ICT Statistics in New Zealand

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Abstract

This paper outlines some of the ICT-related policy questions that face New Zealand. It then will outline the existing data sources and research (including firm-level), their relevance to policy, and highlights potential data gaps. The paper also examines some of the challenges in collecting ICT-related data and hence meeting policy needs, particularly drawing on Statistics New Zealand's experiences in running collections explicitly targeting the ICT sector (namely the ICT Supply, Business Use of ICT, Government Use of ICT, Household Use of ICT, and Internet Service Provider collections) but also drawing on other collections that supply data of interest to the ICT sector (eg Screen Industry Survey, Overseas Merchandise Trade). Finally the paper discusses New Zealand's recently established ICT research community that is aimed at gathering, undertaking and sharing ICT-related research.

Executive Summary

New Zealand recognises the importance of information, communications and technology (ICT) as an enabler of business growth and social cohesion. Over recent years, the New Zealand Government has significantly invested in the ICT and related sectors, both in terms of direct investment in supporting infrastructure (eg broadband networks), the business environment (eg regulatory change) and businesses themselves (eg start-up, incentives). As part of the infrastructure investment there has been investment in official statistics. Through recent discussions with New Zealand ICT statistics users, we understand that all significant data needs are currently being met. However it was recognised that there are some emerging needs, the statistics need to remain contemporary and timeliness needs to be improved. The forum also supported the proposition that further statistical research into the ICT and related sector is needed.

Introduction

1. Recent New Zealand Governments have recognised the high growth potential of the ICT sector and its significant enabling impacts across the economy. In addition, recent governments have made significant investment into the growth, innovation and productivity of New Zealand businesses - ICT is seen as a key enabler of this growth and ICT specific businesses could benefit from this investment. With this backdrop of growth in both the ICT and more broadly New Zealand businesses, ICT targeted Government initiatives have included ensuring skills and talent management (supply), providing management / executive training, raising educational standards, capability marketing, infrastructure (including broadband roll-out, unbundling), research and development funds and / or tax incentives and providing incentives for technology transfer. At the same time the Government recognised the need to improve New Zealand's ICT statistics. In 2003, the New Zealand Government approved appropriations to Statistics New Zealand to "improve the alignment and timeliness of ICT statistical information".

2. Since 2003, Statistics New Zealand and its Official Statistics System partners have been working to create a comprehensive suite of ICT statistics to meet the needs of a wide variety of users. It is pleasing to note that recent discussions of information needs, gaps, and emerging issues, no significant data gaps were identified.

3. This paper will outline some of the ICT-related policy questions that face New Zealand. It then outlines the existing data sources and research (including firm-level), their relevance to policy, and highlighting potential data gaps. The paper then examines some of the challenges in collecting ICT-related data and hence meeting policy needs, particularly drawing on Statistics New Zealand's experiences in running collections explicitly targeting the ICT sector (namely the ICT Supply, Business Use of ICT, Government Use of ICT,

Household Use of ICT, and Internet Service Provider collections) but also drawing on other collections that supply data of interest to the ICT sector (eg Screen Industry Survey, Overseas Merchandise Trade, World Internet Project). Finally the paper will discuss the recently established ICT Research community that is aimed at gathering, undertaking and sharing ICT-related research.

Policy Questions

4. The New Zealand Government has invested significantly in the ICT sector, and New Zealand businesses over recent years in order to grow New Zealand. The following are some of the policy questions and issues that are currently being considered by New Zealand policy makers to support this process:

    a. What is the relationship of ICT use, uptake etc. to productivity and innovation?

    b. Are both the supply and demand sides of the ICT equation adequately covered for businesses, households and Government?

    c. How will the roll-out of ultra-fast broadband best benefit New Zealand?

    d. Broadband access for schools.

    e. What are the future demands being placed on New Zealand internet access, including international links?

    f. What are the nature of skills required to maximise ICT uptake?

    g. How to extend of digital literacy of New Zealanders?

    h. Understanding the barriers to ICT adoption.

    i. To what extent is New Zealand ready to switch from analogue to digital television?

    j. How are 'off-shore services' being used by New Zealand businesses?

    k. The extent to which ICT impacts 'social cohesion', including the differences between urban and rural environments.

    l. The monitoring of the provision of Government services on-line.

    m. What is the investment and regulatory environment needed for good service provision?

Available Statistics

5. These policy questions lead to a number of information needs, which include:

    a. Quantification of the dimensions of the ICT industry (both the vertical and horizontal, along with the supply and demand side).

    b. International benchmarks (including OECD, ITU & World Economic Forum).

    c. Skill levels.

    d. Productivity parameters and drivers.

e. Definitions associated with ICT, including broadband - what should be included, and how to account for sectors (eg manufacturing) that are excluded.

f. Longitudinal studies: current position vs longer term trends; for example analysis of skills requirements requires extension for years into future.

g. Social inclusion and the cultural impacts of new technologies; examples include the move from analogue to digital TV, the impact of artefacts in the New Zealand environment such as data caps.

h. Impact of rapid technology / product change (eg IPv6).

i. Model building or the ability to reclassify information onto particular areas of focus; eg e-citizen, firm productivity.

6. In order to provide this information, Statistics New Zealand and a number of agencies run a suite of collections (see Appendix 1 for descriptions). The key collections on the demand side are the Household Use of ICT, Government Use of ICT, and the Business Use of ICT; and on the supply side are the Internet Service Providers and the ICT Supply surveys. It is important to recognise both the supply and demaind side of the statistical measurement equation, otherwise there could be an imbalance and policies could become irrelevent. In addition to this suite being the basis for meeting most information requirements, it is this suite of collections that are largely used to complete OECD and ITU reporting requirements.

7. The challenges that the existing (and future) survey instruments face include:

   a. Given the fast paced nature of ICT, it is difficult to balance consistency over time and remaining contemporary - this is even more complicated by the fact that the base is rising quickly (eg a few years ago 512kb download speeds were a 'premium service', now this speed is considered an irrelevant part of the market). If lead-times or frequencies for collections are long, the rise of new technology (eg Twitter, or broadband delivery mechanisms) may not be collected for a number of years. The need to remain contemporary needs to be balanced with the desire to present consistent measures over time - which usually means keeping content while adding new content, and thus raising the prospect of respondent burden.

   b. New Zealand is a relatively small country (4.3 million people, with 480,000 businesses) spread across the wide geographic regions, and so as new technologies emerge penetration can be low or geographically isolated. This challenge means that measuring such technologies can be difficult and potentially burdensome. In addition, this contributes to the digital divide.

   c. Many users do not necessarily understand the technology they are using (eg many people do not believe using email is using the internet). This makes measurement difficult. There are a couple of themes to this challenge:

      i. ICTs are increasingly being imbedded in everyday products that people don't see as being ICT-related (eg electronics now form a major part of the internal workings of vehicles, business tools and household appliances). It may well be the case that we have had to accept that we are not capturing the whole of ICT throughout the economy, but only in ICT-intensive areas. This is something that's recognised and is a potential gap or caveat for the collection.

ii. The all-enveloping nature of ICTs (eg through computer systems being an essential part of day-to-day processes for many businesses) provides a dilemma in governments wishing to encourage technology uptake without setting the scope too wide for any support initiatives. In New Zealand an example was the R&D tax credit, where it was necessary to put a cap on the amount of software development that was eligible due to large institutions such as banks seeing any improvement to their IT systems as involving the entire IT system, not just the part being developed (due to their systems being integrated and underpinning their entire operations).

iii. As technologies converge people's understanding of what they are using will be come further confused.

iv. The capture of ICT-related services can be difficult. The question becomes whether such services should be regarded as being all about customer service or providing expert (ICT) advice.

v. Depending on the context of the collection instrument, its completion often falls to the accountant or general manager - meaning that often the ICT-related questions need to be slightly 'dumbed down'.

d. Identifying suitable target populations can be difficult. New Zealand's collection populations and sample selection are based on the Australian and New Zealand Standard Industrial Classification (ANZSIC), however this does not adequately identify the ICT sector separately (whereas ISIC provides an alternative aggregation for the ICT sector). This means that our units of interest (ICT-related businesses or people) are difficult to identify and hence target. To address this, we often rely on supplementary lists, potentially introducing errors such as bias, non-sampling error etc.

e. There is a need to consider how to capture convergent technologies (e.g mobile phones, which can now be used for phone, email, movies). There are two parts to this challenge, firstly ensuring the instrument is contemporary, and secondly recognising the 'C' within ICT. Many government policies or regulatory initiatives are aimed at mobile communications, but many measures focus on computer use, and less on use of phones, PDAs and other devices. In New Zealand we did ask about connectivity using mobile phones in the most recent Household Use of ICT questionnaire, and we intend to include questions in the ISP survey on mobile connectivity.

f. For a number of reasons New Zealand's ICT infrastructure is quite different from other countries (eg much of our networks are copper based, pricing structures are largely 'data cap' based) meaning that international comparability can be difficult even if we have statistically significant data to support the required analysis. This is further highlighted when considering point b above.

g. Most statistical processes are delineated into households and businesses, however the boundaries between the two are not necessarily clear-cut. For example, should the activities of someone running a business from home or working from home outside of normal business hours be considered as household use, business use or both (which may then lead to double-counting)? Given that ICTs could be used in this way by small entrepreneurs working from home and being able to access larger markets or deliver services in different ways, this potentially is an important chunk of business information that we may not be attributing to the business sector.

8. It is recognised that in terms of the New Zealand statistical system there are strong desires for the timeliness of some collections to be improved and that the statistics need to remain contemporary (including capturing emerging needs). In terms of timeliness, there in an issue in that each of the collections are not necessarily aligned so that a 'whole of sector' view can be seen at a single point in time; in addition some of the information needs (eg the extent of text-bullying) are required in a more timely manner. To address this work is underway to develop a plan to better align the ICT-related collections. As a minimum, the expectation is to provide a 'whole of sector' view at consistent time points for key sections of the ICT sector.

9. Through discussions with stakeholders there are a number of identified emerging needs which include the non-profit sector, Green ICT, what ICT is used for (i.e. beyond ICT adoption to the realisation of benefits), e-Government, data download volumes, creation of on-line content by individuals, and more security related information (eg breaches of security, cost of cyber-crime etc.). In order to address these needs, Statistics New Zealand (along with our stakeholders) are seeking opportunities to capture priority areas of interest, either through existing collections or as other opportunities arise. It is important that existing collections remain contemporary and it is good practice to confirm that as each collection is put into the field, user feedback is sought on new and emerging needs, and each question is reconsidered for its relevance. If changes are needed, these are tested and potentially implemented. At the same time, consideration is given to the relevance to previous releases. Another way to examine these emerging needs is through the research mechanisms outlined in the following sections.

ICT-Related Research

10. Given the level of interest in ICT, there have been many pieces of research undertaken in New Zealand in this field. Listing and describing each is beyond the scope of this paper so I will mention a couple of examples of ICT-related research.

    a. The paper "The Need for Speed: Impacts of Internet Connectivity on Firm Productivity", Grimes, Ren & Stevens (2009) examine the firm-level productivity impacts that arise when a firm adopts different speeds of internet connectivity, and found that broadband adoption boosts productivity.

    b. The article "Information and Communication Technology in New Zealand and Australia", Statistics New Zealand (2009) presents a selection of ICT data produced by Statistics New Zealand and the Australian Bureau of Statistics. Following various adjustments, to allow for differing collection and processing methods, this paper compares and analyses New Zealand's and Australia's data on the sales of ICT goods and services, business use of ICT and internet services.

11. In order to facilitate firm-level analysis Statistics New Zealand, along with a number of agencies, have developed the prototype Longitudinal Business Database (LBD) that can be accessed through Statistics New Zealand's (restricted access) Data Laboratory. The LBD comprises both administrative and survey based unit record data linked longitudinally, holding annual data back to 2000. The backbone of the LBD is the Longitudinal Business Frame (LBF), which is a longitudinal register of businesses, including demographic data. Administrative data from other government agencies, including Inland Revenue and the New Zealand Customs Service, along with a number of Statistics New Zealand sample surveys that measure business practices and performance data are linked the LBF. The LBD provides a powerful tool to create, test and analyse firm-level dynamics. For a further description of the LBD see Fabling (2009).

12. A recent initiative is the creation of a ICT Research Forum, under the International Institute for Software Economics, Innovation and Entrepreneurship Incorporated (IISEIE). Statistics New Zealand are keen to be an active member of this forum through research contributions and enabling data access. The vision of the ICT Research Forum in New Zealand is to be the leading source of thought, leadership and research for New Zealand's economic and social development through the use and production of ICT. Within this vision, a particular emphasis will be on research activities and projects that support the development of a vibrant 'local software economy' in New Zealand. The core objectives of the ICT Research Forum in New Zealand are:

    a. Promote research and development that advances understanding of ICT economics, innovation management and entrepreneurship for the benefit of the New Zealand ICT community.

    b. Promote research and development that advances understanding of the business skills requirements of New Zealand ICT executives and professionals.

    c. Advise government or other appropriate organisations on policy matters relating to ICT economics, innovation management and entrepreneurship.

    d. Promoting research and development that advances understanding of the key drivers of economic and social development using the World Economic Forum 'Network Readiness Framework' as a reference model.

    e. Collaborate with the global network of IISEIE ICT Research Forums on ICT research, and industry benchmarking projects such as the annual *Local Software Economy Maturity Index Report.*

Appendix 1 – Summary Statistical Collections

The key ICT-related statistical outputs of Statistics New Zealand are outlined in Table 1. This table is split into 'Demand' and 'Supply', to reflect the two sides of the statistical measurement equation. Other ICT-related statistics (including those not from Statistics New Zealand) are outlined in Table 2.

Table 1 – Key ICT-Related Statistics from Statistics NZ

Demand		
Collection Name:	Household Use of ICT	Business Use of ICT
Brief description:	The Household Use of ICT Survey collects information from New Zealand households and individuals about access to, and use of, computers, the Internet, and mobile phones. The survey produces official statistics on New Zealand household access to and use of ICT and is used to gain a better understanding of how these technologies are influencing New Zealand's economy and society. The survey is run as a supplement to the Household Labour Force Survey (HLFS).	The Business Use of ICT is collected as a module of the Business Operations Survey (BOS). BOS provides a snapshot of the link between business practices and performance to help grow the New Zealand economy in the longer term. The modular design enables a wide range of statistics to be collected. The ICT module alternates with the Innovation module and a third module (Module C) is an annual contestable module.
Target population:	The target population for the Household Use of ICT Survey is the civilian, usually resident, non-institutionalised population aged 15 years and over living in private dwellings. The target population for the household portion of the Household Use of ICT Survey is all households from the scope outlined above with at least one eligible individual.	All businesses within New Zealand that have been operating for one year or more, employ 6 or more employees. Does not cover the industries of public administration and safety, heritage activities, creative and performing arts activities, and private households employing staff and goods- and-services producing activities of households for own use.
Sample size:	The HLFS sample contains about 15,000 private households and about 30,000 individuals each quarter. Households are sampled on a statistically representative basis from rural and urban areas throughout New Zealand, and information is obtained for each member of the household.	8,000 economically significant businesses
Key variables:	Household Internet access, Broadband access, Access to computers, Individual internet use	Business use of computers and internet, connection type, e - commerce, security, web presence, networks, impacts of ICT.
Frequency:	3 yearly	Every 2 years
Available data:	2006 and 2009	2006 and 2008
Data gaps (or significant caveats):	Doesn't collect everything in the International Telecommunication Union (ITU) questionnaire (eg household access to radio, telephone and electricity, individual mobile internet access).	Expenditure on ICT. Some other countries collect this type of data. We are working with stakeholders to ensure the collection continues to met their needs.
Key stakeholders:	Ministry of Economic Development, Ministry for Culture and Heritage,	Ministry of Economic Development

	Netsafe, Local Government Online	
Questionnaire available on web:	No	Yes
Supply		
Collection name:	Internet Service Provider Survey (ISP)	ICT Supply Survey
Brief description:	The ISP Survey measures the nature of the Internet Service Provision in New Zealand. The data from this survey contributes to policy decisions and international comparisons. It measures the access that New Zealanders have to technology and the Internet as they are reliable indicators about the performance in the Information Economy. While several years ago, this could be measured by the number of dial up connections, the prevalence of broadband connections is now being linked with the continued acceleration of economic growth in the world economy.	The purpose of the ICT Supply Survey is to collect statistics from New Zealand businesses that are involved in producing or supplying ICT goods and services. Statistics from the survey is used to evaluate the size of the domestic and export markets for ICT goods and services. The results show the changing size of the ICT industries and the evolving mix and value of products and services over time. Aggregated statistics from the survey also provide important information for decision makers and planners in business, government and industry organisations. The ICT Supply Survey is now aligned with relevant OECD definitions, incorporates current industry standards and allows international comparisons to be made.
Target population:	All resident New Zealand Internet service providers, where Internet service providers were defined economically significant business that supply permanent or regular Internet connectivity services to individuals, households, businesses, and others organisations in New Zealand.	The ICT Supply Survey includes all enterprise units with 2.0 or more rolling mean employees (RME) engaged in ICT activity in New Zealand. However businesses that are known to be significant ICT businesses were surveyed regardless of their RME count.
Sample size:	This survey is a census of the approximate 70 ISP suppliers.	The population for the ICT Supply Survey 2007/08 was 2,974 enterprises. ICT Supply 2009/2010 would be similar size.
Key variables:	Number of active subscribers by type, by connection type, by speeds, by maximum data allowance, installation of IPv6 and the barriers of installation, web content filtered services, size of ISPs.	Total ICT Sales, ICT sales of goods, ICT sales of services, export and domestic ICT sales
Frequency:	From June 2009 the survey is annual. Before this it was six-monthly.	From June 2009 the survey is done every 2 years, prior to this it was annual.
Available data	2005 - 2009	2005 - 2008

Data gaps (or significant caveats):	In order to meet OECD's methodology for a new wireless broadband indicator, the questionnaire needs to collect cellular technology with mobile phone connections to the Internet. While it is becoming increasingly more popular, and with quicker speeds, we have looked at questions about the total volume of data used by the ISP's subscribers, but found this too difficult or burdensome to collect so do not.	We use OECD definition of ICT goods and services, but respondents still feel that the definition is confusing. ICT population is hard to define due to fast changing of ICT industry.
Key stakeholders:	Ministry for Economic Development, Commerce Commission, OECD	Ministry for Economic Development, New Zealand Trade & Enterprise and NZICT Group (Industry Association)
Questionnaire available on web:	Yes	Yes

Table 2 – Other Sources of ICT-Related Statistics

Collection Name	Description	Available data	Collecting agency
Population Census	The household dwelling form contains a question on access to cellphone and the internet. This question is only answered by one member of the household on behalf of the household.	2006, collected every 5 years.	Statistics New Zealand
Linked Employer Employee Data	Jobs and earnings in the ICT sector, covering filled jobs (by sex and age breakdowns), and mean quarterly earnings. Industries identified as belonging to the ICT sector fall into the manufacturing, wholesale trade, information media and telecommunications, professional, scientific and technical services, and the 'other services' divisions.	Report has not been released yet	Statistics New Zealand
Household Economic Survey	Households owning or having access to technology items and services.	2006 (every three years)	Statistics New Zealand
Quarterly Manufacturing Survey	Data available at the industry level	Quarterly since June 1998	Statistics New Zealand
National Accounts	Investment in computers and software on a quarterly and annual basis from the National Accounts, and also the stock of fixed assets from the capital stock model.	Quarterly & Annual	Statistics New Zealand
Consumer Price Indices	Hardware prices	1999 onwards on quarterly basis	Statistics New Zealand
Business Demography	Number of businesses by industry, by region with employee counts	2000 - 2009	Statistics New Zealand
Overseas Merchandise Trade	Imports and exports at a very detailed level, eg exports of telephones, computers, scanners etc. No domestic information but good imports and exports. Commodity based.	Monthly from 1997	Statistics New Zealand
Screen Industry	The Screen Industry	2005 - 2009, annual	Statistics New

Survey	Survey collects information used to measure the size and nature of businesses in the New Zealand screen industry. The industry includes production, post-production, distribution, exhibition, and broadcasting of films, television programmes, and other moving-picture productions. The survey asks questions related to digital activity, animation, graphics and effects, as well as technologies used.		Zealand
Research and Development Survey	New Zealand's research and development (R&D) expenditure can be broken down by purpose to highlight its main socioeconomic objectives and the areas of the economy that will ultimately benefit. The 2008 R&D Survey saw the adoption of a different breakdown for information about the purpose of research being undertaken, including expenditure for ICT services by sector (business, government, research institutes etc.)	2002 - 2008, every two years	Statistics New Zealand
Government Use of ICT	The Government Use of ICT Survey provides information about the present state of government ICT use, emerging technology uptake, and factors that hamper ICT use by government organisations. It also provides a picture of how new ICT is changing the way that government organisations carry out their roles.	2006 and 2008. No set plans to run another iteration of this survey at this stage.	Statistics New Zealand collected in 2006, then State Services Commission collected in 2008.
Public Satisfaction with Service	All-of-government national survey to ask	2007, 2009	State Services Commission

Quality 2007: The Kiwis Count Survey	New Zealanders about their perceptions and experiences of public services as a whole, including their satisfaction with ISPs.		
Telecommunications Supplier Survey	The Commission produces an annual telecommunications market monitoring report providing an overview of the telecommunications market and the state of competition. Bi-annual and quarterly market monitoring reports with a more limited range of data and analysis are also produced on an ad-hoc basis.	2007, 2008, 2009. Annual	Commerce Commission
World Internet Project	New Zealand individuals use of the Internet	2007 and 2009. Planned for every two years.	Auckland University of Technology, with funding from the National Library of New Zealand.
ICT in Schools	This includes results of developments into school ICT infrastructure, the use of networks, software, teaching applications, Internet access and usage, ICT planning and funding, E-learning developments, professional development and usage of social software.	Conducted every two years since 1993.	2020 Communications Trust
Other surveys	There are a number of ad-hoc collections that examine a wide range of ICT-related topics (eg hardware and software purchases, local issues). The organisations undertaking this work includes IDC Research New Zealand, Local Government Council, University of Auckland). In addition, there is quite a bit of non-ICT specific data collected as part of a more broader collection (eg electricity use by		

	telecom providers, employment estimates, value add).	

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