the problem.

	Market studies
	• Market studies can be vehicles for providing the empirical and theoretical basis to justify and expedite modifications in long-standing competition regulatory settings (Indig & Gal, 2013). • Market studies can be useful for increasing awareness and inducing voluntary compliance with competition law. • For nations with separate consumer protection and competition agencies, market studies can be a useful way to integrate competition and consumer policy. • Market studies can perform a useful educative or "myth-busting" role. Competition agencies in other jurisdictions have assessed whether price increases for certain commodities reflect legitimate market forces as opposed to anti-competitive conduct. In these circumstances, studies have helped to avert government intervention where markets are working efficiently.
Disadvantages	The Commerce Commission is not currently resourced to undertake market studies, so specific additional funding would need to be made available. If market studies were added to the Commerce Commission's toolkit without an accompanying increase in funding, undertaking them would dilute the resources available for the Commerce Commission's existing tasks. In addition to costs incurred directly by the Commerce Commission, costs will be faced by participants in the markets under study. Granting the Commerce Commission the additional responsibility to undertake market studies could potentially conflict with their primary role of enforcing the Commerce Act. For example, if a market study did not reveal any competitive issues in the market, this might make it more difficult for the Commerce Commission to pursue enforcement actions in that market in the future. The outcomes from market studies are highly uncertain. Some market studies have been very influential in promoting major regulatory changes that benefit competition and consumers. But on occasions they have had the opposite effect. In a survey of 36 competition authorities that undertake market studies, just 9 reported that the Government is required to respond to their recommendations (ICN Advocacy Working Group, 2009). Market studies may also create uncertainty around the future regulation of particular markets – potentially dampening investment.

How useful are market studies?

Market studies are not costless. Any decision to fund market studies would need to be based on careful assessment of the costs and benefits. Competition authorities in other countries are generally of the view that market studies are useful for collecting information and developing thinking that informs their enforcement work (ICN Advocacy Working Group, 2009). Yet agencies also note that quantifying the costs and benefits of market studies work can be hard. Indeed, the Productivity Commission is unaware of any research that attempts to quantify the overall benefits and costs from having a competition authority that is empowered to conduct market studies.

Internationally, the practice of evaluating the effectiveness of market studies is relatively under-developed.[17] The United Kingdom's OFT conducts evaluations. Box 4.5 summarises its three most recent evaluations. Each points toward significant benefits accruing as a result of changes implemented in response to the market study.

[17] Survey information that the ICN compiled (2009) shows that evaluation of market studies is a relatively under-developed practice. Of the 37 respondents who undertake market studies, 32 "look back and reflect on the effect of their market studies work". Only 11 reported measuring changes in markets following their market studies (ICN, 2009, p. 81).

Box 4.5 **Recent evaluations of OFT market studies**

Market study into doorstep selling in the United Kingdom – The OFT investigated doorstep selling in 2002. In 2012 the OFT evaluated the impact of changes resulting from the study's recommendations. The approximate annual value stemming from the changes were:

- sales growth of £57 million a year as measured by the value of extra purchases that consumers made that they would not otherwise have made without changes in consumer protection regulations as a result of the OFT's market study.
- £8.5 million a year in reduced/avoided "consumer detriment" as measured by the value of the purchases that consumers cancelled that they would not otherwise have cancelled without changes in consumer protection arrangements as a result of the OFT's market study.

Market study into care homes – In 2005 the OFT published a market study into care homes, noting a range of concerns and concluding that many users were poorly served by the market. The OFT recommended improving how the market operated, including changes to the information that local authorities provided to prospective and existing care home residents, and changes to care home regulators and care homes.

A 2011 evaluation found that recommendations in the market study led to changes in the care homes market, resulting in the improved welfare of care home residents. The evaluation estimated that "the overall benefit to cost ratio … associated with the OFT's market study seems unquestionably to be well in excess of the 5:1 target that is part of the current OFT's Spending Review Commitments" (OFT, 2011). The evaluation also identified scope for improving how information is provided and improving access to redress in the care home market.

Control of entry regulations in the retail pharmacies market – The OFT's 2003 market study recommended that the control of entry regulations for community pharmacies be abolished. The Government implemented changes as a result of the study, but these were considerably more modest than the changes recommended in the study.

A 2010 evaluation estimated that the reforms had increased entry rates and competition in the pharmacies market, delivering benefits of choice and access to consumers and stimulating investments and improvements in service that would not otherwise have occurred. The reforms delivered quantifiable yearly benefits to consumers of £24.7m to £32.8m against quantifiable financial costs to businesses and the National Health Service of £12.5m. The evaluation also identified numerous extra non-quantifiable benefits such as increased availability and extended opening hours.

Source: OFT (2010b; 2011; 2012).

What alternative approaches are available?

The preceding chapters set out the important link between competition and productivity growth, and that some parts of the New Zealand services sector suffer from relatively low levels of competition. With this context in mind, the Commission considers that studies to ensure that markets are competitive and functioning efficiently are potentially very valuable.

Even so, research into the state of competition in markets does not necessarily have to take the form of a formal market study conducted by the Commerce Commission. Several existing approaches to studying competition in New Zealand fulfil similar objectives:

- ad hoc inquiries;
- competition advocacy; and
- consumer advocacy.

Table 4.2 sets out some of the basic features of these three different approaches.

Table 4.2 Different approaches to studying competition in New Zealand

	Ad hoc inquiries	Competition advocacy	Consumer advocacy
Agency	MBIE, Ministerial inquiries or other government agencies	Commerce Commission	Consumer NZ
Focus	Competition issues in specific markets	Improving compliance with existing competition law	Improving outcomes for consumers
Frequency	Infrequent	Ongoing	Infrequent
Example	Inquiry into competition in the residential construction sector	Project to improve awareness of competition law among health professionals	Mystery shopper exercise examining advice provided by financial advisers

F4.2 Although the Commerce Commission does not have explicit powers to conduct market studies, there are other ways to investigate competition in certain markets. The advocacy work conducted by the Commerce Commission and consumer groups also fulfils some of the objectives of market study regimes in other countries.

Ad hoc inquiries

A range of options exist for Ministers to request an inquiry into competition in certain markets. For the sake of simplicity, these are referred to here, as "ad hoc inquiries".

The Ministry of Business, Innovation and Employment (MBIE) is responsible for providing policy advice on the Commerce Act and applying competition policy to specific sectors.

MBIE is currently in the process of conducting a market study into the residential construction sector. The study forms part of the Government's response to the Productivity Commission's report into housing affordability and aims to identify market level barriers to improved housing affordability, with particular reference to the competitiveness and productivity of the sector. An options paper was recently released which examines competition issues including the use of targeted discounts for building materials and strategic practices such as cover pricing (MBIE, 2013b).

Ministerial inquiries are another option for examining competition issues (Box 4.6). These inquiries are conducted on a one-off basis, so are not particularly well suited as a substitute for regular market studies. Productivity Commission inquiries can also touch on competition issues in certain markets, however these inquiries tend to examine broad topics – none of its inquiries to date have focused on competition issues within a certain market.

Box 4.6 Ministerial inquiries

With agreement from Cabinet, Ministers can establish inquiries into areas for which they are responsible. The inquiries are usually convened to look into matters of policy that are controversial or of strong public interest (Department of Internal Affairs (DIA), 2001). Ministerial inquiries do not have powers to summon witnesses or compel evidence be provided.

There is scope for Ministerial inquiries to examine the state of competition in certain markets. One example is the Ministerial Inquiry into the Electricity Industry, completed in 2000. The inquiry examined whether the regulatory arrangements for the electricity sector were best suited to ensuring that electricity was delivered in an efficient, reliable, and environmentally sustainable manner (OAG, 2005). The terms of reference for the inquiry included specific reference to examination of competition in the market: "make particular comment on … whether there are barriers to entry by new retailers that

restrict the development of retail competition" (Hodgson, 2000).

Ad hoc inquiries as a substitute for market studies

One alternative to resourcing the Commerce Commission to undertake market studies is to dedicate resources to establish a small team within MBIE's competition policy group to undertake market studies such as the current inquiry into the residential construction sector. The costs involved would likely be similar to those required to resource the Commerce Commission to undertake market studies. This option raises the question as to which agency out of MBIE or the Commerce Commission would be better suited to the task.

The main advantage of MBIE undertaking market studies is that the Commerce Commission's role would remain focused on monitoring and enforcement as distinct from competition policy advice.

However, there are also factors that point toward the Commerce Commission being better suited to undertake market studies, as noted below.

- Being an independent Crown entity, the Commerce Commission is more independent from Government. This separation would better enable market studies (including decisions about which market to study) to be completed without being unduly influenced by political issues. An alternative view is that a degree of political oversight would be prudent so as to avoid a situation where an independent entity has the power to investigate whatever it wants – sometimes referred to as "fishing expeditions".
- Market studies in other countries are typically undertaken by the Competition Authority. As the Commerce Commission already has established relationships with agencies in other jurisdictions, it would be better placed to leverage off overseas expertise.
- Market studies that MBIE undertakes would run the risk of being crowded out by their other policy work.
- Enabling the Commerce Commission to conduct market studies would mean changing the Commerce Act. This presents the opportunity to place specific parameters around market studies (for example, setting out what powers the Commerce Commission has to compel the supply of information) to help ensure that they are conducted in a consistent and robust fashion.

Competition advocacy

The Commerce Commission's main responsibility is to enforce legislation that promotes competition in New Zealand markets and prohibits misleading and deceptive trading. In the past, the Commerce Commission's approach to these responsibilities has focused on investing and litigating potential breaches of the Commerce Act. More recently, the Commerce Commission has adopted a complementary approach of encouraging greater awareness of the benefits of competition and education to avoid illegal behaviour (Commerce Commission, 2010). The Commerce Commission has also established a Screening and Intelligence Unit that will conduct risk assessments with a view to proactively identify anti-competitive practices.

In the 2012/13 year, the Commerce Commission spent $2.2 million on "advocacy and development" (Commerce Commission, 2013). At the time of writing, two advocacy initiatives are in progress: one on compliance with competition laws among firms involved in the Christchurch rebuild; the other initiative seeks to improve awareness of competition law among health professionals.

Parts of this competition advocacy work fulfil some roles of market studies – in particular it bears a reasonably strong resemblance to the work of the Japan Fair Trade Commission.

One alternative to introducing market studies would be to simply increase the amount of resources available for the Commerce Commission's advocacy and development work. This would enable the Commission to conduct more frequent and more detailed examinations of different markets to determine

what advocacy measures are required. One advantage of this option is that it would build on existing resources and expertise already dedicated to advocacy and development work. The costs would depend on the amount of additional activity undertaken.

The major limitation of this option is that the outcomes from any inquiry would likely be limited to advocacy initiatives, rather than recommending more substantive changes that might be warranted.

Consumer advocacy

Several organisations in New Zealand work to improve the welfare of consumers of services and goods. Examples include the Home Owners & Buyers Association, the Telecommunications Users Association of New Zealand, the Domestic Energy Users' Network, and Consumer NZ.

Some consumer advocacy work that these organisations conduct presents an interesting alternative to more formal market studies by competition authorities. For example, Consumer NZ sometimes undertakes "mystery shopper" exercises as a way to monitor how certain markets perform from a consumer perspective. While quite different from market studies, such studies are a potential rich source of information on how markets are performing, particularly where consumer outcomes are poor.

One example is Consumer NZ's mystery shopper exercise into the advice provided by financial advisers (Box 4.7). The project was completed with financial support from the Retirement Commission (now the Commission for Financial Literacy and Retirement Income) and MED, and in-kind support from the Securities Commission (now the Financial Markets Authority).

Box 4.7 **Consumer NZ's investigation of financial advisers**

In 2009 Consumer NZ conducted a mystery shopping exercise with the aim of producing a snapshot of the quality of advice that financial advisers give to consumers. Consumer NZ collected 17 investment plans from different financial advisers after mystery shoppers had approached them for advice based on their own circumstances.

A panel of three experts reviewed the 17 plans to assess the quality of advice and information given to the shoppers. The panel classified the plans in one of three categories.

- **Good** plans gave clear, relevant and specific advice supported by relevant analysis. Implementing the advice was likely to be in the shopper's best interests.
- **Disappointing** plans lacked good analysis, or gave no or few reasons for the recommendations. In some cases, despite good analysis, the advice or costs were unclear or the recommended strategy seemed unnecessarily costly.
- **Rejected** plans contained little relevant analysis and advice, lacked essential information, or were plans that contained advice not in the shopper's best interests.

Only three plans were rated as good, six were rated as disappointing and the remaining eight were rejected. Three common problems with the plans included:

- a lack of a meaningful rationale for what was being advised – in particular, some advisers recommended that shoppers invest their savings with one provider group but gave no reason for selecting that provider;
- some advice was deemed not to be in the consumer's interests – for example, one adviser recommended investing heavily in managed funds when the shopper was likely to have a significant mortgage; and
- many investment plans failed to include clear information about costs – it was impossible to work out the initial and ongoing costs of their recommended strategies.

Source: Consumer NZ (2009).

Consumer advocacy as a substitute for market studies

Currently, mystery shopping exercises are undertaken infrequently due to Consumer NZ's lack of resources. Consumer NZ has a limited pool of funding that is generated primarily from member subscriptions – its ability to review financial advisers in 2009 was due largely to financial support from government agencies.

The extent to which the study led to changes in the way the financial advice sector behaves is unclear, because unfortunately there was no follow-up evaluation. Nor was there any follow-up exercise to see whether the performance of financial advisers had improved. Even so, there may well be a case for Consumer NZ or another organisation to conduct ongoing mystery shopping exercises. A small government-administered fund, available on a contestable basis, and extra support from relevant government agencies could support such exercises. As little evidence exists about how effective such initiatives are, any initiative should be conducted as a pilot, with a thorough ongoing review and evaluation process.

Four advantages of this approach are noted below.

- The partnership would limit the need for Government involvement and take advantage of the existing role and reputation of organisations such as Consumer NZ.
- Mystery shopping exercises can shine a spotlight on markets that are performing poorly for consumers. Similarly they might also play a useful role in dispelling any misconceptions about supposedly poor-performing markets.
- Non-government organisations (NGOs) may be equipped to provide complementary contextual information and advice to consumers.
- Although less rigorous than a formal market study, this approach would likely be less costly.

What type of market study would be most beneficial in New Zealand?

The Commission is still considering the merits of different approaches to market studies. The Commission welcomes submissions from inquiry participants on the following questions.

Q4.1 Is there a case for some form of ongoing research or investigation into the state of competition in New Zealand markets?

If so, which of the following options would be most beneficial?

1. Granting the Commerce Commission a formal mandate to conduct market studies.
2. More regular use of inquiries that are currently undertaken on an ad hoc basis.
3. Providing greater resources to the competition advocacy work of the Commerce Commission.
4. Establishing a small contestable fund available to organisations that research the performance of different markets, with an emphasis on improving market outcomes for consumers.

Q4.2

If a market studies regime were introduced in New Zealand:

- Should the Commerce Commission have formal powers to compel the supply of information for market studies?
- Should the Commerce Commission have the discretion to launch market studies, or should this be the responsibility of Parliament or Ministers?
- Should the Government have to formally respond to market study reports?
- What other design features should it have?

5 ICT is revolutionising services

Key points

- Information and communications technology (ICT) underlies a "revolution" in services. ICT is transforming many existing services and creating new ones similar to how previous general purpose technologies – such as steam and electricity – transformed manufacturing and agriculture.
- ICT is disruptive. Its effects across the economy are pervasive and impact service industries significantly.
- The application of ICT frequently devalues existing assets while creating new opportunities for profit. Affected assets include firms, business models, brands, and human and physical capital. Reallocation – putting assets to more productive uses – is the single largest contributor to productivity growth. It operates across firms, industries and regions.
- Adjustment costs – the costs incurred in redeploying devalued assets – discourage reallocation. Policies aimed at reducing adjustment costs can contribute to productivity growth.
- Firms, industries and countries will be better off to the extent that they can adapt quickly – and at lower cost – to the opportunities that ICT creates and destroys.
- Countries face choices of policies and institutions that influence the way they respond to, and take advantage of, the ICT revolution. Such choices are best made deliberately since making them by default risks an uncoordinated set of policies and institutions that work against each other and dissipate potential gains.
- The production costs of ICT fall and quality improves over time, typically leading to dramatic drops in quality-adjusted prices. Adoption costs also fall as information diffuses on how the technology is best applied. The benefits realised by technology adopters often increase as others adopt the same or compatible technology.
- International research indicates that adopting ICT increases productivity growth. This effect is strong in some countries over some time periods and in some industries, particularly service industries. The effect appears to be weaker in New Zealand, particularly for the distribution industries (retail, wholesale, and transport).
- Per-capita ICT investment in New Zealand has historically been similar to Canada but lower than that in other comparable advanced countries. It has been improving since the early 2000s and now matches Australia's per-capita ICT investment, but remains significantly lower than that in the United States and United Kingdom.
- The economic characteristics of ICT include strong economies of scale, non-rivalry and network effects. These underlie its strong current and potential future contributions to productivity, economic growth and wellbeing.

ICT is a particular case of new technology. Since the 1960s the silicon semiconductors that underlie ICT have improved in performance at a historically unprecedented rate. Moore's Law – the observation that the number of active components (transistors) that could fit on a given area of silicon doubles every two years – has seen performance improve dramatically and prices fall dramatically (Moore, 1965).[18]

[18] Indeed, there is some evidence of this trend accelerating over time (Byrne, Oliner & Sichel, 2013).

ICT is disruptive. Its effects across the economy are pervasive and they are impacting service industries significantly. They can undermine the value of existing assets, including business models, physical assets and people's knowledge and skills. Firms, industries and countries will be better off to the extent that they can adapt quickly – and at lower cost – to the opportunities that ICT creates and destroys. Section 5.1 examines the revolutionary and disruptive impacts of ICT and its potential to deliver benefits.

Given the enormous economic effects of ICT, it is not surprising that the topic has provoked much research. Section 5.2 summarises the part of this research that is most relevant to this inquiry – the impact of ICT on productivity in service industries, in New Zealand and elsewhere.

All major new technologies – such as steam power, the internal combustion engine and electricity – have distinctive characteristics that influence the economy and society. This influence shows up, for example, in changes to production processes, skills, infrastructure, regulation and business models. Section 5.1 describes the features of ICT that are influencing current social and economic trends, particularly in the services sector.

Topic scope

The scope of this topic is an in-depth analysis of the adoption of ICT by New Zealand firms, particularly service firms. This includes the choices of whether and when to adopt particular ICT, and how that ICT is applied.

Many important policy issues concern consumer use of ICT; for example, the availability and uptake of residential broadband. These issues are outside the scope of this inquiry.

Firms that produce ICT – particularly those targeting international markets – have interesting economic characteristics and are the target of much public interest and government policy. Such firms are not the main focus of the topic. They are in scope to the extent that they are service firms themselves, and that they supply services to other New Zealand firms.

Adopting technology (including ICT) is conceptually distinct from other aspects of technological change. Technology adoption involves processes and products that are new to a firm. Adoption may, but need not, include developing new-to-world ideas, processes and products and their commercialisation. New-to-world development – often termed "research and development" (R&D) – interacts with government innovation policy and public-sector organisations, including universities and Crown Research Institutes. Innovation policy and institutions are important for economic development; however they are not within the scope of this topic.

Guide to the ICT chapters

This chapter sets the scene on the potential for ICT to spur widespread economic and social change and lift productivity in many service industries. The four chapters that follow focus on different aspects of adopting ICT and provide greater depth and recommendations on specific subjects.

- Chapter 6 covers ICT adoption by firms and the business and policy influences on adoption decisions.
- Chapter 7 uses distribution industries to illustrate the opportunities and barriers that affect firms in New Zealand's service industries adopting ICT.
- Chapter 8 investigates the supply of and demand for ICT skills.
- Chapter 9 covers cloud computing – a specific example of a new ICT.

5.1 ICT – the "steam engine" of services

Steam power, the internal combustion engine, electricity and ICT

ICT is reaping social and economic changes on a scale comparable to those resulting from previous breakthrough technologies such as steam power, the internal combustion engine, and electricity. These breakthrough technologies, combined with conducive economic environments, have been largely

responsible for the huge rises in the material living standards of many people since the Industrial Revolution. They occur infrequently – perhaps less than once in a generation.

There is much to learn from those earlier eras of rapid, sustained and far-reaching change. Economic historians have noted striking similarities between them – similar patterns in the nature and reach of the changes, the benefits delivered and costs suffered while transitioning from the old era to the new era. Economists have given the term "general purpose technologies" to these revolutionary and far-reaching new technologies.

General purpose technologies (GPTs)

The disruptive and far-reaching impacts of ICT make it an example of a GPT. GPTs typically have applications in many, if not most, economic activities (Box 5.1).

Bresnahan and Trajtenberg (1996) identify three characteristics of GPTs:

- *pervasiveness* – GPTs spread to most sectors because of the multitude and variety of their potential applications;
- *improvement* – GPTs get better over time and so keep lowering costs for their users; and
- *innovation spawning* – GPTs make it easier to invent and produce further new products or processes.

These characteristics are evident with ICT. ICT applications began in areas requiring rapid and routine calculations such as banking, accounting and the military. Applications have now spread to most industries, including health, manufacturing, wholesale trade and agriculture.

Box 5.1 **Defining general purpose technologies**

A GPT can be defined as:

> …a technology that initially has much scope for improvement and eventually comes to be widely used, to have many uses, and to have many Hicksian and technological complementarities. (Lipsey, Bekar & Carlaw, 1988, p. 43)

Hicksian complementarities are those that arise as a result of price changes (such as a reduced price of X increases the use of X and of other complementary inputs). *Technological complementarities* occur when the benefits of one technological advance cannot be fully realised without the redesign or reorganisation of other items that cooperate with it.

ICT meets this definition and is widely recognised as a GPT (Crafts, 2002). Previously important GPTs include steam power, the internal combustion engine and electricity (Crafts, 2011).

GPTs are disruptive. In the process of creating new products, services and economic activities, GPTs strand existing assets, including business models and physical and human capital. GPTs typically involve large reallocations of resources: a lot of new firms enter the market, old firms exit, new types of business list on the share market, and investment by new firms expands relative to existing firms.

It takes time to learn how best to produce and apply GPTs. The economic effects of previous GPTs have taken many decades to work through an economy (Crafts, 2011; Gordon 2012). Typically the onset of a new GPT is slow and uneven. Productivity usually dips in the early stages as the GPT disrupts traditional production and skills, sparks experimentation and learning, and ignites significant new investment that is either not immediately productive or turns out to be non-productive (Jovanovic & Rousseau, 2005). Productivity rises later, as benefits are realised.

General purpose technologies underpin "industrial revolutions"

The ramifications of the most historically influential GPTs were pervasive enough for them to be associated with the periods of change known as *industrial revolutions*. For example, Gordon (2012) classifies US economic history into three industrial revolutions. The first (1750–1830) was powered by steam and

railroads. The second (1870–1900) was sparked by electricity, the internal combustion engine, running water, indoor toilets, communications, entertainment, chemicals and petroleum. The third (1960 to the present) is the *computer revolution* brought on by microprocessors, the internet and mobile phones.

A long period of spinoff technologies accompanied each revolution. For example, the second revolution spawned aeroplanes, television and air conditioning.

The main consequence (of what Gordon termed the first and second industrial revolutions) was improved economies of scale in producing goods. By the middle of the twentieth century, productivity improvements in primary and goods-producing industries were far outstripping those in service industries, and the productivity prospects for service industries looked bleak (Baumol, 1967).

A defining feature of what Gordon termed the third industrial revolution – the computer revolution – is how it applies to services. While goods production has benefited, arguably ICT is generating a "revolution" in services. ICT is transforming many existing services and creating new services similar to how GPTs, such as steam and electricity, transformed manufacturing and agriculture. Extending this analogy, ICT is becoming the "steam engine" of services.

F5.1 ICT underpins a "revolution" in services. It is transforming many existing services and creating new services similar to how previous general purpose technologies, such as steam and electricity, transformed manufacturing and agriculture.

Gordon (2012) goes on to argue that productivity improvements from the computer revolution had faded in the United States by 2004. Other researchers have challenged this view. They cite evidence that the productivity improvements from ICT have continued and will likely continue (Byrne, Oliner & Sichel, 2013; Brynjolfsson & McAfee, 2011).

Syverson (2013) acknowledges a slowdown in productivity in the United States between 2004 and 2012, but draws parallels with how productivity increased in response to electrification in an earlier era. Syverson notes that history "shows that productivity growth driven by general purpose technologies can arrive in multiple waves; it need not simply arrive, give what it has, and fade away forever thereafter" (p.39).

ICTs are highly disruptive

ICTs are diffusing very quickly, both within and across countries (Box 5.2)

Box 5.2 **Faster diffusion – the smartphone and the tablet**

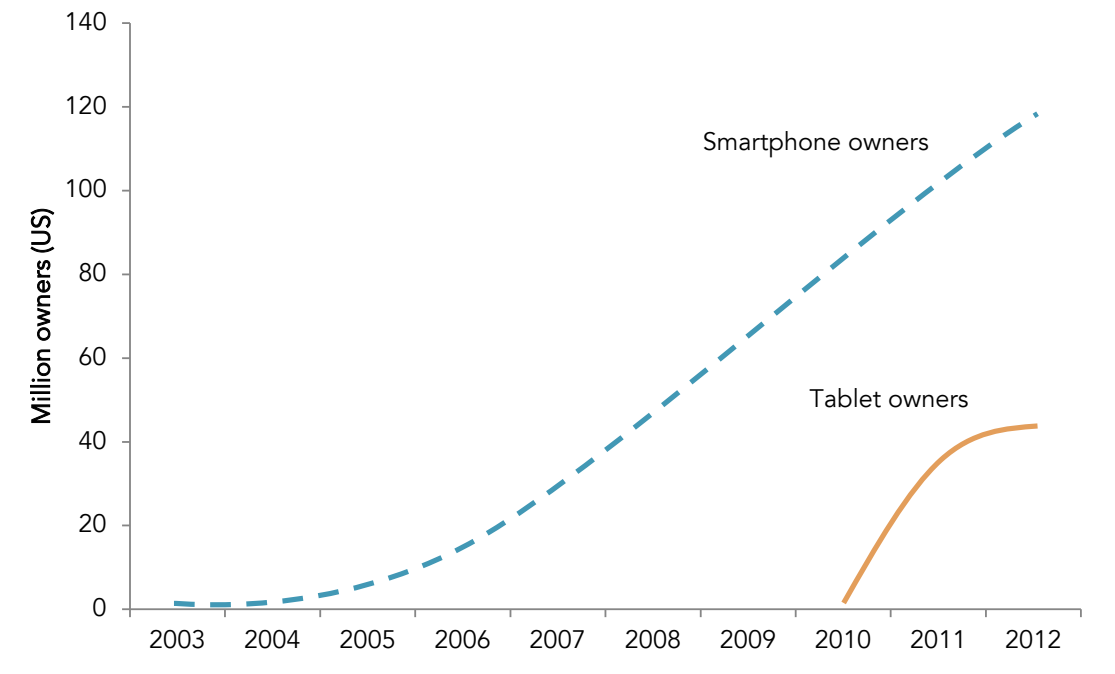
Less than a decade after the BlackBerry (2003), and only five years after the launch of the original iPhone (2007), the smartphone market came of age in 2012. The majority of mobile consumers in the US, the UK, France, Germany, Spain and Italy now own a smartphone (comScore, 2013). In the US, tablets took only three years to achieve a level of adoption that it took smartphones nearly a decade to reach (Figure 5.1).

64% of New Zealanders aged between 15 and 65 currently own a smartphone. Ownership is expected to grow strongly reaching 90% penetration by 2018. 26% currently own a tablet and 42% of all households have at least one member who owns a tablet. Penetration of tablets is predicted to increase to 78% by 2018 (Frost & Sullivan, 2013a).

The markets for mobile devices are extremely volatile. Company fortunes change very quickly:

> In 2005, the [US] market was dominated by Palm, Symbian [Nokia] and BlackBerry. However, by the following year all three had ceded control to Microsoft as the new market share leader. 2008-2010 saw BlackBerry stage a comeback to assume the #1 position before eventually giving way to the upstart Android platform in 2011. The only key player in the current smartphone market never to have owned the market share lead, interestingly enough, is iOS [Apple]. (comScore, 2013, p.29).

Figure 5.1 Smartphone and tablet owners in the US (millions), 2003-12



Source: comScore (2013).

And these mobile devices are disrupting other industries:

> Many US consumers have come to rely on their smartphones to assist with their in-store shopping, arming them with information in the palm of their hands to ensure they are getting the right product at the best available price. This behaviour, known as "showrooming", is putting significant price pressure on brick-and-mortar retailers as they are forced to compete with e-commerce retailers within the confines of their own stores. With the pricing power so clearly in the hands of the consumer today, the retail industry is rapidly being disrupted as e-commerce grows at 4x the rate of traditional retail while accounting for 1 out of every 10 retail dollars. Brick-and-mortar retailers are being faced with the need to quickly adjust with aggressive defence strategies. (comScore, 2013, p.8)

These diffusion rates are unprecedented. The average delay between the first country to adopt a major new technology and other countries adopting that technology was 47 years over the past two centuries (Comin & Hobijn, 2008). Diffusion rates have accelerated over this whole period, and adoption delays are now dramatically shorter – especially for new ICT.

Shifts in relative prices strand assets and create opportunities

Rapidly falling quality-adjusted prices in ICT makes it cheap relative to other business inputs. This in turn enables its wider use in the production of goods and services, supporting follow-on reductions in the quality-adjusted prices of those goods and services.

Such rapid price falls can undermine the value of existing assets, including business models, physical assets and the knowledge and skills of people. A somewhat ironic example is the word *computer*, which dates from 1613 (Oxford University Press, 2008). It described an occupation – those employed to perform mathematical calculations. Human "computers" were made redundant by the commercial availability of mechanical and then electronic computers; and the term was appropriated to name the new devices.

Rapid price falls also create business opportunities. The falling costs of personal computers and internet connectivity in the 1990s supported their wide dispersion, creating many opportunities such as those successfully exploited by Google and Facebook.

Firms, industries and countries will be better off to the extent that they can adapt quickly – and at lower cost – to the opportunities that ICT creates and the devaluation of many existing assets.

F5.2 Firms, industries and countries will be better off to the extent that they can adapt quickly – and at lower cost – to the opportunities that ICT creates and the devaluation of many existing assets.

Shifts hard to predict

ICT is continuously spawning further innovations. These innovations and their effects are even more challenging to predict than those arising from relative price shifts.

These features of ICT make planning for change difficult and unreliable. They favour business and policy responses that are experimental and flexible. A conservative, rigid single approach will likely mean a late start and the loss of any first-mover advantage – even if the "best" option is selected. Trying many approaches, while staying flexible to back out of unsuccessful ones, is likely to offer better results in aggregate.

"Creative destruction" and reallocating resources

Creative destruction – also called *Schumpeterian growth* – describes the process of innovations replacing older technologies:

> Day in, day out, jobs are created and destroyed through businesses' openings, closings, expansions, contractions and relocations. Entrepreneurs start companies, some of which will meet the test of the marketplace and flourish. Eventually, many of these enterprises will be eclipsed by other companies that offer consumers newer and better products. In this way, an economy continuously re-creates itself through a process of "creative destruction"… This natural process of replacement of business enterprises by new or reformulated companies redefines existing jobs and creates new industries. Eventually – and continually – this process reconstitutes and restructures a nation's economy. It is this churning of business enterprises and their work forces in a free enterprise economy that spurs income growth and creates wealth. (Cox & Alm, 1992, pp. 4–5)

The photographic industry provides a vivid example. Dominated for decades by a single technology (film) and a few large companies, the digital camera largely destroyed the value of film-production and processing companies such as Kodak. And while many film-camera companies successfully transitioned to the digital-camera business, they are now having their business eroded by mobile phone manufacturers, including Samsung and Apple. Meanwhile, a plethora of new service businesses have developed to handle digital photo collections, such as Flickr and Instagram.

GPTs are Schumpeterian in nature. As they spread across the economy, they typically cause older technologies to be abandoned (Aghion, Akcigit & Howitt, 2013). It would be unusual for this process to proceed smoothly over time.

Growth associated with reallocation

Creative destruction reallocates market share and inputs between incumbent and new firms through three mechanisms:

- firms that increase their productivity expand at the expense of those that do not;
- lower-productivity firms exit the market; and
- new firms enter the market, with higher productivity than those exiting.

These reallocation mechanisms contribute as much as 70-80% of productivity growth in the United States (Acemoglu, Akcigit, Bloom & Kerr, 2013). One study estimated that entry and exit were responsible for about one third of this productivity growth. Reallocation between firms was responsible for the other two-thirds (Lentz & Mortensen, 2008). The 20-30% of productivity growth not due to reallocation came from

increases in productivity within firms. Yet the threat of reallocation – losing market share – drives the innovation and greater efficiency behind this growth too.

Variations in the dynamism of reallocation across countries contribute to differing levels of productivity across countries (Bartelsman, Haltiwanger & Scarpetta, 2012).

F5.3 Underlying "creative destruction" and its associated productivity growth is an essential process of reallocating resources to successful existing firms and to new firms, and away from less successful existing firms and dying firms.

Advantage goes to those who can "recycle" assets efficiently and grasp opportunities

In a disruptive environment, firms that can efficiently recycle assets and grasp opportunities (that is, innovate) will get ahead. This applies equally at the national level. The countries that prosper will be those whose institutions and policies support an environment which, in turn, allows firms to efficiently recycle and innovate.

Driven by competition

The intensity of competition is an important driver of productivity improvements (Chapter 2).

The extent of reallocation depends on intensity of competition. Firms with low productivity may be able to survive – and even prosper – if there is a low competitive intensity in the market for their products. A well-performing competitor provides both direct pressure (through competition for customers) and unintended assistance in the form of information about how to improve performance.

Efficient reallocation requires that low-productivity firms either improve their productivity or exit the market. Policies that create high exit costs, such as strict land-use regulations and regulations that overly protect existing employment, can encourage low-productivity firms to stay in business longer than ideal. The effect is lower aggregate productivity by tying up assets that could be redeployed to higher-productivity firms.

Input markets are an important extra source of competitive pressure. Competition occurs for investment funds, talented staff and other inputs. These input markets are an important discipline on firms, in part because firms often compete in them against firms in other markets.

Competition policy is important in maintaining and promoting competitive intensity. Chapter 4 discusses improvements to some aspects of competition law – an important component of competition policy. Other important components include openness to international trade and investment and how friendly product market regulation is to competition (Chapter 2).

Choices for New Zealand

New Zealand, like other countries, has choices in the face of the ICT revolution. The environment for all countries is one of rapid advances in ICT, and numerous and disruptive economic changes (globally and domestically) as businesses seize commercial opportunities. Each country has the opportunity to choose policies and institutions that enable it to respond to the ICT revolution in a way that most enhances the wellbeing of its people.

To not take this opportunity would simply be to let change happen according to the influence of existing arrangements and external forces. The Commission does not see such "choice by default" as a good option for New Zealand.

The rest of this chapter, and Chapters 6 to 9, pull together research and analysis that help to lay out choices available to New Zealand and how they are likely to influence the benefits and costs that come from the ICT revolution. A wise country's strategy needs to take account of the features mentioned above: the pace and extent of change, its unpredictability, the process of competition and creative destruction and the need to promote flexibility, adaptability, and experimentation.

In making policy choices, governments will of course be concerned about the impacts of the ICT revolution on individuals as well as businesses. Some effects on some people will be adverse such as making formerly valued and useful skills redundant. Adopting the right policies can make the necessary transitions for affected individuals less painful but never straightforward. Countries need to fashion a response to the ICT revolution that extracts high benefits and distributes them widely.

The ICT revolution poses several strategic choices for New Zealand. The following two, while not binary, illustrate the sort of questions that New Zealand people, businesses and the Government should be thinking about.

Specialise in incremental or revolutionary improvement?

Research suggests that countries with higher reallocation costs specialise in industries where technical change tends to be incremental, and that those with lower reallocation costs specialise in more innovative products (Cuñat & Melitz, 2012; Samaniego, 2006; Andrews & de Serres, 2012). For example, Germany specialises in high-quality traditional engineering products such as machine tools and cars. Small technical improvements in these products, including those based on ICT, happen fairly continuously. In contrast, United States companies such as Google, Amazon and Apple are famous for radical innovation in new products and business models.

Specialise in being a smart follower or a technology pioneer?

The policies and institutions that help a country to copy, adapt and implement new technologies developed elsewhere are different from those that help it to create leading-edge innovations (Aghion, Akcigit & Howitt, 2013). For example, countries with a strong track record in innovation tend to favour more stringent intellectual property protections, whereas countries that adapt technologies developed elsewhere tend to be less stringent. Another example is that smart-follower countries tend to have policies and institutions that are effective at importing knowledge such as joint ventures with foreign firms and fostering people exchanges.

These choices are not easy in the case of the ICT revolution because there are often strong advantages to being first or being radical. The reasons for this lie in the economic characteristics of ICT (see section 5.3).

While the questions may suggest that specialisation is desirable – based on a choice between one set of policies and institutions or the other – the choice for an economy such as New Zealand is unlikely to be "either or". New Zealand has some strong areas of specialisation (dairy, some areas of software) but ranks low in OECD productivity league tables. It may therefore make sense to tailor policies to be a technology leader in some areas and a smart follower in others. Yet, of course, this is not an option for policies that apply across the economy.

Perhaps the worst outcome would come from a failure to make a deliberate choice, adopting by default a mixture of policies and institutions that lack coherence and work against each other.

Policies and institutions should also be carefully chosen to match where New Zealand is now – and where it wants to go. Section 6.7 considers the "framework" policies and institutions to take best advantage of the ICT revolution.

F5.4 Countries face choices of policies and institutions that influence the way they respond to, and take advantage of, the ICT revolution. Such choices are best made deliberately since making them by default risks an uncoordinated set of policies and institutions that work against each other and dissipate potential gains.

5.2 ICT and the productivity of service industries

ICT is important to services; both as the basis of service industries in their own right (for example, software) and in how they contribute to other service industries.

International research

The volume and penetration of ICT in the 1970s and 1980s grew without any corresponding increase in US national-level measures of productivity (Solow, 1987). This lack of any observable effect became known as the ICT "productivity paradox" (Brynjolfsson, 1993).

However, this lack of an observable effect on productivity proved temporary. Later research showed that the industries that produced ICT and those that used ICT intensively were together responsible for the "revival" of US productivity evident between 1995 and 2000 (Stiroh, 2002; Jorgenson, Ho & Stiroh, 2005). Services industries that were ICT intensive, such as retail, wholesale and finance, contributed significantly to this revival (Triplett & Bosworth, 2004).

Interestingly, Europe did not experience such a rapid increase in productivity in the same industries (Timmer, Inklaar, O'Mahony & van Ark, 2011; Strauss & Samkharadze, 2011). This contributed to (but is not the only explanation for) significantly lower productivity growth in Europe (Dahl, Kongsted & Sørensen, 2011; Ortega-Argilés, 2012).

Other research has confirmed these links between ICT and productivity in service industries, in other countries (Box 5.3) and New Zealand (Box 5.5).

Box 5.3 **The productivity impact of ICT in the United States, United Kingdom and the European Union**

Extensive international research has examined the effect of ICT on productivity growth at national and industry levels. The research highlights that countries that do not adjust well to a service-based economy will see productivity growth slow. The research also highlights that industries that produce IT can achieve very high productivity growth.

Timmer et al. (2011) examined why, since the 1990s, Europe has seen a decline in labour productivity growth while US labour productivity grew substantially. They found:

- faster multi-factor productivity (MFP) growth in the United States was the main difference compared with the European Union;[19]
- more investment in ICT led to greater ICT capital deepening in the United States; and
- the United States adapted better to the growth in market services than the European Union. Market services contributed 1.2 percentage points to yearly average labour productivity growth in the United States and only 0.6 percentage points for the EU-15[20] over the period between 1995 and 2007.

Jorgenson, Ho & Stiroh (2008) studied the effect of IT on US growth in labour productivity. They found that IT played a critical role in the United States when that country's productivity surged after 1995:

- from 1973 to 1995 labour productivity grew on average only 0.85% each year; and
- from 1995 to 2000 labour productivity grew on average 2.7% each year, with the deepening of IT capital contributing 1 percentage point each year to that growth; and.
- a large part of the US MFP growth (1.0 percentage point each year from 1995 to 2000 and 0.9

[19] The 10 European Union countries are: Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Spain, and the United Kingdom.
[20] This analysis covered 15 EU countries.

percentage points each year from 2000 to 2006) was from industries that produced IT.

O'Mahony and Vecchi (2005) measured the long-run effect of ICT on real output growth for the United States and the United Kingdom for the period from 1976 to 2000. The authors found:

- a long-run relationship between ICT capital, non-ICT capital, labour and real output;
- a positive and statistically significant relationship between ICT capital and real output growth for the United States; and
- no evidence of a positive relationship between ICT capital and real output growth for the United Kingdom.

O'Mahony and Vecchi suggest that the United States has seen a greater benefit from ICT due to earlier adoption than other countries. They also argue that a lack of the skills needed to reorganise production helps to explain the difference in returns to ICT between the United Kingdom and the United States.

International research on reallocation

Bartelsman (2013) highlights the potential for significant labour productivity growth due to improvements in ICT pushing out the productivity frontier. Bartelsman then goes on to note the importance of flexibility and reallocation of labour resources to achieving this productivity growth.

> However, in order to live up to this potential, economies need to accommodate the dynamic behaviour of firms required in implementing these technologies, and must be able to reallocate workers that have been substituted away by the new technologies to tasks that are complementary to the technology. (Bartelsman, 2013, p.28)

ESSLimit (2012) looked at the reallocation of employment for three sectors for 12 European countries between 2002 and 2009.

- In the United Kingdom the quarter of the firms with the lowest productivity employed the highest percentage of workers. There was relatively low employment growth in the quarter of firms with the highest productivity.
- The United Kingdom had the highest share of jobs destroyed due to firms exiting the market. This was a sign that firms were unable to adjust their labour force without exiting the market (most likely due to regulations that strongly protect existing employment).
- Scandinavian countries Sweden, Norway and, to a lesser extent, Finland had the largest share of employment in firms with high productivity. These high-productivity firms also had high employment growth. Sweden and Norway had a low share of jobs destroyed due to firms exiting the market. This suggests that firms in Scandinavia are more easily able to reallocate labour to more productive sectors, most likely because hiring and firing costs are relatively low in Scandinavia.

The Scandinavian model appears to offer an effective combination of low employment protection, generous but temporary safety nets, and rigorous disciplines on displaced workers to accept retraining or alternative employment (OECD, 2013c).

The impact of digital technology on jobs in the future is uncertain. For instance, it was once thought that driving in traffic was a task that could not be automated, meaning that truck drivers, bus drivers and taxi drivers would never be displaced by computers (Murnane & Levy, 2004). Yet since 2004 huge leaps have been made in developing and deploying driverless cars. For example, there have been no accidents in over half a million driverless miles by Google's test vehicles.

Different types of firms face different reallocation problems. (Bartelsman, 2013) identifies three types of firms and discusses the appropriate private and public responses to the challenges they face.

- *Innovators:* Innovative firms that try to be at the global technology frontier need highly-skilled workers. Agglomeration of firms reduces job and income uncertainty for skilled workers and increases technology spill-overs and the development of specialist supply chains. Agglomeration is successful when the most productive firms, in the same field, locate near each another. The policy challenge is ensuring unproductive firms are not able to occupy a potential location at the expense of more productive firms.
- *Potential entrants:* Rapidly evolving ICT has greatly increased the opportunities for new firms to enter new markets. One major challenge for potential entrants is gaining access to venture capital. A healthy supply of venture capital requires a sophisticated financial eco-system with the right mix of culture, skills, networks and incentives to facilitate investment in promising new firms. It also requires a regulatory and tax system that does not discriminate against new entrants in favour of existing firms.
- *Firms that attempt to keep up by adopting new ICT technology:* ICT-adopting firms must be flexible if they are to reorganise their operations to make new disruptive technology pay off. Reorganisation costs reduce the incentive for firms to adopt risky technologies. Not all new technology displaces workers, but it typically needs complementary training of employees. The firms risk losing their investments in training if employees leave to work for competitors. To solve this problem firms using these technologies could offer employees contracts that provide training, but with high penalties if those employees leave their jobs within a set period (Bartelsman, 2013).

New Zealand research

The lack of more detailed data means that much New Zealand research focus on IT rather than ICT (Box 5.4)

Box 5.4 **IT vs. ICT**

Often the terms IT and ICT are used interchangeably, even though they are fundamentally different. ICT covers communications equipment and computers and software while IT only covers computers and software.

Communications equipment is essential in making IT capital more productive, so ICT garners more interest than IT on its own. By excluding communications equipment such as fibre networks, communication satellites, mobile phones and so on, the effect of ICT on productivity could be understated and the effect of non-ICT on productivity overstated.

Conceptually, communications equipment is technology that uses electronic means for person-to-person and device-to-device communications (from the telegraph through to the internet).

Under the current Statistics New Zealand convention, communications equipment is classified under electrical and electronic assets. Since electrical and electronic assets also include assets not related to ICT, such as turbines, medical and surgical equipment, they form part of non-IT capital. Statistics New Zealand are aware of this problem and realise that fixing it will help with future research.

New Zealand data is broadly consistent with the international evidence (Box 5.5). Industries that produce ICT, or are relatively intensive users of ICT, have tended to show stronger growth in productivity than less ICT-intensive industries (Engelbrecht & Xayavong, 2006).

Box 5.5 **The productivity impact of ICT in New Zealand**

In contrast to other countries there has been relatively little research into the impact of ICT on productivity in New Zealand.

Engelbrecht and Xayavong (2006; 2007) examined the link between ICT intensity (an index that measures the percentage of ICT inputs among all the inputs that firms use) and labour productivity growth in 29 industries over the period from 1988 to 2003. The authors found:

- labour productivity growth for more ICT-intensive industries was similar between the two sub-periods 1988-1992 and 1993-2003, but growth in labour productivity for less ICT-intensive industries declined dramatically between the two periods; and
- the lack of overall productivity growth was not evidence against the benefits of ICT.

Statistics New Zealand (2013) decomposed the contribution of IT to growth in labour productivity for 20 industries from 1978 to 2011, and from 1996 to 2011 for a further five market-based industries. The study found:

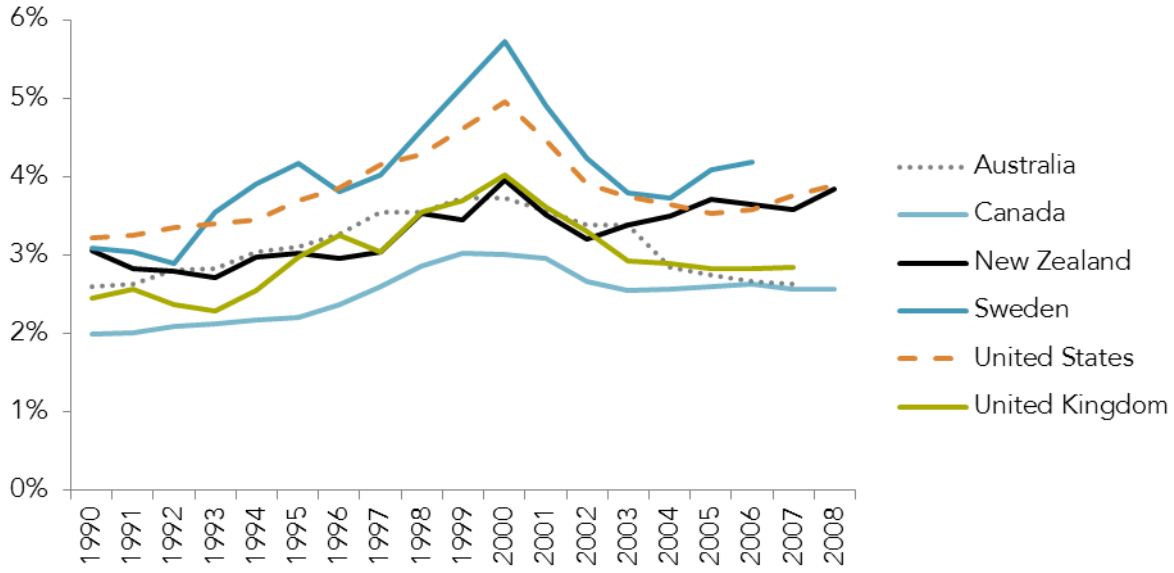
- a strong contribution of IT capital per worker to growth in labour productivity in the information, media and telecommunications; finance and insurance; and professional, scientific, and technical industries;
- a contribution, but to a lesser extent than in the above industries, of IT per worker to growth in labour productivity in the wholesale trade; retail trade; printing; transport equipment; machinery; and equipment-manufacturing industries; and
- IT contributed 0.5 percentage points a year to the 1.5% average yearly growth in labour productivity from 1996 to 2012. By incorporating new technology, IT investment is also likely to enhance MFP. MFP growth contributed a further 0.5 percentage points per year to the growth in labour productivity.

ICT capital investment

New Zealand's investment in ICT as a percentage of GDP is about average compared to a selection of OECD countries (Figure 5.2). Yet New Zealand's GDP per capita is lower than the other countries in the comparison. So New Zealand would need to invest more relative to GDP to put in place a similar quantum of ICT per head of population as these other countries. Because of open trade and the movement of skilled people, it is likely that the prices of ICT hardware, software and specialist ICT skills are similar across the world. So, there is little basis for thinking that New Zealand gets more ICT for a given level of expenditure. The exception to this is that non-specialist ICT skills may be cheaper in New Zealand.

Taking the same countries, Figure 5.3 compares investment in ICT per head of population. On the assumption that all countries pay international prices for their ICT, New Zealand's real investment in ICT per capita has been relatively low. It is about the same as Canada but significantly below the United States, the United Kingdom and Sweden. Yet since the early 2000s New Zealand's investment has increased relative to Australia's investment, and since 2007 it has been similar.

Figure 5.2 ICT investment as a percentage of GDP

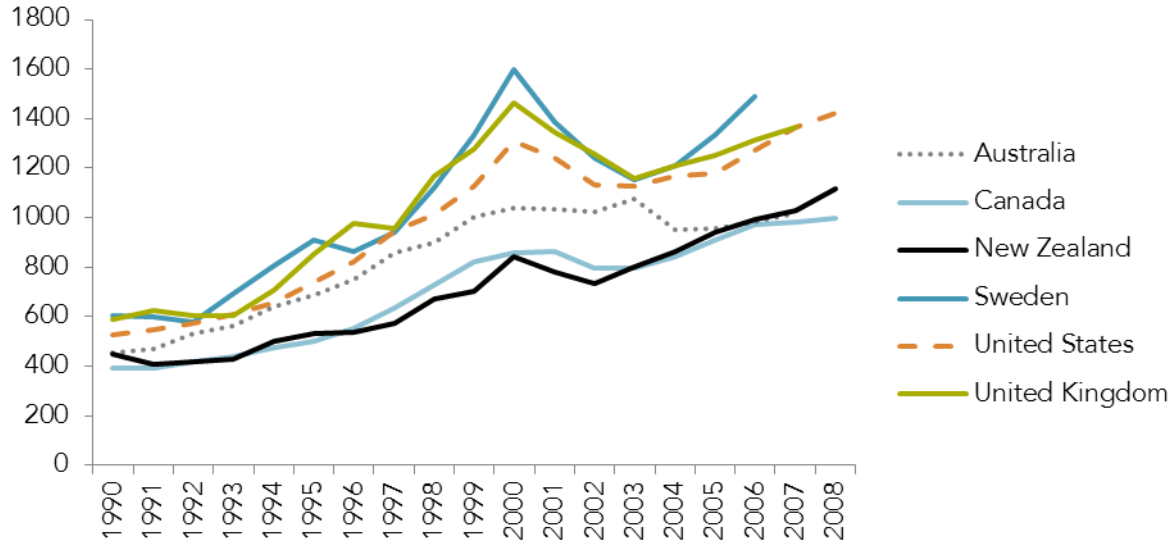


Source: OECD National Accounts Statistics.

Notes:

1. "ICT investment" is ICT gross fixed capital formation.
2. Investment and GDP are measured in current prices.

Figure 5.3 ICT investment per capita



Source: OECD National Accounts Statistics.

Notes:

1. Y-axis is 1995/96 US dollars.
2. "ICT investment" is ICT gross fixed capital formation.

F5.5 Per-capita ICT investment in New Zealand has historically been similar to Canada but lower than that in other comparable advanced countries. It has been improving since early 2000 and now matches Australia's per-capita investment. Yet it remains significantly lower than US and UK levels.

5.3 The economic characteristics of ICT

The productivity impact of ICT adoption arises from some specific economic characteristics that make them somewhat different from typical goods. This subsection describes these characteristics and some of their important implications.

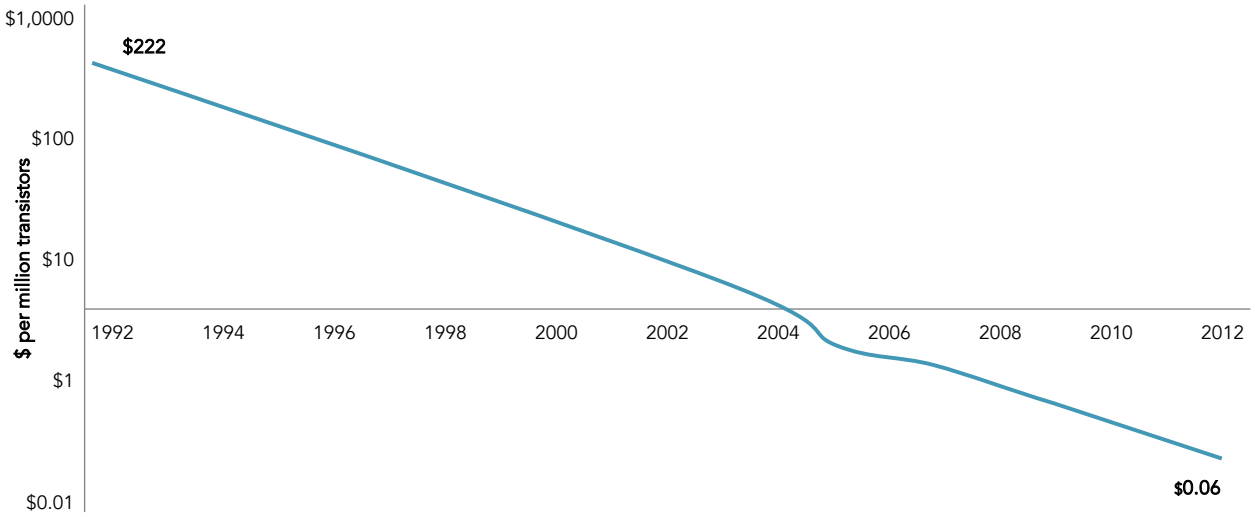
Falling prices

Improvements in transistors and other components account for the annual 20-30% quality-adjusted price decline for computers (Brynjolfsson & Hitt, 2013).

Figure 5.4 illustrates the decrease (on a log scale) of the cost of transistors over time. The near-linear relationship on the log scale visually hides the dramatic dollar price decline in transistors. Advances in technology have driven the decline in price. This has enabled exponentially more transistors to be placed on microchips over time. Similar exponential trends exist in other measures of digital technology such as pixels per dollar[21] and network capacity[22], which have also contributed to the dramatic quality-adjusted declines in the price of technology goods.

The rapid declines in the price of microchips have in turn led to similar declines in the prices of products that use microchips, such as computers, televisions and cameras.

Figure 5.4 Cost per one million transistors



Source: Deloitte (2013)

Note:

1. Costs are in US dollars based on US transistor prices.

High fixed and low marginal costs

The combination of high fixed costs and low marginal costs creates economies of scale – the opportunity to improve productivity through increasing levels of production and consumption.

This combination is a feature of much ICT. Software is a typical example – a program takes a lot of time and money to develop and test for its first user, yet the cost involved in making it available to each extra user is much lower, and can approach zero.

The fixed costs of production can be shared among customers that share the same needs and preferences. They can then access the technology at the (generally very low) average variable cost. This has big benefits

[21] "Pixels per dollar" – a measure of value for digital cameras – also follows a linear trend (on a log scale). Over time the amount of pixels that $1 can buy has increased dramatically.

[22] The quantity of data that can be transmitted along an optical fibre is doubling every nine months, with a similar effect on prices.

for those whose preferences are widely shared, and for those whose preferences can be met by assembling and adapting widely-purchased components.

However, those whose needs differ significantly from the mass of the market may face significant costs for bespoke technology (that is, products made to the specific requirements of one customer). Firms with non-standard requirements often face a difficult decision between paying for bespoke technology that fits their current business processes and changing their processes to take advantage of cheaper, but standardised technology.

High fixed and low marginal costs create a barrier to entry, as new entrants need to cover the fixed costs of development before earning any revenue. In stable industries this cost structure can create the conditions for oligopolies or natural monopolies, with depressive effects on innovation. However, when technology is fast-changing, incumbents need to continuously innovate lest any market power be short-lived (Christensen, 1993, Box 5.2).

ICT typically encourages and facilitates increased scale in the firms that use it, but in particular situations can support the entry of smaller firms and act to change the scale at which firms operate most efficiently (Chapter 9).

Network effects

Network effects occur when a product becomes more valuable to customers as a greater number of other customers also use it (Shapiro & Varian, 1999). In the case of new ICT, network effects influence which firms invest in the new technology and when they choose to do so. For example, video-conferencing equipment will only be useful to a firm to the extent that the firm's associated firms possess the same technology.

Networks effects are also common when it takes time to learn about new ICT (Shapiro & Varian, 1999). A pool of existing users can reduce the cost for later users to obtain advice and hire people with relevant skills.

Network effects are common, but not found in all ICT applications. Network effects are reduced when customers can multi-home (that is, make use of more than one service such as Skype or Google Hangouts) or the systems are interoperable (for example, phone calls between users on different networks).

Non-rival information

Information, in general, is *non-rival*. That means its use by one person does not reduce its value to others. For example, a novel does not become less valuable to a potential reader when others read it. Non-rivalry is an extreme case of high fixed costs and low marginal costs. The cost of supplying the first person is the fixed cost, after which the cost of supplying each additional person is close to zero.

Non-rivalry and technology that dramatically lowers the cost of transporting and copying information are a powerful combination. This permits enormous economies of scale when creating digital content.

Particular effects of the non-rivalry of information on adopting ICT include knowledge spill-overs and demonstration effects.

- *Knowledge spill-overs* occur when investigations, research and learning about the use and effectiveness of a new ICT spread to other firms and individuals. The recipients gain from that knowledge without having to pay for its creation. This lowers their costs of adopting ICT (Cooper et al., 2006).
- *Demonstration effects* are a subset of knowledge spill-overs. They occur when the visible success or failure of adopting ICT influences how others decide whether or not to adopt ICT.

Winner-take-all markets

Economies of scale in production can create "winner-take-all" markets[23] – in which a single firm can become dominant.

Network effects (economies of scale in consumption) act to strongly reinforce economies of scale in production. Winner-take-all markets are highly likely when both apply.

Such markets offer a *first-mover advantage* –the first firm to bring a successful product to market has a huge advantage over later entrants. An example is the internet search market. Google, the first company to successfully monetise this market, has remained dominant despite enormous investment by rivals Yahoo! and Microsoft.

Late adoption is costly in these markets. Risk-taking is important as there is no other way to gain a first-mover advantage. Whether New Zealand has the right settings to encourage risk-taking by businesses is an important question (see Chapter 6).

Effects on the innovation process

Brynjolfsson (2011) suggests that ICT is changing the nature of the innovation process, through "big data" analytics interacting with online experimentation.[24]

Brynjolfsson reports that recently the link between traditional investments in the inputs of innovation (such as R&D and hiring scientists) and growth in productivity has fallen. Yet the link between investing in ICT and innovation (and so growth in productivity) has increased significantly.

Investing in ICT has led to "digitisation" (the process of transforming information into a digital format), which is increasing the pace of innovation and changing the way it is carried out. Brynjolfsson (2011) explains four ways that digitisation is accelerating innovation.

- Real-time, detailed *measurement* of business activities. Businesses can obtain information on consumer behaviour at low cost by observing their searches, website traffic and online purchases. This provides information never before collected and is accredited with the shift from intuitive management to firms making decisions based on numbers.
- Faster, cheaper and more frequent business *experimentation*. Historically, experimentation has been difficult given the cost, time and convenience associated with it. Yet now some companies, mainly digital companies, can develop a hypothesis and have it tested within a day. Improved collection of information and access to customers has driven this development.
- More widespread *sharing* of information, observations and ideas. Information is increasingly being stored as bits rather than atoms, which enables near costless replication and transportation. This has not only improved scientific and business collaboration but also how employees use intranets, databases, email networks and other tools to collaborate with each other.
- Increased ability to *replicate* innovations. Innovations within a business can be quickly and cheaply replicated over the whole business. Technology enables quick and cheap communication of innovations and provides a means to monitor the correct adoption of new innovations. This applies to innovative business practices and innovative digital products such as software and websites.

Brynjolfsson notes that these ways of accelerating innovation do not occur automatically and certain conditions are needed to ensure their impacts are maximised: education, infrastructure and flexibility.

[23] Such markets are also called *natural monopolies*.

[24] "Big data" refers to datasets so large and complex that it becomes difficult to process using traditional data processing applications. It is also used to refer to the opportunities that analysing such datasets creates.

- *Education*: Firms with a skilled workforce that is able to adapt to changes will receive higher returns on their innovations. Employees with skills in experimental design and analysis will further increase the rate of innovation.
- *Infrastructure*: Infrastructure that facilitates the sharing of information (such as the internet) has similar properties to a public good and can be subject to under-investment. Without well-designed regulation and mechanisms to fund such infrastructure, it may be under-supplied.
- *Flexibility*: Flexible institutions, labour force and regulatory policies are required in industries with new innovative firms that often supplant existing firms. (Brynjolfsson, 2011)

Importance of complementary investments

Evidence suggests that turning investment into higher productivity growth is not a straightforward process (Pilat, 2004). Extracting the highest possible returns from ICT requires complementary investments and business changes:

> …a significant component of the value of information technology is its ability to enable complementary organizational investments such as business processes and work practices; … these investments, in turn, lead to productivity increases by reducing costs and, more importantly, by enabling firms to increase output quality in the form of new products or in improvements in intangible aspects of existing products like convenience, timeliness, quality, and variety. (Brynjolfsson & Hitt, 2000, pp.24–25)

Some of the main complementary factors associated with ICT investment are skills, organisational factors, and innovation.

- *Skills:* Theoretical research and empirical analysis and evidence shows a strong link between the level of human capital in firms and the benefits of ICT use on productivity growth (Gretton, Gali & Parham, 2004). Firms with a high proportion of skilled employees also tend to be early adopters and the heaviest users of ICT.
- *Organisational factors:* Firms that combine ICT investment with organisational changes (such as new strategies, new business processes and practices, and new organisational structures) typically receive higher benefits from ICT. The most successful changes are those that give individual employees more responsibility.
- *Innovation:* The ability of a firm to innovate is important in ensuring that the firm realises the full benefits from ICT. As noted earlier ICT has sped up the innovation process, so firms must be able to invest in experimentation and invention to extract the benefit of innovation and the productivity gains associated with it.

The case study in Box 5.6 explores an example of the returns from complementary investments.

Box 5.6 **Complementary investments –the returns from "big data" and evidence-based decision making**

The potential returns from the combination of ICT, "big data" and an evidence-based approach to decision making are substantial.

Ross, Beath and Quadgras (2013) found that businesses that consistently use data to guide how they make decisions are rare. Companies that do consistently use data to guide how they make decisions have a culture of "evidence-based decision making" and all show improvements in their business performance. Yet adopting an evidence-based decision making culture is hard due to the need for changes to business rules, work processes and so on. Even so, once companies have made the culture change they usually do not change back. Ross, Beath and Quadgras (2013) outlined four business practices that businesses follow that exhibit a culture of evidence-based decision making.

- Provide *reliable* data: This involves everyone accepting a single source of data. Over time the quality of data improves as the people who need to use the data take an active interest in ensuring

its appropriate collection and accurate recording.

- Near-real-time performance *feedback*: A way to teach employees how to use data to create business benefits is to provide them with data, daily if possible, about their own performance. Feedback must be on results that individuals can control.
- Establish *business rules*: Specify what actions to take in a given circumstance. This ensures actions align with the overall strategic goals of the business. Business rules can be made less complex by embedding them in software (for example, storing a customer's purchase data lets the computer check whether a given return qualifies for a refund).
- Training employees who *make decisions* on a regular basis: Without training employees, there is potentially no point in undertaking the first three points. Appropriate training means the employees can shift from basing their decisions on instinct to basing them on data.

Brynjolfsson & Hitt (2000) estimate that the total capital stock (including intangible assets) associated with computerising the economy may be significantly understated in official measures of capital stock.:

> In particular, both case studies and econometric work point to organizational complements such as new business processes, new skills and new organizational and industry structures as a major driver of the contribution of information technology. These complementary investments, and the resulting assets, may be as much as an order of magnitude larger than the investments in the computer technology itself. (Brynjolfsson & Hitt, 2000, p. 45)

This suggests that the economic contributions of computers are likely to be understated in aggregate level analyses. It also draws attention to the importance of non-ICT costs in determining the business case for ICT investments. This subject is further explored in section 6.3.

ICT contributes to productivity, economic growth and wellbeing

One common attribute of the economic characteristics described above is their non-linearity; that is, outputs grow more rapidly than inputs. Non-linearity makes for sensitivity to initial conditions, path-dependence, and cumulative causation. Developments can move ahead very fast or hardly at all. Prediction is difficult and unreliable.

Returns to scale and non-rivalry in use let outputs increase at a faster rate than inputs. This is central to achieving productivity and economic growth.[25] It is because these effects are so strong in ICT that their contribution (and potential future contribution) to wellbeing are so high.

F5.6 The economic characteristics of ICT underpin their strong current and potential future contributions to productivity, economic growth and wellbeing.

[25] Growth in the value of output that does not require a growth in (physical) inputs means that resulting economic growth is completely consistent with concepts of sustainable development.

6 ICT adoption by firms: business and policy influences

Key points

- The great majority of productivity benefits from information and communication technology (ICT) for New Zealand will come from the adoption and use of ICT developed and produced overseas. New Zealand creates a very small portion of global ICT products.
- Common patterns exist in how firms adopt new technology, including ICT. The patterns are driven by changes over time in prices, quality, risks, adoption costs and expected benefits.
- Individual firms adopt technology when it is available and its anticipated benefits exceed expected costs. The optimum date for adopting technology will vary by technology and by firm.
- Some ICT relies on shared infrastructure. The high fixed costs of such infrastructure limit the number of providers to one or, at most, a few. Providers are typically regulated to constrain market power (among other reasons). Competition in infrastructure and technology is a dynamic process, and undue downwards pressure by regulators on the price charged for current infrastructure can reduce incentives to invest in newer infrastructure and technologies, delaying their introduction.
- A significant proportion of the costs of adopting ICT are fixed; they do not vary due to a firm's size or its expected revenues. This favours adoption by larger firms. Larger firms are also favoured if and because they can access lower-cost capital. New Zealand has few large firms compared to other countries, implying later adoption by New Zealand firms, on average.
- The combination of New Zealand's small market scale and the fall in unit ICT costs with scale tends to delay ICT adoption.
- New Zealand firms appear to be adopting ICT in line with what would be expected given the private costs and benefits they face.
- Government action aimed at speeding up adoption needs to modify one or more factors that influence the optimum adoption time for firms. Important factors include access to capital, information diffusion, and ICT technical and managerial skills.
- The Government should focus on a framework of policies and institutions that facilitate flexible resource reallocation, adaptability and mitigation of the costs of transition to an ICT-enabled economy.
- Countries face choices of frameworks that influence the way they respond to, and take advantage of, the ICT revolution. Such choices are best made deliberately since making them by default risks an uncoordinated set of policies and institutions that work against each other and dissipate potential gains.

For New Zealand firms to successfully apply ICT requires at first that firms choose to adopt those technologies. ICT adoption is not an "all or nothing" choice – virtually all firms employ some ICT. It is useful to view adoption as a series of choices about whether and when to adopt (or skip) successive waves of technology.

The chapter effectively uses a cost-benefit approach to understand ICT adoption by New Zealand firms. There are two levels at which costs and benefits of options are weighed up and decisions taken to maximise net benefits:

- Private costs and benefits as perceived by firms. The adoption decisions of a firm are made within its overall business operating environment. This environment includes the demands and capabilities of a firm's suppliers, competitive forces (from direct competitors and those offering close substitutes), customer preferences, available technology, as well as the framework of government regulation and policies. Sections 6.1 through 6.5 explore the factors that influence firms' own decisions.
- Social costs and benefits as perceived by policy makers. Governments have the opportunity to set the framework of institutions and policies within which firms operate. They need to design a framework so the ICT adoption choices of firms are also the best for the wider society. Sections 6.6 and 6.7 explore the factors that policy makers need to take into account to achieve this.

Firms are best placed to evaluate their private costs and benefits of whether and when to adopt technology. In general, the privately-optimal decisions of individual firms are also socially optimal if two conditions are met:

- spill-over effects are minor (that is, decisions do not significantly affect third parties); and
- the framework set by government is well designed and does not unduly distort private decisions.

6.1 ICT adoption

Why does technology adoption matter?

Technology lags impact on economic performance. Differences in technology adoption accounted for at least one quarter of per-capita income disparities according to a study of how technology spread across 166 countries over the last two centuries (Comin & Hobijn, 2008). The lag in adopting technology has been declining:

> [the] growth 'miracles' of Japan and the East Asian Tigers, though more than half a century apart, both coincided with a reduction of the technology adoption lags in these countries relative to those in their OECD counterparts. (p.25)

These observations are consistent with the view that New Zealand can improve its productivity by adopting ICT more quickly.

Adoption at the country level is the aggregate of the adoption choices of individual firms, consumers and governments. This chapter is about the ICT adoption choices of firms.[26]

International research points to the adoption of ICT leading to increased productivity growth (Chapter 5). This effect is strong in some countries, over some time periods and in some industries – particularly service industries. These productivity effects exist but have been generally weaker in New Zealand.

Weaker productivity effects might be explained if New Zealand firms adopted less ICT (realising fewer benefits) or they adopted it later (delaying benefits).

Weaker productivity effects might also occur if firms failed to make complementary investments (weakening the effects and so the benefits). Lower expected benefits will likely lead firms to reduce their ICT or delay adopting it. This means that barriers to making complementary investments can lead to reduced or delayed adoption.

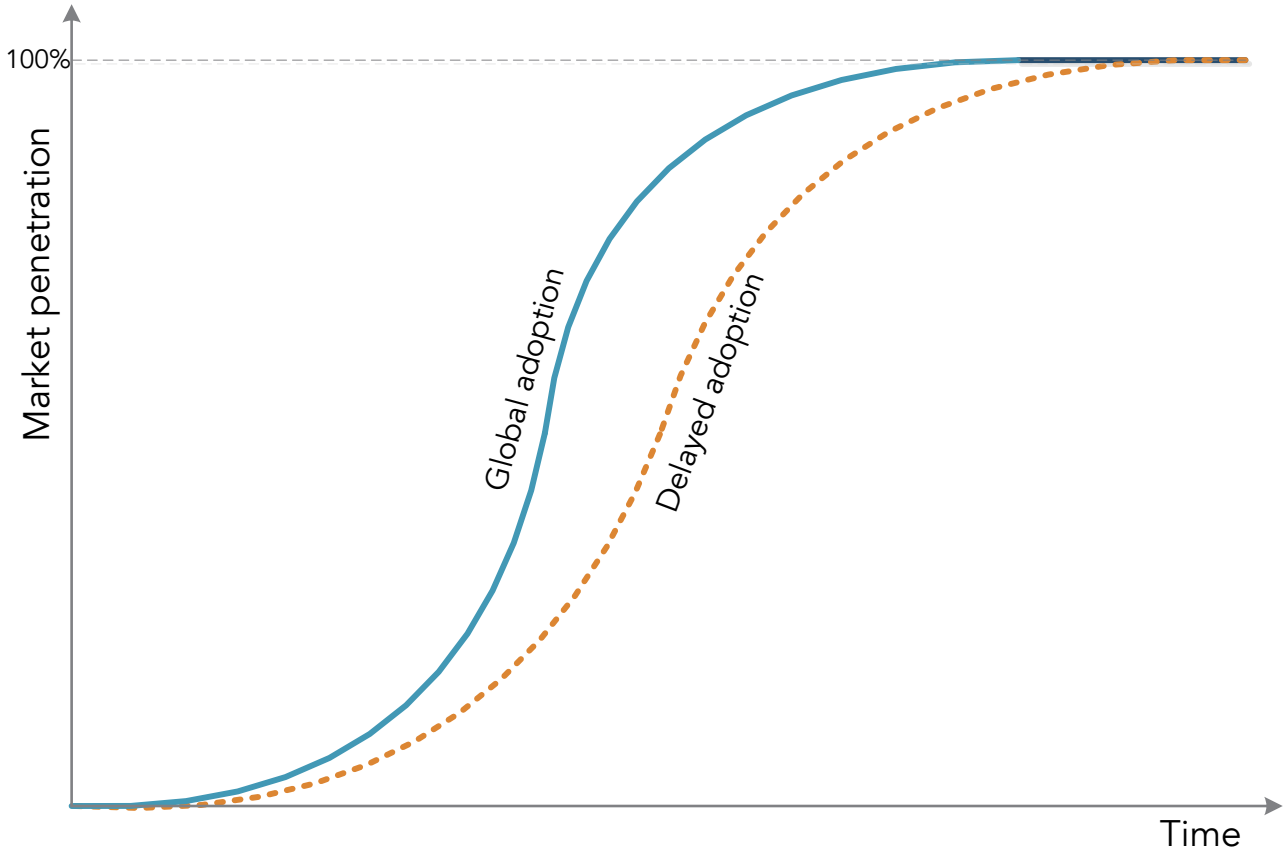
ICT adoption can be seen as decisions about waves of individual technologies. Some technologies depend on the adoption of previous waves; others are independent of them. From a New Zealand perspective, the big question is whether there are factors that systematically reduce or delay adoption.

[26] The adoption choices of governments are outside the scope of this inquiry, except to the extent that they affect the decisions of firms.

Model of technology adoption

Figure 6.1 shows the typical diffusion of an innovation according to Rogers (1962). With successive groups of customers adopting the new technology, its market share (solid blue curve) will eventually reach saturation level.

Figure 6.1 The technology diffusion curve



Source: Rogers (1962).

The curve follows an "S" shape – a low initial rate of adoption is replaced by relatively rapid adoption, which then slows as adoption nears 100%. Box 6.1 explores different models of technology diffusion that support the S-curve typically found by empirical studies.

The dotted orange curve shows the likely adoption pattern in a country with conditions that encourage relatively later adoption. This curve has been "shifted" to the right in the time dimension.

Box 6.1 **Models of technology diffusion**

Different models generate an S-curve of technology adoption, including:

- epidemic model of information diffusion;
- legitimation and competition;
- information cascades; and
- the probit model.

The epidemic approach considers diffusion as resulting from the spread of information. Information about the successful adoption by a single firm spreads to those nearby or otherwise closely linked. Once they have this information, these "second generation" firms are better placed to make adoption decisions and in turn influence a larger "third generation". The adoption rate eventually slows as non-

adopters become scarce.

Legitimation and competition refer to two forces responsible for the slow adoption rates in the early and late phases. In the early phase, there are significant questions about a new technology: will it work, is it superior to competing technologies, does the infrastructure exist to support it, and will others buy it? Adoption speeds up as these questions are resolved, that is, the technology becomes established. In the late phase, competition in the market for the goods or services using the technology lowers the returns earned by adopters, slowing the diffusion rate and ultimately bringing the process to an end.

In the information cascades model, people base their decisions on the observed actions of others, essentially relying on their judgement over their own assessments. Adoption is essentially herd behaviour.

In the probit model, decision makers make valuations – incorporating adoption costs and benefits – specific to the circumstances of their firms. Differences in those valuations and learning effects lead to progressive adoption.

The probit model is the most general as it allows for both information spill-overs and heterogeneous firm characteristics. That model underlies the analysis in this chapter.

Source: Geroski (2000); Jensen (1982).

The working hypothesis for this chapter is that the adoption curve for ICT in New Zealand sits to the right of the global adoption curve – due to identifiable, country-specific factors. This shift delays the benefits, including productivity benefits. Policy changes that reduce the influence of those factors could generate positive net benefits through earlier adoption. To be justified, such policy changes would need to incur fewer costs than the benefits they generate.

Firm decisions occur within the framework set by government

A firm's perceptions of risk, cost and returns affect its decisions.

Perceptions of risk, cost and returns are influenced by government policies and actions affecting infrastructure, taxes, subsidies, information dissemination and regulation.

F6.1 A firm's perceptions of risk, cost and returns affects its decisions about adopting ICT. Those perceptions are influenced by government policies and actions affecting infrastructure, taxes, subsidies, information dissemination and regulation.

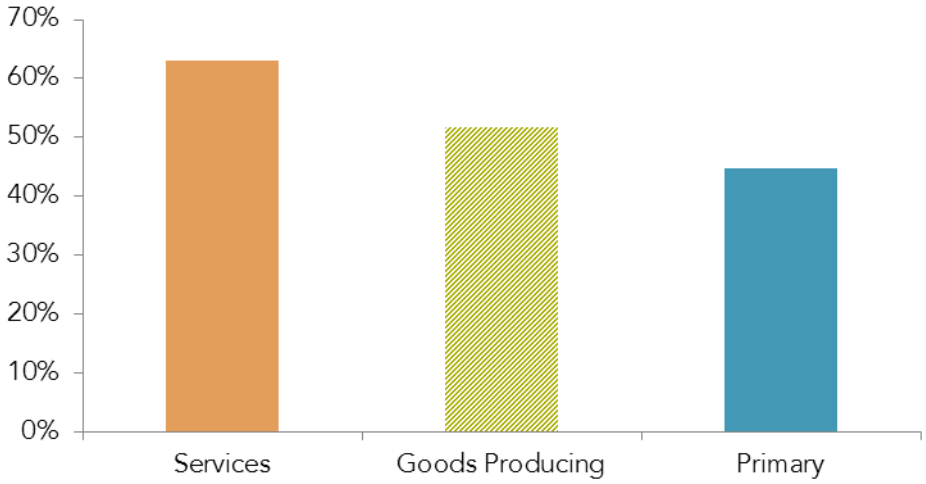
The situations of different firms are highly diverse, as can be the circumstances of different decisions made by the same firm. The importance of different factors will vary according to the situation. For most decisions, no one factor will be decisive. This makes it is highly unlikely that there are any "silver bullets" – policy changes that, in isolation, will make a significant difference to the adoption decisions of a large number of firms.

Section 6.7 explores framework policies that are conducive to New Zealand gaining the most from the ICT revolution.

Business survey: ICT investment by New Zealand firms

The Commission's 2013 business survey asked firms whether they had made a significant investment in ICT during the past two years. More than 60% of firms in the services industry responded positively (Figure 6.2). This percentage was higher than positive responses from firms in either the goods-producing or primary industries.

Figure 6.2 Percentage of firms that made a significant investment in ICT during the last two years



Source: Colmar Brunton (2013).

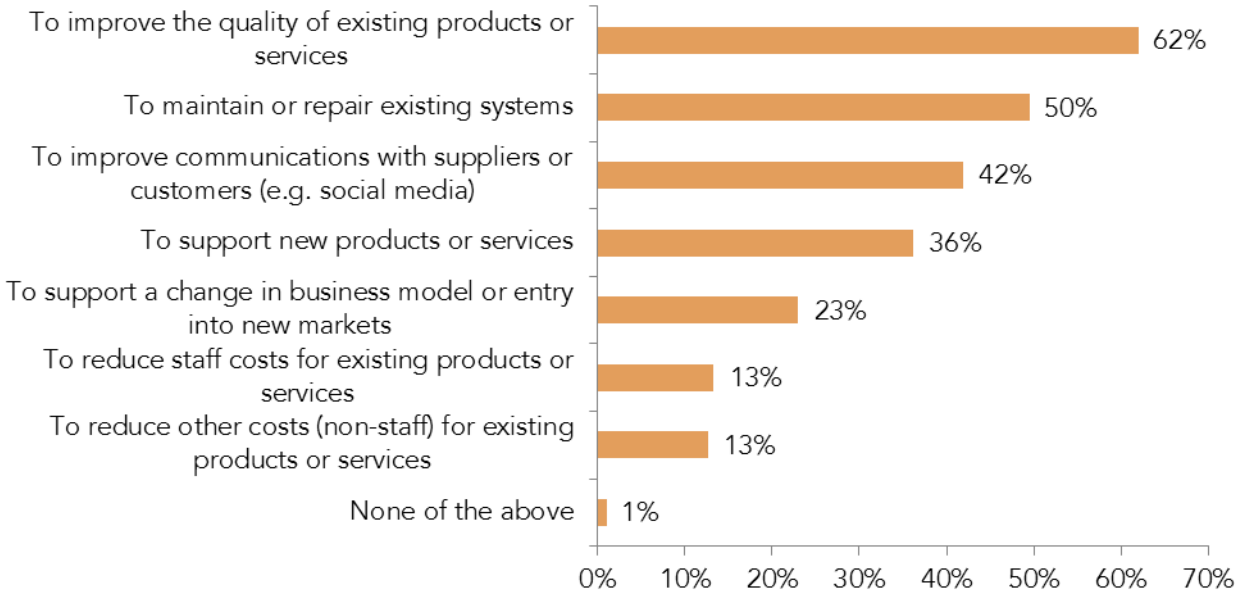
F6.2 Survey results indicate that services firms are more likely to have made a significant investment in ICT during the past two years than those in either the goods-producing or primary industries.

The survey further explored the rationales of services firms behind their decision to invest or not.

Why do service firms choose to invest in ICT?

The Commission's business survey asked service firms (that had made a significant ICT investment during the last two years) their rationale for investing (Figure 6.3).

Figure 6.3 Service firms rationale for ICT investment



Source: Colmar Brunton (2013).

Reasons for investing in ICT most commonly relate to a need to improve the quality of existing products or services (62%) followed by the desire to maintain or repair existing systems (50%), improve communications with suppliers or customers (42%), and support new products or services (36%). Survey responses were similar for goods-producing and primary industry firms.

The least common rationales focused on reducing cost.

The survey results support a finding that New Zealand service businesses are investing in ICT to improve their services or support new activities, rather than to reduce the costs of existing activities.

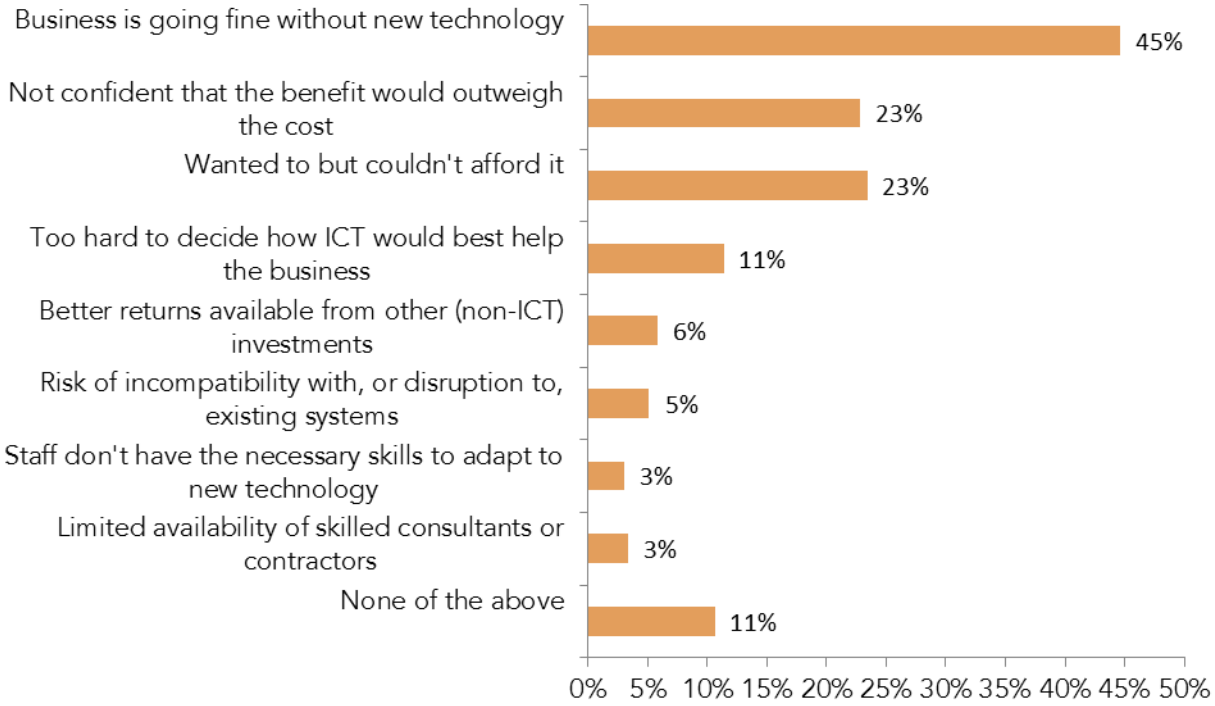
This association – between ICT investment with business improvement and change – is consistent with overseas research on the links between ICT use, business transformation and productivity growth. Barriers to adopting ICT are likely to affect business transformation, and so may be particularly detrimental to New Zealand's productivity growth.

F6.3 Survey responses indicate that service firms in New Zealand are investing in ICT to improve their services or support new activities. Reducing the cost of existing activities was the least common rationale for investing.

Why do businesses choose not to invest?

The Commission's business survey asked respondents (that had not made a significant investment in ICT in the last two years) their rationale for not investing (Figure 6.4).

Figure 6.4 Reasons why service firms chose not to invest in ICT



Source: Colmar Brunton (2013).

The "business is going fine without new technology" response dominates. If would be a cause for concern of it reflects a large number of firms with no aspirations for expansion or under little competitive pressure.

The response is, however, challenging to interpret. It could also cover cases where respondents are simply unaware of the possibilities of business improvement through ICT. And equally, it could cover businesses that made a large ICT investment more than two years ago. Without further information it is difficult to read more into this response. The Commission intends to explore this data further for its final report.

The response categories can be summarised into themes. In order of importance:

- overall financial case does not add up (23%);
- limited capital (23%);
- limited information (11%); and
- limited access to skills (3-6%).

These themes – along with others – are explored in the sections 6.3, 6.4 and 6.5. Chapter 8 further develops the issue of ICT skills.

F6.4 Survey responses indicate that the factors that discourage New Zealand service firms from investing in ICT include, in order of relative importance, the overall financial case, limited capital, limited information, and limited access to skills.

Responses to this question from firms in the goods-producing and primary sectors were not significantly different from those of services-sector firms, suggesting that the issues are similar across the economy.

6.2 Availability of ICT

Adopting ICT requires, at first, for it to be available for purchase. Potential barriers to purchase appear relatively minor in New Zealand. The Commission is interested in hearing whether this assessment matches the experience of New Zealand firms.

Q6.1 Have you faced any barriers to buying information and communication technology (ICT) products and services in New Zealand? If so, what products are affected, and how?

The production and marketing of ICT is global. Software is typically released simultaneously worldwide.[27] ICT hardware is typically available in New Zealand within a few weeks of its initial release.

One historical example of a barrier to the worldwide availability of a type of ICT was the US Government's restrictions on the export of strong cryptographic technology. These restrictions affected the development of applications such as banking that required strong encryption to ensure client privacy and security. The export restrictions became less effective as competing technology was developed in other countries, and the restrictions were progressively lifted from 1996.[28]

6.3 Factors that affect the costs to a firm of adopting ICT

The adoption of new technology is relatively risky and requires reallocation of resources both within and between firms (Bartelsmann, 2013). These risks, resources and reallocations are all sources of potential cost to the ICT-adopting firm. This section covers the main sources of costs, and policy issues that could affect these costs such as access to human capital and infrastructure. Regulatory risk is dealt with in this section whereas the next section deals with how regulations affect the benefits of ICT adoption by firms.

Investment capital

Younger businesses tend to be more limited by a lack of capital than mature businesses with established cash flows. For example, of the respondents to the Commission's 2013 business survey that did not make a significant ICT investment during the last two years, younger businesses were more likely to say they "wanted to, but couldn't afford it" (39% of businesses up to 2 years old versus 21% of businesses more than 2 years old). This raises a question about whether start-ups and developing businesses face particular difficulties in getting the funds needed to invest in ICT.

The mostly intangible nature of ICT investment provides one possible reason. Software generally costs more than hardware and yet it has little if any value on the secondary market. So ICT capital counts for little in terms of collateral to support a firm's ability to borrow (Andrews & de Serres, 2012). This suggests that for firms significantly dependent on bank debt as a source of funding, and without the financial strength to borrow unsecured, investing in ICT may be harder than investing in more tangible forms of capital. This will be an issue mostly for small and medium enterprises (SMEs). Large corporations generally have a greater ability to borrow unsecured, including in the securities market, while the main form of financing for start-ups and emerging firms is equity.

[27] This is true for English language versions. Markets requiring translated versions often experience delays before those versions become available.
[28] Some export restrictions remain, particularly those targeted at exports to "rogue" states and terrorist organisations.

- As the proportion of intangible assets rise, valuing firms becomes trickier. IT-related intangible capital as a proportion of total firm capital has been increasing over time. In 2005 it was about one quarter of the value of physical capital (Tambe, Hitt & Brynjolfsson, 2011).
- Matching investors to investments is hard in small markets (investors cannot afford to specialise).
- The transmission of tacit information over distance is tricky (and investors want to closely supervise/monitor their investments).
- The last two bullets indicate the challenge in establishing a vibrant and effective early-stage investment eco-system in a small economy such as New Zealand's, and it is also hard to rely on offshore finance for this segment of the market.

Human capital

In advanced economies, the use of ICT capital and skilled labour is increasing in all sectors and regions (Jorgenson & Timmer, 2011). Reflecting this growth, ICT skills are reported to be in short supply in most, if not all, advanced economies.

Management and technical skills are a complementary input to ICT capital. Limits on those inputs will limit the productivity benefits of investing in ICT.

Specialist skills are needed to implement most ICT. New Zealand produces its own ICT graduates as well as competing in an international labour market for ICT skills. The return to balance between supply and demand in New Zealand will come about through a mix of public policy, immigration and market forces over time (Chapter 8). In the meantime, the shortage of skills will hinder the adoption of ICT. New Zealand shares this problem with most other countries.

ICT costs

ICT products and services are the most visible cost components of an ICT investment, though they are typically a minority of total costs (Chapter 5).

ICT prices in New Zealand

The markets for many – perhaps most – ICT products and services are global in nature. It is reasonable to expect that prices will be roughly equivalent across countries after accounting for taxes and transport (Chapter 5).

An Australian parliamentary committee inquired into IT product pricing in 2013 found:

> Australian consumers and businesses, however, must often pay much more for their IT products than their counterparts in comparable economies. In many cases Australians pay 50 to 100 per cent more for the same product. (House of Representatives Standing Committee on Infrastructure and Communications, 2013, p. vii).

The committee explored several general reasons for higher Australian prices: differences in advertised prices; relative market size; wages and occupancy costs; warranties and green schemes; exchange rates; channel partners; and localisation costs[29]. They were not convinced that these reasons, even cumulatively, explain the price differences consumers experience in relation to many IT products, especially those delivered via the internet. The committee's investigation did, however, concentrate on consumer products rather than business ICT inputs.

There may be a case for slightly higher prices for international software and hardware in New Zealand than Australia if, for example, consumer guarantees were more comprehensive, transport costs were higher, or companies faced the fixed costs of legal advice, localisation or a local presence.

[29] *Localisation costs* are the costs incurred by software and digital content publishers in adapting their product to the requirements of a specific country's market and for checking and meeting legal requirements for sale in that country. They can range from very low (for example, a music download) to quite high (for example, Microsoft's support for te reo Māori in Windows 8, Office 2013, Outlook.com and Internet Explorer 10).

Consistently higher prices for ICT products would contribute to delayed adoption by New Zealand firms. The Commission seeks further information on this issue.

Q6.2 What is your experience of purchasing ICT products for business use in New Zealand? Do prices differ significantly from international prices? What might explain these differences?

Technology licensing

New Zealand firms face no obvious barriers in licensing technology from overseas for use in New Zealand. Such a barrier might arise in the hypothetical case that New Zealand was to offer significantly weaker intellectual property (IP) protection than the licensing country, which would deter firms in those countries from licensing their IP to New Zealand firms.

This suggests a general benefit to New Zealand in staying within global norms for IP protection.

Infrastructure

Some ICT requires shared infrastructure, for example mobile phone networks and undersea cables. The nature of such infrastructure limits the number of providers to one or, at most, a few. Providers are typically regulated to constrain market power; for example, restricting the ability of monopolists to prevent competitors from accessing essential pieces of infrastructure.

Competition in infrastructure and technology is a dynamic process, and undue downwards pressure by regulators on the price charged for current infrastructure can reduce the incentives to invest in newer infrastructure and technologies, delaying their introduction.

In these markets the short-run interests of consumers (lower prices) may run counter to their long-run interests (companies investing to upgrade technology). The regulatory task is complex, and probably best done at arm's length from government due to the need to make credible medium-term commitments.

Cloud computing platforms

The hosting of cloud computing platforms in or near New Zealand is an example of limited infrastructure. Amazon Web Services only recently began providing services from Sydney. Its main competitors – Google App Engine and Microsoft Azure – are still hosted in South East Asia, where the latency[30] involved in data transfers makes them unsuitable for many New Zealand applications. This issue is discussed in Chapter 9.

Q6.3 In your experience, does latency – the delays involved in moving data to and from other countries – make some services unattractive or unusable in New Zealand? What services are affected?

Domestic data-communications infrastructure

The Government's ultra-fast broadband (UFB) initiative involves infrastructure subsidies to extend the country's fibre-optic network to hospitals, schools, businesses and residences:

> By 2020, 75 percent of New Zealanders will be connected to ultra-fast broadband. Schools, hospitals and 90 percent of businesses will be connected by 2015. Homes and the remaining 10 percent of businesses will be connected by 2019.
>
> The Ultra-Fast Broadband will enable downlink speeds of at least 100 Mbps (megabits per second), and uplink speeds of at least 50 Mbps. Downlink is the rate you can receive information, and uplink is the rate it's sent.
>
> The government is contributing $1.35 billion to the initiative with significant amounts of private co-investment also being contributed by the government's Ultra-fast Broadband partners. (Ministry of Economic Development (MED), 2012)

[30] Latency is the delay incurred in transporting data over a distance. Long latencies are perceived as slow speeds, yet latency is not directly related to the measures of bandwidth typically used as proxies for internet "speed".

Connections for business are the relevant ones for this inquiry. Schools and hospitals are largely government provided and thus out of scope. Residential connections are within scope only to the extent they relate to business use.

Technology is fast evolving. VDSL – which works over the pre-existing copper network – provides speeds of up to 70/10Mbps (upload/download) (Telecom NZ, 2013)[31]. Cable networks in Wellington and Christchurch support 130/10Mbps.

Technology preferences are also fast evolving. The growth rates for mobile data usage are dramatically higher than those over fixed lines, reflecting the proliferation of mobile devices and a consumer preference for mobility. 4G – otherwise known as LTE – currently provides up to 150/50Mbps on Vodafone's New Zealand mobile network (Vodafone, 2014). Future versions, termed "LTE Advanced" are designed for speeds up to 1024/500Mbps (Kottkamp, Roessler & Schlienz, 2012).

New Zealand's businesses tend to be clustered in its cities. Fibre-optic networks were present in the major cities before commencement of the UFB roll-out. Businesses had the option to relocate to places with fast internet access – in the same way previous generations of businesses have chosen to locate near ports, railways and airports. Other businesses with high valuations on fast connections negotiated with network providers to have fibre-optic networks extended; for example, CityLink's extensions to the Wellington suburbs of Petone and Miramar (Howell, 2010).

These observations indicate that domestic data-communications infrastructure is not constraining ICT adoption by New Zealand businesses. The Commission is interested in hearing about specific examples where this is not the case.

Q6.4 In your experience, is a deficiency in domestic data-communications infrastructure constraining ICT adoption by New Zealand businesses? Which businesses are affected and in what way?

Pending further information, the Commission's draft finding is:

F6.5 The roll-out of fibre-optic networks, and advances in mobile and copper-based fixed-line technology mean that domestic data-communications infrastructure is not constraining ICT adoption by New Zealand businesses.

Other complementary assets

Most existing businesses have significant investments in fixed assets such as land, buildings, vehicles and specific plant. ICT investments typically have implications for those assets. For example, a logistics firm wanting an ICT system to optimise its use of trucks will need real-time information about truck position and speed, which in turn may require upgrades to trucks. Implementation of such a system, in turn, may change the economics of the firm's trucking fleet. The new optimal configuration could involve changes to the types of trucks and the location, size and role of distribution centres. It could also involve outsourcing some activities – and insourcing others. (See Chapter 7 for further examples.)

The costs of such changes affect the business case for the ICT investment. Most of these costs relate to the value of the assets themselves. However, some relate to the costs of reorganisation or redeployment.

Business reorganisation

Obtaining the full benefits from ICT requires complementary changes within – and across – businesses (Bloom, Sadun & Van Reenen, 2012; Brynjolfsson, Hitt & Yang, 2002; Brynjolfsson & Hitt, 2000).

[31] VDSL can vary widely depending on a property's location, the condition of its copper wiring and how busy the local copper network is at any given time of day and other factors. A benefit of optical fibre is that it reduces variability on some of these dimensions.

Different forms of ICT can either reduce firms' information acquisition costs (for example, enterprise resource planning software) or reduce communication costs (for example, networks) – and that therefore they have different implications for within-firm organisational change (Bloom et al., 2009). The first favours increased decentralisation of decisions, while the second favours increased centralisation. Both potentially change the locus of decision making, the rewards to specific skills in particular positions and labour requirements at different levels.

One example of technology helping to make decisions more centralised is in retail chains where higher-level managers can monitor sales closely. These managers make decisions about purchasing, pricing, presentation and advertising at the store level, as well as the location and design of new stores (Australian Productivity Commission (APC), 2000; Stanback, 1990; Chapter 7).

Investment in ICT with little or no organisational change can create negative interactions with existing organisational practices and result in losses in productivity (Brynjolfsson & Hitt, 2000). This has led some authors to advocate "all or nothing" changes when introducing ICT (Box 6.2).

Box 6.2 **"All or nothing" organisational change – "Don't automate, obliterate"**

A reason why businesses often earn disappointing results from investing in technology is because those businesses use technology to improve/speed up *old* practices instead of creating new practices (Hammer, 1990). Investing in IT but making little or no organisational change can create negative interactions with existing organisational practices and result in losses in productivity (Brynjolfsson & Hitt, 2000) The need for "all or nothing" organisational changes to achieve the potential results from IT led to the phrase "don't automate, obliterate" (Hammer, 1990).

Many businesses have improved their performance from investing in ICT and significantly overhauling out-of-date business practices; for example:

- Ford Motor Company planned in the 1980s to reduce the number of people in its accounts payable department (500) by 20%. Observing that Mazda only employed five people in this department, Ford figured a 20% reduction was not ambitious enough. Ford completely restructured the accounts payable process and fully automated most of the process. The end result was a 75% reduction in that department's staff. By using technology to dramatically change their old practices, Ford exceeded their initial goal, reduced financial discrepancies and increased the quality of reporting (Hammer, 1990).
- Mutual Benefit Life (MBL) – one of the largest life insurance companies in the United States – used to spend 24 hours processing an insurance application. Most of this time was spent passing information between departments. The president of MBL demanded a 60% improvement in case-handling productivity. MBL created extensive databases and computer networks that provided different kinds of information to a single person. It also significantly reduced the number and types of field-office positions, replacing them with the position of case manager. This eliminated delegating small tasks and reduced processing times to as little as five hours (Hammer, 1990).

These two examples share a significant improvement in firm productivity as a result of investing in ICT and organisational change. The businesses drastically restructured their labour force, work practices and processes. This highlights the need for an environment that encourages this type of change, particularly given the disruptive nature of ICT.

Adjustment costs

Firms adopting new forms of ICT will incur costs as they move from their current ways of doing business. These adjustment costs range from minor (such as new stationery) to major (such as a restructure of staffing that involves redundancies).

To realise the full benefits of ICT, a firm typically needs to change its business model rather than simply automate aspects of its existing business model (Chapter 5; Box 6.2). Adjustment costs can be a significant barrier to changing a firm's business model.

Lowering the adjustment costs that firms face can be expected to increase the adoption of ICT. To some extent, adjustment costs depend on a firm's size and its prior investments in human and physical capital. The Commission's 2013 business survey reflected this, as larger businesses (with 50+ employees) were more likely than were smaller businesses (with less than 50 employees) – 21% vs. 6% – to note the "risk of incompatibility with, or disruption to, existing systems" as a reason for not investing in ICT.

Regulation contributing to inflexible labour, product, land and capital markets may increase adjustment costs. To that extent, it can act to discourage ICT adoption or reduce the benefits realised.

Staff changes

ICT adoption can change labour requirements – both in numbers and the types and level of skills and experience required. These impose costs on both the adopting firm and the individuals affected. Section 6.7 explores the consequences of these changes at the individual, firm and national levels.

Risks

Risks can be characterised as costs, adjusted by the probability of their occurrence. Alternatively, the cost of risk mitigation is appropriate if that figure is lower. A firm will not adopt ICT unless the total benefits exceed the total costs, making risks an integral part of the cost-benefit equation.

Risk is an inherent part of the business process. Government actions can, however, amplify risk or increase uncertainty. Such increased risks can undermine the business case for ICT adoption.

Regulatory risks

Regulatory risks arise for firms because it is unclear how governments will respond to future circumstances. This uncertainty can have chilling effects on investment. Government commitments not to change particular policy settings – at least not before a specified date or without a fixed notice period – can help, but only to the extent that the commitment is credible. Governments cannot bind future Parliaments.

Regulatory risks can also occur when it is difficult or costly to predict how decision makers will react to specific proposals or behaviours.

Technology risks

Firms – even those competing in the same industry – differ along many dimensions. Those differences affect the firm's costs and benefits from adoption. Technology prices and associated adoption costs typically fall with time, while benefits become more predictable. Firms will wait until expected benefits outweigh expected costs.

Early adopters are a special case. They face the risk of stranded or sub-optimal investment should a competing technology prove to be a better match for their needs or win out in the market. They may also face higher costs if adopting a very new technology. They trade off these higher risks and costs against earlier returns and, in some (for example, winner-take-all) markets, the possibility of capturing medium-to-long term rents.

6.4 Factors that affect the benefits to a firm of adopting ICT

Firm and market size

Much of the cost of adopting technology is fixed, with low marginal costs as the volume of business expands. In other words overall cost does not vary much according to the size of the adopting firm or its anticipated revenues. This makes adoption by larger firms with large volumes of business more cost-effective and profitable.

Larger firms are also favoured to the extent they are able to access lower-cost capital and diversify risk. A lower cost of capital reduces the economic cost of investing in ICT. Larger firms have lower risks as they are less likely to be in the position of "betting the farm" on the success of a single ICT project.

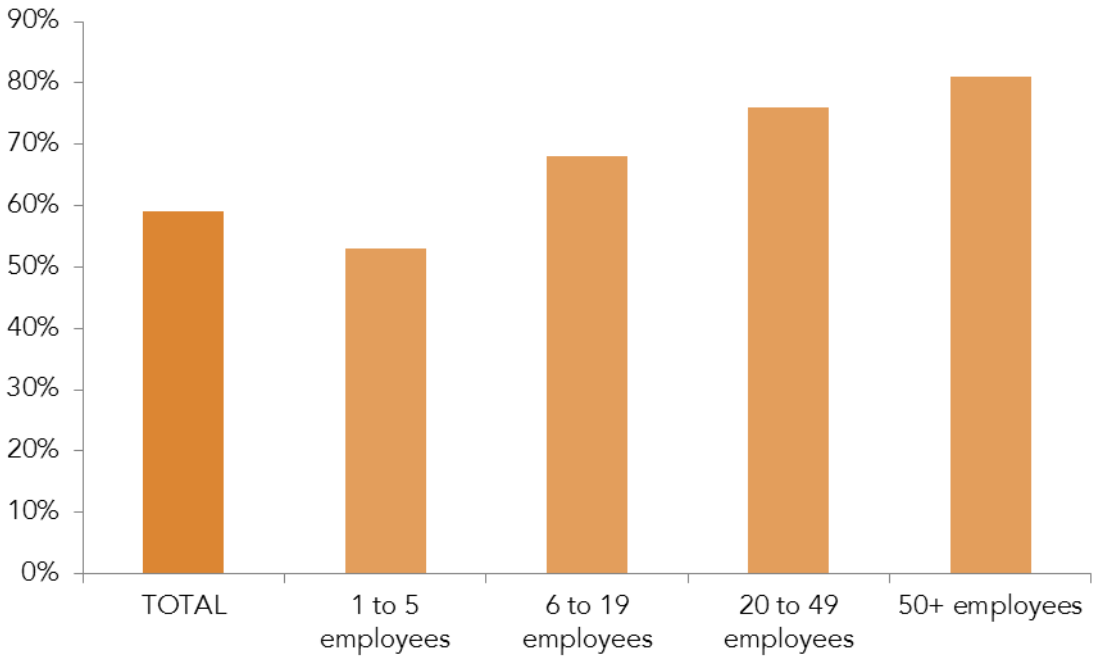
These arguments are borne out empirically. For example, "IT returns are substantially lower in small and mid-size firms than in Fortune 500 firms" (Tambe & Hitt, 2011, p. 1).

The positive associations found between ICT capital intensity and labour productivity by Doms, Jarmin and Klimek (2004) for the US retail industry between 1992 and 1997 only applied to firms with 100 or more employees.

These results are consistent with the observation by Sheehan (2006) that large service firms innovate more than small service firms.

The Commission's 2013 business survey asked New Zealand firms whether they had made a significant ICT during the last two years. Responses indicate that the percentage of investing firms rises significantly with the number of employees (Figure 6.5).

Figure 6.5 Percentage of firms that made a significant ICT investment during last two years by firm size



Source: Colmar Brunton (2013).

Note:

1. Includes all firms. At the stage of writing, it was not possible to disaggregate the services sector by firm size.

New Zealand has proportionately fewer very large firms compared to larger economies, implying that New Zealand firms, on average, will rationally adopt new technology later in its lifecycle – all else being equal. Overcoming this lag requires firms to be compensated on some other factor.

Small firms – and more particularly small, young firms – have some advantages that offset scale disadvantages to some degree. They can be more agile as they are less constrained by existing customers and relationships. And they typically have fewer assets that might be stranded by business model changes – reducing the costs of business reorganisation.

Barriers to realising benefits

Regulatory barriers (such as those relating to data security and privacy, or affecting the provision and pricing of physical infrastructure) may hinder New Zealand adopting new ICT. Dealing with a broad range of ICT-related issues has become the normal business of government (Table 6.1).

Table 6.1 Some current and recent ICT-related regulatory issues

Issue	Laws and institutions (examples)
Cyber bullying	Harmful Digital Communications Bill
Data interception by intelligence agencies	Telecommunications (Interception Capability and Security) Act 2013; Government Communications Security Bureau (GCSB)
Copyright infringement via digital downloads	Copyright (Infringing File Sharing) Regulations 2011; Copyright Tribunal
Trans-Tasman roaming charges	Joint investigation by MBIE and Australia's Department of Broadband, Communications and the Digital Economy
Software patents	Patents Act 2013
Access prices for copper broadband	Commerce Commission
Ultra-fast Broadband roll-out	Crown Fibre Holdings
Privacy	Privacy Amendment Act 2013; Privacy Commissioner
Internet crime	New Zealand National Cyber Security Centre; GCSB; Convention on Cybercrime

Source: Productivity Commission.

While, the Commission could assess each of these issues – and others – it is perhaps more valuable to consider whether the correct institutions and incentives are in place to take a whole-of-economy perspective on each of them[32].

A significant amount of this activity is designed to minimise harm. A typical government response to these issues is to allocate it to an agency with a harm-minimisation objective. A risk with "harm-minimisation" agencies is that their mandate to minimise specific potential harms fails to take a wider economic perspective and recognise harms elsewhere in the community/economy from their actions.

ICT knowledge and expertise to some extent sits in silos within government. There are specialist groups spread across government, each with perspectives on particular issues. For example, agencies with such groups include MBIE, the Treasury, the Department of Internal Affairs, the State Services Commission and the Ministry of Justice. This raises questions about coordination. Are the broader connections being made? Is draft regulation potentially affecting ICT adoption closely examined for its economic impact? Is there a role for an integrating body?

Such integration could occur through a unit in a core government agency (such as the Department of Prime Minister and Cabinet) to deepen policy expertise and coordinate across government. Another model is the Chief Science Advisor, who offers the Prime Minister strategic and operational advice on science and science policy issues.

Q6.5 To what extent does internet- and ICT-related policy advice within government reflect a whole-of-economy perspective? Is there a useful role for cross-agency coordination? How could this be best achieved?

6.5 Factors that affect the decisions of firms to adopt ICT

The "net benefit" approach to decision making compares total expected benefits to total expected costs, with no one factor predominating – appears consistent with the results from the Commission's 2013 business survey.

[32] Some of these issues are discussed in Chapter 9 in the context of cloud computing.

The decision-making process of firms is affected, however, by some additional factors. This section outlines those factors.

Information to inform decision making

Firms may delay adopting innovation if they do not know whether it is profitable or not, to gather information and reduce this uncertainty (Jensen, 1982).

Firms will generally not over-invest in collecting information to make decisions because such collection is costly. Further, a firm's perception that the prospective returns from investing in ICT are low will make it less likely to invest in collecting information on that ICT.

Because of this risk, early perceptions about the lack of value of an ICT investment may determine non-investment – even in cases where a fuller investigation would have found positive net benefits.

The effects may be stronger in small countries such as New Zealand. The distance from ICT leaders and lack of local agglomeration may create barriers and lags in the dissemination of tacit knowledge about ICT and the complementary management and organisational changes needed to make them work.

Promoting "digital maturity"

MYOB, a developer of accounting software, carries out periodic surveys of online technology use by small and medium-sized firms. MYOB found in 2013 that firms that use online technology have generally better business prospects. Over 60% of firms surveyed did not have a website, and for some this means reduced performance:

> At least one third of small to medium businesses are reducing their performance potential by overlooking significant opportunities offered by the digital economy.
>
> …it's vital for government and business leaders to work together with our business community, sharing knowledge about the benefits of embracing the online world and supporting them on their journey. (Henderson, 2013)

Telecom New Zealand asks:

> …whether enough is being done to educate or promote to small to medium businesses the benefits of ICT (or adopting digital business models)? To make the most of ICT requires existing firms to consider the benefits beyond what they currently do, i.e. develop a vision beyond their current needs. This is not necessarily easy to do. While the ICT industry has an incentive to promote ICT adoption, there may be some facilitative role for policy makers to educate and promote uptake. (Telecom New Zealand, sub. 16, p. 3)

The Government has programmes in place to increase the capability of small-to-medium businesses, largely coordinated through its business.govt.nz website (Box 6.3). The most recent ICT-focused initiative focused is the Digital Enablement Training programme, where approved businesses can receive subsidised access to a one-day workshop (Minister of Communications and Information Technology, 2013).

Box 6.3 **Government programmes to support business adoption of ICT**

MBIE (2011) outlines ways in which ICT can support business growth:

- make it easier for businesses to internationalise, and grow within New Zealand, through better access to customers, suppliers and partners, investment and R&D;
- reduce capital and operating expenditure through access to a wide range of applications and business solutions, and increase productivity by providing timely access to people and services;
- increase firm flexibility through remote working, and greater cost savings for consumers through online research; and

- early adoption of fibre could lead to a competitive advantage for New Zealand firms through developing, testing, and commercialising fibre-based applications.

Government provides support programmes for business ICT adoption. These include capability development vouchers offered by New Zealand Trade and Enterprise; research funding and other grants from the Ministry of Science and Innovation; TechNZ's business investment programme; the regional business partners network; and support for industry associations such as the New Zealand Information and Communication Technologies Group.

The most recent government ICT initiative is the Digital Enablement Training programme, announced in August 2013 (The Digital Office, 2013). This programme seeks to help small businesses take advantage of the Government's UFB and rural broadband investment. New Zealand businesses with less than 50 employees are eligible for subsidised access to a one-day workshop. Accredited trainers help workshop attendees examine the impact of new technologies on business and explore the opportunities presented by ICT.

Crown Fibre Holdings is implementing a government-funded programme to promote the benefits for businesses of connecting to the UFB (Crown Fibre Holdings, 2014).

Such programmes are also common in other countries; for example, tax incentives in Singapore (EnterpriseOne, 2011) and large-scale research projects in Israel (Deloitte & Trigger Foresight, 2013).

While the theoretical case for such programmes is strong, there is less evidence about the actual outcomes of specific programmes. Implementation risks include that the quality of information provided is poor, the information has low credibility coming from government, and the programme provides a free service for those who would have paid anyway.

The Commission would like to hear from those who have designed, implemented, evaluated or used such programmes as to their efficiency and effectiveness.

Q6.6 Are government programmes to provide information to firms about the benefits of adopting ICT efficient and effective? What might improve them?

Q6.7 Should publicly-funded programmes to promote to firms the benefits of adopting ICT be expanded or contracted? On what criteria should such a decision be made?

Quality of firm management

Firms with high-quality management are best placed to adopt the right ICT at the right time, and get the best from them. This requires managers with a combination of skills:

- entrepreneurial skills – seeing opportunities to improve business performance and being willing to experiment (section 6.7);
- being "tech-savvy" – keeping current with ICT and its potential business applications;
- creating an environment in which staff can learn how to best use the new technology to improve business performance; and
- business reorganisation skills.

Nicholas Bloom of Stanford University and other researchers have developed a set of survey instruments to measure the quality of management practices and their effects of firm productivity. Management practices are measured on three dimensions covering how well firms:

- track what is going on inside their organisations;
- set targets, track outcomes and take action to correct problems; and
- promote and reward employees based on performance, and systematically try to hire and keep the best employees.

The surveys have been conducted across a wide range of countries in successive years from the mid-2000s. From this they have determined that fully 29% of cross-country differences in productivity can be attributed to differences in management practices. Differences in management practices are also associated with wide within-industry productivity distributions in each country (Bloom, Sadun and Van Reenen, 2013). The United States consistently rates highest on management quality.

Of particular relevance to ICT adoption, Bloom, Sadun and Van Reenen (2012) show that US multi-nationals in Europe and the UK make more productive use of ICT than other multi-nationals in the same markets. This was accounted for by the people management practices in the US firms. Those practices involve closer attention to managing poor performance, to hiring and firing decisions, and to incentivising high performance. US multi-nationals are able to transfer some of their management practices across countries despite differences in labour market regulation. These practices complement ICT:

> IT-enabled improvements usually require more worker flexibility inside the firm, with workers taking on new roles … when there is uncertainty over how best to use a new technology, giving more discretion to employees with higher-powered rewards may be a way to efficiently exploit their private knowledge. (Bloom, Sadun & Van Reenen, 2012, p. 191)

Fabling and Grimes (2010), using data from Statistics New Zealand's Business Operations Survey, found that younger firms, large firms and high-tech firms were most likely to adopt high-performance human resource (HR) systems. Firms that adopted these practices experienced a lift in their profitability, productivity and market share. Two practices were particularly important – performance pay for most or all employees, and firm-specific (innovation-related) employee training. The authors proposed that high-performance HR practices are particularly important in high-technology industries. They found that high-performance HR practices are associated with better management practices on other dimensions (such as having a formal planning process). These findings are congruent with the international research.

IT-savvy managers are a key to using ITs effectively (Chapter 8). Managers need to recognise the potential for ITs to re-engineer their business, and also identify the required complementary investments, for example in training and changes in business organisation and processes. They have to map and implement a path for the change process, and manage the interface between IT specialists and senior managers. US firms with senior managers with IT qualifications and experience are more likely to use well-developed IT governance mechanisms that lead to better financial performance (Boritz & Lim, 2007).

Management quality in New Zealand

Evidence on the quality of New Zealand's management practices is scant (New Zealand Treasury, 2008). Most evidence is from small sample subjective evaluations of management quality.

The available data suggests that management quality in New Zealand is weak. For instance, in a small intensive cross-country survey, management practices in New Zealand manufacturing firms were ranked 10 out of the 14 OECD countries studied. People management was found to be particularly poor (Green et al., 2011).

If similarly poor people-management practices are also prevalent in the services sector then they would hinder the beneficial adoption of ICT by services firms.

There is some evidence that New Zealand lacks a good cohort of ICT-savvy managers and directors (Chapter 8).

Improving firm management performance

Countries that have low average management practices scores have long tails of poorly performing firms. Even though their best firms perform well in international comparisons, it is the long tail of poor performers

that pulls their average scores down. The best performing firms in India are better than average performing firms in the United States, but on average domestic firms in India perform well below domestic firms in the United States. (Bloom et al., 2007)

Better country performance is associated with more competitive product markets and a lack of regulatory distortions (Bloom, Sadun & Van Reenen, 2013; Bartelsmann, 2013). Competition causes managers to revise their perceptions of their performance, and winnows out companies with poor management practices (Coelho, Kao & Roland, 2013). Regulatory distortions reduce the benefits available from good management practices.

Bloom et al. (2013) report an interesting management practices experiment carried out in India. A random selection of firms was provided with management practice consultancies and their performance subsequently compared with other firms. In the first year, the firms that received management practice advice were 17% more productive than the others and went on to expand their operations. The productivity gains were from improved quality and efficiency and reduced inventory. This demonstrates that effective management practices can be taught.

Training and advice on effective management practices is most useful in young, large and high-tech companies. According to Fabling and Grimes (2010), these firms are most likely to adopt effective people-management practices and so receive productivity benefits.

F6.6 Recent research indicates that management practices make a significant difference to firm performance and that training and advice in management practices can be effective. The training and advice is most useful in young, large and high-tech firms.

Bloom, Sadun and Van Reenen (2013) speculate that information and motivation problems may restrain firms from adopting management practices that benefit performance. Both the problem of poor management and its solution are recognised by some senior managers, but others are not persuaded. This divergence of views poses a challenge to adoption of high-quality management practices.

Increased competition, removal of barriers to reallocation of resources and better information are factors that will stimulate firms to use superior management practices. These same factors affect the adoption of ICT, as covered elsewhere in this chapter.

Firm ownership

Ownership matters – being a standalone ("independent") firm is associated with decreased ICT adoption:

> A high level of independence … significantly decreases the ICT adoption, whatever the type of technology. Indeed, independent firms suffer from larger search and learning costs than dependent units. The latter can benefit from previous information acquisition and financial and logistic support from the parent company. Independent firms face greater risk and this hinders ICT adoption. (Bocquet, Brossard & Sabatier, 2007, p.381)

Multi-national firms reduce the costs of credibly transmitting information across borders as they can internalise demonstration effects and learning-by-doing. Information about the success and failure of different ICT options is likely to be more credible within a firm than between potentially competing firms, or from a vendor to a potential customer. The flexible internal labour markets in multi-national firms support people who can move easily and quickly (with their associated knowledge) to the location where their knowledge is most valuable.

Consulting firms can also be a vector for cross-company knowledge diffusion, leading to cross-border diffusion in the case of multi-national consulting firms.

This suggests that multi-national firms are an important route for technology diffusion into New Zealand. Double taxation and restrictions on foreign ownership or international labour mobility affecting these firms are likely to slow knowledge diffusion about ICT into New Zealand, potentially slowing ICT adoption. These issues were explored in the context of New Zealand's relationship with Australia in the Productivity

Commissions' trans-Tasman inquiry (APC & NZPC, 2012). The relevant recommendations of that inquiry (R4.18, R4.19 and R4.20) are consistent with the analysis in this chapter.

F6.7 Multi-national enterprises reduce the costs of credibly transmitting information across borders, as they can internalise demonstration effects and learning-by-doing. They are an important route for technology diffusion into New Zealand.

Information spill-overs suggest a reason for governments to favour foreign suppliers where they have access to current technology, in contrast to the perhaps more often heard arguments in favour of local firms (such as NZCTU, 2013; NZRise, 2012). Government procurement of ICT is further explored in Section 6.6.

The OECD's foreign direct investment (FDI) Regulatory Restrictiveness Index suggests that New Zealand has more restrictive investment regimes than many other OECD countries (OECD, 2012). While there is debate about the methodology and content of this index, there is clearly scope to reduce the costs of restrictions.

Intensity of competition

Competition encourages firms to look at how to lower their costs and better match their products to their customers' needs. In most markets, increased competitive intensity leads to increased economic efficiency.

Competition occurs in input as well as product markets. For example, firms compete for skilled workers and higher-quality, lower price materials.

Chapter 2 found that competitive intensity tends to be lower in New Zealand, and that this may particularly affect specific service industries.

Competitive intensity interacts with many of the other factors that affect a firm's ICT adoption decisions. Firms facing competitive threats are incentivised to lower costs or improve quality. ICT offers the potential to do both.

How competitive intensity interacts with productivity dispersion

Firms operating within an intensely competitive market are incentivised to innovate to escape the competition (Chapter 2). Research finds the average difference in productivity between leaders and followers increases with competition (Aghion et al., 2005).

A related observation applies to ICT adoption. Intensity of ICT use is positively associated with wider dispersion of productivity within an industry (Bartelsmann, 2013). Similarly, high-productivity industries tend to have a wider dispersion of productivity levels (Scarpetta et al., 2002).

Taken together, these results are consistent with a link between ICT adoption and competitive intensity. Firms adopt ICT to reduce the competitive intensity they face, but in doing so increase the competitive pressures on other firms in their industry. These firms respond in the same manner. Because of the time lags involved, the productivity dispersion will be higher (on average) in such "dynamic" industries than those in which competition is less intense.

The high aggregate productivity in some industries is partially accounted for by the presence of exceptional performers that lengthen the right-hand tail of the industry productivity distribution (Scarpetta et al., 2002). Altomonte et al. argue that policy should focus on such high performers:

> …rather than just working on the 'average' performance of the sector, a successful policy for competitiveness should aim at generating a 'thicker' right-hand tail of the distribution over time. In this sense, policies aimed at fostering the internal growth of firms via more efficient product and factor markets (cross-firm competition and agglomeration, removal of financial constraints and better access to capital, wage-setting mechanisms more in line with individual firms' productivity) are instrumental in reallocating resources towards better performing firms and thus increasing the aggregate level of competitiveness. (2011, p.4)

Policies aimed at supporting weaker firms, such as those targeted towards SMEs, may result in barriers to growth, and relatively more low-performing firms (Altomonte et al., 2011).

More generally, Acemoglu et al. (2013) find that:

> Industrial policy (support to existing firms and industries) is damaging to growth and welfare, and at best ineffective. (p. 5)

Many small firms are not oriented for growth (Haltiwanger, Jarmin & Miranda, 2010) and thus play a limited role in reallocation. MYOB usefully classify New Zealand businesses into business builders, passionate professionals and lifestyle seekers (South, 2012). Only the first of these is strongly motivated to expand their business.

A better target for policy might be younger firms. This is explored in section 6.7.

Survey evidence on decision quality

Productivity differences between New Zealand and other countries might also be explained if New Zealand firms made systematically poorer decisions about adopting ICT or had a higher rate of failure in implementation. The Commission is not aware of any cross-country studies that address this question.

The Commission's 2013 business survey offers some insights on New Zealand business experience with significant ICT investments made in the preceding two years. While a larger number of investments cost more, rather than less, than anticipated (23% vs. 4%), only 3% of respondents reported that they did not expect the financial costs to be covered over time. And 93% reported that they expected their investments to deliver significant benefits to the business over time. These two results point to low levels of implementation failure or decisions that were subsequently regretted.

F6.8 Survey evidence does not support the idea that New Zealand firms are making systematically poor decisions about ICT investments, or seeing poor results from implementing those decisions.

At least some ICT investments are risky, so it would be surprising if every outcome was positive. While some degree of self-reporting bias cannot be ruled out, these high success levels would point to low levels of risk-taking as opposed to systematically poor decisions or implementation.

F6.9 Survey evidence suggests that New Zealand businesses are not big risk takers in deciding on whether to invest in ICT.

6.6 Spill-overs from adopting ICT

Spill-over effects on other firms

The decisions of firms to adopt ICT are affected by, and in turn affect, the decisions of other firms (Box 6.4).

Box 6.4 **Spill-over effects and ICT adoption**

Some economic decisions create benefits or costs for others – beyond the people or firms who chose to partake. For example, bystanders may be harmed by cigarette smoke as a result of someone else's decision to consume tobacco.

These effects are called "externalities" or "spill-over effects". Products with positive spill-over effects include education and vaccinations.

Individuals and organisations do not usually consider spill-over effects when deciding how much of a product to produce or purchase. Production and use of that product will be lower (for positive spill-overs) or higher (for negative spill-overs) than it would be had all the costs and benefits been taken into account.

An economy could improve its productivity if the wider costs and benefits to society were recognised and acted on. Such improvements are conditional on the costs of recognition and action being lower than the benefits gained. If not, then society will be better off accepting the spill-overs and their consequences.

The types of positive spill-over effects that influence ICT adoption include network effects, knowledge spill-overs and demonstration effects.

- *Network effects* occur when a product becomes more valuable to customers as a greater number of people use it. For example, video-conferencing equipment will only be useful to a firm if its associates possess the same technology.
- *Knowledge spill-overs* occur when investigations, research and learning about the effectiveness of a new ICT spread to other firms and individuals. The recipients gain from that knowledge without having to pay for its creation. This lowers their costs of adoption (Cooper et al., 2006).
- *Demonstration effects* are a subset of knowledge spill-overs. They occur when the visible success or failure from adopting ICT influences the adoption decisions of others.

Spill-over effects on ICT adoption can also be negative. For example, if most firms are using outdated technology, the desire to maintain compatibility may discourage individual organisations from upgrading (Shapiro, 1999).

The economic evidence of spill-overs from adopting ICT is weak:

> While the spillover mechanism is pretty clear for R&D it is much less clear for ICT… IT, unlike R&D, is embodied, and therefore knowledge spillovers will be less likely. Network effects may be more important, but these might apply to specific forms of ICT (like operating systems or communication networks) rather than ICT in general. (Draca, Sadun & Van Reenen, 2006, pp. 12 and 36)

Spill-over effects are limited to the extent that adopting ICT is specific to the circumstances of the firm, and by the disincentives and credibility issues that reduce knowledge sharing in a competitive environment.

Sharing experiences of adopting ICT

Information about the success and failure of ICT projects – if relevant and credibly communicated – can generate valuable spill-overs to other potential adopters. Early adopters, in particular, can provide valuable demonstration effects.

Firms face strong incentives to suppress information about failures, which in turn makes information about their successes less credible. This increases the importance of information spill-overs via internal and external labour mobility.

Q6.8 What institutions or incentives might best encourage firms to document and credibly share, in a timely way, their learnings about the success and failure of ICT projects? Can you point to initiatives that have been successful elsewhere?

Spill-over effects from government ICT purchases

Government agencies are significant users of ICT products and services, a direct employer of ICT-skilled workers and, more generally, a large customer in many local product markets. Government purchasing in New Zealand makes up more than 15% of its Gross National Product.

The Government might appear to be a single buyer, but its ICT needs are highly diverse. ICT decision making is devolved to agencies because they are better placed to understand their own needs than a central purchasing agent.

Government purchasing creates negative and positive spill-over for local firms. Procurement could encourage diffusion to firms that supply government and others who could use the same products. Equally, procurement can stipulate or encourage others to make outdated or low-value investments.

The New Zealand Government is not yet an effective and informed purchaser of ICT (Ministerial Inquiry into the Novopay Project, 2013; Dunleavy et al., 2005; Small, 2013). The technologies that government agencies use are often older than those used in the private sector, creating negative spill-overs in skills markets and among government suppliers.

Government actions to improve the quality of its procurement will likely offer spill-over benefits to private ICT adoption. This course of action should be more fruitful than deliberate attempts to understand spill-over effects and incorporate them into individual procurement decisions. That would require procurement managers to be more capable, including in economics and policy analysis (MED, 2005).

R6.1 Government should prioritise its efforts to be an effective and informed consumer of ICT.

Government should share rather than own intellectual property

IP presents a particularly strong case to change procurement policy. Government agencies acquire rights to digital products such as software through many ICT procurement projects. Government procurement processes should purchase non-exclusive use rights in preference to IP ownership.

This stance offers direct benefits to government, as suppliers are likely to charge less for, and be willing to invest more resources in, a resalable product.

Permitting re-use of IP by others is efficient as they do not bear the costs of duplication. It makes sense for the supplier to retain IP ownership, as they retain the complementary human capital and have stronger incentives to pursue its re-use than does the purchasing agency.[33]

In most cases, the cost of a government agency from not holding exclusive rights to IP is very low. There are very few circumstances where government agencies are mandated, resourced or motivated to make commercial use of IP. There are some rare situations, such as for national security agencies, where government ownership of IP might be desirable.

The stated purpose of the State Services Commission guidelines (SSC, 2008) is consistent with this perspective:

> …only in limited circumstances should the government own and exploit the IP created under a contract. The default position is that the Supplier should own the new IP, with licences being granted to the Customer Agency and all other State Services agencies. (p. 3)

In contrast to this purpose, the guidelines approach IP sharing as an exception rather than a rule. SSC recommends that government procurement managers let suppliers own new IP in a narrowly defined set of circumstances. If any one of seven questions of procurement risk elicits a positive response, SSC guidance directs agencies to maintain IP ownership.

R6.2 Government should purchase non-exclusive rights for the use of intellectual property (IP), rather than exclusive or ownership rights, when procuring ICT. This would encourage lower prices and encourage productive re-use of that IP by suppliers. Government advice to procurement managers on this issue is confusing, and should be amended.

[33] An alternative approach would be for the Government to require that software IP be placed into the public domain or open-sourced. This approach has advantages and disadvantages, and these will vary according to the type of software and the presence of other products in the market. The Commission does not intend to examine this further; however it notes that the recommended approach does not restrict the supplier from choosing, to open-source the IP.

Sharing government's experiences of ICT

Demonstration effects occur when the visible success or failure of ICT adoption influences the adoption decisions of others.

This subsection addresses demonstration effects that potentially arise from government ICT procurement projects. The demonstration effects resulting from government policy on cloud computing are discussed in Chapter 9.

The way that procurement managers are incentivised to respond to risk reduces their ability to experiment (Better Public Services Advisory Group Secretariat, 2011). Public decision makers face strong incentives to suppress information about project failures, which in turn reduces the credibility of government communications reporting. Success stories will not be credible unless government is willing to communicate its failures.

Demonstration effects are most relevant when other decision makers are considering adopting the specific technologies involved. So the value of government demonstration effects crucially relies on agencies being relatively early adopters of new technologies.

Information about the technical success and failure of ICT projects will inevitably leak between agencies and firms as people move jobs. Even so, the rate of such knowledge spill-overs may be slower than ideal, particularly when technology is changing rapidly. Information about the business outcomes of ICT projects is likely more closely held – and potentially more valuable – if shared. The Commission welcomes suggestions of policy changes that might encourage the sharing of such information.

Q6.9 What changes might best encourage government agencies to document and credibly share, in a timely way, their learnings about the success and failure of ICT projects?

6.7 Framework policies for a "revolutionary" economy

This section takes the perspective of the government acting as the agent of the people of New Zealand. It asks and attempts to answer the question "taking into account the way that firms make decisions about ICT adoption, what policy settings will create the best framework for firms and employees to work within as they make decisions to adapt to the ICT revolution and adopt ICT themselves?"

Do New Zealand firms delay their ICT adoption?

The various influences of the factors described in sections 6.3 to 6.6 suggest that delayed adoption of ICT may be optimal for New Zealand firms, at least under current policy settings. Scale, in particular, is a common theme:

- The small size of New Zealand firms (or equivalently, the low number of large firms) limits scope to invest in new ICT with a high fixed cost that requires a larger business base to be profitable.
- Business and market-scale effects make it optimal for New Zealand businesses to wait for a point on the technology diffusion curve where risks and costs are lower – but also where there is a lower expected return and a reduced ability to use the technology to differentiate and innovate.
- Lack of geographic scale and agglomeration in New Zealand reduces opportunities for productivity gains through the use of ICT in some industries in particular (such as wholesaling) compared (for instance) to Australia and the US.

In addition, relatively low labour costs make it profitable for New Zealand firms to use relatively less capital-intensive business models, including those with less ICT capital. This should be seen as an effect as well as a cause – lower capital per worker lowers labour productivity and therefore wages. A challenge for New Zealand is to escape from this circle of causality. Policy changes that increase the returns from ICT capital could assist.

More broadly, the policy challenge is:

- to find areas of specialisation where these factors are less strong;
- to encourage technologies less subject to these effects;
- to get rid of settings that unnecessarily raise adoption costs or reduce adoption benefits; and
- to choose settings that encourage the necessary exploration, experimentation and adaptation to take advantage of changing opportunities.

Relevant policy settings could, for example, aim to increase market size and thus business scale through economic integration and reduce the adjustment costs of firms and workers facing the effects of technology-driven changes in their industry.

Similarly, policies that encourage the adoption of technologies less subject to scale effects could assist (see the discussion of cloud computing in Chapter 9).

F6.10 The specific circumstances facing New Zealand firms are likely to, on average, delay the adoption of ICT. Tailored and high-quality policy settings – perhaps different from those in other countries – that reduce the costs and raise the benefits of adoption can help to overcome these circumstances.

Some of the government policies and actions affecting these factors are neither ICT nor services-sector specific. They are part of the overall framework set by many individual government decisions. Linking themes include:

- increasing market size through trade openness and economic integration;
- reducing the segmentation of input and product markets;
- increasing the intensity of competition;
- supporting risk-taking and experimentation;
- removing or reducing barriers to resources moving to their most productive use;
- building human capital; and
- improving information flows (with particular attention to the quality and credibility of information).

New Zealand has good policy settings relative to other countries in at least some of these areas (MED, New Zealand Treasury and Statistics New Zealand, 2011). That is not a cause for complacency, nor should it be a justification for inaction. New Zealand faces some country-specific challenges that are not amenable to policy, and it needs to perform well on other dimensions to compensate.

F6.11 Some government policies and actions affecting firm ICT adoption decisions are neither ICT nor services-sector specific. They are part of the overall economic framework set through many individual government decisions.

How to regulate for a fast-changing environment

Investment and innovation are market-driven processes. The policy environment plays an important supporting role. This includes policies affecting competition, market access, finance, taxation and regulation.

Late adoption is costly in winner-take-all markets. Risk-taking is important in those markets. This invites the question: does New Zealand have the right settings to encourage risk-taking? Similarly, Is New Zealand flexible enough to allow low-cost experimentation and learning from those experiments?

To get the full benefit from ICT an economy needs to be tolerant of disruption and well-tuned to respond to it. Do policy settings support New Zealand firms, other organisations and individuals responding to disruption by efficiently moving resources to their new, best use?

A policy environment to support continuous adaptation

The overall picture that emerges in this chapter is a future of rapid change: technological, societal and economic.

> A supportive environment for investment and innovation is… paramount for a dynamic and productive economy. (Besley, Coelho & Van Reenen, 2013, p. R9)

Successful countries will be those that continually adapt. Dynamic firms and dynamic economies are interdependent.

This future is not necessarily "comfortable". Institutions that may have worked well in the past must be open to question, and abandoned or redesigned if they prove a costly drag on adaptation and adoption. Firms will find themselves under pressure to change or go out of business. Their employees will be directly affected. More broadly, the market value of the skills and experience of employees – and those who wish to work – will change in ways that are difficult to predict.

The costs of inflexible regulation and high entry barriers are greater in this likely future. In general, firms have better information than others on the specific market conditions they face, and are in a better position to respond quickly. Delayed responses – because of industry protection or regulatory constraints – may lead to foregoing long-term benefits and exclusion from winner-take-all markets.

In a disruptive environment, employees risk their skills becoming less scarce, or even redundant. This reduces their bargaining power with employers. Employers face disruptions that affect their business models, business location, the skills required and the amount and type of physical capital they require. New competitors often come from other industries, in many cases with different cost structures.

In such an environment, there are rewards to flexibility at the individual, firm and national levels.

F6.12 The ICT revolution is creating continuous disruption. In a disruptive environment, there are rewards to flexibility at the individual, firm and national levels.

Governments that overreact or chop-and-change – or even just threaten to do so – may find their actions counter-productive in dynamic environments. Long-term policy stability remains desirable, but there are many challenges to its feasibility. When the future is difficult to predict, better results are likely from relying on market incentives and experimentation.

Policy should target young firms

Much productivity improvement comes from the reallocation of market share towards higher-productivity firms, from the exit of low-productivity firms and the entry of new firms with potential for growth (Chapter 5).

The costs of assets being stranded acts as a disincentive for ICT-based organisational change. Older firms are more likely to have a larger proportion of their assets specialised to their current business model and customers, and thus face higher adjustment costs than younger firms.

Research has found that young – rather than small – firms are engines of growth (Haltiwanger, Jarmin & Miranda, 2010). The young firms that survive grow much faster than older firms. Small old firms are unlikely candidates for growth.

Yet, policy programmes often target SMEs regardless of age (Altomonte et al., 2011) and favour old firms and old industries (Acemoglu at al., 2013).

Policies often discriminate against potential entrants, as they are under-represented (if represented at all) in the political process.

> These not yet existing firms are crucial in an environment with rapidly evolving ICT. As new market niches open up, entry is driven by enthusiastic entrepreneurs with appropriate business skills, a financial system with enough knowledge, insight and foresight to support the entrants, and a regulatory and tax system that does not favor incumbents. (Bartlesman, 2013)

A policy biased towards young firms would assist rather than hinder entrants.

A bias towards SMEs is apparent in the selection criteria for some government programmes. Government should use firm age, rather than size, in its selection criteria.

R6.3 Government should use firm age (targeting young firms), rather than size, when determining eligibility for programmes aimed at business growth.

Product market regulation

Regulation of markets – usually through restriction on what services can be provided and who can provide them – can have the effect, intended or not, of reducing competition. Reduced competition can slow the adoption of ICT. The OECD (2011) has looked at three types of product market regulation (PMR) for their effects on competition:

- state control of business enterprises;
- legal and administrative barriers to entrepreneurship; and
- barriers to international trade and investment.

In a study of OECD countries including New Zealand, more stringent (competition-reducing) product market regulation was associated with lower diffusion of ICT (Conway & Nicoletti, 2006).

Especially in continental European Union countries, tight regulation of services has slowed down growth in ICT-using industries. These industries use intermediate service inputs intensively and so are particularly likely to be influenced by upstream market regulation (Arnold, Nicoletti & Scarpetta, 2008).

Restrictive PMR in service industries affects productivity growth by hindering the allocation of resources towards the most dynamic and efficient firms (Arnold, Nicoletti & Scarpetta, 2008):

> … anti-competitive service regulations hamper productivity growth in ICT-using sectors, with a particularly pronounced effect on firms that are catching up to the technology frontier and that are close to international best practice. In other words, regulations hurt in particular those firms that have the potential to excel in domestic and international markets. (p.2)

Furthermore, restrictive (anti-competitive) upstream PMR (in energy, transport, communication, retail, banking and professional services) has an adverse effect on downstream industry productivity directly and through lower investments in ICT and R&D (Cette, Lopez & Mairesse, 2013).

Economic integration enables larger markets

Economic integration offers much:

> Increased economic integration expands the extent of markets, enabling countries to capture greater scale advantages and specialise in those things they do relatively efficiently. Resources ultimately shift to these activities and lower priced imports take the place of more costly domestically-produced goods and services. This is a dynamic process that encourages competition and innovation. Consumers benefit from lower prices and greater choice. The integration of labour markets – a prominent feature of the trans-Tasman relationship – opens up opportunities for people to develop and apply their skills and earn higher wages. (APC & NZPC, p. 22)

These effects are particular strong for smaller countries, such as New Zealand. In particular it offers firms the opportunity to operate at larger scale and serve larger markets, which increase the potential returns to ICT investment.

Reallocating capital

Much of the aggregate differences in productivity across countries and growth in productivity comes from creative destruction (Bartelsman, Haltiwanger & Scarpetta, 2012). The efficient movement of capital – from less productive to more productive firms – is an essential part of realising productivity growth. Competition – the availability of better returns elsewhere – drives the reallocation of capital.

Open, flexible capital markets

The availability of equity capital to start-up and emerging firms has been a long-standing issue. In 2002 the Government established the New Zealand Venture Investment Fund (NZVIF), to play a co-financing role, alongside private capital, as a way to catalyse increased availability of equity capital for young and potentially high-growth companies. The Capital Markets Development Taskforce in 2009 assessed the situation in terms of a "lack (of) scale and capability at the commercialisation stage (of new ventures)." It considered that "our angel market is working relatively well, and the model for developing our venture capital market is best practice" and that "the key challenge in private markets is to attract more risk capital and capability to help businesses grow. New Zealand SMEs have been over-reliant on bank financing and will need greater access to capital markets in coming years" (Capital Markets Development Taskforce, 2009, p. 12).

Subsequent assessments of the angel investor[34], venture capital and private equity segments of New Zealand's capital markets have been generally positive. For example, the New Zealand Private Equity and Venture Capital Association in 2012 assessed the outlook for the New Zealand private equity and venture capital market as increasingly optimistic over the medium term, and that the sector preference for investment had swung towards software and ICT companies (New Zealand Private Equity and Venture Capital Association, 2012a, pp.12–13).

NZVIF has noted that while over the last decade there has been a significant increase in the level of investor support for New Zealand private equity investment opportunities, the level remains low compared with that in other countries. Much of the increase has come from government (including the New Zealand Superannuation Fund and the Accident Compensation Corporation) and philanthropic institutional sources. Little has come from private superannuation and similar funds – including KiwiSaver funds, which have grown to $16.6 billion[35]. This has raised the question whether there are barriers to the latter funds investing in private equity. One possible barrier identified is a requirement for such funds to maintain reasonably liquid investment portfolios, so as to be able to accurately value, and transfer, members' interests to competing funds on request (in the case of KiwiSaver funds, within a statutory maximum of 35 days). NZVIF notes that these requirements limit the scope for investment in private equity given the illiquidity and valuation uncertainties associated with this form of investment, even though superannuation funds are vehicles for long-term investment, and in the case of KiwiSaver, with long-term lock-in (New Zealand Private Equity and Venture Capital Association, 2012b, p. 4).

The main rationale for the members of KiwiSaver and similar funds being able to transfer their interests from one fund to another appears to be as a means by which they can maintain investor discipline over the institutions that manage their savings – in a sense, to "keep them on a short leash". (The case for reducing search and switching costs for funds is explored in Chapter 3.)

If, however, such liquidity requirements are constraining investment choices, and holding back the supply of capital to emerging, potentially high-growth, firms, there is a question whether it is the most efficient (and effective) mechanism for achieving that discipline (and solving what essentially is a principal-agent problem).

[34] Angel investors are high net-worth individuals who provide seed capital for start-up businesses, usually in exchange for equity. They also bring business skills, connections and other forms of assistance (Angel HQ, 2014).

[35] As at 30 June 2013.

Q6.10 Is the requirement that a member's interest in a KiwiSaver Fund must, on request by the member that it be transferred to another fund, be so transferred within a maximum of 35 days, constraining KiwiSaver Fund managers in their investment choices and in particular from investing in private equity and venture capital? If so, how material is that constraint, in the short term and the longer term?

Bankruptcy law

Bankruptcy law provides an orderly mechanism for the realisation of the assets of an insolvent firm or individual, which are liquidated to pay creditors. Personal bankruptcy law also punishes or rehabilitates financially-distressed individuals.

The consequences of personal bankruptcy impacts entrepreneurial incentives:

- More severe legal penalties for bankruptcy make would-be entrepreneurs less willing to leave paid employment to pursue innovative business ideas; and
- Entrepreneurs have only one chance to fail if bankruptcy stops them from re-engaging in business, (Armour & Cumming, 2006).

Well- designed bankruptcy regimes, by improving exit mechanisms for business, can promote the release of resources from inefficient firms, and encourage high-risk business start-ups and innovation (Jia, 2008; Andrews & de Serres, 2012).

Q6.11 Do New Zealand's bankruptcy laws encourage or discourage high-risk business start-ups and innovation? What improvements could be made?

Public ownership

Publicly-owned enterprises tend to be slower to adopt new technologies (Rose & Joskow, 1990; Geroski, 2000). Possible reasons are that public ownership:

- makes it difficult to raise new equity capital;
- is poorly matched to entrepreneurial risk-taking; and
- does not provide the strong, and ongoing, scrutiny and pressure for improvement of public capital markets.

Partial private ownership can offset some of these reasons (NZPC, 2012a).

When considering ownership models for particular enterprises, governments should consider the effects of public ownership on technology adoption.

Land use regulation

Barriers to efficient reallocation include anything that could stop or delay the use of an asset for its new best purpose. For example, land-use restrictions could delay a firm moving to new, more suitable, premises. They could also keep a firm at its current premises should the restrictions devalue those premises by making conversion to alternative uses slow and expensive.

The barriers and costs are affected by government policy. The Resource Management Act 1991 and relevant local government plans affect the cost and timing of changes in land use. They also affect the prices of land and land-based assets. Those effects will – in particular cases – influence ICT adoption where complementary assets are involved (Chapter 7).

F6.13 Land-use policy, for example the Resource Management Act 1991 and relevant local government plans, can affect ICT adoption through their influence on the prices and efficient recycling of complementary assets.

Reducing adjustment costs and building human capital

Responding to the ICT revolution presents two particular challenges:

- How to raise the levels of relevant skills and experience?
- How to reduce adjustment costs for firms and employees?

These two challenges may be best dealt with together. There are direct links between skills, training and adjustment costs. Firstly, employees with higher skills levels and more experience are more likely to have easy transitions within and between employers. Secondly, firms with higher-skilled and multi-skilled employees are more likely to be able to fill gaps internally, lowering recruitment and redundancy costs.

ICT is changing labour markets

ICT is reducing the demand for labour for routine manual and routine cognitive tasks, while increasing the demand for labour for non-routine cognitive tasks (Autor, Levy & Murnane, 2003).

Broadband adoption[36], for example:

> …favors skilled labor over unskilled labor by increasing its relative productivity. The estimated increase in productivity of skilled labor is especially large for college graduates in high return fields such as science, technology, engineering and business. By comparison, broadband internet is a substitute for workers without high school diploma, lowering their marginal productivity. (Akerman, Gaarder & Mogstad, 2013, p. 39)

These two effects – labour-replacing and labour-complementing – are behind the observed "hollowing out" of the labour market in OECD countries (Michaels, Natraj & Van Reenen, 2010). Industries with faster growth of ICT had greater increases in relative demand for high educated workers and bigger falls in relative demand for middle educated workers.

It seems likely that this wave of technological disruption to the job market has only just started (The Economist, 2014). And for workers, the dislocations may arrive before the benefits.

Increasing skills and training

Workers whose skills have become redundant because of disruptive technological change can retrain. Yet there are some well-understood market failures in employee training.

Firms have good incentives to pay for employer-specific training for their employees. This, however, is of relatively less value to their employees.

Employers do not have efficient incentives to invest in general training for their employees, as the employee and/or future employers will likely capture the benefit (Acemoglu, 1997). In the worst case, employers face paying twice. First they pay for the training itself, and second for a higher wage to retain the worker – as they are now more valuable in the labour market. All else equal, firms will underfund worker training in open labour markets.

This problem can be addressed contractually, at least in theory. For example, a contract can specify that the employee will refund all or part of the cost of training should they resign within a fixed period. Such arrangements are common in other situations, such as employer contributions to an employee expenses when moving to a new location to commence a job.

[36] Broadband adoption has been a useful proxy for firm willingness to invest in new technologies, though its value as a proxy is declining as it becomes more widespread. Productivity benefits come from software applications that rely on broadband or benefit from the increased speed, rather than the broadband itself.

Governments generally fund a substantial proportion of training and education in general skills for workers. This includes initial education and training up to advanced tertiary qualifications and opportunities for retraining and lifelong learning. It also includes support for credentialing employment-based training and maintaining a training infrastructure for sub-degree level training.

New Zealand has had internationally very high rates of adult students participating in tertiary education over the last 20 years. More recently the proportion of older tertiary students has been falling as attention has focused on encouraging more young adult students to complete an initial period of tertiary education.

It is costly for older workers to take time out from work to retrain. First, if they are in work, the earnings they forego while retraining are higher than they would have been at a younger age. Second they have fewer years to recover the costs of their training through higher labour market earnings. Yet the social costs of not retraining in a rapidly and radically changing market for skills can be high (Bartlesmann, 2013).

Reducing adjustment costs for employees and firms

Employees can be the beneficiaries from flexible labour markets. They can make it easier to move to higher-paying jobs, or ones with conditions better matched to their situation and ambitions. Conversely employees with skills or jobs that have become redundant can experience painful financial and status loss and are deserving of societal support through a safety net and/or retraining.

High-productivity firms tend to pay higher wages, and the resulting wage differentials can lead to efficiency gains through worker mobility:

> Microeconomic data on individual firms and employer-employee matches reveal substantial and persistent dispersion in firm size, productivity, and average wage paid and a positive correlation between each pair. To the extent that intrinsic differences in firm productivity explain these facts, there are several important consequences. First, the reallocation of employment from less to more productive firms will yield efficiency gains. Second, workers will find it in their interest to seek out higher-paying employers. (Lentz & Mortenson, 2010, p.577)

The potential loss of employees is a source of pressure on low-productivity firms to improve their productivity in order to support higher wages.

In practice, employees can face problems arising from fragmented and small businesses that fail to select people well and provide efficient levels of training. Further, mutually-productive bargaining over wages and conditions requires intelligent and respectful behaviour from both parties.

The New Zealand Council of Trade Unions submitted:

> There is an absence of supportive mechanisms (income support and retraining) for worker transition from low productivity firms to high productivity firms. (NZCTU, sub.113, p.3)

The Scandinavian model appears to offer an effective combination of low employment protection, generous but temporary safety nets, and rigorous disciplines on displaced workers to accept retraining or alternative employment (OECD, 2013c; Chapter 5). Scandinavian countries are able to reallocate labour to more productive sectors more easily, most likely because hiring and firing costs are relatively cheaper.

F6.14 The Scandinavian labour market model appears to have much to offer New Zealand. Scandinavian countries are able to reallocate labour to more productive sectors more easily, most likely because hiring and firing costs are relatively cheaper. The model includes an effective combination of low employment protection, generous but temporary safety nets, and rigorous disciplines on displaced workers to accept retraining or alternative employment.

Countries will get a better outcome from facilitating and supporting adjustment than resisting it.

Labour market regulation

Labour market regulation is premised on correcting market failures in unregulated labour markets. These market failures include information and bargaining asymmetries, and encouraging employees and employers to make relationship-specific investments.

Labour market regulation that directly increases adjustment costs has been found to have a negative impact on technology adoption (Box 6.5), and specifically in the services sector.

Box 6.5 **Research on labour market regulation and adjustment costs**

A significant amount of overseas research has considered the effects of labour market regulation and adjustment costs.

The research found that labour market regulation that directly increases adjustment costs has a negative impact on technology adoption, and this impact is relatively stronger in sectors in which technology adoption is more important (Conti & Sulis, 2010). These effects have become stronger since the 1990s and in those countries closer to the technological frontier.

Bartlesman, Gautier and de Wind (2010) report that stricter employment protection legislation (EPL) reduces the share of the highly innovative parts of the economy, disproportionately increasing employment in lower-risk industries.

Poschke (2009) found that stricter EPL has stronger negative effects in the services sector.

EPL has also been found to influence specialisation patterns:

> …whereby countries with high EPL specialise in secure goods at the end of their product cycle while countries with low EPL specialise in more innovative goods (Andrews & de Serres, 2012, p. 27)

Country specialisation based on labour market flexibility is also reported by Cuñat and Melitz (2012) and Samaniego (2006).

The nature and stringency of employment protection legislation determines its effects.

F6.15 Employment protection legislation has been found to affect growth in many advanced countries. The nature and stringency of the employment protection can reduce growth, particularly in the more dynamic parts of the economy and in the services sector in particular.

The applicability of this finding to New Zealand is unclear. New Zealand labour market regulation is generally rated at the "flexible" end of the spectrum in international comparisons (OECD, 2013c). However, such ratings are composite indicators based on specific assumptions. The relevance of those assumptions may vary across economies, and particular forms of labour market regulation may have weaker or stronger impacts on specific economies.

The role of the education system

The education system is the basic institution for building human capital:

> …human capital is a major contributor to creation and adoption of frontier technologies. U.S. technological leadership in the world would not have been possible without the participation of a broad segment of the population in high-tech industries. U.S. workers were able to play this role because they had access to high-quality education by the standards of the time. (Acemoglu & Autor, 2012, p. 7)

Chapter 8 discusses the tertiary education system as a supplier of ICT skills, emphasising the need for the system to be more responsive to demand. Improved responsiveness will be valuable in the education

system more generally. In particular, demand is likely to be strong for lifelong learning and periodic retraining.

Valuing the entrepreneur

> There never has been a worse time to be competing with machines, but there never has been a better time to be a talented entrepreneur (Brynjolfsson & McAfee, 2011),

Entrepreneurs are the networkers who put the people, capital and technology together to conduct business experiments in new firms and within existing ones. Their role is multi-faceted, from identifying and championing opportunities to managing their realisation.

Entrepreneurs need a blend of skills, including business and IT. Better support for multidisciplinary training could increase the potential supply of entrepreneurs (Chapter 8). However, they are likely to remain a scare resource, and a potentially limiting one in an economic environment with high returns (at the societal level) from business experimentation.

Entrepreneurs are encouraged by the rewards associated with success, and likewise discouraged by the personal consequences of failure. Their expectations around those rewards and consequences shape decisions about launching into entrepreneurial activity, and acceptable levels of business risk. Government policy and actions can affect these expectations.

Every new venture carries substantial risk in a volatile business environment driven by fast-changing technology. There will be many failures for a smaller number of successes. Failures are just as likely to occur because of "bad luck" as because of incompetence on the part of the entrepreneur.

Furthermore, as many entrepreneurial skills are best learnt on the job, one or two business failures are not unusual before the creation of a successful venture.

Some social attitudes in New Zealand may not be conducive to entrepreneurship, though there is evidence that attitudes are changing. By contrast, the success of sportspeople and entertainers is celebrated and their failure accepted. The costs of failure are real for entrepreneurs (Singh, Corner & Pavlovich, 2007). They do not need negative social attitudes to reinforce them.

Such issues are complex and mostly not amenable to government policy. However, there is an opportunity for social commentators and others with influence to lead in celebrating those who succeed in taking business risks and those who simply try.

F6.16 Entrepreneurs perform a key role in modern economies. They are the networkers who assemble the people, capital and technology to conduct business experiments in new firms and within existing ones. Their role is multi-faceted, from identifying and championing opportunities to managing their realisation.

New Zealand's response to the ICT revolution

The analysis and evidence reported in this chapter suggests that firms in New Zealand's services sector are responding to the ICT revolution as might be expected, given the underlying economics, and the overall framework of government policies in which they operate.

Yet New Zealanders can influence that framework. To restate an important finding from Chapter 5:

F5.4 Countries face choices of policies and institutions that influence the way they respond to, and take advantage of, the ICT revolution. Such choices are best made deliberately since making them by default risks an uncoordinated set of policies and institutions that work against each other and dissipate potential gains.

This chapter's review of New Zealand's overall framework points to policy areas that deserve attention if the services sector is to reach its potential through embracing the ICT revolution. Because ICT is a general-

purpose technology, the changes it is bringing in the services sector are extensive and far-reaching. They involve major changes in business, employment, and skills; and extensive reallocation of resources from old businesses to new businesses. Framework policies and institutions need to support and encourage flexibility, adaptability and experimentation. The choices will often be hard and uncomfortable, and will call for consideration of social and community issues as well as economic issues. Yet, with good design, New Zealanders have the opportunity to reap major gains from the ICT revolution.

The ICT revolution is a major global issue. The challenge for all countries is to find ways to lower the costs of the difficult transitions that firms, employees and communities face, and grasp the valuable opportunities that are there. The policies most likely to succeed in achieving this worthy aim will embrace change rather than resist it, and effectively support people through transitions.

7 Application of ICT in retail and wholesale

Key points

- The use of ICT in the retail and wholesale industries has contributed significantly to productivity growth in the United States and Australia, but less so in Europe where regulation has limited the productivity benefits from innovative use of ICT.
- ICT has enabled retail chains to expand efficiently. It has also enabled economies of scale through scanning technology, radio frequency identification and enhanced data management. These facilitate real-time tracking of inventories and supply, international integration of supply chains, and pricing and advertising that are more responsive to customer demand.
- In North America, average store and firm size have grown as big national and regional chains have replaced single-store firms.
- Realising the full productivity benefits of ICT requires large complementary investments, for example in new distribution centres and stores and direct purchasing arrangements with domestic and international suppliers.
- Industry reorganisation has entailed significant reassignment of employment across firms and changing roles within firms.
- Labour productivity levels in retail and wholesale in New Zealand are considerably lower than in Australia, with little sign of catch-up. The Australian industries, particularly wholesale, are much more capital intensive (especially for buildings) than their New Zealand counterparts.
- New Zealand is also proving less attractive than Australia for international retail chains seeking to expand.
- ICT is contributing to productivity growth in New Zealand retail and wholesale, but at a lower rate than in the United States. New Zealand is belatedly adopting many of the new technologies and business models.
- Wholesale and retail inventories have generally been falling as a proportion of industry output since the mid-1980s, but retail inventories have levelled off since 2000.
- Retail chains have grown in many parts of the industry since the late 1990s, taking advantage of the economies of scale afforded by ICT. Since 2000, average firm and store size has increased in parts of wholesale in New Zealand.
- Online shopping has grown quickly over the last decade and its prevalence is similar on both sides of the Tasman. Large and small retailers are using ICT to streamline their business processes. As ICT prices fall and capability increases, these trends are likely to continue.
- The New Zealand retail and wholesale market is small, with limited competition and roading less developed than in Australia, Europe and the United States. These factors, combined with New Zealand's geography, limit the gains that can be achieved from centralising distribution centres, integrating supply chains and making more use of transactions data for business decisions.

The Commission has selected the retail and wholesale trade industries as a case study of how ICT raises productivity in services and how the barriers noted in Chapter 6 may play out in practice. Retail and wholesale account for 10% of New Zealand's GDP.

During the 1990s ICT helped to boost labour productivity growth in retail and wholesale in North America and Australia. The New Zealand retail and wholesale industries have used ICT with increasing intensity over

the last 25 years (Statistics New Zealand, 2013). Despite this increase, labour productivity in retail and wholesale remains much lower in New Zealand than Australia with little sign of catch-up over the last 15 years.

This chapter looks at how ICT has contributed to productivity growth in retail and wholesale internationally and evidence for its effects and barriers to its use in New Zealand. The coverage is selective and focuses mostly on retail, which has experienced particularly dramatic changes as a result of ICT use. Indeed, many big retail chains have integrated wholesale into their operations.

7.1 ICT has boosted productivity growth in retail and wholesale in the United States and Canada

ICT facilitates economies of scale and scope

Retail and wholesale have been at the centre of an international revolution enabled by ICT. From 1995 to 2005 US labour productivity grew strongly, averaging 2.8% each year (Jorgensen, Ho & Stiroh, 2008). Retail, with a 9% share of GDP, accounted for 11% of the labour productivity growth over this period, with annual labour growth rates of between 4.2% and 6.0% from 1995 to 1999 (Doms, Jarmin & Klimek, 2006). Managerial and technical innovation enabled by ICT and competitive pressure from Walmart (Box 7.1) partly explain productivity growth in the general merchandise part of the industry (McKinsey, 2002).

ICT has facilitated large economies of scale across supply chains from producers to retailers, and within stores. Retail is a transaction- and information-intensive industry. In the United States, daily retail transactions number in the hundreds of millions across supply chains from manufacturers to consumers. This volume of transactions provides a fertile ground for streamlining processes and targeting effort. ICT boosts retail productivity through:

- better merchandise planning and management (using sales and other data to forecast demand, order stock, set prices, track purchasing behaviour and target promotions);
- better coordination of production and inventories with sales (often involving the vertical integration of wholesaling and retail);
- improved logistics, including optimising routing, cross-docking distribution centres[37] and use of barcodes and radio frequency identification (RFID) to track and redistribute shipments; and
- automation of store operations through scanning technology and management software.

Scale economies are important. Doms, Jarmin and Klimek (2006) find that only large US retail firms (with more than 100 employees) experienced productivity benefits from intensive use of ICT. For these firms, a 10% higher share of capital expenditure on ICT was associated with almost 2% higher labour productivity in 1992 and higher labour productivity growth during the 1990s.

Basker (2012) identifies another productivity benefit of the efficient identification, tracking, sorting and delivery of products enabled by ICT. The range of items typically stocked in US supermarkets increased enormously, from about 6,000 items in each store in about 1960 to 45,000 items in 1996. The same technology enables "big-box" formats such as Walmart to offer a wider variety of products in one store.[38] Customers have more choice at "one-stop" destinations and stores can operate at greater scale and lower cost.

[37] Cross-docking refers to offloading and breaking down incoming consignments at a distribution centre and re-assembling outgoing consignments and shipping them to their next destination without storing them.
[38] A big-box format is a retail store with a very large amount of space and a wide variety of products. Economies of scale enable the store to operate at high volumes, low margins and thus low prices. The term "big-box" is derived from the typical store's physical appearance.

F7.1 Market and store scale is a strong driver of productivity in retail and wholesale. ICT has played a major role in productivity growth in US retail, particularly by facilitating increased scale of chains and stores.

Successfully implementing ICT-enabled retail strategies requires not only substantial ICT investments, but also thoroughly reorganising business operations and investing in new buildings and machinery. For example, new stores help capture the benefits of the increased scale that ICT facilitates. New cross-docking distribution centres use ICT to identify and sort incoming shipments and reallocate them to outgoing shipments. Decisions about purchasing, pricing, presentation and promotions once made by the individual store can now be made by chain managers helped by merchandise management systems (Australian Productivity Commission (APC), 2000; Stanback, 1990).

Foster, Haltiwanger & Krizan (2006) note (unsurprisingly) that labour productivity rises with capital intensity in US retail firms. They also note that the share of computer investment in capital investment is highest in the top 20% of firms by labour productivity. But the larger the chain, the more important are complementary investments in new stores and distribution centres to leverage the full benefits from ICT. As a result, the share of computer investment in capital investment falls as chain size grows (Foster, Haltiwanger & Krizan, 2006).

F7.2 Substantial complementary investments (for example in stores and distribution centres, business reorganisation and direct international purchasing arrangements) are needed to realise the productivity potential of ICT in retail.

Business models based on ICT shake up the North American market

Between 1986 and 1997, 95% of labour productivity growth in US retail was attributable to the entry and exit of stores (including new stores of existing firms) (Foster, Haltiwanger & Krizan, 2006). The average size of stores grew, and the number of single-branch stores fell. This was associated with national chain stores being much more productive than single-branch stores. Entering stores of a national chain had higher labour productivity than existing stores, and grew faster in productivity after entry than surviving existing stores. Unsuccessful entrants (those that made an early exit) had especially low productivity.[39]

Between 1984 and 1998, 70% of the productivity growth in the Canadian retail sector was attributable to output and input shifting from exiting firms to entering firms that were more productive. Foreign-controlled firms (such as Walmart) accounted for 30% of labour productivity growth over this period, but only 20% of sales. Successful new-entrant firms (the more productive) grew and improved their performance over time as they learnt about best business practices (Baldwin & Gu, 2009). In contrast, the 2000s were a period of consolidation when most productivity growth was attributable to more productive existing firms growing at the expense of less productive incumbents (Baldwin & Lafrance, 2013).

Box 7.1 **The United States retail productivity story is a Walmart story**

"Back of envelope" calculations show that between 1982 and 2002 half of US labour productivity growth in the general merchandise retail sub-industry was attributable directly to Walmart (Basker, 2007). In the 2000s Walmart's prices were about 10% lower than competitors. Entry of a Walmart store led to a fall in competitors' prices in the same location of between 1% and 2%.

Starting with a single store in Arkansas in 1962, Walmart grew to 4,000 US stores with 1.3 million employees by 2007. It accounted for 6.5% of US retail sales in 2004, and 15% of US imports of

[39] In their investigation of the productivity effects of IT in the United States retail industry during this period, McKinsey (2002, p.19) found "For the most part …IT applications that favourably impact productivity also favourably impact profitability". They noted a large gap between industry best practice and average performance in the effectiveness with which the US retail industry has used IT in supply chain management, merchandise planning and revenue management (pricing).

consumer goods from China in 2007. Its expansion strategy has centred on locating new stores close to existing distribution centres – optimising the trade-off between reducing distribution costs and cannibalising the sales of existing stores.

Technology and scale are at the core of the Walmart advantage. As early as the late 1970s all its stores and distribution centres were connected by a computer network. Walmart installed barcode readers throughout its operations by the late 1980s and inventory management software in 1990. In the 2000s it mandated the use of RFID by its suppliers. General merchandise is characterised by low margins on each item, so improving efficiencies across the supply chain can increase profits substantially (McKinsey, 2000).

"Walmart's better technology has allowed it to grow, and this growth has lowered its operating costs." A 10% increase in total sales volume decreases marginal cost by 2%. Poorer consumers have benefited disproportionately from Walmart's rise (Basker, 2007, p. 180).

Scale means that Walmart can import at lower cost than other retailers, while the ability to offer lower prices as a result of cheaper imports increases demand. This, in turn, increases optimal chain size. Barcodes and RFID increase the range of products offered in stores and so increase optimal store size (Basker, 2007).

ICT favours the growth of large retail chains at the expense of small firms

Variations on the business model developed by Walmart (Box 7.1) were quickly adopted by other North American retailers (such as Costco and Target in general merchandise and CVS and Walgreens in pharmacy). The United States and Canada saw the average firm size increase. National chains grew at the expense of single establishment firms (McGuckin, Spiegelman & Van Ark, 2005). The number of single-store retailers in the United States fell by 55% between 1963 (one year after the first Walmart store opened) and 2002. Over the same period, the number of chain stores nearly doubled, and the number belonging to chains with more than a 100 stores more than tripled (Basker, 2007). Average store size also increased (McGuckin, Spiegelman & Van Ark, 2005).[40]

F7.3 The adoption of ICT has allowed new business models in North American retail and wholesale. More productive firms entering the market are replacing less productive firms exiting the market. Innovative chains have grown at the expense of single-store firms. As a result, reallocation of employment across firms has been substantial. Also, the average size of firms has increased.

The growth of online shopping

Online retailing (through online services and traditional retailers with online services) is expanding rapidly. E-commerce sales grew by 15% in the United States in 2012 – seven times faster than traditional retail (Anders, 2013).[41] Online shopping in some retail categories in the United States now exceeds 20% of the market and traditional retailers are under intense pressure (Jordan, 2014).

Amazon, the world's largest online retailer, has continually expanded the scale and scope of its operations since it began in 1994, using new technologies at almost every step. Its worldwide sales are now about US$75 billion per year. Starting as an online bookstore, Amazon has diversified into a wide range of products and services. These include electronic hardware, e-books, printing titles on demand, cloud computing and providing an online platform for other retailers. Amazon is currently investing US$14 billion to expand its network of US distribution centres to reduce shipping times and so increase sales. It has also

[40] In this chapter "firm" refers to a business that has one or more geographic units or outlets. "Store" refers to a single geographic outlet.

[41] Only a few countries, including the United States and the United Kingdom, collect official data on online sales. The online share of all retail sales appears to have been much higher and growing more quickly in the United Kingdom than in the United States in 2011 (APC, 2011, p. 92).

offered distribution services to other retailers since 2006. It invests heavily in technology "to create the most advanced warehouses, the smoothest customer-service channels, and other features that help it grab an ever larger share of the market" (Anders, 2013). Amazon has worked on the philosophy that while competitors can copy its business model, it keeps ahead of them through excellent delivery performance and efficient logistics (Girotra & Netessine, 2013).

Online shopping reduces customer search costs and often, as in the case of Amazon, provides a reliable and easily accessible source of consumer review. Together with greater product variety offered online, this increases the collective share of niche products in sales, more accurately reflecting consumer preferences (Brynjolfsson, Hu & Simester, 2011). Online shopping eliminates costs associated with maintaining a traditional "bricks and mortar" presence and, through ICT-assisted scale economies, enables more efficient distribution from supplier to the customer's door. Some traditional national US chains such as Sears and Macys have been reducing the size of their stores and increasing sales online to better compete with purely online retailers (Frost & Sullivan, 2012). Online grocery shopping is also growing and now accounts for over 3% of the market in the United Kingdom (*The Economist*, 2013).

The international scope of retail chains grows

While most retailers continue to operate only in their home markets, some larger European and US chains (including Carrefour (France), Tesco (UK), Aldi (Germany), Zara (Spain), IKEA (Sweden) and Walmart and Costco (US)) have expanded internationally. Of the top 250 international retailers, 93 have headquarters in the United States and 87 are based in Japan, the United Kingdom, France and Germany. Also 58% of these top 250 retailers sell food (Nordås, Grosso & Pinali, 2008).

The trend for retailers to "go international" reflects less a search for economies of scale (for example in international purchasing) than the opportunity to take advantage of proprietary knowledge about business organisation and technology. Not all business models transfer successfully to new locations. For example, Walmart quickly withdrew from the German market. Its failure there was apparently due to cultural conflicts, labour market institutions that did not fit Walmart practices, German preferences for smaller stores and mistakes in transplanting United States product preferences into the German context (DW, 2006; Macaray, 2011). The large retail chains aim to internationalise by quickly becoming one of the three largest retailers in the markets they enter, and withdrawing promptly if they fail to achieve this rank (Nordås, Grosso & Pinali, 2008).

7.2 Retail productivity in Europe and the United Kingdom lags behind the United States

Labour productivity levels in the retail industry in Europe (except France) and the United Kingdom are generally well below those in the United States. Retail and wholesale trade accounted for 50% of the US lead over Europe in productivity growth in the period 1995 to 2000 (McGuckin, Spiegelman & Van Ark, 2005). Europe was slower to adopt the new technologies and their benefits were limited by market conditions, the regulatory environment and European management practices.

Smaller markets and regulation make new retail models less profitable in Europe

Wholesale and retail markets in Europe are smaller than in the United States as a result of language, cultural and regulatory differences and national borders. No European retail chain could achieve the scale economies of a Walmart. Transport was deregulated later in Europe than the United States, delaying improvements in logistics and making early adoption of the new technologies less profitable. More restrictive labour market regulation in Europe also made it relatively difficult for European firms to move to new business models (whether through the rise of new firms and the exit of incumbents or through changes within firms) (McGuckin, Spiegelman & Van Ark, 2005).

Land-use regulation in the United Kingdom and some European countries such as Denmark made it hard to establish new stores at an efficient scale and in the right locations so as to fully reap the benefits of the new

technologies. Instead, UK supermarket chains have been expanding into small convenience store formats in high street locations (Griffith & Harmgart, 2005).

The United States does IT better

The personnel management practices of US firms are better suited to innovative business models. European and UK firms acquired by US multi-nationals make more successful use of IT than similar firms acquired by other multi-nationals (Bloom, Sadun & Van Reenen, 2012). US firms pay closer attention to hiring decisions, incentivising high performance and managing poor performance than other firms. As a result, managers give employees more flexibility to adapt to fast-changing technological and organisational environments (Chapter 6).

F7.4 European firms were slower than firms in the United States to adopt new ICT. Reasons include smaller markets and the more restrictive employment regulation in Europe.

F7.5 Restrictive land-use regulation in the United Kingdom and elsewhere in Europe has limited the economies of scale gained from using ICT.

7.3 ICT lifts productivity in Australian retailing and wholesaling

Most innovations in Australian retail and wholesale trade originated from overseas (APC, 2011). This includes the rise of self-service grocery shopping in the latter half of the last century, checkouts using barcodes and, more recently, self-checkouts. It also includes the rise of franchises, such as 7-Eleven convenience stores, Dymocks and Harvey Norman. During the 1980s capital intensity in retail grew mostly as a result of the growth in market share of large firms at the expense of smaller firms (APC, 2011).

Continuing this trend, big-box retailing emerged in the 1990s, typically occupying large floor space in single-storey buildings with large areas for parking. The business strategy relies on high volumes and low margins and on using ICT to achieve efficiencies in purchasing, supply, store operations and marketing. Australian retailers introduced their own versions based on international experience. For instance, Wesfarmers launched Bunnings in 1994, modelled on the American Home Depot. Investment in ICT rose strongly during this period and into the 2000s (APC, 2011).

During the 1990s other parts of Australian retail consolidated. The number of service stations fell dramatically. Service stations installed self-service pumps together with single-operator consoles and added a convenience store. Motor vehicle servicing shifted to dealers with electronic diagnostic systems that could match the increasingly sophisticated computer systems in vehicles. Specialty chains developed in clothing, targeting particular groups of customers and operating with minimal staff (APC, 2000).

Over the 20 years to 2000, and particularly in the 1990s, ICT use and business reorganisation transformed Australian wholesaling. Barcodes and RFID combined with warehouse management systems (WMS) and enterprise resource planning (ERP) greatly reduced the labour needed in the industry, and the need to hold inventories.[42] Many retailers took control of the wholesale function directly, with integrated supply chains from manufacturers to retail stores and sometimes (for example in whiteware and high-end computer hardware) to customers' homes. Cross-docking rose during the 1990s as centralised distribution centres replaced high-rise warehouses built in the 1970s and 1980s to store goods. Some retail stores in Sydney and Adelaide now receive supplies directly from distribution centres in Melbourne. Computerised systems allowed trucks to be routed more efficiently, making petroleum wholesaling, in particular, more efficient. It is now common for wholesalers to outsource transport to carriers who can exploit economies of scale. Lead times from manufacturer to delivery have substantially reduced (APC, 2000).

[42] ERP is business management software that integrates and uses data from a range of business processes to support decision making. For example, in retail it could include merchandise orders, people and financial management systems, and sales and inventory management. WMS is a subset of ERP.

A number of large international retailers entered the Australian market in the 2000s as prospects for further growth in their home markets declined and the Australian economy boomed. Entrants included Aldi from Germany, Costco and Gap from the United States, Zara from Spain, Uniqlo from Japan and IKEA from Sweden. Australian retailers Wesfarmers and Woolworths have operations in New Zealand. In 2010 Woolworths ranked 20th and Wesfarmers ranked 23rd in global sales revenue.

Online retailing has also added to the competitive pressures that traditional Australian retailers face. While they have responded by developing their own online sales capability, one submitter to the APC retail inquiry in 2011 argued that they were five years behind developments in the United States (APC, 2011, p. 24). The online share of some traditional retailers' sales remained very low in 2011 – often less than 1.5%, and even as low as 0.1% for Harvey Norman. This was much lower than their counterparts in the United States and the United Kingdom. The APC estimated that the online share of retail sales in Australia in 2011 was about 4%, with a third of these sourced from overseas (APC, 2011).[43] Frost & Sullivan (2013b) estimate that online sales are growing at a rate of about 13% each year in Australia.

7.4 ICT in New Zealand retailing and wholesaling

New Zealand has seen many of the same ICT-enabled developments in retail and wholesale as Australia. IT investment in retail and wholesale grew strongly between 1996 and 2011 at a rate close to the service industry average (Figure 7.1). IT capital deepening made a stronger contribution to labour productivity growth than other forms of capital. Yet multi-factor productivity (MFP) growth has made a particularly important contribution, particularly in wholesale (Figure 7.2). This is likely to reflect the effects of industry reorganisation and improvement of logistics as a result of the use of ICT.

Figure 7.1 Average input growth, 1996-2011

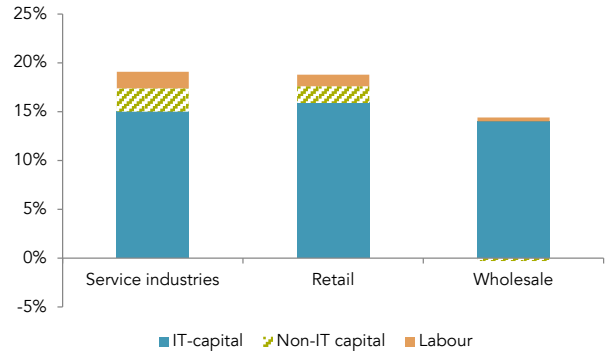
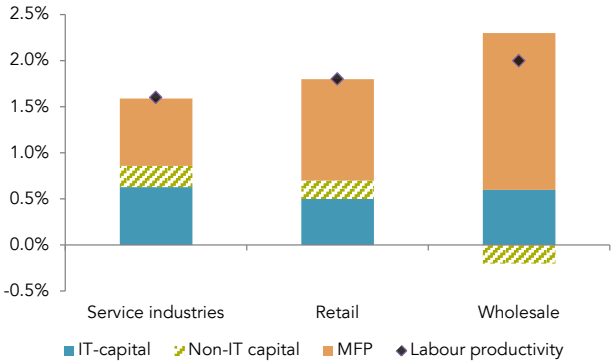


Figure 7.2 Contribution to labour productivity growth, 1996-2011



Source: Statistics New Zealand (2013).

The Warehouse Group illustrates these developments. It occupies a Walmart-like niche in New Zealand retail, allowing for a vast difference in the scale of the two firms. It entered the New Zealand market in 1982 with one store on Auckland's North Shore and has now expanded to about 90 Warehouse stores and almost 50 Warehouse Stationery stores. In 2012 it acquired the Noel Leeming chain of more than 70 electronic goods and whiteware stores, including those operating under the name Bond & Bond. The Warehouse established the big-box format in New Zealand by first locating stores in the suburbs, and competing with low prices, direct purchasing from overseas and efficient ICT-enabled distribution. In 2003 The Warehouse launched its brand in Australia with 126 stores, but the venture was unsuccessful and it sold its operation in 2005. It began its online shopping operation in 2009. Noel Leeming was already operating online before The Warehouse bought it.

The two supermarket chains, Progressive (Countdown) and Foodstuffs (PAK'nSAVE, New World and Four Square) have continued to occupy a dominant role in food retailing. Foodstuffs North Island recently

[43] According to APC estimates, the online share of retail sales in Australia was a little lower than in the United States and substantially lower than in the United Kingdom (APC, 2011).

announced a multi-million dollar contract with Fujitsu to replace its retail software and hardware infrastructure. This will enable the chain to receive information on operations in real time. Progressive is owned by Woolworths in Australia and its current general manager of logistics in New Zealand has previously worked in Australia and with Tesco in the United Kingdom. This illustrates how international labour markets can facilitate the transfer of knowledge about global developments in the use of ICT.

Over the past 20 years, big mall formats, such as Sylvia Park in the Auckland suburb of Mount Wellington, have gained ground at the expense of traditional "high street" locations (New Zealand Retailers Association (NZRA), 2013b).

Many smaller retailers are now using ICT in their businesses to streamline their operations, improve how they respond to customers and to reduce costs. A market of 40 to 50 competing firms that develop and supply off-the-shelf and customised retail software packages has emerged. Yet Richard Brett of Fieldpine, a retail software development company told the Commission that the ICT sophistication of smaller retailers varies considerably. Firms that do not use ICT survive, but generally do not grow. Franchisees of foreign firms are the most sophisticated in this segment. Diverse approaches to the use of technology co-exist in the small-business segment of the New Zealand retail market.[44]

Unlike Australia, New Zealand has not proved attractive to big international retail chains such as Costco, Aldi and Zara. There was a failed attempt to bring IKEA to Auckland in the mid-2000s (Box 7.5). Yet some Australian retail chains have extended their operations into New Zealand, including Woolworths (Progressive), and Bunnings, Harvey Norman and Dick Smith (all Wesfarmers). Collectively, Australian firms or their subsidiaries occupy a substantial part of the New Zealand retail market. These firms have introduced their own ICT-enabled business models and practices (based on international models) into New Zealand. Some New Zealand retail firms such as Pumpkin Patch, Kathmandu and Michael Hill Jewellers have successfully established operations overseas.

Online shopping is growing rapidly in New Zealand

Online shopping has grown rapidly over the last decade, but measuring that growth has lagged. BNZ (2013) has created an index using credit card data to estimate the yearly value of online purchases. In 2013 online purchases were $2.7 billion or 6% of all retail sales (9.5% if groceries and liquor are removed). About $1 billion or roughly 40% of all online purchases are bought overseas. Frost & Sullivan (2013c) surveyed 1,200 consumers in Australia and New Zealand using a broader definition of retail that includes travel and entertainment. They estimated the value of online sales at $3.7 billion or 7% of all retail sales in New Zealand. The question of payment of GST on online purchases from overseas has been raised by local retailers (Box 7.2).

Frost & Sullivan (2013b; 2013c) find that the Australian and New Zealand online markets are similar in maturity, but that New Zealanders (54%) are much less likely than Australians (79%) to buy from overseas. In their 2012 survey, they found that 35% of New Zealanders' online purchases were from overseas, compared with 45% for Australians (Frost & Sullivan, 2012). This may reflect the success of locally-based TradeMe in New Zealand.

The rapid rise in online shopping in New Zealand mirrors the experience in Australia, the United States and the United Kingdom. The volume of online sales covered in the BNZ index doubled in the four years to September 2013, while retail sales rose by about 10%.[45] Online purchases from overseas grew faster than domestic purchases, reflecting the appreciation of the New Zealand dollar against the US dollar.

[44] Diverse production technologies co-existing in the same retail markets have been documented for Chile (de Vries & Koetter, 2011).
[45] The BNZ Online Retail Index currently focuses on retail goods that can be benchmarked against Statistics New Zealand's Retail Trade Survey and "includes purchases of groceries, liquor, clothing, footwear, hardware, electronic goods, homewares and recreational goods, among other store types" (BNZ, 2013).

Box 7.2 **Retailers have an issue with unequal GST treatment of overseas online purchases**

New Zealand retailers have raised the issue of goods purchased online from overseas not attracting GST. Customs generally do not collect GST on imported goods consignments with a value of less than $400. With the rise of direct-to-the-consumer online sales, the volume of consignments imported with a value of less than $400 has risen sharply. New Zealand retailers charge 15% GST on all domestic transactions. Unequal treatment of GST adds to increased competitive pressure from overseas online retailers (Box 7.3). As a result, New Zealand online retailers, as well as traditional retailers, cannot match international prices, other things (such as scale economies, freight costs and margins) being equal.

New Zealand consumers benefit from the increased choice and competition that overseas online retailers provide. Yet differential tax treatment distorts consumer choices in favour of overseas online retailers.

In May 2013 the Government announced that it would issue a discussion document to canvass views on GST and online shopping. Late last year it decided to delay release of the document, pending a study of wider cross-border tax issues and how other countries tax online sales.

Most large New Zealand retailers offer online shopping, but consolidated information on its relative importance in their business models is lacking. Online shopping so far has favoured compact non-perishable items such as books, apparel and some electronic goods. As a result, traditional retailers face particular pressure in these areas. Retailers of larger or more perishable goods are now supplementing their in-store offerings with online sales. Consumers are increasingly expecting a multi-channel service delivery where online and in-store functions are seamlessly interwoven, they can access products online from in-home, in-store and mobile devices, and can use, for example, social media and group buying sites to buy products (NZRA, 2011; Frost & Sullivan, 2012).

TradeMe is a purely online business success story that maps on a New Zealand scale the growth strategy of Amazon (section 7.1). Starting in 1999 as a site for buying and selling second-hand goods, it has expanded relentlessly since then. Its websites now cover travel, property sales and rentals, jobs, dating, motor vehicles, and health and life insurance. About 40% of goods sold on TradeMe are new. In 2012 it acquired the Tradevine platform and is launching a campaign to increase the sales of new goods through it. About 40% of visits to TradeMe's website are from mobile devices and it has developed applications for Android, iPad and iPhone.

Box 7.3 **Competition from online shopping leads to JK Kids exiting the market**

Online shopping has put intense competitive pressure on traditional "bricks and mortar" retailers in areas such as children's apparel and books. Ben Sproat, the owner of the 22-store national children's clothing chain JK Kids cited these pressures as the "new normal" when he recently announced the chain's closure (Booker, 2013).

Online apparel retailers are offering broader choice and lower prices, with consumers becoming increasingly comfortable with the ever-developing online infrastructure and delivery systems. While JK Kids made 12% to 13% of its sales online, this percentage was not enough for the chain to stay profitable in the face of online competition. New Zealand's purely online retailers were buying end-of-line products overseas and selling them at extremely low prices. Direct online consumer purchases from overseas often did not attract GST.

Analysts expect other New Zealand traditional clothing chains to feel the same pressures (Morrison, 2013).

Source: Booker (2013); Adams (2013); Morrison (2013).

Competitive pressure from online retailing (Box 7.3) may partly explain falling New Zealand retail profit margins. NZRA calculate the net profit before tax as a percentage of total income for the retail industry (NZRA, 2013b). Profits have fallen from 6.3% of total income in 2003 to between 2.0% and 3.0% from 2009 to 2011. The global financial crisis and economic slowdown will also have had an effect on profits.

F7.6 Competitive pressures on traditional retailers from online sales continue to grow. This is forcing many retailers to adapt their business models to incorporate online sales and others to drop out of the market.

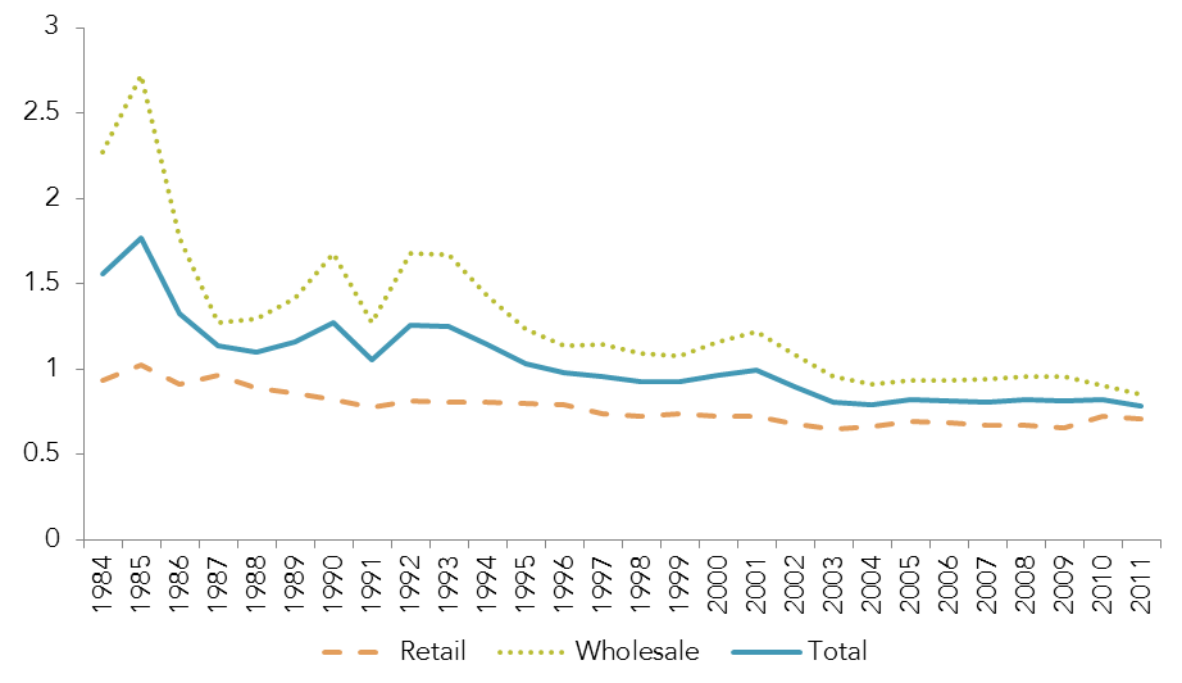
Consolidation in New Zealand retail and wholesale

Over the last 15 years or more, the New Zealand retail and wholesale industries, like their counterparts in other countries, have consolidated.[46] ICT has enabled more efficient management of inventories. As a result, inventories have been falling as a proportion of industry value-added since the mid-1980s (Box 7.4).

Box 7.4 **Industry reorganisation reduces the need to hold inventories**

The efficiencies achieved in wholesale-retail supply chains have greatly reduced the need to hold inventories to support sales. There has been a notable decline in the ratio of inventories to industry value-added in retail and wholesale in Australia and New Zealand (APC, 2000 for Australia; Figure 7.3 for New Zealand).

Figure 7.3 Ratio of inventories to value-added – retail and wholesale trade



Source: Calculations by Productivity Commission; Statistics New Zealand national accounts and retail trade and wholesale trade surveys.

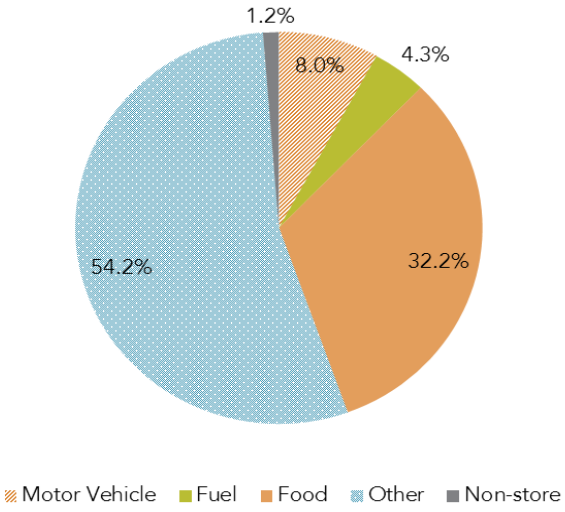
[46] Because of limitations in the available data from the Statistics New Zealand website, this section presents trends only from 2000 using the ANZSIC06 industry classification. Earlier data exists based on the ANZSIC96 classification dating from 1997 which show that firm size was increasing and retail chains growing in some retail sub-industries over the period 1997 to 2003. To simplify the discussion, these trends are not shown in this section.

F7.7 Wholesale inventories have been falling as a proportion of value-added since the mid-1980s. This reflects increased efficiency in supply-chain logistics. Since the mid-1980s retail inventories have also slowly declined as a proportion of value-added.

Consolidation of retail and wholesale in other countries has led to stores and firms becoming larger on average and single-store firms declining (section7.1). If investment in ICT in retail and wholesale is productive, it should be having similar effects in New Zealand. The effect will likely vary by the market served and the products sold in different parts of the retail and wholesale industries. In some segments, such as supermarkets, ICT has enabled integration of retail and wholesale. Food wholesaling has become concentrated in larger firms and stores as a consequence (Figure 7.8 and Figure 7.9).

Figure 7.4 shows the employment shares of the retail sub-industries in 2012. This helps assess the relative economic importance of the trends shown in the following figures. Statistics are available for five categories of retail. Other store-based retailing (54% of employment) includes furniture, electric and electronic goods, hardware, recreational goods, apparel, department stores and pharmacies.

Figure 7.4 Retail sub-industries employment shares, 2012



Source: Statistics New Zealand NZ.Stats tables.

Average firm size and average numbers of stores in retail chains in parts of the industry have increased since 2000. Chains are relatively important in "other" retailing. While food retailing is dominated by two large chains (Table 7.1) it also has many single-store firms (Figure 7.6). More than 60% of employees in food retailing work in firms with more than 100 employees and this changed little over the 12 years to 2012.

Employment in "other" retail has shifted towards larger firms in the 12 years to 2012, and average numbers of stores per retail firm has increased (Figure 7.5 & Figure 7.6). This may be because single store firms have dropped out of the market or because retail chains have grown in size, or both. Yet other data shows that the number of clothing outlets (which belong to the "other" retailing category) grew strongly over the last decade, perhaps meeting the needs of niche markets (NZRA, 2011, 2013a).

Fuel retailing, a small part of retailing by employment, has also consolidated. The number of outlets and employees in fuel retailing has fallen over the period (NZRA, 2013b; Statistics New Zealand).

Figure 7.5 Retail sub-industries share of employment in firms with more than 100 employees

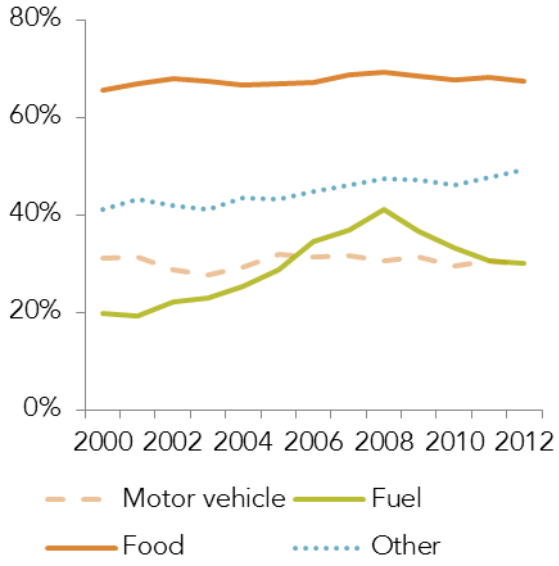
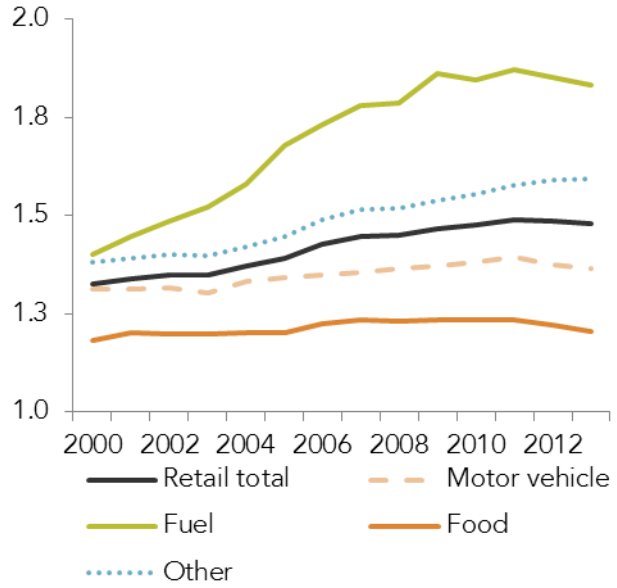


Figure 7.6 Retail stores per firm



Source: Statistics New Zealand NZ.Stats tables.

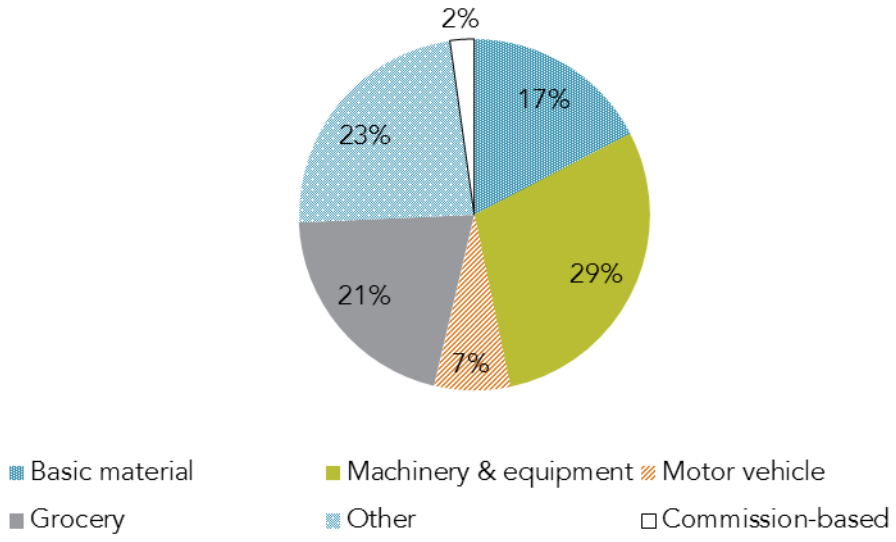
Notes:

1. Firms with no employees are excluded.
2. Stores include all establishments at separate locations including head offices.

F7.8 Parts of the retail industry have consolidated since 2000, with employment shifting to larger firms and the average number of stores per firm growing.

Figure 7.7 shows the employment shares of the wholesale sub-industries in 2012.

Figure 7.7 Wholesale sub-industries employment shares, 2012



Source: Statistics New Zealand NZ.Stats tables.

Employment has been shifting to larger stores and larger firms in grocery and machinery wholesale since 2000 (Figure 7.8 and Figure 7.9).

Figure 7.8 Wholesale sub-industries share of employment in firms with more than 100 employees

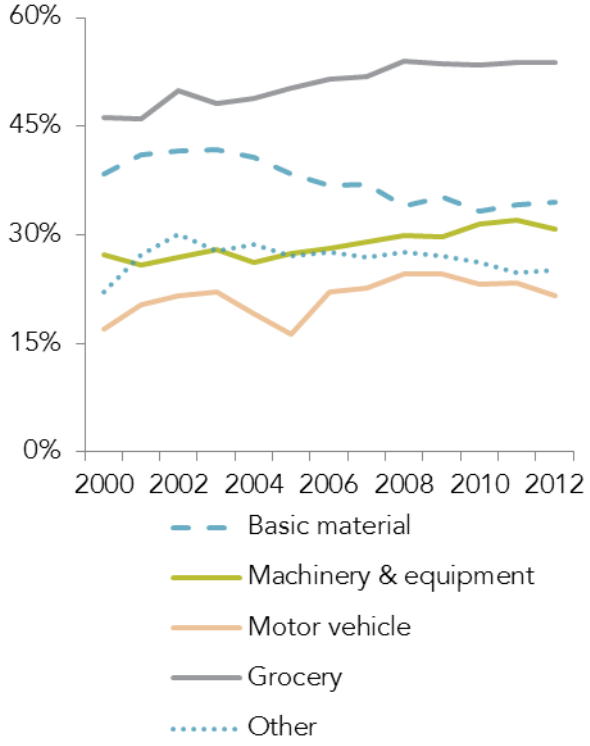
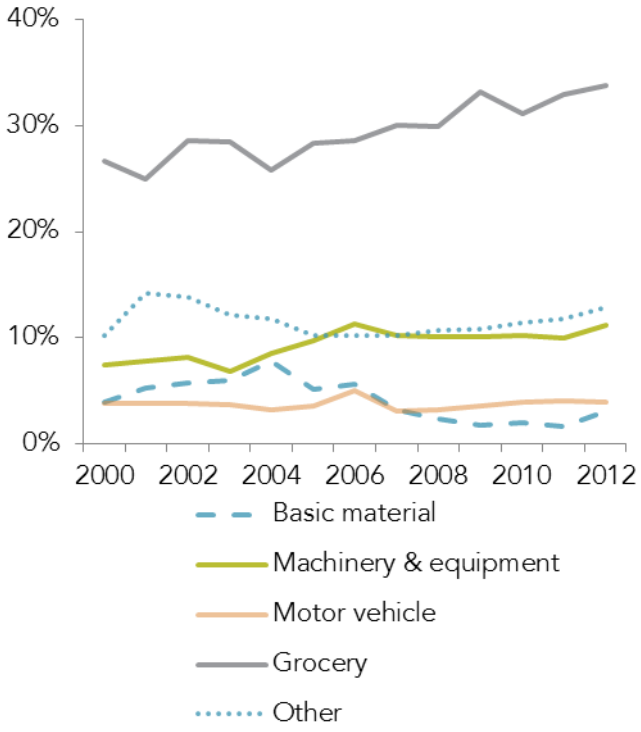


Figure 7.9 Wholesale sub-industries share of employment in stores with more than 100 employees



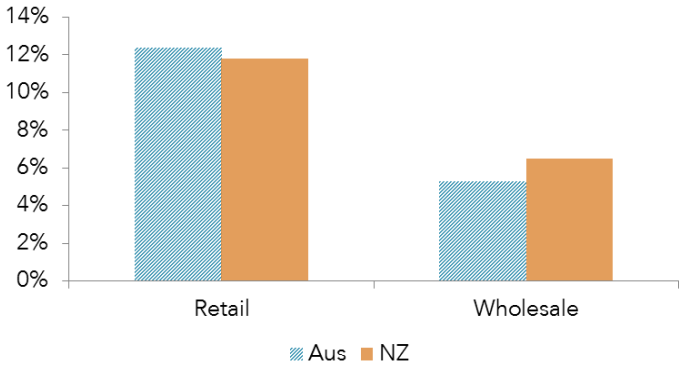
Source: Statistics New Zealand NZ.Stats tables.

F7.9 Wholesale (particularly grocery and machinery) has consolidated since 2000, with average firm and store size increasing.

7.5 Retail and wholesale productivity is lower in New Zealand than in Australia

Retail accounts for a slightly larger share of employment in market industries in Australia than in New Zealand, while wholesale accounts for a slightly smaller share (Figure 7.10). Together, retail and wholesale account for about 18% of all market industry employment in each country.[47]

Figure 7.10 Share of employment in market industries GDP, 2009



Source: Mason (2013).

[47] Market industries are defined as "industries that are dominated by market-based providers of goods and services" (Mason, 2013, p. 10). In the Australian and New Zealand market, industries account for just over 75% of total hours worked.

Labour productivity levels in retail and wholesale in New Zealand are about 50% to 60% of those in Australia. Labour productivity in the Australian retail industry is, in turn, 64% of the US level (APC, 2011). In wholesale, the gap between Australian and New Zealand is explained equally by differences in capital intensity and differences in MFP. As Figure 7.11 shows, differences in MFP account for the greater part of the gap in retail.

Figure 7.11 Contributions to the within-industry gap in labour productivity in Australia and New Zealand, 2009

Source: Mason (2013).

Note:

1. The vertical axis shows the labour productivity gap between Australia and New Zealand as a percentage of the Australian level.

Capital per hour worked in New Zealand retail and wholesale were (respectively) 64% and 45% of the Australian level in 2009 (Figure 7.12). Capital per hour worked in "machinery & equipment, including computers" is lower in New Zealand in both industries, and particularly low in wholesale.[48] Relative to New Zealand wholesale firms, Australian firms appear to have invested more heavily in buildings and equipment, including ICT.[49] New distribution centres and stores are important complements to ICT in improving efficiency in distribution. Australian wholesale firms also appear to have invested more in computer software than their New Zealand counterparts.[50]

Figure 7.12 Capital per hour worked: New Zealand relative to Australia, 2009

Source: Mason (2013).

Notes

1. Capital per hour worked in Australia is set to 100.
2. Machinery includes computers.

[48] Some of the difference between Australia and New Zealand in capital intensity may be due to firms in New Zealand being more likely to lease rather than own buildings, equipment and vehicles.
[49] This is similar to the pattern in the United States, with larger retail chains being more capital intensive in buildings (section 7.1).
[50] This can be deduced from the fact that "intangibles" comprise 5% of wholesale capital stocks in Australia, but only 1% in New Zealand. "Intangibles" cover software and "oil and gas exploration and other exploration" (Mason, 2013). Only software is relevant to wholesale.

F7.10 Labour productivity levels in the retail and wholesale industries are much lower in New Zealand than in Australia. The difference is partly explained by considerably higher capital intensity in Australia. Australian firms have invested much more heavily in buildings, particularly in wholesale. These types of investments complement ICT in raising productivity.

Retail labour productivity grew a little faster in New Zealand than in Australia over the period from 1997 to 2008. Wholesale labour productivity grew slightly more slowly in New Zealand than in Australia (Figure 7.13). In both industries, capital per hour worked grew faster in Australia (Mason, 2013). Productivity in the retail industry in Australia grew more slowly than in the United States over much the same period (APC, 2011).

Figure 7.13 Labour productivity growth rates, 1997-2008

Source: Mason (2013).

7.6 Barriers to productivity gains from ICT in New Zealand retail and wholesale

New Zealand has experienced many of the same trends in retail and wholesale as Australia. Yet New Zealand's labour productivity levels are lower. Since 1997 the gap in levels between the two countries has not closed in wholesale. While it did close a little in retail between 1997 and 2008, this trend was strongly reversed in the following two years (Mason, 2013). Lower productivity levels in New Zealand are partly explained by New Zealand's lower investments in ICT (section 7.5). This section examines some other explanations for New Zealand's lower retail and wholesale productivity. It considers barriers that might reduce the benefits that can be gained from the use of ICT (Chapter 6).

Market, firm and store scale

New Zealand's small market offers fewer economies of scale from using ICT than larger markets. New Zealand's largest retail chain, The Warehouse, made net sales of $1.7 billion in 2012. By contrast, Walmart made net sales of US$444 billion worldwide.

While New Zealand retail has benefited from improved logistics, more integrated supply chains, increased responsiveness to customer preferences and more efficient in-store processes, the investments are spread over a much smaller customer base. In the future, cloud computing will make it easier for smaller firms to invest in ICT at a scale and cost that best fits their business (Chapter 9). Yet much of the international productivity gains in retail and wholesale have been built on large investments in physical infrastructure and international purchasing arrangements where significant scale economies will continue to operate.

New Zealand's smaller cities support relatively smaller stores. The fixed costs of technology and operating overheads are also spread over a smaller customer base at the store level. Smaller stores are likely to keep older business processes longer because of the fixed costs of moving to a new model.

Transport infrastructure

The best location for distribution centres and stores depends on the quality of transport networks which, in turn, partly depends on population density. A driver delivering goods by truck from Tauranga to Wellington faces very different conditions to a driver delivering goods from Melbourne to Sydney or Adelaide (section 7.3). As a result, New Zealand distribution centres are likely to be located relatively close to the centres of population that they serve, be relatively smaller than those in Australia, and involve relatively smaller vehicles making deliveries. The gains from sophisticated use of ICT will be correspondingly lower.

The Commission's international freight inquiry (NZPC, 2012b) considered road infrastructure. The Commission was told that the availability of routes with sufficient bridge capacity for high productivity motor vehicles (HPMV)[51] was limited in New Zealand.

In its submission to the draft report the New Zealand Transport Agency (NZTA) stated:

> On High Productivity Motor Vehicles (HPMVs) the NZTA is seeing significant freight productivity gains being made from greater route access. The NZTA is aware of industry aspirations for greater HPMV access and the progressive opening up of routes remains a priority for us. The NZTA is working closely with freight operators to: develop new HPMV designs that are safer and more efficient, identify priority HPMV routes for investment, and streamline the HPMV permitting process. We are also working with local government who are responsible for local road HPMV access. (NZTA, 2012, p. 5)

Local governments face increased costs from HPMVs in terms of road maintenance and bridge upgrades but receive no corresponding increase in revenue. The New Zealand Retailers Association (NZRA) also submitted on behalf of Progressive Enterprises on the need for improved road networks that support larger vehicles and reduce congestion in major urban centres (NZRA, 2012).

Lower competition

Other things being equal, a smaller market means less intense competition and lower incentives for firms to innovate. Retail and wholesale trade have moderate levels of competition relative to other New Zealand service industries (Chapter 2). Some market segments, such as supermarkets, have only a few chains (Table 7.1). Yet competition may still be vigorous even in these segments, for instance because of the ease with which consumers can switch between retailers.

Table 7.1 Grocery and supermarket market shares, 2005-07

Market Share	Australia	United Kingdom	Canada	Ireland	Netherlands	New Zealand
Top 2	54	42	51	35-45	Around 45	100
3th and 4th	19	24	25	15-25	Around 16	Neg.
Top 4	73	65	76	50-70	Around 60	100

Source: APC (2011).

Notes:

1. Percentage values rounded up to nearest whole number.
2. Data are for shares of grocery sales and supermarket sales for various years between 2005 and 2007, so are only partially comparable.

The rise in online shopping and fall in retail profit margins (section 7.4; NZRA, (2013b)) suggest that competitive pressures in retail will grow.

Land use regulation

Stores and distribution centres need best-for-the-chain locations and the right scale to get the full benefits of ICT. Retail chains have noted that consent processes under the Resource Management Act 1991 and its

[51] HPMVs are a class of vehicle that are allowed to exceed standard length and mass limits (NZTA, 2011).

amendments are a barrier to them deciding where to locate their stores. In the mid-2000s, IKEA's attempt to enter the New Zealand market was blocked by planning processes (Box 7.5).

In a submission to the APC retail industry inquiry, the NZRA in May 2011 noted:

> Some retailers, particularly the larger supermarkets and general merchandise retailers have had some concerns that planning laws have acted as a barrier to the establishment of new retail businesses, particularly in metropolitan centres. (NZRA, 2011)

In the course of the current inquiry, the NZRA told the Commission that this remains a pressing issue, not just for new development but also for redevelopment or extension of facilities. Certainly, consents can work smoothly for some large retail projects. Recently Bunnings have successfully obtained planning consent for a new store in the central Auckland suburb of Arch Hill. The application was reviewed first by the Auckland Council and then by a panel of independent commissioners. The decision may still be appealed to the Environment Court (New Zealand Herald, 2013).

In 2009 the Resource Management Act was amended to stop it being used to oppose trade competitors. The two major supermarket chains had for many years battled through the courts over the siting of a new PAK'nSAVE supermarket in Wairau Road on Auckland's North Shore. The Government cited this case as evidence of the need for an amendment. While the amendment may address the most egregious anti-competitive behaviour, battles between competitors may focus on district plans rather than specific consents. They may involve property developers rather than retail firms directly.

For example, in May 2013, Todd Property Group, the owner of the Kāpiti Landing commercial development at the Kāpiti Coast Airport entered a war of words with Coastlands, the existing retail mall in Paraparaumu. At issue was the Kāpiti Coast district plan restriction on large format retail in the new development. Kāpiti Landing chair Sir Noel Robinson argued against "outdated patch-protecting regulations in the new district plan" (Maxwell, 2013). In the other corner, Richard Mansell, the chief executive of Coastlands "require[d] the council to be resolute in its defence of the overall provisions for the Kāpiti Coast" (Maxwell, 2013). Similar battles have emerged in the past over other developments (for example Johnsonville vs Lambton Quay, Harbour Quays precinct vs Lambton Quay).

Box 7.5 IKEA barred in land-use hearing

Redwood Group, the developer of a new retail site in the Auckland suburb of Mount Wellington, planned to bring IKEA into New Zealand in the mid-2000s. Lengthy planning procedures culminated in an Environment Court hearing. Consent for the development was finally given in 2008 based on agreement among the parties to the proceedings. Consent was subject to "extra-tough" conditions on the types of outlets that could be located there (Dey, 2008). IKEA was explicitly barred.

The main grounds for opposition to the development were its effects on traffic flows in the immediate locality. It was argued that IKEA was known as a generator of high traffic volumes. The owners of the Sylvia Park retail centre (across the road from the proposed development) joined the Environment Court process. Other types of outlets explicitly barred in the decision included supermarkets, department stores or discount department stores, all of which already had a presence in Sylvia Park. The wider consumer benefits in stimulating competition in the New Zealand market through the entry of a new international chain were not apparently considered.

Source: Dey (2008); *Redwood Group Limited* v *Auckland City Council* (2008).

In a survey of businesses conducted for the Commission's local regulation inquiry, businesses in the wholesale industry were the most likely (54% of wholesale businesses responding) of all industries to agree that "[l]ocal government regulations (not rates) place a significant financial impact on my business". Some 59% of wholesale businesses and more than 40% of retail businesses reported that regulatory compliance had greatly impacted their financial position or performance. Across all industries, firms were most likely to

identify building and construction consents, and planning, land use or water consents among their top compliance costs (NZPC, 2012c).[52]

Q7.1 Do the Resource Management Act 1991 provisions or district planning processes still pose significant barriers to siting businesses in the right location and at an efficient scale?

Direct regulation of retail

New Zealand ranks fourth among OECD countries for the least restrictive regulation of retail trade (OECD, 2013d). This rank is based on requirements for registration or licensing or for permits to engage in various types of retail activity, including siting over and above "general urban planning provisions".

7.7 Summing up

The global retail and wholesale industries have been undergoing sustained transformation as a result of ICT use. Successive waves of ICT have led to ongoing evolution of business models that replace the traditional approaches. Currently online retailing is growing very rapidly and is increasingly being integrated with other more traditional retail modes and evolving modes of electronic access. Online retailing is exposing New Zealand retailers to international competition much more than in the past. Yet the rise of cloud computing should allow smaller New Zealand retailers to be more efficient users of ICT than before. As ICT develops further these changes are likely to continue.

Globally, the largest productivity gains from ICT in retail and wholesale have come from achieving enormous scale economies. These are associated with very large markets, particularly the United States, and the related growth of huge retail chains (such as Walmart) operating with large distribution centres and outlets. While scale economies of this size are never going to be available to New Zealand retailers, there are still opportunities for further productivity growth through the use of ICT.

Changing retail and wholesale business models require reorganisation within firms and complementary investments in physical capital and training. The constant turnover of firms as successful models increase their market share requires resources to shift between firms. Barriers to reallocation of resources can reduce the productivity gains from ICT and delay firms making ICT investments. International evidence shows that restrictive labour market and land use regulation can have an adverse effect on labour productivity growth in retail and wholesale. There is no strong evidence that these types of regulation act as a barrier to resource reallocation in New Zealand.

[52] Nevertheless, more than 40% of retail and wholesale businesses reported that employment regulations had a greater impact than the top ranked local government regulation (see Chapter 6 for a discussion of employment regulation and the adoption of ICT).

8 Supply and demand of IT skills

Key points

- Firms in IT-producing industries and industries that make intensive use of IT need skilled professionals and IT-savvy managers to realise the benefits of IT investments.
- Firms are less likely to invest in IT if skills are in short supply.
- There has been a worldwide long-term increase in the demand for IT professionals. As the cost of IT continues to fall and its use becomes more widespread, this demand is likely to continue.
- New Zealand firms compete in an international market for IT skills. Local firms rely heavily on immigrants to fill vacancies for IT skills.
- New Zealand firms pay close to international wages for starting salaries in some IT occupations. IT graduate salaries are high relative to most other fields of study.
- The number of IT graduates has begun to rise after a period of decline and stagnation.
- A high proportion of firms in the IT-producing (mostly software) industry report difficulties in recruiting skilled professionals and managers.
- To get the best from IT investments, firms need people with technical skills and business skills.
- IT faculties in universities and polytechnics do not have strong incentives to work closely with firms in developing student skills so students are work-ready. Establishing stable collaborative arrangements takes time and other resources. Academic staff also find it difficult to keep up with developments in the practical application of fast-evolving IT.
- Better information for intending students on the employment and earnings outcomes of IT graduates from each tertiary education provider would sharpen incentives to establish collaborative links between providers and firms.
- One-year post-graduate programmes in computer science for graduates in other disciplines would help speed the supply response to changes in demand for IT graduates. Graduates taking such courses – particularly those with a business-related degree – would then have a better range of skills to meet employer needs.
- Students taking computer science majors in New Zealand have limited opportunities to take business courses at the same time.
- One-year post-graduate programmes in business studies for computer science graduates would better prepare them for a career in business.
- Larger IT-producing and IT-using firms offer better salaries to graduates and often provide cadetships and induction programmes that help bridge the gap between study and work. Graduates make these firms their first choice. Many of these firms also have an international presence that makes it easier for them to transfer or recruit IT professionals from overseas.
- Small IT-producing and IT-using firms individually lack the resources to provide graduates with an induction programme to build business and entrepreneurial skills. They also find it difficult to collaborate among themselves and with universities and polytechnics to help students gain the technical skills and other skills needed to be ready for work when they graduate.
- Adjusting current tertiary education funding mechanisms could improve incentives for IT education providers and IT-producing and IT-using firms (especially small firms) to collaborate in preparing graduates for work.

This chapter discusses the supply and demand of "professional IT skills" – the ability to develop, repair, create and use advanced IT tools (López-Bassols, 2002). These skills are generally acquired through degree level or equivalent study. The chapter also covers the management skills needed to use IT to improve firm performance.

The chapter looks at evidence of a chronic international shortage of IT skills and the effects this has on delaying IT investments in New Zealand. It then considers approaches to improving the supply of skills.

The Commission is aware of initiatives to encourage a wider range of secondary school students into information science before going on to tertiary study. These initiatives aim to make information science less "geeky" and more attractive as a career choice while, at the same time, increasing the academic rigor of how information science is taught at secondary school. Yet the Commission has chosen to focus on the interface between tertiary education and the labour market. Here policy adjustments have the potential to provide faster results in matching supply and demand.

Box 8.1 **IT or ICT skills?**

This chapter generally uses the term IT (information technology) skills rather than ICT skills unless the context or specific sources require otherwise. This is because the academic qualifications needed for both are taught in computer science, information science and information management courses. Official statistics on enrolments and graduations in these fields are captured under IT. In addition, research on IT skills often focuses on IT rather than ICT as a profession.

ICT refers to a group of rapidly evolving information and communication technologies based on the increasing capability and falling costs of ICT hardware (Chapter 5). IT and communications technology have converged to share information sciences as a common base for skills. Factors affecting demand for and supply of skills in the IT profession are likely to apply equally to similarly scarce and specialised skills required by the communications industries.

8.1 Skill shortages reduce investments in technology

Chapter 6 discusses the emergence of ICT as a revolutionary general purpose technology that is transforming the production of services. Rapid development of new forms of ICT makes the economic life of existing ICT short – meaning firms need to make frequent new investments to keep current.

Professor Stephen MacDonell of the University of Otago argues that the key challenge for using ICT in New Zealand "relates to the development and retention of human capital *with the appropriate skills, knowledge and experience*". He submits that the organisational value in the information industries "resides extensively in the people who create and manage knowledge as much as in the knowledge itself" (sub. 106, p. 1).

Skill shortages can result in low investment in new IT and less intense use of existing IT. Acemoglu (1997) looks at how workers' and firms' expectations fit. Firms will not invest in new technology if they expect workers with the required skills will not be available; workers will not train if they expect firms will not invest in the technology. As a result, a persistent shortage of skills can reduce how much a firm invests in technology. Consistent with this model, Nickell and Nicolitsas (2000) find that, in a sample of UK manufacturing firms, a 10 percentage point increase in the number of firms reporting a lack of skilled labour in their industry leads to a permanent 10% reduction in a firm's fixed capital investment. Forth and Mason (2006) investigated the effect of self-reported ICT skill shortages on firm performance. They found that ICT skill shortages reduce the adoption and intensity of use of ICT, which reduces sales.

With rapidly evolving technology, it will be harder for firms to find workers with the right skills (López-Bassols, 2002). Firms prefer qualified IT professionals with successful work experience because they have already shown that they can adapt their academic learning to business processes, learn proprietary systems and keep their skills current. For example, experienced software testers use more effective strategies than

the standard approach taught to graduates, partly because they have learnt how the software will be used in business (Itkonen, Mantyla & Lassenius, 2013).

IT-savvy managers are at least as important as skilled technicians in using IT effectively. Managers need to recognise the potential for IT to re-engineer their business, and also identify the required complementary investments (for example, the costs of training and making changes in business organisation and processes). They have to map and implement a path for how change will occur, and manage the relationship between IT specialists and senior managers during that process.

US firms with senior managers with IT qualifications and experience are more likely to use well-developed IT governance mechanisms that lead to better financial performance (Boritz & Lim, 2007). So a current shortage in IT skills may also reduce the future pool of IT-savvy managers, and have longer-term effects on a firm's financial performance.

Workers will be less willing to specialise in particular skills if few firms use those skills. Firms will want to locate in markets where there is a good pool of the specialised workers they need. This is partly why firms that need specialised IT skills tend to co-locate. Co-locating creates a thicker market for skills, reducing the risk to workers and firms from employment and business shocks. The international market for more specialised IT skills also reduces the risks involved in New Zealanders investing in those skills, and in New Zealand-based firms finding those skills. Migrant flows play an important part in meeting New Zealand's demand for IT skills.

F8.1 Firms need skilled IT professionals and IT-savvy managers to realise the productivity benefits of their ICT investments.

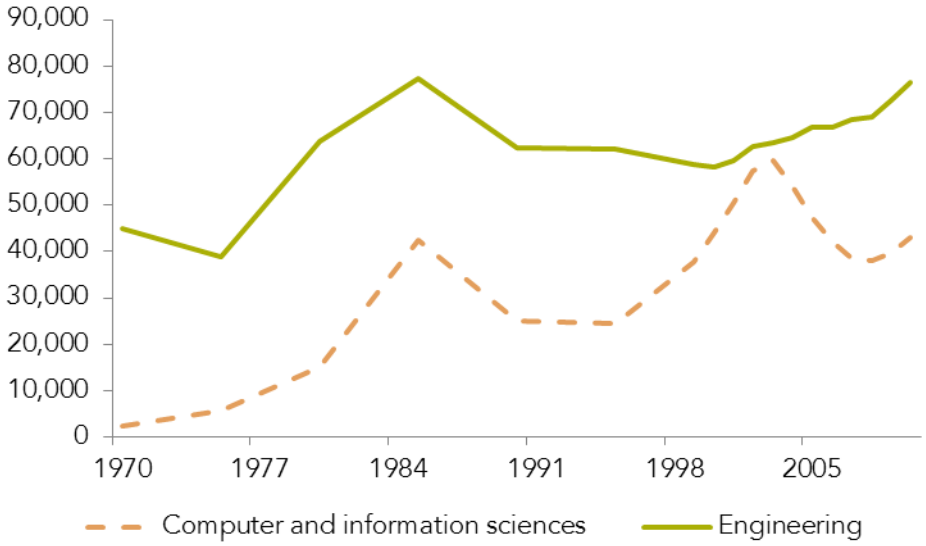
F8.2 Firms will likely respond to chronic IT skill shortages by reducing technology investments.

8.2 The long-term global rise in demand for IT skills

Persistent skill shortages have a stronger effect on investment decisions than cyclical fluctuations. The last 40 years has seen a sustained increase in underlying demand for IT skills. The falling price of IT hardware and the increasing use of IT in business and society have driven this demand (Chapter 5). IT and IT skills will continue to grow in importance for the economy (Bartelsmann, 2013; Panko, 2008; Byrne, Oliner & Sichel, 2013). Examples are the recent rapid growth of online shopping (Chapter 7), the development and uptake of new mobile applications, the adoption by governments of more sophisticated IT, the development of robotics and driverless cars and the exponential growth in data gathering, storage and analysis capabilities (Chapters 6 and 9).

US data on computer science graduations since the early 1970s reflect the long-term rising demand for IT skills (Figure 8.1). Growth for the new discipline of computer science has been much faster than for the mature discipline of engineering. The supply of IT graduates has risen to match increasing demand.

Figure 8.1 Computer science and engineering graduations in the United States



Source: US Department of Education, National Center for Education Statistics.

Notes:

1. The data is for bachelor degrees.
2. Engineering graduations are shown for a comparison of trends.

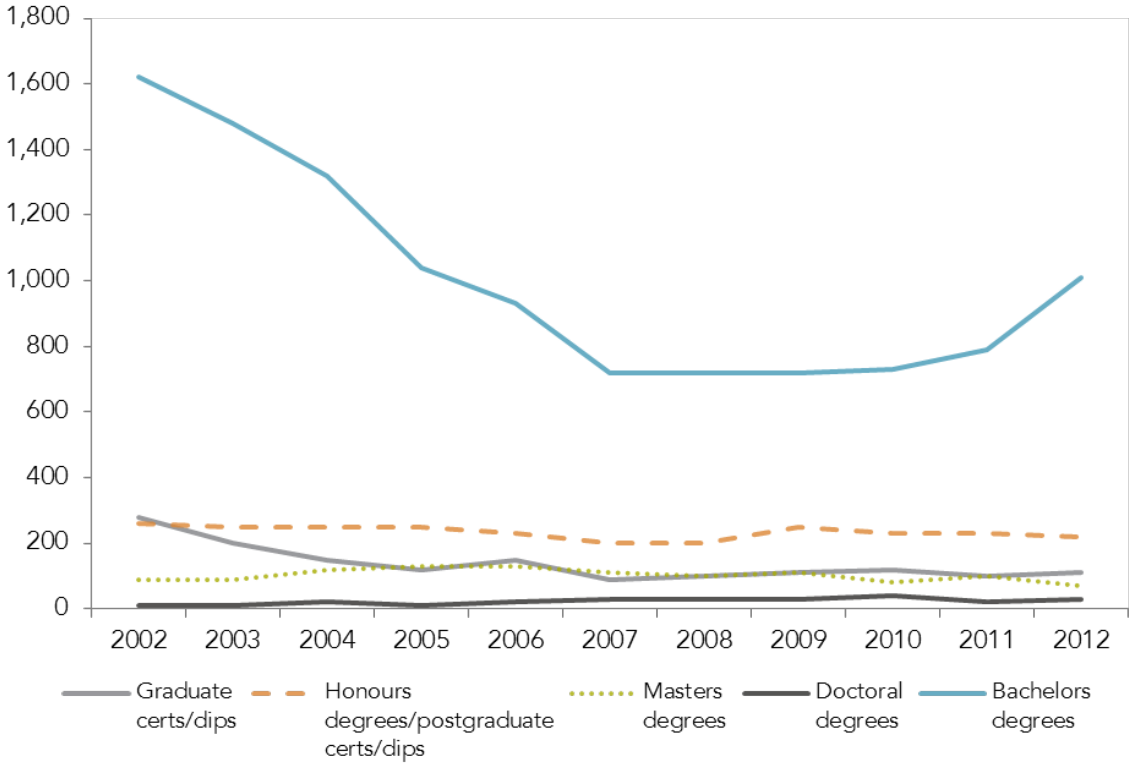
F8.3 Since the 1970s, the demand for IT professionals globally has continued to rise. Given the falling cost of ICT and its increasing use, this pattern is likely to continue.

The dotcom bust and collapse in IT graduations

Like many new technologies with great potential for wealth, ICT production has experienced economic bubbles. In the mid-1980s and particularly the late 1990s, enthusiasm for careers in IT saw ever more students study IT and graduate with IT qualifications. A sudden loss of confidence in both periods caused a sharp decline in graduations. The most recent decline lasted from three years after the peak of the dotcom boom in 2000 until around 2008 in the United States and a little later in New Zealand.[53] Some countries saw enrolments and subsequent graduations fall steeply by between a third and a half from their peak (see Panko (2008) for the United States, HECSU (2007) for the United Kingdom, Nordicity & Ticoll (2012) for Canada, and Figure 8.2 for New Zealand).

[53] A speculative rise in stock prices of internet-based companies drove the dotcom boom. Business models were based on rapid expansion to gain market share while not "turning a profit". Changing economic conditions led to a rapid drop in stock prices from a peak in March 2000, with many companies going bust.

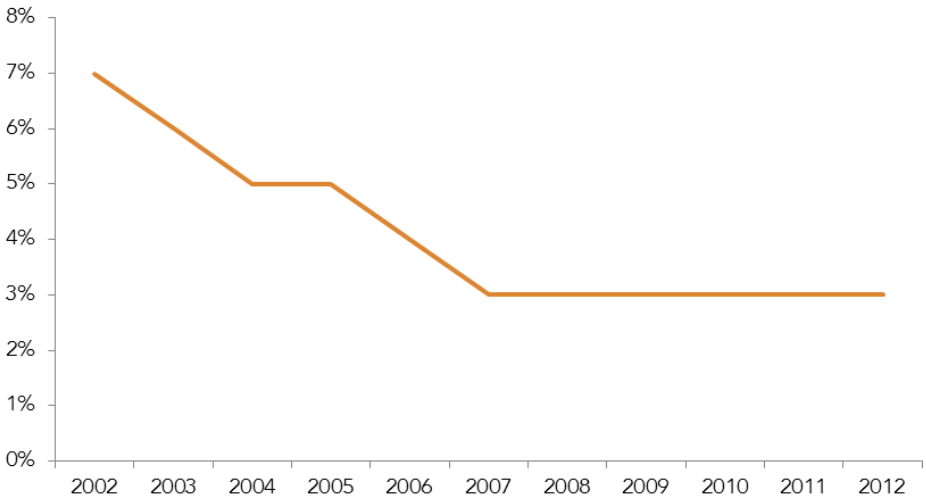
Figure 8.2 Trends in IT degree completions by domestic students



Source: Data supplied by Ministry of Education; Productivity Commission analysis.

While falling sharply in absolute terms, the number of domestic students graduating with an IT degree also fell sharply as a proportion of all degrees (Figure 8.3). IT departments in universities would face difficult options to adjust staffing levels.

Figure 8.3 IT degrees completed by domestic students as a proportion of all degrees



Source: Data supplied by Ministry of Education, Productivity Commission analysis.

F8.4 The dotcom bust in 2000 saw a rapid fall globally in the number of students graduating with IT qualifications. In the United States, the United Kingdom and New Zealand the number fell by between a third and a half over a 5-year period.

During the 2000s the number of IT jobs rose while the number of IT graduates fell

Sharply falling and then stagnant graduations were accompanied by only a short pause in the long-term rise in IT jobs. Rising employment in IT-using industries absorbed many who lost work in the dotcom bust. This led to a boost in productivity growth in those industries (Tambe, 2013). Employment in IT jobs in New Zealand rose much faster than overall employment in the 10 years to 2012 (Table 8.1).

Table 8.1 Annual average growth in demand for ICT occupations in New Zealand, 2004-13

	Level of skill	Average number of workers, 2013	Growth rate
ICT managers	Degree or higher	6,309	5.9%
ICT trainers	Degree or higher	1,305	5.4%
ICT sales professionals	Degree or higher	996	-7.8%
Web designers	Degree or higher	756	4.4%
Electronic engineers	Degree or higher	928	-2.2%
ICT business & systems analysts	Degree or higher	9,659	4.9%
Multimedia specialists & web developers	Degree or higher	1,425	6.8%
Software & applications programmers	Degree or higher	17,432	5.7%
Database & systems admin, & ICT security	Degree or higher	6,254	3.8%
Computer network professionals	Degree or higher	3,135	5.0%
ICT support & test engineers	Degree or higher	1,596	8.3%
Telecommunications engineers	Degree or higher	1,482	7.0%
Electronic engineering draftspersons & technicians	Diploma	2,367	-1.0%
ICT support technicians	Diploma	9,864	2.6%
Telecommunications technical specialists	Diploma	108	0.5%
Electronics trades workers	Level 4	1,862	0.0%
Telecommunications trades workers	Level 4	2,558	-0.5%
ICT sales assistants	Level 1	157	2.5%
Total ICT workers	-	68,193	3.7%
Total workers – all industries	**-**	**2,218,350**	**1.3%**

Source: Papadopolous (2013) calculated from MBIE detailed employment estimates modelled from Statistics New Zealand HLFS, LEED and Census data.

F8.5 The number of IT jobs in New Zealand has grown much more rapidly than the total number of jobs over the last 10 years.

Despite ongoing fast increases in employment, new enrolments stagnated during the mid-2000s because students lacked confidence in IT as a career (Panko, 2008). Tertiary education enrolments also tend to fall in a buoyant economy, such as many countries experienced between 2000 and 2005. The start of the global financial crisis in 2008 saw a rise in tertiary enrolments. The follow-on effect was that the number of New Zealand IT graduates began to rise from 2011 (Figure 8.2). The growth in the number getting jobs in IT was filled partly by a continuing (though reduced) stream of new graduates and partly by a net migration of IT professionals.

New Zealand competes in an international market for IT skills

New Zealand employers compete in an international market for skills. Net migration of IT graduates is an important contributor to balancing supply and demand. Five years after graduation just over 30% of New Zealand IT graduates with a bachelor degree have moved overseas (compared to around 28% for all graduates with bachelor degrees) (Smyth, 2013). In 2012, seven years after graduation, 36% of computer science graduates had been overseas for at least three years, compared to 23% of all graduates (Papadopolous, 2012). The buoyant international labour market for IT graduates is one reason why they are less likely than other graduates to return to New Zealand.

The number of work and skilled migrant visas approved each year for ICT jobs accounted for 8% of employment in these occupations overall and up to 84% in some very specialised occupations (Table 8.2).[54]

Table 8.2 Work and residence visas approved in ICT occupations, 2008-12

	On long-term essential skills list?	Ave. annual number of work visas approved	Ave. annual number of skilled migrant visas approved	Work visas approved as share of total workers	Skilled migrant visas approved as share of total workers
ICT managers	Yes	264	133	4.2%	2.1%
ICT trainers	No	28	7	2.1%	0.6%
ICT sales professionals	No	114	47	11.5%	4.7%
Web designers	Yes	36	13	4.8%	1.8%
Electronic engineers	No	48	34	5.1%	3.6%
ICT business & systems analysts	Yes	365	137	3.8%	1.4%
Multimedia specialists & web developers	Yes	317	46	22.2%	3.3%
Software & applications programmers	Yes	1,073	356	6.2%	2.0%
Database & systems admin, & ICT security	Yes	163	80	2.6%	1.3%
Computer network professionals	Yes	207	91	6.6%	2.9%
ICT support & test engineers	Yes	290	104	18.2%	6.5%
Telecoms engineers	Yes	94	43	6.3%	2.9%
Electronic engineering draftspersons & technicians	No	57	40	2.4%	1.7%
ICT support technicians	Yes	586	390	5.9%	4.0%
Telecoms technical specialists	No	66	25	61.3%	23.4%
Electronics trades workers	No	67	43	3.6%	2.3%

[54] These figures are derived by comparing work visas and skilled migrant visas issued for people in these occupations with average employment numbers employed in those occupations over four years. This is only a rough indication of how important migrants are to these occupations, as not all migrants issued with visas will enter jobs in their occupations and, if they do, migrants may stay in those jobs for varying lengths of time. In addition differences in how occupations are defined in visa and worker data may affect the accuracy of these figures.

	On long-term essential skills list?	Ave. annual number of work visas approved	Ave. annual number of skilled migrant visas approved	Work visas approved as share of total workers	Skilled migrant visas approved as share of total workers
Telecoms trades workers	No	147	99	5.7%	3.9%
ICT sales assistants	No	13	0	8.4%	0.1%
Total ICT workers	-	3,934	1,689	5.8%	2.5%
Total workers – all industries	-	**50,977**	**10,345**	**2.3%**	**0.5%**

Source: Papadopoulos, 2013, p. 11, calculated from Immigration New Zealand data.

In a 2009 survey of its members the NZICT Group (now the New Zealand Technology Industry Association) found that almost 30% of experienced staff recruited in the previous six months had been recruited from overseas, and over 40% of firms had employed new or recent migrants (NZICT, 2009). In 2012, Xero hired 70 of its 200 new hires from overseas (Doesburg, 2013).

F8.6 Flows of IT professionals in and out of New Zealand are strong. New Zealand is highly reliant on immigration to fill IT professional vacancies – especially in some specialist areas.

New Zealand's immigration policy appears to be working reasonably well in making it easy for skilled migrant IT workers to fill IT vacancies (Table 8.2). The immigration system, while meeting other objectives, needs to facilitate the rapid and smooth transfer of IT professionals to fill New Zealand vacancies to mitigate the effects of skills shortages.

Q8.1 What adjustments to New Zealand's policies and procedures for temporary work visas and skilled migrants would speed up and reduce the cost of filling IT positions from overseas?

The Commission does not have data on trans-Tasman flows of IT professionals because visas are not required. These flows are particularly important for matching supply and demand in the New Zealand market. Many trans-Tasman firms transfer staff between Australia and New Zealand to deal with fluctuations in demand. The Commission, in its trans-Tasman joint study with the Australian Productivity Commission, found that trans-Tasman double taxation arrangements posed a barrier to the efficient transfer of temporary staff between Australia and New Zealand. It recommended that "[t]axation of non-resident employees should be considered when the double taxation arrangements between Australia and New Zealand are next reviewed". (APC & NZPC, 2012, p. 142)

A number of New Zealand-based companies transfer staff to and from countries other than Australia, including the United States, United Kingdom, Canada and China. New Zealand's mutual taxation arrangements with these countries may also be a barrier to the efficient temporary transfer of staff between countries.

R8.1 New Zealand should negotiate taxation arrangements with other countries that allow more efficient temporary transfer of employees between New Zealand and those countries.

New Zealand firms pay close to international wages for starting IT workers

New Zealand firms have to pay close to international wages for the lower-paid workers in selected IT occupations (Table 8.3). This may be due to a reliance on migration to fill positions. Yet the best paid IT professionals in New Zealand are paid substantially less than their Australian counterparts. This may partly

reflect differences between New Zealand and Australia in the scope and responsibilities of top-paid IT workers.

Table 8.3 IT wages in New Zealand and Australia, 2013

	New Zealand		Australia		% difference	
	$NZ,000		$NZ,000			
	Lower	Upper	Lower	Upper	Lower	Upper
Data warehouse developer	80	110	90	140	13%	27%
Senior analyst programmer	80	105	85	120	6%	14%
Chief information officer	150	200	150	365	0%	83%
Technical writer	55	80	65	100	18%	25%
Development manager	95	130	100	175	5%	35%

Source: Hudson (2013) and Commission analysis.

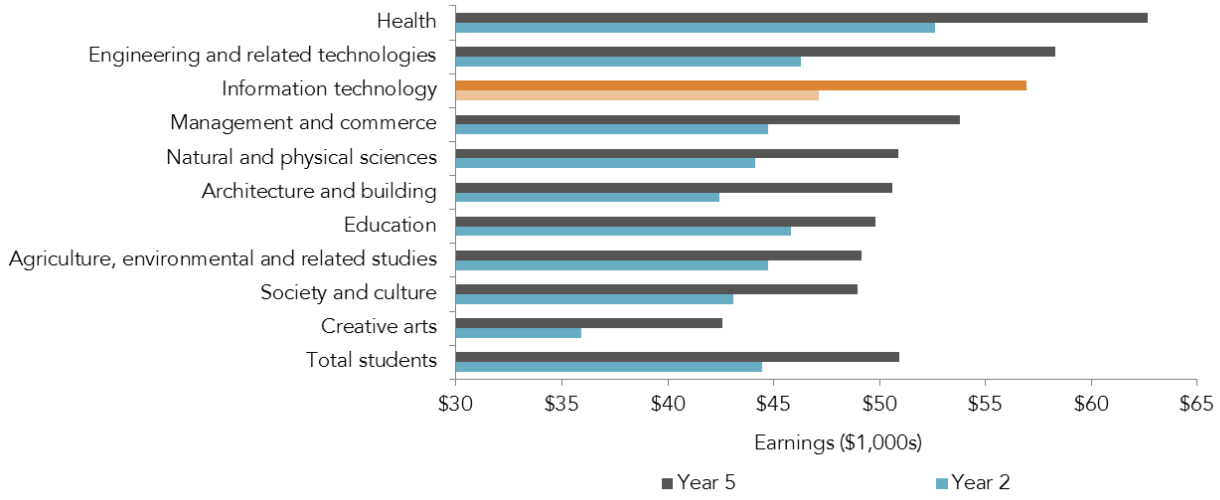
Notes:

1. Australian salaries have been converted to New Zealand dollars using OECD purchasing power parity (PPP) exchange rates http://stats.oecd.org/Index.aspx?datasetcode=SNA_TABLE4

F8.7 New Zealand firms pay close to international wages for lower-paid workers in some IT occupations but pay much less than Australian firms in the upper ranges.

IT graduates earn good salaries in New Zealand relative to other graduates (Figure 8.4).

Figure 8.4 Median earnings of domestic bachelor graduates 2 and 5 years after graduation



Source: Mahoney, Park & Smyth (2013), Figure 11, p. 36.

F8.8 IT graduate earnings in New Zealand are high relative to graduates in most other fields of study.

8.3 Global shortages in IT skills have emerged over the last decade – New Zealand is no exception

The dotcom bust, economic conditions over the following decade and uninterrupted growth in the use of ICT have combined to produce a sharp decline in IT graduations at the same time as IT jobs have continued

to rise in the IT-using industries. The result has been an emerging global shortage of IT professionals. Predictions of an impending shortage appeared as early as 2007 (HECSU, 2007). The issue has attracted the attention of many governments and quasi-governmental agencies (see for example Didero, Hūsing & Korte, (2009) for Europe, Nordicity & Ticoll (2012) for Canada, and the Australian Workforce Productivity Agency (2013) for Australia). Globally, IT jobs rank seventh in a list of the top 10 jobs that employers find hard to fill (ManpowerGroup, 2013, p. 7).

It is not surprising that New Zealand has been facing similar concerns. New Zealand shares an international market for IT graduates and has experienced strong growth in IT jobs at the same time as a decline in graduates with IT qualifications (section 8.2). In 2012, around half of employers in the computer system design sector (which employs more than a third of all IT workers) reported that they found it hard or very hard to recruit IT professionals and managers. More than half stated that it was hard or very hard to recruit IT technicians and associated professionals (MBIE, 2013c). ICT-using and producing firms have been reporting recruitment difficulties for some years (NZICT (2009), Shearer & Trewinnard (2012), Robertson (2013)). In 2012, the ANZ Business Barometer found that 33% of businesses in the IT/Technology industry reported concerns about the lack of skills, with a rank of 6 out of 19 industries surveyed (ANZ, 2012).

Fast-growing companies such as Xero place a premium on "hiring the best" and consequently find "[i]t is a challenge to find suitably qualified, experienced and savvy people who also fit our culture" (Natasha Hubbard, General Manager Human Resources at Xero, quoted in Doesburg, 2013). This finding is consistent with evidence that companies that pay higher wages are more likely to report hiring difficulties, and that these difficulties persist over the business cycle and are independent of local labour market conditions (Fabling & Maré, 2013). TradeMe told the Commission that "[h]iring IT professionals is difficult all over the world, and it doesn't seem especially harder here in Wellington". TradeMe confirmed that "hiring the right people, great people with the right attitude, reasonable skills and the ability to learn quickly, is often what makes it hard, rather than necessarily finding people with the right skills".

More broadly, there is some evidence that New Zealand lacks a good cohort of ICT-savvy managers and directors. About 10% of members of the New Zealand Institute of Directors have a technical background, though younger directors have a better technical knowledge. CIOs and IT managers are still seen as too detail-oriented, tactical and narrow in outlook to make effective board members (Putt, 2013). Yet the evidence shows that firms are much more likely to make productive use of ICT investments if their senior managers and directors are trained in and have experience with ICT (Boritz & Lim, 2007).

F8.9 New Zealand firms, like firms in most other developed countries, report relatively high levels of difficulty in recruiting IT professionals and managers.

Consequences of IT skill shortages

IT skill shortages can cause firms to delay investing in IT (section 8.1). New Zealand has little evidence to show whether and how much a shortage of IT skills impacts on investing in IT. The Commission's business survey (Chapter 1) found that only 5% of firms *not* investing in ICT in the previous two years gave skill shortages as a reason (Chapter 6). Yet this reason was more commonly given by non-investing businesses with 20-49 employees (23% of such firms) and by businesses in the healthcare and social assistance sector (25%).

Other anecdotal evidence suggests that IT skills shortages are having an effect on business development in New Zealand. Orion Health says that they could develop more of their software in New Zealand if they could find suitable people. Two of its four software development centres are located overseas (Doesburg, 2013). This is consistent with the evidence that skill shortages reduce investments in technology (section 8.1).

F8.10 Some New Zealand firms are limiting their IT investments or sending work overseas because they cannot recruit enough skilled IT professionals in New Zealand. The extent of the impact of IT skill shortages in New Zealand is unclear.

8.4 Improving the relevance and speed of tertiary-education responses to IT skills shortages

Markets for skills exhibit lags and cycles of over and undersupply. Wages respond slowly to emerging shortages and time is required for potential students to recognise the increase in demand and acquire skills (Forth & Mason, 2006). Education providers may also be slow in expanding training places and adjusting programmes to reflect emerging technologies and business practices. By the time that students graduate, demand for skills may have changed. Policies that speed responses to market changes may reduce the amplitude of cycles.

Information technology is developing extremely rapidly (Chapter 6) and firms instead of academic institutions are driving IT innovation. Unless these institutions have close links with business, IT academics will find it hard to keep up with the pace of innovation (Norman & Oakden, forthcoming). This makes it harder for tertiary education providers to prepare students for IT careers than in more established disciplines such as engineering, law or medicine. Unlike these disciplines, IT does not have well-established industry institutions and practices that help students bridge the gap between academic learning and work.[55] In their recent survey of "knowledge sector" firms in the Wellington region, Norman and Oakden found that "the ICT sector appeared to be struggling to create networks of potential benefit to the industry as a whole" (Norman & Oakden, forthcoming, p. 54).

Current tertiary education funding arrangements do not provide strong incentives for providers to take on the cost of establishing and maintaining links with firms. Funding largely follows student numbers agreed in broad terms between the Tertiary Education Commission (TEC) and tertiary education providers through their investment plans. Student choices about their courses and tertiary education providers are the main drivers of funding. Additional funding for providers is tied to their performance in research.

Recently the Ministry of Education has started to publish regular information on graduate employment and earnings outcomes by field of study, but not by education provider (Mahoney, Park & Smyth, 2013). Better information for intending students about the employment and earnings outcomes of qualifications gained from *particular providers* will sharpen incentives for tertiary education providers to tailor their programmes to industry needs.

F8.11 The Ministry of Education publishes regular information on graduate employment and earnings outcomes by field of study. Information on outcomes by tertiary education provider and field of study would help students in their tertiary education choices and provide stronger incentives for providers to work closely with employers.

Q8.2 What are the advantages and disadvantages of the Ministry of Education publishing information on graduate employment and earnings outcomes by field of study and by tertiary education provider?

To get the best from IT investments, firms need effective business and entrepreneurial skills to complement technical IT skills (section 8.1). Under current arrangements many IT graduates do not meet these employer requirements. Few IT students have the opportunity to gain significant experience of a business environment during their study. Professor Stephen MacDonell of Otago University told the Commission that computer science departments in universities do not necessarily see their role as producing graduates to work in business. They may see themselves more as developing technical expertise within a scientific paradigm. Adding to this are course requirements and timetabling issues that sometimes make it hard for students to take a joint degree in computer science and business.

[55] See McKinsey (2012) for a discussion of the broader issues in managing the interface between education and employment.

F8.12 Degree structures, timetabling and other administrative arrangements make it hard for students to do joint degrees in business and IT, including computer science.

Q8.3 How could degree structures, timetabling and other administrative arrangements be made more accommodating for students to do joint degrees in business and ICT, including computer science?

Information science, information systems and information management are usually offered in the business schools of tertiary institutions, and students majoring in information science are obviously likely to be more interested in business careers. Even so, while studying they currently face limited opportunities for significant exposure to a business environment. The Commission was also told that it is easy for business students to skip technical IT courses. This means that they do not have the foundation to become IT-conversant managers and CEOs (Professor Stephen G. MacDonell, Otago University, sub. 106). Business students need to be IT-literate to succeed in a world where IT is increasingly used when shaping business strategy.

Q8.4 To what extent should IT courses be required for business students?

Tertiary providers currently sometimes allow graduates in one discipline to undertake one-year programmes in another discipline. The programme is designed to give graduates bachelor-level equivalent qualifications in the second discipline. The qualification is usually a graduate diploma but could be a one-year masters. Encouraging business (and other) graduates to undertake a one-year programme in computer science would help the IT industry to respond to changes in demand more quickly. Computer science graduates could also be encouraged to undertake a one-year programme in business studies. This would better prepare them for work in firms where IT is closely integrated into business strategy. This strategy would be targeted at students who have already been successful in their studies and have developed a clearer idea of their future career paths. Students would benefit from having a wider range of skills and more flexible career options.[56]

R8.2 The Tertiary Education Commission and the Ministry of Business, Innovation and Employment should encourage tertiary education providers (using investment plans and other levers) to collaborate with the IT industry associations in promoting one-year diplomas in information science/technology for graduates in other disciplines as a means to quickly fill shortages in the supply of IT graduates.

R8.3 The Tertiary Education Commission should encourage tertiary education providers to promote one-year graduate diplomas in business studies for computer science graduates as a means to better prepare them for work in firms where IT is central to their business strategy.

Larger firms have the resources to bridge the academic-to-work gap

Larger established ICT-producing firms (such as Datacom, Xero, Vodafone and Telecom) and ICT-using firms (for example TradeMe, banks and finance companies) often have induction programmes for graduates, and offer higher starting salaries. They sometimes offer cadetships so they establish a link to good students. Many IT graduates see these firms as their preferred choice and the firms put a high priority

[56] Ireland has adopted a similar approach as part of its ICT action plan (Department of Education and Skills, Ireland, 2012).

on employing graduates who best fit their business strategy. An IT graduate who joins one of these firms can learn about current industry best practice, the proprietary systems that are in use, and how IT fits with the firm's business. Their employer bears the costs of their on-the-job training and aims to keep them in the firm by offering a competitive salary and an attractive work culture. Such IT firms have the scale to absorb the risk in hiring untried new graduates and to provide the training that bridges the gap between academic learning and work.

F8.13 Larger ICT-using and ICT-producing firms have the resources to employ top IT graduates and provide them with induction programmes that help the graduates learn quickly about the business environment and proprietary systems.

Small firms find it particularly hard to recruit "business-ready" IT graduates

Small ICT-producing and ICT-using firms have fewer resources than large firms to confidently take on the risks of employing untried new graduates. Such firms are less able, individually, to induct graduates into the business environment. Unlike more established professions, IT professionals do not have a widely-accepted, well-developed training and development infrastructure that small firms can rely on when employing graduates. Without this infrastructure, ICT firms find it hard to keep links with tertiary education providers and to meet and work with students before graduation, such as through in-study employment and work-based education projects. Small ICT-using firms are spread throughout the economy. This makes it even harder for industry initiatives to fill this gap.

F8.14 Small ICT-producing and ICT-using firms find it hard to recruit IT graduates who have the range of skills needed to operate successfully in their business environment. Such firms find it hard to collaborate with other similar firms and with tertiary education providers to help students gain a broader range of skills before graduation.

A subset of these small firms illustrates these difficulties and offers a partial solution. Small ICT-producing firms have clustered in Auckland and Christchurch and are also concentrated in Wellington. Local authorities and central government have encouraged the development of clusters as places where firms can collaborate to exchange knowledge, where personnel can flow easily between firms, and where firms and personnel can interact with academics. One benefit is that the firms reduce their risks in finding suitable IT professionals by locating in places where such professionals are concentrated. A second benefit is that IT professionals reduce the risks from a current employer closing down by locating in an area with a number of potential employers. One drawback is that co-location may lead to job-hopping and poaching. This fear may make firms more reluctant to invest resources in developing new graduates more than is necessary for immediate business purposes.

An inquiry participant told the Commission that these small firms currently do not readily collaborate with each other or with tertiary education providers to improve the supply of "work-ready" IT graduates. This is partly because of a "cultural disconnect" and poorly aligned incentives, and partly because links relied on individuals and so were not necessarily sustainable. Similar concerns were expressed in a recent survey of Wellington hi-tech firms that staff and students at Victoria University conducted (Norman & Oakden, forthcoming). Internships would be one valuable way to establish links between universities and firms. Yet establishing and managing them is time-consuming to the host firms and to the tertiary education providers.

Collaboration between small firms and education providers could be made more sustainable by adjusting current tertiary education funding policies. Some of the funding attached to IT students could be tied to contracted internships and other collaborative arrangements. The clustering of firms would allow education providers to economise on the resources needed to establish and maintain the programme of collaboration. Firms would need to collaborate with each other to work with the education providers. The benefits to these firms would be an improved flow of "work-ready" IT graduates, and better matching of graduates to work opportunities. Collaboration also reduces the cost to each firm of setting up internships

and lets them better replicate the learning opportunities that larger firms offer graduates. Teaching staff would benefit by having closer links with firms where IT innovation is taking place.

If a collaborative initiative focused on small ICT-producing firms in clusters proves successful, it may be possible to use that initiative as a model to extend to other small ICT-producing and ICT-using firms.

R8.4 The Government should develop initiatives to encourage greater engagement and collaboration between education providers and ICT firms, especially small firms.

Q8.5 What initiatives have been tried to improve collaboration between education providers and firms in the past? How effective have they been? What are the factors that made the initiatives successful or unsuccessful?

8.5 Summing up

New Zealand's experience of IT skills shortages over the last seven years has been similar to that of many other countries. Demand has been driven by the increasing importance of IT in the global economy while supply of graduates slumped after the dotcom bust around 2000. Supply has started to accelerate and New Zealand fills many IT positions through migration. This skill shortage reflects a massive shift in the demand for ICT skills globally. The return to balance between supply and demand in New Zealand will come about through a mix of public policy, immigration and market forces over time.

A more pressing problem expressed by firms is finding IT professionals with the range of skills required by their business. Although this is not unique to IT, the fact that IT is rapidly evolving makes it more acute. What IT students learn is not always current.

Addressing these problems is not easy, and requires action from the IT industry, firms that rely on IT graduates, professional bodies, and education providers. Improved collaboration between firms and tertiary education providers would help students gain a fuller range of skills before graduation.

Successful adoption and use of IT among firms in the services sector requires a mix of skills. Business qualifications should be designed so that future managers are knowledgeable about IT, the benefits it can bring, and how it can be integrated into business practices. Equally, services firms often seek IT graduates with good business skills, pointing to the need for flexible, short courses covering these.

9 Cloud computing

Key points

- Cloud computing is changing how information and communication technology (ICT) services are delivered around the world.
- Cloud computing encapsulates many ideas, including that the ownership of data can be separated from its physical location and direct control, data should be stored and processed wherever cheapest, services are best rented on an as-needed basis, and access to data should be seamless across devices and locations.
- Cloud computing is driven by ongoing trends including huge economies of scale and scope in the centralised storage and processing of data, falling data transport costs, near global internet connectivity and consumer preferences for mobility.
- The shift involved in cloud computing – from the immediate physical control of data to control via contract – is as much psychological as technological. Overcoming barriers to the adoption of cloud computing will typically involve designing contracts and institutions to minimise and best allocate risk, and building trust in those contracts and institutions.
- Cloud computing improves the scalability of ICT products. This should be particularly beneficial to firms that are small users of ICT. However, surveys suggest that small firms in New Zealand are slow adopters of cloud computing. The apparent benefits of cloud computing for smaller firms appear to be outweighed by other factors, such as the costs of complementary investments or obtaining the relevant knowledge.
- Cloud computing products create a level playing field for New Zealand digital-service firms competing in foreign markets.
- The Commission has not found evidence that international data connectivity is constraining the adoption of cloud computing in New Zealand.
- Restrictions on data flows will have a disproportionately negative effect on smaller countries such as New Zealand, as they lack the scale to support a wide range of sophisticated, home-grown, digital services.
- The global infrastructure supporting cloud computing has been late to arrive in Australia, and it will take even longer to get to New Zealand. Rather than wait for its arrival, New Zealand policy should support efficient use of Australian infrastructure.
- The Government should relax its requirement that agencies ensure that their data is stored solely in New Zealand. As a first step, the use of services located in Australia should be allowed. Any legal or privacy issues should be dealt with, as a matter of urgency, through negotiations with the Australian Government. Resolving such issues will help New Zealand firms adopt cloud computing.
- The free flow of data will be a central trade issue for this century. The Ministry of Foreign Affairs and Trade and other government agencies should prioritise negotiations that relate to data flows and other internet issues.
- Government policy to encourage firms to adopt cloud computing is best aimed at removing any regulatory barriers, and at increasing the trust that firms have in cloud-based approaches.

Cloud computing is changing the way that information and communication technology (ICT) services are delivered around the world. This chapter looks at the drivers of cloud computing, its potential benefits and barriers to its adoption in New Zealand.

9.1 What is cloud computing?

"Cloud computing" is a loosely defined term. It encapsulates the ideas that:

- ownership of data can be separated from its physical location and direct control;
- data should be stored and processed wherever it can be done most efficiently;
- computing resources and services should be rented as required; and
- access should be seamless across devices and locations.

Box 9.1 explores some definitions of cloud computing. From the – predominantly economic – perspective of this report, the important characteristics are widespread network access (reducing geographic constraints), resource pooling (lowering costs), on-demand service (to cope with peaks and troughs in use), and metered service (users pay only for what they use).

Box 9.1 Defining cloud computing

Cloud computing means many different things to different people.

The New Zealand Institute of IT Professionals defines "cloud computing" as:

> On-demand scalable resources such as networks, servers and applications which are provided as a service, are accessible by the end user and can be rapidly provisioned [ie, configured and started] and released [ie, stopped] with minimal effort or service provider interaction. (IITP, 2013, p. 3)

One definition from the academic literature defines "clouds" as:

> …a large pool of easily usable and accessible virtualized resources (such as hardware, development platforms and/or services). These resources can be dynamically re-configured to adjust to a variable load (scale), allowing also for an optimum resource utilization. This pool of resources is typically exploited by a pay-per-use model in which guarantees are offered by the Infrastructure Provider by means of customized SLAs [service level agreements] (Vaquero, Rodero-Merino, Caceres & Lindner, 2009, p. 51).

The US National Institute of Standards and Technology lists five essential characteristics of cloud computing:

- *On-demand self-service*. Consumers can purchase, configure and use computing capabilities, such as server time and network storage, without human interaction with each service provider.
- *Broad network access*. Services are available over the network and can be accessed from a variety of devices such as mobile phones, tablets, laptops, and workstations.
- *Resource pooling*. Providers pool computing resources to serve multiple consumers, with resources dynamically assigned and reassigned. Customers generally have no control or knowledge over the exact location of the provided resources, but may be able to specify location at a higher level of abstraction (such as country or region).
- *Rapid elasticity*. Resources are allocated and released, in some cases automatically, to scale to match real-time demand. The resources available to consumers may appear to be unlimited and can be appropriated in any quantity at any time.
- *Measured service*. Cloud resources are typically metered at a level of abstraction appropriate to the type of service (for example, storage, processing, and bandwidth). (Mell & Grance, 2011)

These definitions relate cloud computing to technology that provides services to firms on which they may build further services – for their own or their customers' use. The end consumer of a service

cannot necessarily determine whether or not – or the degree to which – cloud computing technologies are being used to provide that service.

The shift involved in cloud computing – from the immediate physical control of data to control via contract – is as much psychological as technological. People have become comfortable with the idea that crucial information about one's business or life can be stored digitally on physical media such as disk drives, and that locks on the door can prevent unwanted access and multiple physical copies can protect against disaster. Cloud computing requires them to trust other parties with their data and its security.

A similar range of issues were no doubt faced when the electricity grid became available for firms with their own power sources such as water or steam. New contracts, institutions and laws were required to resolve information and bargaining asymmetries, and to encourage efficient use of a grid that connects diverse producers to diverse consumers.

F9.1 The shift involved in cloud computing – from the immediate physical control of data to control via contract – is as much psychological as technological. Overcoming barriers to adopting cloud computing will typically involve designing contracts and institutions to minimise and best allocate risk, and building trust in those contracts and institutions.

Types of cloud computing

Cloud computing products are usefully separated into three types (Mell & Grance, 2011):

- *software-as-a-service* (SaaS) – includes the use of consumer-oriented cloud applications (for example Dropbox, Gmail, iCloud, Google Maps) and business-oriented applications (for example, Salesforce, Xero, and Office 365);[57]
- *platform-as-a-service* (PaaS) – cloud computing platforms (such as Amazon Web Services, Windows Azure, and Google App Engine);[58] and
- *infrastructure-as-a-service* (IaaS) – rental of computing and storage infrastructure (such as Rackspace, IBM SmartCloud, and Revera Homeland).[59]

Businesses are potential customers for each of these three types of products. Some then use them to offer online services to their own customers. Shopify, for example, is a SaaS product that lets firms create their own online stores.

Economies of scale are driving cloud computing

The trend towards cloud computing is driven by huge economies of scale and scope in the centralised storage and processing of data (Hamilton, 2008), falling data transport costs, near worldwide internet connectivity and a significant consumer premium on mobility. These trends have reshaped the ICT world over the past decade and show no signs of abating in the near term.

The effect of scale shows in the prices of US and New Zealand cloud providers. The Commission performed a limited comparison of publicly-quoted IaaS prices, and found the US provider offered more options and significantly lower prices (Box 9.2).

[57] Dropbox provides cloud file storage and synchronisation across multiple devices. Gmail is a cloud-based email client. iCloud provides email, calendar, contacts, reminders, web-based spreadsheets, word processing and presentations, device backups and synchronisation. Salesforce is a customer relationship manager (CRM). Xero provides small-business accounting. Office 365 is a cloud-enabled version of Microsoft Office.
[58] Amazon Web Services, Windows Azure and Google App Engine provide (on a rental basis) physical and software infrastructure that firms and government agencies use to develop and host complex websites and applications in the cloud.
[59] Rackspace, IBM SmartCloud and Revera Homeland rent physical and virtual servers in their own data centres.

Box 9.2 **IaaS pricing comparison: New Zealand vs. the US**

The Commission compared the cost of renting a server in New Zealand with that of a comparable server located in the US[60], to get an indication of relative prices.

- OpenHost in Auckland offer a Linux virtual server with 10GB disk space, 60GB data traffic and 1GB RAM for NZ$69/month (OpenHost, 2014).
- Rackspace in the US offer a Linux virtual server with 20GB disk space (using an SSD), 60GB data traffic and 1GB RAM for NZ$44/month[61] (Rackspace, 2014).

The Rackspace offer is at two-thirds of the New Zealand price. Furthermore, the Rackspace configuration is more highly configured, offering a much faster disk subsystem and double the disk storage space.

Rackspace also offer a much wider range of product configurations, especially at the high end. The four packages from OpenHost correspond most closely to the lowest-configured two of the nine packages offered by Rackspace[62].

High fixed costs and low variable costs are an integral part of ICT (Chapter 5). This pattern of costs is a direct source of productivity gains through increasing returns to scale. Yet fixed costs can be an adoption barrier for smaller firms, leading to lower levels of competition in industries that use ICT.

The cloud computing model is subject to high fixed costs. Cloud service providers usually bear these costs and recover them through their (variable) charges. Their customers mainly face variable costs. The consolidation of fixed costs with service providers also lets providers spread demand risk[63] across their customer base, and benefit from economies of scale in purchasing and financing.

Providing PaaS and IaaS on a global scale is sufficiently capital intensive that only a few companies compete in these markets (Box 9.3).

Box 9.3 **Global competition to provide cloud services**

Some of the most influential companies in technology – Google, Microsoft, IBM and Amazon – are using clouds to compete for the corporate and government computing markets.

Businesses are moving from owning their computers to renting data-crunching power and software over the internet. Providers are making big promises about computing clouds. For example, supercomputing-based research need not be limited to organisations that can afford supercomputers. And technology companies with a hot idea will be able to expand rapidly, without the need to build and maintain their own computer networks.

The Snapchat photo-swapping service processes 4,000 pictures a second on Google's servers. It is just two years old and has fewer than 30 employees. The company started out working with a Google service that helps young companies create applications and was chosen by Google to be an early customer of its cloud. Snapchat has never owned a computer server.

[60] Both providers offered many configurations. For this comparison, the Commission chose the two configurations with the closest match in advertised features.

[61] US dollar prices converted to New Zealand dollars based using the exchange rate as at 20 January 2014.

[62] OpenHost's sister company WebDrive has a wider range of offerings; however they fall well short of the higher configuration packages offered by Rackspace.

[63] Demand risk, in this context, is the risk that a firm purchases too little, or too much, infrastructure to meet customer demand.

This is a big shift from the days when, for young companies, knowing how to build a complex data centre was as important as creating a popular service.

Amazon's cloud, Amazon Web Services, was arguably the pioneer of the public cloud and for now is the largest player. Amazon's cloud has hundreds of thousands of customers, including big names like Netflix, which stopped building its own data centres in 2008 and was completely on Amazon's cloud by 2012. All of Amazon's services also run inside that cloud.

3M – a more traditional consumer goods company – is using Microsoft's Azure public cloud to process images for 20,000 individuals and companies in 50 countries to analyse various product designs. Microsoft says Azure handles 100 petabytes of data a day, which equates to about 700 years of high-definition movies.

Each big cloud provider has built a global network of over a million computer servers in the past few years. The companies have re-thought almost every step to maximise efficiency and reduce power use.

Only a few other companies are likely to manage either the capital or the expertise to build such systems. Facebook owns a giant global computing network, but has shown no interest in corporate computing.

IBM, which in July 2013 paid US$2 billion to buy cloud storage provider SoftLayer Technologies, plans to add 12 new facilities in 2014 to its existing 25 facilities.

The biggest promise of these clouds is to make it easy to do computing activities that would have cost millions of dollars in hardware just a few years ago.

Source: Hardy (2013).

9.2 What does cloud computing offer?

Cost reductions and enhanced functionality from cloud computing potentially benefit all ICT producers and their users. This section explores who might benefit in particular, and how that might affect New Zealand.

Cloud computing is particularly beneficial for small ICT users

Many products and services are "scalable", in the sense that purchasers can buy exactly (or very nearly) the quantity they need. For example, petrol is sold by the fraction of a litre and hotel rooms are sold by the night. Others are inherently non-scalable or "lumpy", so it makes little sense to buy half a computer server or a part-time enterprise resource planning system.

Such lumpy – or imperfectly scalable – technologies disadvantage small users, as they face buying more capacity than they expect to use.

Cloud computing can improve the scalability of ICT products as noted below.

- The rent-rather-than-buy nature of cloud products reduces the costs and risks of innovation and experimentation. This is particularly beneficial to start-ups and smaller firms with limited access to capital.
- The shared-use nature of cloud products typically leads to lower overall costs, particularly for firms with regular or irregular peaks and troughs in their computing requirements. For example, an event management firm may need to process tens of thousands of transactions on only a few days each year. Access to shared infrastructure means the firm does not need to own IT systems equipped to service peak loads, which would otherwise sit idle for most of the year.

- SaaS products typically have finer-grained pricing than their non-cloud equivalents. Many products are offered that have payment for each transaction (called per-transaction pricing). This can be an advantage for small firms that would otherwise face non-scalable pricing schedules.
- IaaS products are available with fine-grained pricing. A firm can rent exactly what it needs; for example two-thirds of the capacity of a single server with backup as and when needed.[64] This is a much better use of resources – and likely much more cost-effective – than purchasing two full servers (primary and backup), neither of which is completely used. So IaaS is likely to be particularly advantageous for firms with relatively small ICT needs.

Cloud computing helps smaller firms, in particular, manage financial and business risk, such as inadequate capacity and stranded assets.

Software vendors traditionally served smaller customers using feature-based discrimination – offering them cheaper "lite" versions with reduced functionality (Shapiro & Varian, 1999). Cloud-based rental models, such as per-transaction pricing, do not limit the features available to smaller customers (Sapere, sub. 105).

F9.2 Cloud computing improves the scalability of ICT products. This is particularly beneficial to firms that are small users of ICT.

Cloud computing benefits digital-service exporters

Renting cloud services in other countries lets New Zealand firms that export digital services have similar IT costs to competitors based in those countries. This "levelled playing field" will offer an overall cost advantage to New Zealand firms if other costs (such as labour) are lower than those of their competitors.

IaaS and PaaS services hosted elsewhere help New Zealand-based firms create and export SaaS products. For example, New Zealand service exporter Xero rents servers (IaaS) from Rackspace in the United States to provide its accounting software (SaaS) to customers in North America.

Other examples of New Zealand digital-service exporters that use cloud services include the Mi5/iDefigo video surveillance services (Vodafone, sub. 8) and the Vend point-of-sale products.

F9.3 Infrastructure-as-a-service and platform-as-a-service products create a level playing field for data-intensive New Zealand firms competing in foreign markets.

How cloud computing affects ICT adoption

Cloud computing offers firms:

- lower overall ICT costs than if they had provided the services themselves (McAffee, 2011);
- freedom from having to make large capital outlays on computing hardware; and
- an increased number of product choices.

In terms of the adoption model presented in Chapter 6, these factors make ICT adoption more likely, all being equal. It is a separate question as to whether they will narrow the gap between New Zealand and global adoption. To narrow (or increase) the gap, New Zealand would have to be affected differently by cloud computing. Section 9.3 explores the adoption of cloud computing in New Zealand.

ICT costs are only part of the overall cost-benefit equation involved in deciding what ICT to adopt.[65] Cheaper ICT costs by themselves may be insufficient to turn an unprofitable investment into a profitable

[64] "Backup" in this example means a secondary server to take over when the primary one fails or requires maintenance, rather than data backup facilities. (The nature of the cloud offers lower costs for data backup as well.)
[65] Research has found the cost of complementary investments to be as much as 10 times ICT costs (Chapter 5).

one. In many cases, other factors (such as the lack of relevant skills, limited market size or regulatory barriers) will be more significant than ICT costs.

Cloud computing should be relatively more beneficial for firms with capital constraints, reflecting its effect on fixed costs.

As discussed in Chapter 6, anticipated adjustment costs may be a significant factor in adoption decisions that involve disruptive technologies. Should cloud computing options be more disruptive to a firm's operations than alternatives, then adjustment costs may negate any cost advantages from this form of ICT.

Cloud computing creates additional options for firms. First, delivery by cloud potentially allows digital-service providers to service a larger geographic area, increasing the number of products available to firms in particular locations. Second, as many cloud products compete against existing products delivered in a conventional way, more products enter the market.

In general, firms are better off with more choices about their inputs. Having more choices increases their chances of finding a product more closely matched to their particular needs. Also, an increased number of close substitutes increases competition and helps to improve efficiency and drive down prices.

F9.4

Cloud computing creates more choices for firms about their inputs. In general, firms are better off with more options. First, cloud services increase their chances of finding inputs more closely matched to their particular needs. Second, an increased number of close input substitutes increases competition, and helps to improve efficiency and drive down prices.

9.3 Adoption of cloud computing in New Zealand

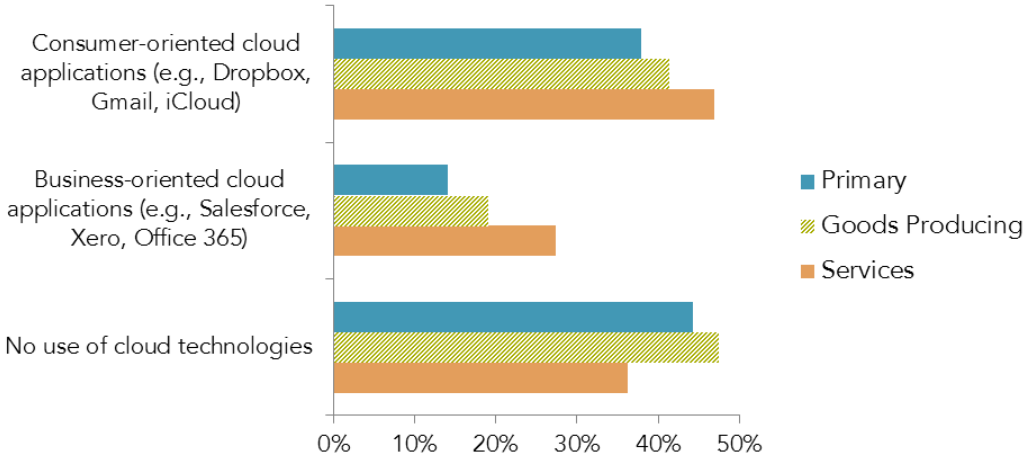
Business use of cloud computing

Surveys provide a source of data on the use of cloud computing by New Zealand businesses.

The Commission's 2013 business survey

Sixty percent of businesses that responded to the Commission's business survey reported that they use, or intend to use in the near future, at least one type of cloud computing technology. Consumer-oriented cloud applications are most commonly reported (45%), followed by business-oriented cloud applications (23%). Figure 9.1 breaks this down across sectors. The use of cloud technologies in the services sector is higher than in the primary sector and goods-producing sector.

Figure 9.1 Business-reported current or near-future use of cloud computing technologies



Source: Colmar Brunton (2013).

The adoption of more consumer-oriented cloud applications than business-oriented applications is consistent with the emerging phenomenon of consumer-led technology diffusion. Another example is the "bring your own device" effect, which has seen the use of technology in the workplace increase as employees bring their own devices such as phones and tablets to work, expecting that they will be interoperable with workplace ICT systems.

The MYOB *Business Monitor September 2013*

The MYOB business monitor reports a much lower level of cloud computing use (18%) than the Commission's survey (60%). This could be due to one or both of two factors.

First, the MYOB monitor asked about current use, while the Commission's survey asked about current *and near-future* use. Low current use but high intended near-future use could explain all or part of the difference. Yet the slow growth in use (from 14% in May 2012 to 16% in March 2013) is inconsistent with high rates of intended near-future use.

Second, the MYOB monitor is more strongly weighted towards smaller businesses than the Commission's survey. In particular, the Commission's survey excludes sole traders and firms with no employees.

The MYOB business monitor reported that most businesses surveyed that used cloud computing benefited by being able to work remotely (55%). Other reported benefits were reduced time spent on IT issues (29%) and reduced IT costs (29%), increased access to new technology (28%) and increased security of business data (28%) and improved customer service (28%).

Frost & Sullivan's *State of Cloud Computing New Zealand 2013*

Market research firm Frost & Sullivan (2013d) reported on New Zealand organisations' use of cloud computing:

> …of organisations in New Zealand currently using cloud computing services, 47% spend more than 10% of their total IT budget and 32% spend more than 20% of their total IT budget on cloud solutions or services.
>
> …There is a marked increase from 2012's figures, indicating a growing shift to the cloud.
>
> Organisational understanding of cloud computing is maturing, and interest is observed across all sectors in the New Zealand market, with no one vertical [industry] dominating demand. Software-as-a-Service (SaaS) still accounts for the largest portion of cloud revenues, although the adoption of Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS) has been very strong over the past two to three years.

These trends appear consistent with overseas experiences.

Larger businesses spend more on cloud computing

Frost & Sullivan (2013d) found that in New Zealand:

> …larger organisations generally spend more on cloud computing services
>
> SaaS application adoption rates are positively correlated with the size of the organisation…

This finding is consistent with the adoption rates in the Commission and MYOB surveys since the MYOB survey – weighted towards smaller businesses – reported a much lower adoption rate.

Taken together, the three surveys support a conclusion that smaller firms in New Zealand are lower adopters of cloud computing. This is inconsistent with the more theoretical discussion earlier in this chapter that smaller firms stand to benefit disproportionately from adopting cloud computing. So it is likely that the apparent benefits of cloud computing for smaller firms are outweighed by the other factors raised in Chapter 6, such as the costs of complementary investments or gaining the relevant knowledge.

F9.5 Surveys suggest that small firms in New Zealand are slow adopters of cloud computing. For small firms, the benefits of cloud computing appear to be outweighed by other factors, such as the costs of complementary investments or obtaining the relevant knowledge.

Porirua City Council (sub. 114) suggests that knowledge may be a barrier to New Zealand firms adopting cloud computing:

> The risks and benefits associated with adopting this new technology … may not be well understood, nor well communicated to individuals and organisations (p. 3).

Government use of cloud computing

The New Zealand Government has been a strong adopter of New Zealand-located IaaS services. Yet local services are dearer than similar overseas services. The Government has decided not to use overseas-hosted IaaS, PaaS and SaaS services (Box 9.4).

Box 9.4 Government policy on overseas-hosted cloud computing

Several government agencies, such as the Department of Conservation, have integrated cloud-based services into their operations. The Commission is not aware of any government agencies that are making use of overseas-hosted cloud services.

The Government announced a new cross-agency programme to coordinate and control cloud computing across departments in August 2012. Individual agencies are no longer permitted to make decisions related to cloud computing without approval from the Department of Internal Affairs (DIA). Cabinet agreed that office productivity services would be the first set of cloud computing tools to be deployed across government, and that these services could not be hosted outside of New Zealand:

> It is appropriate that any cloud-based office productivity services selected for deployment across government agencies be hosted onshore for the time being. (Cabinet Minute, 2012, p. 3)

The Minister of Internal Affairs cited a number of reasons for this approach. The Minister recognised the potential for cloud computing to reduce costs, improve productivity and increase innovation (Office of the Minister of Internal Affairs, 2012). The Minister also noted the cost of a restriction on offshore hosting – unlike large jurisdictions such as the United States, New Zealand does not have the scale of local ICT operations to enable low-cost cloud services onshore. Cabinet considered that, on balance, the risks for data misuse and loss of control outweighed the potential benefits of international cloud services. Cabinet agreed that onshore hosting was desirable for security reasons:

> As [office productivity services] handle a huge amount and wide range of official information, it is vital that there is tight management of the selection and deployment of these services. The potential risks to data security, control and access and other privacy concerns discussed in this paper are a critical consideration for these services. I consider that these risks can be more tightly managed in the first instance if office productivity services are selected that are hosted within New Zealand. (Office of the Minister of Internal Affairs, 2012, p. 11)

Little progress on implementing the government cloud computing programme appears to have been made since 2012. The State Services Commission's (SSC, 2009) guidance for agencies currently available on the www.ict.govt.nz website is out of date and misleading. DIA issued a request for desktop-as-a-service proposals in early 2013, but the status of this project, and the existence of any other government work underway on cloud computing, is not clear.

The Productivity Commission has interpreted this – somewhat conflicting – documentation as a general prohibition on the overseas hosting of government cloud computing.

This policy has been criticised for two reasons:

- the Government is paying too much for cloud services, and this will likely increase over time (Bisley, 2013); and
- the Government is sending a poor signal to private firms about how suitable cloud computing is for the ICT needs of private firms (Sapere Research Group and Covec, sub. 105, p. 6).

The policy also reduces pressure from government agencies to address regulatory changes that would deal with the issues and perceptions that motivated the policy. Those issues may well have a more significant effect on firms' ICT adoption decisions than the policy's demonstration effects.

For New Zealand to take full advantage of cloud computing, firms and government agencies need seamless access to infrastructure in countries in the region (see section 9.4).

Wider regional or multilateral treaties are the ideal way to deal with security and data sovereignty issues. Pending those, the best strategy is bilateral negotiations with the relevant countries. Australia, Singapore and Taiwan should have priority, as these are the closest locations that offer the relevant infrastructure. Of these, Australia is the most important, and has the most compatible regulation and institutions (APC & NZPC, 2012). Closer Economic Relations supports the fast resolution of trans-Tasman regulatory issues.

R9.1 The Government should relax its requirement that government agencies ensure that their data is stored solely in New Zealand. As a first step, the use of services located in Australia should be permitted. The legal and privacy risks should be dealt with, as a matter of urgency, through negotiations with the Australian Government. Resolving such issues will also help New Zealand firms adopt cloud computing.

9.4 Barriers to the adoption of cloud computing

This section considers barriers that might prevent or delay New Zealand service firms from adopting cloud computing. These barriers also apply to the adoption of other ICT, but only those barriers particularly relevant to cloud computing are covered in this section.

Latency favours providing cloud services within Australasia

Latency is the delay incurred in transporting data over a distance.[66] It creates a significant disadvantage for some services to clients in New Zealand who use cloud services hosted outside Australasia (Box 9.5).

Box 9.5 **Latency – what is it and when does it become a problem?**

People using an online service typically expect an "immediate" response. Slow responses tend to frustrate computer users and waste their time. All else being equal, they will choose a more responsive system rather than a less responsive system.

Data needs to travel both ways to interact with a remote system. Data transport latency is the round-trip time – the time required to transport a request to the remote system and transport the response back.

Latencies of up to about 50ms (1/20th of a second) are seen as instantaneous by most people in most situations. Longer delays may – or may not – be acceptable, depending on the specific situation.

Data cannot be transferred faster than the speed of light in a vacuum – about 300,000 km a second. In practice, fibre or copper transmit data at about two-thirds of this speed. So it takes 50ms for a round

[66] Long latencies are seen as slow speeds; yet latency is unrelated to measures of bandwidth typically used as proxies for internet "speed".

trip across a distance of 10,000 km.

Submarine cables do not follow straight lines, so actual round-trip latencies are around 23ms for Auckland to Sydney and 121ms for Auckland to California (Southern Cross, 2012a).

Computer users in New Zealand experience latencies that also include processing time on the local remote computers, transport latency in New Zealand and the hosting country, and further delays created by switching equipment or congestion. Only services hosted in New Zealand and eastern Australia can feasibly meet a total latency target of 50ms.

Hosting in South East Asia – for example in Singapore or Taiwan – may be a feasible option for services less sensitive to latency.

PaaS services have arrived late to Australasia

PaaS services are poorly provided in Australasia. Amazon's Sydney data centre hosts the only major service – and this has only opened in the past year. Microsoft may open a competing data centre in the near future (Bennett, 2013).

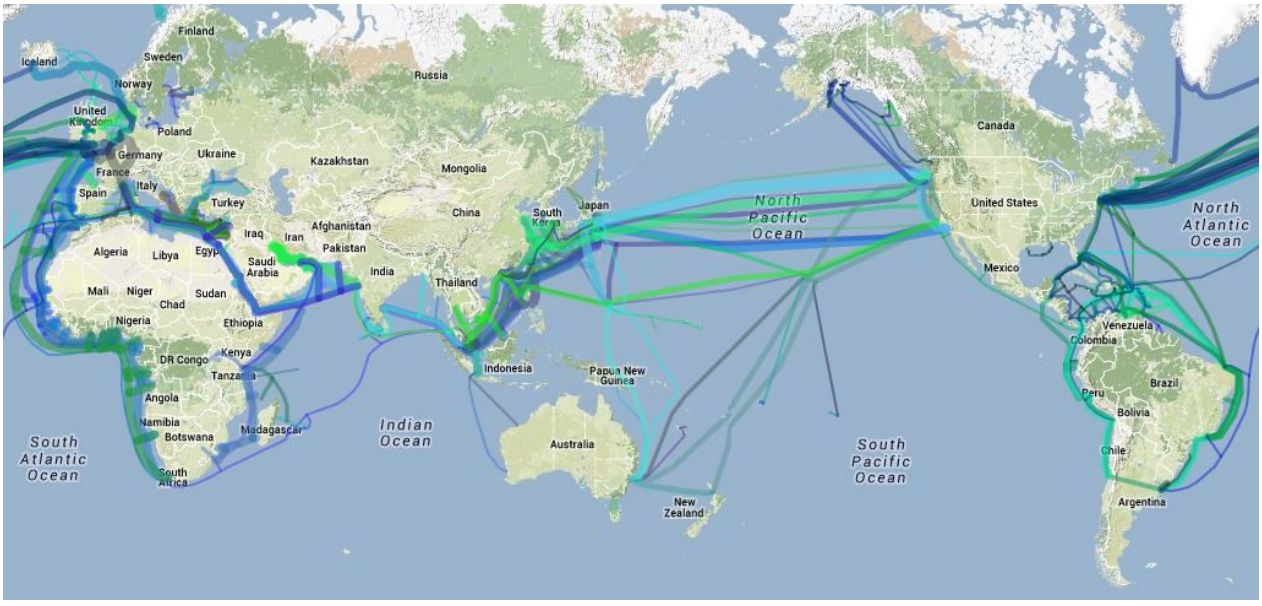
PaaS hosting in New Zealand is unlikely in the medium term, as economies of scale are lacking. This should not be a problem for New Zealand unless other barriers prevent New Zealand firms and the Government from using Australia-hosted PaaS.

Google has recently opened its first data centres in Asia – in Singapore and Taiwan (Google, 2013).

International connectivity

Full adoption of cloud computing requires reliable connectivity with the rest of the world. New Zealand's location and relatively small population see it stand apart in the global data network (Figure 9.2).

Figure 9.2 Undersea data cables



Source: Mahlknecht (2013).

Notes:

1. Cables in service as at 19 December 2013.
2. The width of the cables reflects their relative design capacities. Cables less than 1Gbps are not shown.
3. Land-based cables are not shown.

New Zealand's three submarine fibre-optic cables come ashore near Auckland. This small number of cables – and having their landing zones clustered geographically – offers limited redundancy, and increases the risk that a natural disaster, accident, sabotage or equipment failure could seriously compromise New Zealand's data connectivity.

The Tasman 2 cable links Auckland and Sydney. Commissioned in 1992, it is owned by Reach, a joint venture between Telstra and Hong Kong-based PCCW. Its data capacity is very small by today's standards.

Two Southern Cross cables provide most of New Zealand's international data connectivity. One cable links Auckland to Sydney, the other Auckland to California via Hawaii. They are operated by Bermuda-based Southern Cross Cables Holdings Limited (SCCHL), which is owned by Telecom New Zealand (50.01%), SingTel (39.99%) and Verizon Business (10%). All three owners have an equal power to veto resolutions, offering a Telecom New Zealand less control than indicated by their majority shareholding.

Commissioned in 2000 the cables cost about US$1.5 billion. Improved technology has seen their capacity progressively upgraded. Capacity is currently 2.7Tbps[67] – more than 10 times the original design capacity of 240Gbps. SCCHL expect to increase this capacity to more than 12Tbps, and expect that demand will continue to be lower than capacity for some years:

> The chances are very high that the existing cable will continue to perform past 2025 until at least 2030 and the upgrade path for the cable means we will be able to outpace demand for many years (Southern Cross, 2012b).

Some commentators, users and potential users of the Southern Cross cables are concerned about their limited capacity and the market power of SCCHL to inflate prices (see Sunlight on international cables, 2011; and Keall, 2013a; 2013b).

SCCHL claim that their New Zealand market rates are identical to their Australian market rates:

> We charge the same market rate for capacity from NZ to the US and for capacity to AU. We establish NZ market prices in the very competitive Australian and Hawaiian capacity markets and apply those prices to the NZ market. (Southern Cross, 2012b)

The Commission has not seen any hard evidence to support concerns of demand exceeding supply in the near future, or of inflated pricing. It welcomes further information from inquiry participants.

Q9.1 Does New Zealand face an impending shortage of capacity on its international data links? Can you supply information that indicates the likely extent and timing of such a shortfall?

Q9.2 Can you supply information to support or refute concerns that market power is used to inflate the prices charged for use of the Southern Cross cable?

Claims about limited capacity and competition should become less relevant if the cable construction announced by several consortia occurs. For example:

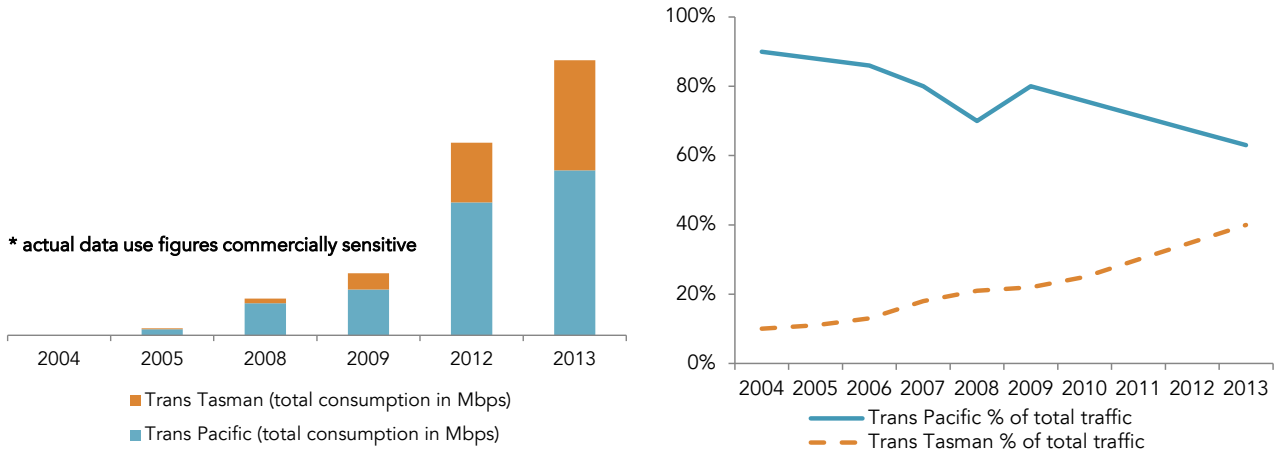
> Telstra, Telecom and Vodafone have issued a tender for their proposed Tasman Global Access cable between Auckland and Sydney… The contract for the 2300km, $US60 million cable is expected to be awarded by the end of the year… Construction should begin in 2014 and the cable […] operational by 2015. (Keall, 2013c)

The proportion of New Zealand traffic going to or through Australia (as opposed to the United States) has been steadily increasing over the last decade (Figure 9.3). The trans-Pacific share of traffic has fallen from about 90% of the total in 2004 to about 60%. An extra link between New Zealand and Australia will provide

[67] "Tbps" is terabits per second or 1,024 gigabits per second (Gbps).

further competition on this leg and into Asia;[68] and indirect competition for data traffic to the United States.[69]

Figure 9.3 Telecom International cable data New Zealand traffic trends



Source: Bennett (2013).

The proposed Tasman Global Access cable will also reduce risk through increased redundancy:

> The […] cable will enable New Zealand to better leverage the four additional international cable systems serving Australia (with several more proposed or in development) and providing important redundancy (a second cable pathway) for New Zealand international traffic. (Vodafone, sub. 8, p. 6)

An additional trans-Tasman cable is a good match for New Zealand's medium-term requirements. A trans-Pacific cable dedicated to New Zealand traffic would be far more costly.

SubPartners recently announced the APX-East cable between Sydney and Los Angeles via Hawaii (SubPartners, 2013a). Construction is planned for 2014-15. Its design includes a branch connection to New Zealand (SubPartners, 2013b). Hawaiki Cable Limited has a similar project underway and has signed letters of intent with several customers (Hawaiki Cable Limited, 2013). It is unclear whether these two proposals are fully funded at present.

Undersea cables are very expensive, and ultimately have to be paid for by their users. The economically-optimum number of cables is always likely to appear smaller than desirable from a competition or redundancy perspective. Government intervention to "fix" these perceived problems by artificially increasing the number of cables would be costly with the costs borne by internet users or taxpayers.

Pending further information on this issue, the Commission does not believe that international data connectivity is limiting the adoption of cloud computing in New Zealand.

F9.6 The Commission has not found evidence that international data connectivity is limiting the adoption of cloud computing in New Zealand.

Regulatory barriers

ICT processes, stores and transports information, and its characteristics and fast rate of change can create challenges for existing regulations and a need for new ones.

Cloud computing further complicates these challenges, as it undermines assumptions about who owns data, and about the location of its production, transport, storage and consumption.

[68] Australia has four current cable connections with Asia, with a further two planned (Mahlknecht, 2013).
[69] It is a partial substitute, as routing New Zealand–US traffic through Australia increases latency, and so offers a lower quality of service.

Two broad questions are:

- How does existing regulation, perhaps designed for a different era, work with the cloud?
- How do governments react to the new challenges that the cloud creates?

The Commission is not in a position to fully address these questions in this interim report. This subsection covers a subset of relevant issues. Many of these issues are not specific to cloud computing; however cloud computing increases their importance.

Q9.3 Are there other regulatory issues relating to cloud computing that the Commission should consider in its final report?

Cloud computing raises significant issues for the owners of data – around security (unauthorised access or modification), reliability, switching (costs of moving to another provider) and control (such as access to data in the case of supplier bankruptcy). These issues create costs that deter individuals and firms adopting cloud computing.

Data security

Security is very important for data owners:

> Security is the most important criteria when selecting a cloud vendor, followed by reputation, trust, service and reliable support, price and ROI [return on investment] success. Vendors must also have sufficient SLAs [service level agreements], offer sufficient product scalability and offer a range of value added services. (Frost & Sullivan, 2013d)

There are many aspects to data security. Data owners want to be able to determine who has access to their data and under what conditions. They want to access it (for their own use) wherever and whenever they determine. They want it protected against malicious (or inadvertent) access, modification or deletion. They want it reliably backed up. And, at times, they want to be able to erase it beyond recovery.

Many of these matters are properly the business of data owners and service providers, and most appropriately resolved by mutual agreement. Yet government interests overlap and to some extent conflict with the needs of data owners. For example, governments need access to private data to enforce some laws:

> [The] Government is currently considering lawful interception requirements for communications services. That policy process needs to properly consider the issues and implications for remotely hosted Cloud services. Further, clarity around the firm's data storage obligations and opportunities would likely give firms further confidence to use cloud based services. (Telecom, sub. 16, p. 3)

Malicious cyber security threats do not respect borders. Notions that in-house is "safer" than onshore, which in turn is "safer" than offshore, are outdated. Cloud providers may be better placed to deal with security threats by responding to the aggregate security needs of many customers and providing 24/7 response capability.

Privacy

Privacy is a more subtle aspect of data security. Privacy issues can arise because of the *way* information is used, *who* makes use of it, or what other information is *combined* with it, rather than publication in itself.

Such aspects are a challenge to regulate. As data flows across borders, regulatory responses may need to be international to be fully effective.

Digital content

Much legislation focuses on content, for example bullying, defamation, pornography, advertising and film classification. In the past such legislation was often specific to particular media types. These distinctions continue. For example, a complaint against a television programme is considered differently depending on whether it was broadcast over the television network or accessed online (NZLC, 2013). The process of

"digital convergence", where most content has become digitised and the lines between different media increasingly blurred, has made such distinctions less than helpful.

Similarly, copyright laws aim to balance the interests of content producers with those of content consumers. There are some open questions about whether New Zealand's current approach has the exceptions and fair use/dealing provisions to stimulate innovation and collaboration.

Law enforcement

Since the internet became widespread in the 1990s, it has proved a challenge for national legal systems. The internet raises questions: Whose laws apply to website content potentially created in one country, stored in a second and used in a third?

These considerations are important for national governments. For example, search warrants and restraining orders must be effective to enforce laws.

The European Centre for International Political Economy (ECIPE) has proposed a Mutual Legal Assistance Protocol to set rules (with safeguards) for law enforcement requests and responses for information – combined with rules restricting data localisation[70] (Lee-Makiyama, 2013). It is an interesting solution as it combines legal and economic objectives. ECIPE argues that "improved law enforcement removes the only legitimate argument for countries to demand greater access to data through localisation rules".

Regulation in the digital era

Cloud computing has made questions about data location harder to answer. In its purest form, data in the cloud is stored "everywhere and nowhere". Flexibility over where data is stored and processed allows cloud computing service providers to be more efficient – and ultimately to provide services at lower prices for their customers. Restrictions on where data is stored or the free flow of data between countries may be costly for those affected.

From an efficiency perspective, the challenge is to let data flow freely across national borders without impeding national governments to enforce their laws. On the other hand, national laws may be ineffective without international cooperation. Governments will need to be realistic about the limits of their ability to regulate.

The Government should prioritise international negotiations on internet issues. The free flow of data is a trade issue for this century. Restrictions on data flows will have a disproportionately negative effect on smaller countries such as New Zealand, as they lack the scale to support a wide range of sophisticated, home-grown, digital services.

F9.7 Free trade agreements are likely to have an increasing focus on "free trade in data". For efficiency, the challenge is to let data flow freely across national borders without impeding national governments to enforce their laws.

F9.8 Restrictions on data flows will have a disproportionately negative effect on smaller countries such as New Zealand, as they lack the scale to support a wide range of sophisticated, home-grown, digital services.

R9.2 The Government should give priority in international trade negotiations to internet issues.

[70] "Data localisation", in this context, is the requirement to store data within national borders.

The Government should pursue free-trade-in-data agreements with other countries. A reasonable aim of such agreements should be that the rights and responsibilities of data owners are indifferent to the physical location of their data.

Transfer pricing and tax evasion

Services across national borders challenge tax. This is especially the case for digital services, as concepts of country of origin and country of consumption become blurred, and their flows across national borders are difficult to monitor. The widespread adoption of cloud computing make these challenges harder.

The OECD's base erosion and profit shifting initiative identifies specific challenges associated with taxing digital services:

> The spread of the digital economy also poses challenges for international taxation. The digital economy is characterised by an unparalleled reliance on intangible assets, the massive use of data (notably personal data), the widespread adoption of multi-sided business models capturing value from externalities generated by free products, and the difficulty of determining the jurisdiction in which value creation occurs. This raises fundamental questions as to how enterprises in the digital economy add value and make their profits, and how the digital economy relates to the concepts of source and residence or the characterisation of income for tax purposes. (OECD, 2013e, p.10)

Transfer pricing – moving profits to low-taxing jurisdictions – has long been an issue for governments. Working out where Google makes its profits is much harder than in the case of, for example, Exxon, which used to be the type of company associated with transfer pricing. These issues will not be easy to resolve and may rely on the actions of consumers (*Dominion Post*, 2014) and the unilateral and multilateral actions of governments.

The specific challenge for New Zealand in the context of cloud computing is how to tax the profits of international providers earned in the New Zealand market without prompting them to avoid liability by somehow relocating to offshore tax or data havens.[71] Consequences of such relocation could be not only lost potential tax revenue but also poor quality of service (due to increased latency), increased data transport costs, and a reduced ability to apply New Zealand law to digital content.

So solutions are most likely to involve coordinated action by multiple governments. This makes it important for New Zealand to be involved in multilateral initiatives.

R9.3 New Zealand should promote – and participate in – international forums with the aim of reducing the ability of multi-national firms providing digital services to shift their profits across national borders to avoid paying tax.

[71] A "data haven" in this context is a jurisdiction with relatively unrestrictive laws about data content and that does not support enforcing the laws of other countries.

Summary of questions

The full set of questions from the report are below.

Chapter 1 – About this enquiry

Q1.1 Do current innovation policies adequately incentivise innovation in the services sector? If not, what changes are required?

Q1.2 Can you provide examples of innovative projects in the services sector that failed to launch because they did not qualify for innovation subsidies or grants?

Chapter 3 – Addressing search and switching costs

Q3.1 Is there a need for specific guidelines or an accreditation system for comparison websites in New Zealand? If so, what approach would be most effective and who would be best positioned to manage and run it?

Q3.2 Are there additional steps that the Law Society could take to further strengthen competition within the legal profession?

For example, would there be merit in following the UK lead and including the promotion of a competitive market in the statutory objectives of the Law Society?

What measures could be undertaken by other professional bodies to strengthen competition in their respective professions?

Chapter 4 – Improving competition law

Q4.1 Is there a case for some form of ongoing research or investigation into the state of competition in New Zealand markets?

If so, which of the following options would be most beneficial?

1. Granting the Commerce Commission a formal mandate to conduct market studies.
2. More regular use of inquiries that are currently undertaken on an ad hoc basis.
3. Providing greater resources to the competition advocacy work of the Commerce Commission.
4. Establishing a small contestable fund available to organisations that research the performance of different markets, with an emphasis on improving market outcomes for consumers.

Q4.2 If a market studies regime were introduced in New Zealand:

- Should the Commerce Commission have formal powers to compel the supply of information for market studies?
- Should the Commerce Commission have the discretion to launch market studies, or should this be the responsibility of Parliament or Ministers?
- Should the Government have to formally respond to market study reports?
- What other design features should it have?

Chapter 6 – ICT adoption by firms: business and policy influences

Q6.1 Have you faced any barriers to buying information and communication technology (ICT) products and services in New Zealand? If so, what products are affected, and how?

Q6.2 What is your experience of purchasing ICT products for business use in New Zealand? Do prices differ significantly from international prices? What might explain these differences?

Q6.3 In your experience, does latency – the delays involved in moving data to and from other countries – make some services unattractive or unusable in New Zealand? What services are affected?

Q6.4 In your experience, is a deficiency in domestic data-communications infrastructure constraining ICT adoption by New Zealand businesses? Which businesses are affected and in what way?

Q6.5 To what extent does internet- and ICT-related policy advice within government reflect a whole-of-economy perspective? Is there a useful role for cross-agency coordination? How could this be best achieved?

Q6.6 Are government programmes to provide information to firms about the benefits of adopting ICT efficient and effective? What might improve them?

Q6.7 Should publicly-funded programmes to promote to firms the benefits of adopting ICT be expanded or contracted? On what criteria should such a decision be made?

Q6.8 What institutions or incentives might best encourage firms to document and credibly share, in a timely way, their learnings about the success and failure of ICT projects? Can you point to initiatives that have been successful elsewhere?

Q6.9 What changes might best encourage government agencies to document and credibly share, in a timely way, their learnings about the success and failure of ICT projects?

Q6.10	Is the requirement that a member's interest in a KiwiSaver Fund must, on request by the member that it be transferred to another fund, be so transferred within a maximum of 35 days, constraining KiwiSaver Fund managers in their investment choices and in particular from investing in private equity and venture capital? If so, how material is that constraint, in the short term and the longer term?
Q6.11	Do New Zealand's bankruptcy laws encourage or discourage high-risk business start-ups and innovation? What improvements could be made?

Chapter 7 – Application of ICT in retail and wholesale

Q7.1	Do the Resource Management Act 1991 provisions or district planning processes still pose significant barriers to siting businesses in the right location and at an efficient scale?

Chapter 8 – Supply and demand of IT skills

Q8.1	What adjustments to New Zealand's policies and procedures for temporary work visas and skilled migrants would speed up and reduce the cost of filling IT positions from overseas?
Q8.2	What are the advantages and disadvantages of the Ministry of Education publishing information on graduate employment and earnings outcomes by field of study and by tertiary education provider?
Q8.3	How could degree structures, timetabling and other administrative arrangements be made more accommodating for students to do joint degrees in business and ICT, including computer science?
Q8.4	To what extent should IT courses be required for business students?
Q8.5	What initiatives have been tried to improve collaboration between education providers and firms in the past? How effective have they been? What are the factors that made the initiatives successful or unsuccessful?

Chapter 9 – Cloud computing

Q9.1	Does New Zealand face an impending shortage of capacity on its international data links? Can you supply information that indicates the likely extent and timing of such a shortfall?
Q9.2	Can you supply information to support or refute concerns that market power is used to inflate the prices charged for use of the Southern Cross cable?
Q9.3	Are there other regulatory issues relating to cloud computing that the Commission should consider in its final report?

Findings and recommendations

The full set of findings from the report are below.

Chapter 2 – Stimulating competition in the services sector

Findings

F2.1 For markets to function well, there needs to be reasonable symmetry in the information available to buyers and sellers. If information is much more in favour of sellers, buyers are not well equipped to shop around, and this dampens competition.

F2.2 The internet is transforming the landscape for the delivery of many services. These developments have considerable potential to address the information asymmetries, and search and switching costs that inhibit competition in, and the functioning of, a number of service markets.

F2.3 Exposure to foreign competition makes an important contribution to the intensity of competition in New Zealand services markets. Barriers to such competition include barriers to foreign firms establishing a local presence from which to provide services in New Zealand (mainly foreign direct investment screening requirements, and behind-the-border regulatory barriers that foreign firms face from having to learn about and comply with New Zealand regulations).

F2.4 New Zealand does not recognise some licences to practice held by foreign service providers even when these licences are based on equivalent or better standards than the corresponding New Zealand standards. Improving recognition of overseas qualifications would remove a barrier to competition. Where foreign standards fail to meet New Zealand standards in a narrow and specific aspect, New Zealand could still substantially remove the barrier by confining its requirements to that aspect.

F2.5 Most areas of economic regulation bear on, and have consequences for, the intensity of competition in markets.

F2.6 Overall, New Zealand's service industries experience less intense competition than the goods-producing industries and primary industries.

Of the services industries, those that feature on most measures as having relatively weak competition are:

- rental, hiring and real estate services;
- financial and insurance services;
- retail trade; and
- professional, scientific and technical services.

F2.7 Competition in most circumstances is an important driver of productivity growth and low intensity of competition exists in many service industries in New Zealand. So scope exists to sharpen competition in these industries, and it is worth doing so when opportunities that would yield net benefits arise.

Chapter 3 – Addressing search and switching costs

Findings

F3.1 Accurate and accessible comparison websites can help to reduce search costs and facilitate more competitive markets. Yet the complexity of some service markets can make accurate comparisons difficult.

F3.2 Information disclosure requirements, in conjunction with accessible online presentation, can significantly improve the availability of information in complex service markets, and may generate net benefits in some situations. Information disclosure also involves costs, so the usual cost-benefit analysis should be undertaken when considering this option.

F3.3 There is an absence of accessible comparative information about third-tier lenders (in contrast to the situation for personal loans or mortgage rates for banks).

F3.4 Transparent and reliable privately-owned comparison websites can play a useful role in the competition process by reducing consumer search costs.

F3.5 Privately-operated comparison websites tend to be less prevalent in New Zealand than in other countries. There are no apparent barriers to entry in this market, and in recent years there have been a number of new entrants. Because these websites generally rely on revenue from advertising or commissions from providers that are part of the website, it is likely that the small scale of the New Zealand market makes it difficult for comparison websites to attract enough traffic to be commercially successful.

F3.6 Comparison websites have the potential to undermine consumer confidence if the sites fail to provide reliable information or are not transparent about the number of service providers they are comparing, how the sites receive revenue, how the sites rank participants and how the sites receive information.

F3.7 The introduction of telephone number portability has positively impacted competition in the New Zealand telecommunications sector.

F3.8 Full bank account number portability is not available in any country. Currently there is no case to introduce it in New Zealand as the cost would very likely exceed the benefits.

F3.9 Recent regulatory regimes for professional service providers have adopted a licensing approach rather than a certification approach. Examples are the Financial Advisers Act 2008 and the Real Estate Agents Act 2008.

F3.10 Feedback mechanisms can play a powerful role in helping consumers to drive competition among providers of professional services.

Recommendations

R3.1

- Before undertaking any initiative to try to reduce search and switching costs, it should be established that they do have adverse effects, and a range of intervention options should be assessed using a thorough cost-benefit analysis.
- If government decides there is a case to reduce search and switching costs in services markets (for example, by funding or developing comparison websites), then initiatives should be appropriately resourced so that the information presented is accessible and accurate.

R3.2

To further improve access to KiwiSaver periodic disclosure statements, completed disclosure forms should be available in a single location, such as the Financial Markets Authority website.

R3.3

Reliable comparative information about third-tier lenders should be available to help consumers make informed decisions. If the Consumer Credit and Financial Services Law Reform Bill is passed, the information that the Bill mandates should be compiled in a user-friendly online format. Several privately-operated websites appear well equipped to do this.

R3.4

The Commerce Commission should include information in the updated Fair Trading Act guidance about the provisions in the Fair Trading Act that are relevant for providers of comparison websites.

R3.5

The Commerce Commission should monitor and compile data on standard form contracts with terms that unfairly restrict a business's right to end a contract (and so present a barrier to switching).

Unfair contract terms provisions introduced in the Fair Trading Act should be reviewed within two years of coming into effect, with a particular focus on whether there is a case for these provisions to be extended to apply to business-to-business contracts.

R3.6

Payments NZ should improve the transparency of the bank switching process by publishing a summary of the rules on their website. Publishing a fact sheet that gives information about the bank switching process and sets out the timeframes involved would also be useful.

R3.7

Payments NZ should collect and publish statistics that show the number of current account switches each year and how long the switching process takes.

R3.8

The New Zealand Telecommunications Forum should develop industry guidelines to create a low-cost user-pays system that enables customers to access emails after they have switched providers.

R3.9

New Zealand officials should monitor international developments in bank switching and account number portability. If another country develops a workable approach, New Zealand should closely examine how it might be applied to the New Zealand banking system.

R3.10

- The Government should consider the competition benefits of a regime based on certification or registration rather than licensing when reviewing existing, or considering new, arrangements for the regulation of providers of professional services.
- Where the Government considers that licensing is required to provide a minimum level of protection to all users of a professional service, the activity that requires licensing should be prescribed no more broadly than is required to achieve that protection (such as confining the licensing requirement to prescribed areas of "restricted work").
- When the Government gives statutory recognition to professional bodies, it should be explicit (in legislation) about its expectations of those bodies, including: competency standards – both entry and ongoing; obligations in relation to supporting a competitive market for the services in question; and complaints resolution and reporting.
- Governing boards of professional bodies should include members who are appointed to focus on the interests of consumers and to foster a competitive market for providing the service in question.

Chapter 4 – Improving competition law

Findings

F4.1 Market studies are a tool that competition authorities around the world commonly use. Practices vary significantly between jurisdictions.

F4.2 Although the Commerce Commission does not have explicit powers to conduct market studies, there are other ways to investigate competition in certain markets. The advocacy work conducted by the Commerce Commission and consumer groups also fulfils some of the objectives of market study regimes in other countries.

Recommendations

R4.1 The Government should review section 36 of the Commerce Act 1986 to assess how best to improve its accuracy in identifying situations where firms take advantage of market power for anti-competitive purposes.

R4.2 Any review of competition law on the misuse of market power should note the future review of competition policy in Australia to achieve a consistent approach that mirrors best practice and furthers the goal of a single trans-Tasman economic market.

R4.3 The Government should consider a reform of section 36 to achieve either:

- a more flexible approach where courts do not rely on a single counterfactual test for an abuse of monopoly power, regardless of the case; or
- more of an "effects" approach that aims to minimise the economic costs of decision errors, and in simpler cases uses appropriate guidance material and mechanisms for quick decisions to mitigate uncertainty.

R4.4 The Commerce Commission should include smaller and younger businesses in its education campaign on pro-competitive collaboration.

R4.5 Industry peak bodies, in consultation with the Commerce Commission, should seek to ensure that businesses are aware of the benefits of pro-competitive collaboration, and guide businesses on what steps they can take to clarify the legality of collaborative arrangements.

Chapter 5 – ICT is revolutionising services

Findings

F5.1 ICT underpins a "revolution" in services. It is transforming many existing services and creating new services similar to how previous general purpose technologies, such as steam and electricity, transformed manufacturing and agriculture.

F5.2 Firms, industries and countries will be better off to the extent that they can adapt quickly – and at lower cost – to the opportunities that ICT creates and the devaluation of many existing assets.

F5.3 Underlying "creative destruction" and its associated productivity growth is an essential process of reallocating resources to successful existing firms and to new firms, and away from less successful existing firms and dying firms.

F5.4 Countries face choices of policies and institutions that influence the way they respond to, and take advantage of, the ICT revolution. Such choices are best made deliberately since making them by default risks an uncoordinated set of policies and institutions that work against each other and dissipate potential gains.

F5.5 Per-capita ICT investment in New Zealand has historically been similar to Canada but lower than that in other comparable advanced countries. It has been improving since early 2000 and now matches Australia's per-capita investment. Yet it remains significantly lower than US and UK levels.

F5.6 The economic characteristics of ICT underpin their strong current and potential future contributions to productivity, economic growth and wellbeing.

Chapter 6 – ICT adoption by firms: business and policy influences

Findings

F6.1 A firm's perceptions of risk, cost and returns affects its decisions about adopting ICT. Those perceptions are influenced by government policies and actions affecting infrastructure, taxes, subsidies, information dissemination and regulation.

F6.2 Survey results indicate that services firms are more likely to have made a significant investment in ICT during the past two years than those in either the goods-producing or primary industries.

F6.3 Survey responses indicate that service firms in New Zealand are investing in ICT to improve their services or support new activities. Reducing the cost of existing activities was the least common rationale for investing.

F6.4 Survey responses indicate that the factors that discourage New Zealand service firms from investing in ICT include, in order of relative importance, the overall financial case, limited capital, limited information, and limited access to skills.

F6.5 The roll-out of fibre-optic networks, and advances in mobile and copper-based fixed-line technology mean that domestic data-communications infrastructure is not constraining ICT adoption by New Zealand businesses.

F6.6 Recent research indicates that management practices make a significant difference to firm performance and that training and advice in management practices can be effective. The training and advice is most useful in young, large and high-tech firms.

F6.7 Multi-national enterprises reduce the costs of credibly transmitting information across borders, as they can internalise demonstration effects and learning-by-doing. They are an important route for technology diffusion into New Zealand.

F6.8 Survey evidence does not support the idea that New Zealand firms are making systematically poor decisions about ICT investments, or seeing poor results from implementing those decisions.

F6.9 Survey evidence suggests that New Zealand businesses are not big risk takers in deciding on whether to invest in ICT.

F6.10 The specific circumstances facing New Zealand firms are likely to, on average, delay the adoption of ICT. Tailored and high-quality policy settings – perhaps different from those in other countries – that reduce the costs and raise the benefits of adoption can help to overcome these circumstances.

F6.11 Some government policies and actions affecting firm ICT adoption decisions are neither ICT nor services-sector specific. They are part of the overall economic framework set through many individual government decisions.

F6.12 The ICT revolution is creating continuous disruption. In a disruptive environment, there are rewards to flexibility at the individual, firm and national levels.

F6.13 Land-use policy, for example the Resource Management Act 1991 and relevant local government plans, can affect ICT adoption through their influence on the prices and efficient recycling of complementary assets.

F6.14 The Scandinavian labour market model appears to have much to offer New Zealand. Scandinavian countries are able to reallocate labour to more productive sectors more easily, most likely because hiring and firing costs are relatively cheaper. The model includes an effective combination of low employment protection, generous but temporary safety nets, and rigorous disciplines on displaced workers to accept retraining or alternative employment.

F6.15 Employment protection legislation has been found to affect growth in many advanced countries. The nature and stringency of the employment protection can reduce growth, particularly in the more dynamic parts of the economy and in the services sector in particular.

F6.16 Entrepreneurs perform a key role in modern economies. They are the networkers who assemble the people, capital and technology to conduct business experiments in new firms and within existing ones. Their role is multi-faceted, from identifying and championing opportunities to managing their realisation.

Recommendations

R6.1 Government should prioritise its efforts to be an effective and informed consumer of ICT.

R6.2 Government should purchase non-exclusive rights for the use of intellectual property (IP), rather than exclusive or ownership rights, when procuring ICT. This would encourage lower prices and encourage productive re-use of that IP by suppliers. Government advice to procurement managers on this issue is confusing, and should be amended.

R6.3 Government should use firm age (targeting young firms), rather than size, when determining eligibility for programmes aimed at business growth.

Chapter 7 – Application of ICT in retail and wholesale

Findings

F7.1 Market and store scale is a strong driver of productivity in retail and wholesale. ICT has played a major role in productivity growth in US retail, particularly by facilitating increased scale of chains and stores.

F7.2 Substantial complementary investments (for example in stores and distribution centres, business reorganisation and direct international purchasing arrangements) are needed to realise the productivity potential of ICT in retail.

F7.3 The adoption of ICT has allowed new business models in North American retail and wholesale. More productive firms entering the market are replacing less productive firms exiting the market. Innovative chains have grown at the expense of single-store firms. As a result, reallocation of employment across firms has been substantial. Also, the average size of firms has increased.

F7.4 European firms were slower than firms in the United States to adopt new ICT. Reasons include smaller markets and the more restrictive employment regulation in Europe.

F7.5 Restrictive land-use regulation in the United Kingdom and elsewhere in Europe has limited the economies of scale gained from using ICT.

F7.6 Competitive pressures on traditional retailers from online sales continue to grow. This is forcing many retailers to adapt their business models to incorporate online sales and others to drop out of the market.

F7.7 Wholesale inventories have been falling as a proportion of value-added since the mid-1980s. This reflects increased efficiency in supply-chain logistics. Since the mid-1980s retail inventories have also slowly declined as a proportion of value-added.

F7.8 Parts of the retail industry have consolidated since 2000, with employment shifting to larger firms and the average number of stores per firm growing.

F7.9 Wholesale (particularly grocery and machinery) has consolidated since 2000, with average firm and store size increasing.

F7.10 Labour productivity levels in the retail and wholesale industries are much lower in New Zealand than in Australia. The difference is partly explained by considerably higher capital intensity in Australia. Australian firms have invested much more heavily in buildings, particularly in wholesale. These types of investments complement ICT in raising productivity.

Chapter 8 – Supply and demand of IT skills

Findings

F8.1 Firms need skilled IT professionals and IT-savvy managers to realise the productivity benefits of their ICT investments.

F8.2 Firms will likely respond to chronic IT skill shortages by reducing technology investments.

F8.3 Since the 1970s, the demand for IT professionals globally has continued to rise. Given the falling cost of ICT and its increasing use, this pattern is likely to continue.

F8.4 The dotcom bust in 2000 saw a rapid fall globally in the number of students graduating with IT qualifications. In the United States, the United Kingdom and New Zealand the number fell by between a third and a half over a 5-year period.

F8.5 The number of IT jobs in New Zealand has grown much more rapidly than the total number of jobs over the last 10 years.

F8.6 Flows of IT professionals in and out of New Zealand are strong. New Zealand is highly reliant on immigration to fill IT professional vacancies – especially in some specialist areas.

F8.7 New Zealand firms pay close to international wages for lower-paid workers in some IT occupations but pay much less than Australian firms in the upper ranges.

F8.8 IT graduate earnings in New Zealand are high relative to graduates in most other fields of study.

F8.9 New Zealand firms, like firms in most other developed countries, report relatively high levels of difficulty in recruiting IT professionals and managers.

F8.10 Some New Zealand firms are limiting their IT investments or sending work overseas because they cannot recruit enough skilled IT professionals in New Zealand. The extent of the impact of IT skill shortages in New Zealand is unclear.

F8.11 The Ministry of Education publishes regular information on graduate employment and earnings outcomes by field of study. Information on outcomes by tertiary education provider and field of study would help students in their tertiary education choices and provide stronger incentives for providers to work closely with employers.

F8.12 Degree structures, timetabling and other administrative arrangements make it hard for students to do joint degrees in business and IT, including computer science.

F8.13 Larger ICT-using and ICT-producing firms have the resources to employ top IT graduates and provide them with induction programmes that help the graduates learn quickly about the business environment and proprietary systems.

F8.14 Small ICT-producing and ICT-using firms find it hard to recruit IT graduates who have the range of skills needed to operate successfully in their business environment. Such firms find it hard to collaborate with other similar firms and with tertiary education providers to help students gain a broader range of skills before graduation.

Recommendations

R8.1 New Zealand should negotiate taxation arrangements with other countries that allow more efficient temporary transfer of employees between New Zealand and those countries.

R8.2 The Tertiary Education Commission and the Ministry of Business, Innovation and Employment should encourage tertiary education providers (using investment plans and other levers) to collaborate with the IT industry associations in promoting one-year diplomas in information science/technology for graduates in other disciplines as a means to quickly fill shortages in the supply of IT graduates.

R8.3 The Tertiary Education Commission should encourage tertiary education providers to promote one-year graduate diplomas in business studies for computer science graduates as a means to better prepare them for work in firms where IT is central to their business strategy.

R8.4 The Government should develop initiatives to encourage greater engagement and collaboration between education providers and ICT firms, especially small firms.

Chapter 9 – Cloud computing

Findings

F9.1 The shift involved in cloud computing – from the immediate physical control of data to control via contract – is as much psychological as technological. Overcoming barriers to adopting cloud computing will typically involve designing contracts and institutions to minimise and best allocate risk, and building trust in those contracts and institutions.

F9.2 Cloud computing improves the scalability of ICT products. This is particularly beneficial to firms that are small users of ICT.

F9.3 Infrastructure-as-a-service and platform-as-a-service products create a level playing field for data-intensive New Zealand firms competing in foreign markets.

F9.4 Cloud computing creates more choices for firms about their inputs. In general, firms are better off with more options. First, cloud services increase their chances of finding inputs more closely matched to their particular needs. Second, an increased number of close input substitutes increases competition, and helps to improve efficiency and drive down prices.

F9.5 Surveys suggest that small firms in New Zealand are slow adopters of cloud computing. For small firms, the benefits of cloud computing appear to be outweighed by other factors, such as the costs of complementary investments or obtaining the relevant knowledge.

F9.6 The Commission has not found evidence that international data connectivity is limiting the adoption of cloud computing in New Zealand.

F9.7 Free trade agreements are likely to have an increasing focus on "free trade in data". For efficiency, the challenge is to let data flow freely across national borders without impeding national governments to enforce their laws.

F9.8 Restrictions on data flows will have a disproportionately negative effect on smaller countries such as New Zealand, as they lack the scale to support a wide range of sophisticated, home-grown, digital services.

Recommendations

R9.1 The Government should relax its requirement that government agencies ensure that their data is stored solely in New Zealand. As a first step, the use of services located in Australia should be permitted. The legal and privacy risks should be dealt with, as a matter of urgency, through negotiations with the Australian Government. Resolving such issues will also help New Zealand firms adopt cloud computing.

R9.2 The Government should give priority in international trade negotiations to internet issues.

R9.3 New Zealand should promote – and participate in – international forums with the aim of reducing the ability of multi-national firms providing digital services to shift their profits across national borders to avoid paying tax.

Appendix A Public consultation

This appendix documents public consultation since the release of the inquiry's 1st interim report in July 2013. Lists of earlier engagement meetings and submissions can be found in the 1st interim report.

Submissions

INDIVIDUAL OR ORGANISATION	SUBMISSION NUMBER
Christchurch Airport	101
MYOB NZ Limited	102
DCW Management Ltd	103
Moneyworks NZ Limited	104
Sapere Research Group and Covec	105
Professor Stephen G MacDonell	106
Fisher Funds Management Limited	107
Donal Curtin, Economics New Zealand	108
Alistair Sheat	109
Bank of New Zealand	110
Insurance Council of New Zealand	111
Private Asset Management Ltd	112
New Zealand Council of Trade Unions – Te Kauae Kaimahi	113
Porirua City Council	114
Business NZ	115
Hazards and Compass	116
Miles Hayward-Ryan	117
NZ Airports	118

Engagement meetings

INDIVIDUAL OR ORGANISATION

Adam Jaffe, Motu Economic and Public Policy Research
Andrew Sharpe, Centre for the Study of Living Standards, Ottawa
Bronwyn Howell, NZ Institute for the Study of Competition and Regulation
Commerce Commission
Commission for Financial Literacy and Retirement Income
Consumer NZ
Council of the New Zealand Institute of Patent Attorneys, Inc
Dean Parham
Department of Internal Affairs
Economics New Zealand
Electricity Authority
Financial Markets Authority
Fujitsu New Zealand
Inland Revenue Department
Insurance Council of New Zealand
Internet New Zealand
Kiwibank
Ministry of Business, Innovation and Employment
Ministry of Education

MYOB NZ Limited
New Zealand Treasury
New Zealand Venture Investment Fund
New Zealand Bankers Association
New Zealand Law Society
New Zealand Retailers Association Incorporated
New Zealand Telecommunications Forum
Payments NZ
Professor Lew Evans, Victoria University of Wellington
Professor Stephen G MacDonell, University of Otago
Reserve Bank of New Zealand
Richard Brett, Fieldpine
Richard Norman, Victoria University of Wellington
Rob Cameron, Cameron Partners
Simon Walker, United Kingdom Institute of Directors
Statistics New Zealand
Telecom New Zealand
Tertiary Education Commission
TradeMe
Victoria Department of State Development, Business and Innovation

ICT REFERENCE PANEL

The preparation of this report has benefited from the input of an expert Reference Panel, drawn from leaders in New Zealand's ICT industry. The panel members were:
Brett Hodgson – BPMetrics
Natasha Crampton – Microsoft
Rohan MacMahon – Crown Fibre Holdings
Ross Young – Google

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