

Industry insights

Westpac

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Media and ICT

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Summary

The Media and ICT (Information and Communications Technology) sector is changing the way all firms operate and how consumers live. This is resulting in arguably the biggest disruption to traditional business models since the Industrial Revolution.

For many businesses, new software applications (“apps”) are increasing operational efficiency, reducing headcount, and making it easier to reach customers. For other firms, like travel services, print media and video and CD stores, technology has made the traditional business model obsolete. They are being forced to re-invent themselves or fail.

In addition, the way news and information about products or services is communicated has changed as digital channels have overtaken traditional print, radio and TV. Media businesses are at the centre of the digital revolution, disappearing or thriving as they navigate these changes. How businesses employ digital media in marketing or responding to customers affects their reputation and profitability.

Meanwhile, the consumer has never had it so good. The range of digitally-offered services the consumer can access for little or no cost from the comfort of an armchair is probably worth hundreds of dollars in savings per year. Yet with these benefits come concerns over security of private information, and how information is used by apps that collect it.

Recent performance of the sector

The Media and ICT sector employed nearly 73,000 full-time equivalent workers (FTEs) and generated 4.5% of New Zealand’s GDP in 2015. But there have been clear winners and losers within the sector in recent years.

Valued added by **software and computer system design** and **internet broadcasting** has lifted by 132% in the last 15 years. Employment has grown 157%. And in a globalised ICT market, exports of telecoms, computer systems and information services have risen 131% since 2000.

But **print and traditional broadcast media have struggled**. Employment in print media has plummeted 50% since 2000. In the last five years, as access to on-line on-demand video and audio has improved, employment in traditional radio and TV has also fallen. Businesses that have survived are those that have largely switched from print and traditional broadcast media to on-line platforms.

Outlook and what this means for New Zealand

The implications of rapid technology change are expected to intensify over the years to come:

- **Disruption and convergence** will change the business landscape: More incumbents across industries will be disrupted by new businesses that harness technology to drastically cut operating costs, as we have already seen in

travel agency, taxi, telecoms and foreign exchange services. More convergence is also expected, such as telecoms moving into digital broadcasting. Employment in many incumbent firms may fall as more agile competitors spring up.

- **Greater opportunities for New Zealand ICT businesses** will develop: The death of distance due to technology changes continues to offer huge opportunities for growth of ICT exports.
- **Skilled ICT-savvy workers** will remain in short supply: the way we train students and the volume we train will continue to be a hindrance to growth of the sector, and will leave us more open to disruption by global players.
- The **“internet of things”** will mean more customisation of consumer experience: With high smartphone penetration and more devices from cars to fridges connected to the internet, retailers and manufacturers have access to more information about how consumers spend their time and money. Until now, these data have not been analysed, interpreted, and acted upon to the extent that they will be. Marketing will increasingly be tailored (through automated processes and machine learning) to individuals, improving on the hit-and-miss nature of mass advertising and providing a more personalised consumer experience.
- **Cyber-crimes** will grow in number and scale: Globally, businesses and consumers are already losing hundreds of billions of dollars a year to cyber-crime. There will be more jobs, more privacy breaches, more financial losses, and more government regulation in this space.
- **On-demand free and paid video** content providers will rule the roost: The ability of traditional pay-TV providers to control access to content within their jurisdiction will be further eroded by global content providers. As a result, incumbent pay-TV providers who stick to the current model will see profits fall and will not be willing to pay as much for content. This will make global content providers more attractive to content producers and will lead to convergence in what content is offered in different countries.
- **Consolidation among Internet Service Providers (ISPs)** and more global plays in telecoms are expected: New Zealand has more than 50 ISPs, a figure that is expected to fall due to the weak outlook for revenue growth. Telecoms will be challenged by digital options that will allow cheaper global roaming and potentially global SIM-cards at much lower rates. We also expect rationalisation of the number of global telecoms businesses.
- **Print media will shift online** or fail: The availability of information for free online has dramatically reduced the profitability of print media. Paywalls on premium content are unlikely to succeed without an overwhelming value proposition for consumers who have come to expect information for free. Printed magazines still sell strongly to over-30s, but without a major shift in preferences of younger demographics, readership will fall and jobs will be lost as the readership ages.

David Norman - Industry Economist

Introducing the sector

- The Media and ICT sector is a major employer and generator of value in New Zealand, but its sub-sectors are undergoing dramatic changes.
- The digital revolution is accelerating, particularly through the advent of the smartphone, better infrastructure allowing faster data transfer, and the resultant improvement in the quality of on-line video and audio streaming.
- This revolution has left no sector untouched, but media businesses, in their role as intermediaries between businesses and consumers, have seen the biggest changes. Print media and even traditional TV and radio media have lost out to digital broadcast media.
- The digital revolution has also reduced the tyranny of distance, which has helped New Zealand grow exports of telecoms, computer system and information services.

The diagram below provides a simplified explanation of the origin and impacts of the digital revolution on the Media and ICT sector, other businesses and consumers. The sub-sectors covered in this report are shaded red in the diagram.

Innovation and infrastructure development in the telecoms and data storage providers and the software and computer system design sub-sectors have driven the digital revolution. For instance, data transmission infrastructure, including fibre-optic cable, have facilitated the faster transfer of data, which is crucial in rolling out digital apps or platforms. Developments in computer systems and software have allowed the change in how rapidly and easily businesses and consumers can access and respond to information.

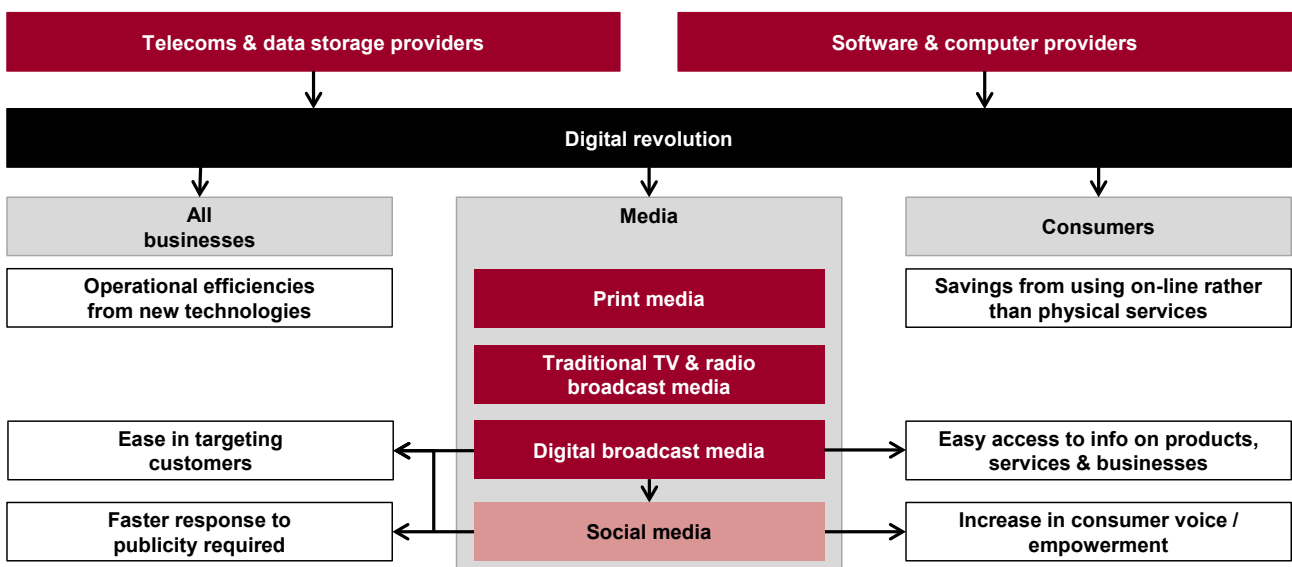
For the purposes of this report, we divide the Media and ICT sector into four sub-sectors:¹

- **Telecoms and data storage providers:** Providers of fixed line and mobile telecommunications services, internet service providers (ISPs), web-hosting, data processing and electronic information storage.
- **Software and computer system design:** Production of software apps for computer or other digital device usage, web-based apps, web-design, software installation, systems analysis and hardware consulting services.
- **Print media:** Traditional printing of newspapers, books, magazines and other hard copy media.
- **Broadcast media:** Free-to-air and paid-for broadcast services by radio, TV or on-line.

All change: the digital revolution

The digital revolution has radically changed the operating environment for all businesses and consumers although it has affected some industries more than others. From travel services, to booksellers, to the local fish and chips store, the impact has varied from major disruption to operational efficiency gains to new advertising channels.

The digital revolution



¹ We define Media and ICT using Statistics New Zealand classification codes. This includes C16 Printing, all of Division J Information Media and telecommunication excluding J60 Library and Other Information Services and J55 Motion Picture and Sound Recording Activities, and M70 Computer System Design and Related Services.

What separates media businesses from other types of businesses (banks, airlines, health providers, or retailers for instance) that have all been affected by the digital changes to some extent, is their role as **intermediary transmitters of information** between consumers and businesses. They are part of the system of interaction between businesses and consumers rather than simply users of digital technology the way most other businesses are.

The rise of digital media, and within this the sub-set of social media, has led to a huge shift away from print media and toward on-line media. Print media and traditional TV and radio broadcast media that have survived, have mostly achieved this by switching more and more toward on-line broadcasting.

The digital revolution has changed the world for businesses and consumers directly by reducing the cost of providing products and services. Many businesses use process management, client relationship and other software and systems to operate more efficiently. Consumers can now buy their plane tickets, do their banking, or do their book shopping without leaving home, saving them time and money.

But the digital revolution has also changed how businesses and consumers interact. It has made it easier to link businesses with the consumers who want their products or services. It has also shifted the balance of power toward the consumer; anyone can be a “keyboard warrior” using social media to respond to good or bad service or products in a way that broadcasts consumers’ individual views to dozens or even thousands of their peers and contacts instantly.

Data download: headline indicators

The Media and ICT sector contributed \$11.3 billion toward GDP in the year to March 2015, or 4.5% of national GDP.²

The telecoms and data storage providers sub-sector is by far the largest contributor to value added by the sector. The large capital investments required in the sub-sector demand significant

returns, with the result that it generates 46% of all value in the sector. Despite having the largest share of workers, software and computer system design contributes only 31% of value added. The remaining quarter is produced by the other two sub-sectors.

An important point to note when considering the contribution to GDP of each sub-sector is the degree of cross-over between sectors. For instance, telecoms providers in New Zealand are also making a foray into broadcast media, through offering on-line streaming platforms for TV shows and movies. The value added by those business units may be captured in the telecoms sub-sector rather than in broadcast media. Similarly, software developed in-house by all sorts of businesses (airlines, banks and so on) will be captured as value added by those businesses rather than by software and computer system design firms.

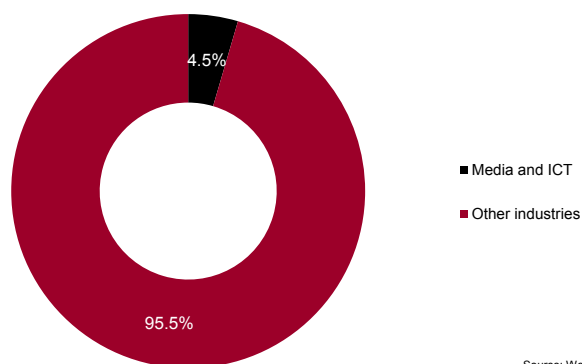
As a result, it is important to consider the headline numbers as well as patterns in growth to get a better understanding of what is really happening in each sector, as we do below. We also comment in a separate section of this report on the possibility that the value added by intangible services (such as data consumption or use of free apps) is considerably underestimated in official data.

Media and ICT businesses directly employed 72,800 FTEs in 2015, with the bulk of these in telecoms and data storage providers; software and computer system design; and print media. Broadcast media was much smaller.

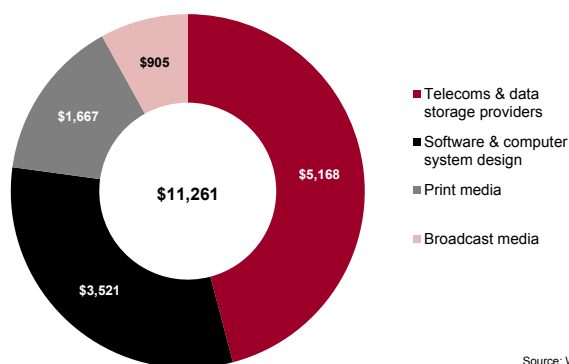
Some sub-sectors punch far above their weight in value added per worker terms, most notably, telecoms and data storage providers. This is a function of the use of expensive capital equipment, which demands a higher output per worker to ensure a reasonable return per dollar of investment.

The relatively large size of the telecoms and data storage providers sub-sector, coupled with its extensive use of infrastructure, skewed the overall output per worker in Media and ICT up to around \$144,000 in 2014. This compared to \$107,000 per worker in New Zealand overall.

Media & ICT share of economy, 2015\$m

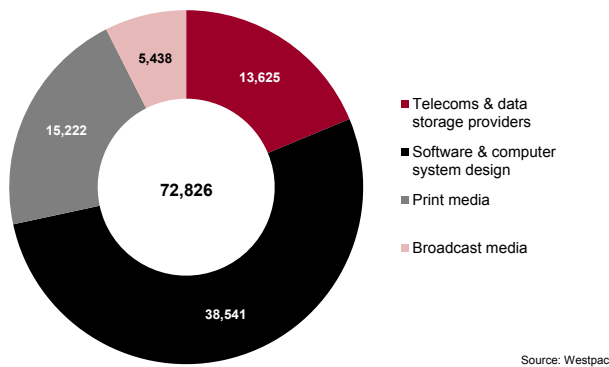


Media & ICT value added, 2015\$m (P)

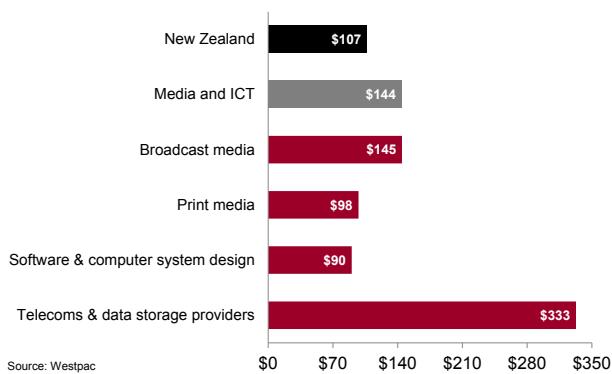


² New Zealand GDP and the constituent value added by specific sectors or sub-sectors consist predominantly of pre-tax and depreciation profits (economic profits) and salaries and wages. All GDP and value added figures in this report are in 2015 dollars. Estimates of 2015 contribution to GDP by Media and ICT or its sub-sectors are still preliminary, and marked by the letter “P” in time series throughout this report.

Media & ICT employment (FTEs)



Media and ICT value added per FTE (2014\$000)

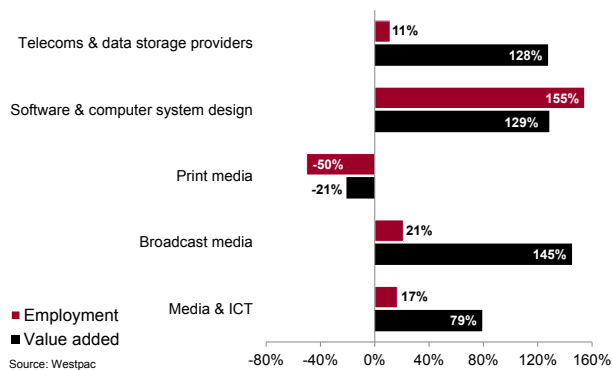


The small print

The Media and ICT sub-sector has been characterised by mixed employment growth, but overall productivity growth has been strong.

The fortunes of the sub-sectors have varied widely over the last 15 years. The most difficult operating environment has been in print media, where employment has fallen 50% and value added has slumped 21% since 2000. These changes are unsurprising. They are in line with the disruption in print media by technology and the associated gains in broadcast media.

Growth in employment and value added, 2000 to 2015



The challenge of measuring ICT productivity

The challenge of measuring ICT productivity makes it likely the value added by the sector is under-counted. In this brief discussion, we consider the telecommunications sub-sector as an example.

The telecommunications sector has been one of the economy's star performers for several decades. As measured by GDP, the sector has grown by an average 5.5% per year since 1990, almost double the economy-wide growth rate of 2.8% per year. However, the sector's reported pace of growth has slowed in recent years, and has apparently grown slower than the rest of the economy since 2013.

That apparent slowdown may actually tell us more about the difficulties of measuring real (i.e. price-adjusted) output in this sector. The System of National Accounts, used to calculate GDP, was developed at a time when output was dominated by physical goods for which changes in prices and quantities are relatively easy to identify. This approach is less well suited to the services sector, where distinguishing between pure price changes and changes in the quality of the service, for instance, can be rather subjective. The telecommunications sector raises the difficulty even further, as many services are not directly priced at all, yet they clearly have value to consumers.

Telecommunications are an example of how, in a rapidly evolving industry, methods of measuring growth can quickly become outdated. In the past, Statistics New Zealand used measures such as call minutes, which have fallen in recent years as people have moved away from voice in favour of alternatives such as messaging, social media and Skype. Internet use was measured in terms of number of connections, which clearly understates the intensity of use.

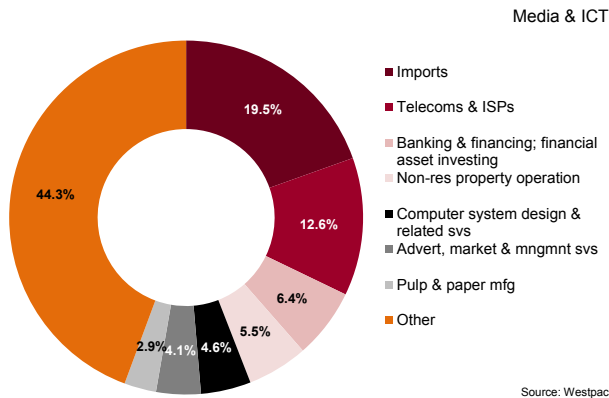
In 2013, Statistics New Zealand switched to using price-deflated industry revenue as the key measure of volume. However, this shifts the challenge towards calculating an appropriate price deflator. With capped data plans, it is possible to calculate a per-unit price for internet use. But this approach will become less feasible over time as more households move to uncapped data plans.

Another approach, as used by the Australian Bureau of Statistics, is to directly record the volume of data traffic. But in this case, the potential error lies in the direction of overstatement. Some of the increase in data use is due to the fact that websites have become more data-intensive over time without necessarily improving the user experience.

The difficulty of measuring output in the ICT sector is well recognised internationally, and new standards are constantly being developed. So it's possible the finding that growth has slowed in recent years may not survive future revisions.

Michael Gordon
Senior Economist

Where inputs come from



All other sub-sectors have seen some growth in employment terms, ranging between 11% and 15%. Overall, the sector saw employment growth of 17% over the 15 years, not stellar by national standards, but better than might have been expected in a time of rapid technology change and its impacts on a number of Media and ICT sub-sectors. As we discuss in the sections on each sub-sector, however, the 15-year average growth rate hides the fact that some sub-sectors peaked a couple of years ago, and are now in decline.

By far the biggest growth in employment has been in software and computer system design. This was also the only sub-sector where employment growth was faster than the rise in value added. The weak growth in value added relative to employment is likely a function of the growth in start-ups and smaller businesses in the sector, and the increasing difficulty in monetising new software apps, which indicates that the consumer may be capturing much of the true value of the product without paying for it (consumer surplus).

Other sub-sectors have seen remarkable growth in value added – 145% in broadcast media; and 128% in telecoms and data storage providers – implying large productivity gains over the 15 years.

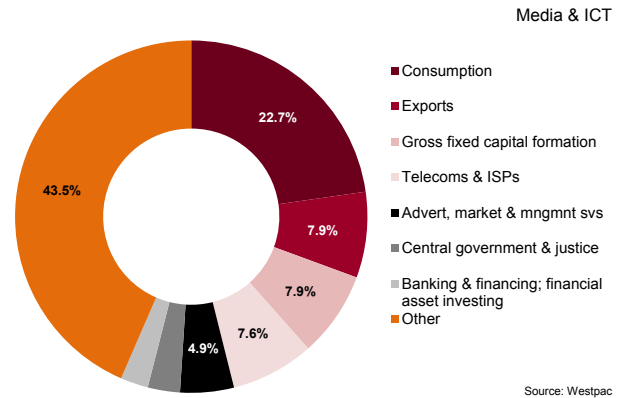
Upstream and downstream

National input-output tables allow us to examine which industries are major suppliers (upstream sources) to the Media and ICT sector, and where the outputs (downstream beneficiaries) from the sector go. This helps clarify how closely the fortunes of certain industries are linked to Media and ICT.

We examine the input and output mix for the sector as a whole here. Input-output analysis for the telecoms and data storage providers; software, music and internet publishing; and printing and publishing sub-sectors are also provided in the relevant sections of the report.

The wide reach of the Media and ICT sector is clearly apparent from analysis of both its inputs and outputs. One fifth of inputs into Media and ICT is in the form of imports, and one eighth comes from within telecoms and data storage providers. But a number of other industries each provide smaller inputs into the sector, with the top eight sources only accounting for 56% of the sector's inputs.

Where outputs go

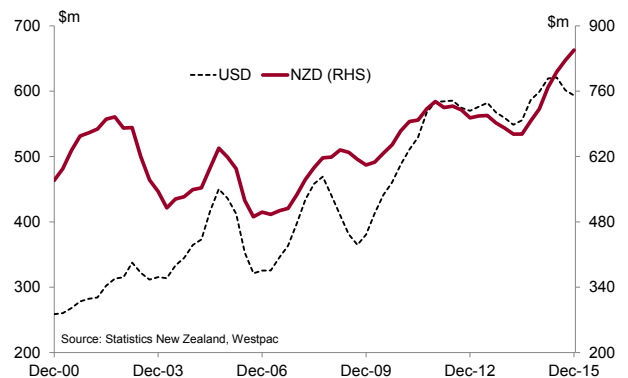


The outputs picture is as telling. Practically every industry in New Zealand is reliant on Media and ICT to some extent. While 23% of outputs are directly consumed by the public, all sorts of businesses rely on these services, including advertising and marketing businesses, banks and financial institutions, and government. As much as 44% of the sector's outputs are consumed by other industries outside of the top eight destinations for the sector's outputs. This illustrates the wide-ranging benefit that productivity gains in ICT has on the broader economy.

This is a very different spread compared to the last sector we studied in an Industry Insights report, for instance. In Fishing, Aquaculture and Seafood 85% of all outputs were directly consumed by end-users, or were exported.

Still, telecoms, computer systems and information services exports have grown sharply over the last 16 years, measured in US dollar or New Zealand dollar terms. The exchange rate acts as a buffer, keeping export values from New Zealand more stable over time. In New Zealand dollar terms, exports of these services have risen 49% since 2000. In US dollar terms, however, exports have surged 129%, or 5.7% per year. The recent decline in the New Zealand dollar may further support strong export growth.

Telecoms, computer systems & info services export values, annual



The big picture

- The ubiquity of mobile devices led by smartphones means consumers are available more often, want information faster, and produce massive amounts of data that companies can use to identify their spending habits and preferences.
- Smartphones have also spawned a generation of consumers that has gotten used to getting hundreds of services for free via apps.
- But greater data collection and connectedness raises the risks of cyber-crime to unprecedented heights, which will spawn millions of new global cyber-security jobs over the next several years.
- In addition, thousands of skilled ICT professionals will be needed in New Zealand, even as disruption and automation reduce the number of workers some businesses need.
- Meanwhile, the risk of incumbent businesses across industries being disrupted by technology that simplifies processes and lowers the cost of entry for new businesses will continue to rise.

Upward mobility: always on

Smartphone penetration in New Zealand is expected to reach 90% by the end of 2016, meaning access to consumers, and consumer expectations of quick access to news and other data has changed. Other mobile devices, most notably tablets, are also increasingly mainstream, heading toward 50% penetration. This is changing the method and frequency with which people access information and on-line services and therefore the response by software producers, media companies, and the wider business community.

A recent Deloitte study showed that Australians unlock their phones an average of 30 times a day.³ For those aged 18 to 24, the figure is far higher. This means people have much quicker access to information from social media and traditional data sources. It also means that mobile platforms have become the primary means of reaching customers, over and above traditional laptops and desktop computers.

Yet at this point, the share of advertising spend on mobile platforms is small. This is expected to grow sharply as businesses begin to understand that mobile platforms have the widest reach and want to ensure their message is communicated swiftly.

But the switch to mobile platforms has also created different challenges. The smaller screen means making content and

advertising visually appealing has its own obstacles, and Google has already changed its search algorithm used on mobile devices to prioritise mobile-friendly websites. This means advertising agencies, website designers, and businesses more broadly have to re-think how they deliver information, to focus on mobile platforms.

Collect, analyse, interpret, prescribe, repeat

Businesses are getting smarter about using data to understand customers and to target their marketing to specific customer segments.

The concept of “big data” – businesses having a wealth of information about their customers, products and services – is not new. Banks, government agencies, and insurance companies among others have, for years, collected millions of lines of data about their customers. Since the explosion in the number of services undertaken on-line, this data has grown exponentially.

Yet there were two problems with this data collection. First, big data was mostly confined to data collected through on-line interaction with companies, such as the purchase or use of goods and services. Data was not collected in the physical world, where people went to their local retailer to purchase particular items, with the exception of customer loyalty card programmes. This meant a wealth of information on what consumers and businesses were spending on was not captured at all, meaning businesses could not modify their product and service offerings to better meet the needs of their customers.

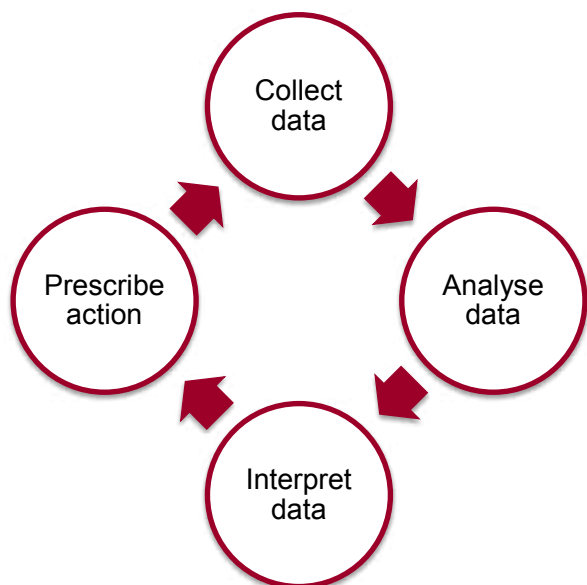
But the rise of the “internet of things” – smartphones and other digital devices from tablets to fridges, cars and buildings, as well as the software run on these devices – have made it possible to collect all sorts of information in the physical world that could not be collected previously. ICT business, CISCO, estimated in 2014 that the sale of hardware and software that form this network of devices would amount to US\$19 trillion by 2022, and that the number of connected devices would reach 50 billion.

Most people have their smartphones with them at all times. By downloading an application from their favourite restaurant or homeware store, for instance, it has become a lot easier for businesses to collect information on their spending habits and preferences. This has revolutionised how products and services are marketed to individual customers via the apps on their phones.

The second problem with historical data collection was that in many cases, data collection was all that happened. Data was collected as a matter of course, but little analysis of the data occurred. As a result, it was not possible to interpret the data, to prescribe an appropriate response to the data, or to change behaviour based on insights the data provided.

³ Deloitte. (2015). *Mobile Consumer Survey 2015 – The Australian Cut*.

Using big data



Businesses dealing in on-line services or using information gathered by the internet of things that take the steps of analysing, interpreting and prescribing are likely to be more successful. Increasingly, even the fourth step of the process – prescription of appropriate action – can be undertaken by computers through machine learning. The wealth of data available makes it significantly faster and cheaper to market customised products and services to particular demographic groups with different buying patterns.

Some see this data collection and evaluation as an intrusion. But there are clear benefits to consumers as well as businesses. A targeted approach based on good interpretation of data means the days of being bombarded with marketing of all sorts of products and services someone has no interest in, or history of buying, are fast becoming a thing of the past. Instead, consumers will receive marketing for products and services they are interested in and have a history of buying, and that are bundled in a way they will find useful.

For businesses, this means better conversion of interested parties into genuine customers and better bang for marketing dollar spent. For individuals, it means a customised and personalised marketing experience.

Consumer surplus: app, app and away

Consumers are getting more products and services for free than ever before, largely facilitated by the ubiquity of smartphones and other mobile devices. But Media and ICT businesses are finding it hard to generate revenues from the software apps they have introduced. Social media, news, internet-based email services, on-demand video services, on-line airfare comparison sites and innumerable other sources of information and services are delivered free of charge to the consumer.

In the early days of the proliferation of software services, the race was about popularity in the first instance, with concern about how to generate revenue from a new application coming second. This was good news for the consumer, but not necessarily for the businesses that developed them.

In the current business model, rather than consumers paying for a new service, software developers or businesses to whom they contract for the software development, and the apps are generally freely available to consumers. Businesses are willing to make these investments because of how it allows them to interact with potential customers.

Younger people in particular find on-line systems easy to use, but they carry multiple benefits for businesses as well. Apps can streamline processes, reduce headcount, help overcome money-laundering risks and, in the case of New Zealand, are by-and-large well catered for by existing legislation, with the possible exception of privacy rules (discussed later).

In the most common model, revenue is generated for developers of apps by advertising or up-selling (premium versions of an application, for instance), or through payment by third party businesses who request that developers build apps for them. But often new apps result in a huge surplus accruing to the consumer as intermediary businesses (like bricks-and-mortar travel agencies, financial institutions, or taxi associations) are cut out.

The cost-savings to the average consumer in many developed countries from using apps compared to traditional ways of purchasing products and services will run into hundreds or thousands of dollars a year. Less travel time and costs, fewer phone calls, and fewer paid-for subscriptions to receive news updates are just some examples of the benefits to consumers.

Some businesses are now looking to turn back the tide by charging for services that were previously free during the race to be most popular. For example, news outlets with free on-line access are adding paywalls. Yet it will be a hard sell persuading consumers who are used to getting free news from around the world to pay for it. Other efforts to get users to pay will likely meet with similar challenges. Our expectation is for limited success in converting free-users into paying users.

Cyber-security: springing a leak

Independent estimates of the size of the cyber-crime problem globally are hard to find, but it is reported to cost world economies between US\$100 billion and US\$500 billion a year. This upper end of the estimate is more than twice New Zealand's annual GDP. One estimate in New Zealand is that the average cyber-breach in New Zealand costs businesses upwards of \$1 million. Estimates for total losses in 2015 were \$257 million in New Zealand, according to the Government.

As a result of increasing attacks, Forbes estimates that one million jobs will be listed in 2016 for cyber-security roles around the world.⁴ By 2019, there are expected to be six million cyber-security jobs globally.

⁴ See <http://www.forbes.com/sites/stevemorgan/2016/01/02/one-million-cybersecurity-job-openings-in-2016/#15e7b4d57d27>

The most common attacks at present, but by no means an exhaustive list, include:

- **Phishing**, whereby hackers gain access to private information such as credit card or pin in an electronic communication.
- **Whaling**, similar to phishing, but aimed at getting subordinates to transfer funds on the false belief that a boss has instructed them to do so.
- **Ransomware**, whereby hackers take control of a computer's hard-drive and block access to its contents until a ransom is paid.
- **Identity theft**, which can be through direct hacking of data, or through gaining access to private information through phishing, for instance.
- **Mass data theft**, whereby businesses and governments are targeted to steal entire databases, whether for direct financial gain, industrial sabotage or other purposes.

At the same time, as more businesses collect and store big data on thousands of their customers, the channels through which cyber-criminals are able to access private information are growing. One concern is whether current legislation in New Zealand is strong enough to ensure businesses take all reasonable actions to protect customer data. There are also concerns about whether legislation needs to be revised to ensure better privacy and sufficient penalties for illegally accessing data. Further, the question arises as to what use of data collected, for example, through the growing internet of things, is appropriate, and how data might be shared between collectors and users of data.

More concerning with the rise of the internet of things is the possibility of a cyber-breach posing immediate threats to survival. Pacemakers, insulin pumps, cars, security systems, electricity supplies are all at varying degrees of risk of being hacked.

The potential for cyber-crime or even cyber-terrorism to wreak havoc is of fundamental importance to government and to businesses. Many countries are already investing in military units devoted to cyber-security, and in some cases, in the ability to launch cyber-attacks. With these risks in mind, the New Zealand government announced in May 2016 that it was establishing a \$22 million unit to tackle cyber-crime and online espionage.

Yet, industry sources believed the public and even businesses were often ignorant of the scale or likelihood of being attacked. Potentially the largest threat to small businesses and individuals in 2016 – ransomware – is little known in the general public and few have taken any action to mitigate the risks.

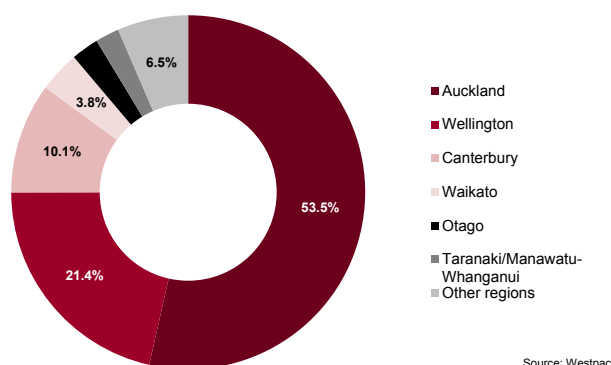
These risks also provide opportunities. New Zealand has the potential to take the lead in cyber-security. Many see New Zealand as relatively well-respected and trusted by the world community. This would make it a lot easier for New Zealand to grow its cyber-security industry by developing new customer bases abroad than for many other countries. But to play a greater role in providing cyber-security around the world, we will need to train a lot more people with the right skills, a topic we return to later.

Cyber-attacks on New Zealand are many and constant

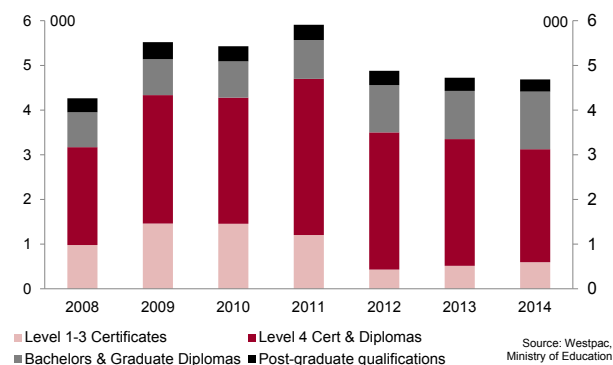


Source: Unitec, NICT

Media & ICT employment by region



Domestic students completing qualifications in IT



Convergence and disruption: crossed lines

The rapid rate of change in technology makes it cheaper and easier to disrupt incumbent businesses by applying new technology to existing industries and services. This creates the ongoing risk that an ever-larger group of industries, especially in services, will be exposed to start-ups and other businesses displacing their business model. It also means more businesses will use technology to shift into industries in which they have not previously operated (convergence).

Every business is a software business

Print media businesses, to survive, have re-invented themselves as on-line services. Telecoms companies are offering on-line video streaming services. But we also see extensive cross-over outside the Media and ICT sector. A useful example is whether an advertising agency is a marketing firm, or is in fact a software and broadcast media company. They do much of their work through digital media, but are they closely linked enough to be called a media business rather than an advertising agency.

This can be taken further. Is a bank really, through its smartphone apps, increasingly a business offering software-based solutions to customers? And as banks increasingly branch into other services such as consultancy and advice on technology solutions, will they be seen as software and computer system design businesses? And then there are the businesses moving into the financial intermediary space, using digital platforms to provide foreign exchange and other services. Are they financial services businesses or software companies?

Similarly, is an airline operating leased aircraft and outsourcing most of its operational components, but that makes extensive use of software for bookings actually a travel agency or a software developer?

These questions are not academic. They show the ease with which businesses are able to morph into something different, assisted by technology. Thus they show the need for agile, adaptable businesses if they are to avoid becoming obsolete. As several industry sources put it: "Every business is a software business".

As a result, businesses are at constant risk of digital disruption. Previous Westpac Industry Insights reports have highlighted how technology is disrupting travel agency and retail businesses.⁵ But others in the firing line include banks, legal and accounting services, traditional manufacturers, and educational institutions. Technology makes it cheaper and easier to disrupt inflexible incumbents, or to leapfrog existing technology.

The death of distance

Technology has also led to the death of distance. Not only are businesses moving into others' fields of expertise, but businesses are increasingly able to compete in new geographic areas against incumbents. This means New Zealand technology companies can compete far more easily in the global market because lower capital investments are needed. But it also means global players can move into the New Zealand market. There are already examples of both.

The telecoms and data storage providers, and software and computer system design sub-sectors are increasingly about human capital and ideas than building towers and laying cable (although this infrastructure is required). This massively increases the opportunities for growth, but also exposes New Zealand businesses to competition from the global Media and ICT sector.

I robot: automation and skills

Some argue that we stand on the precipice of the largest disruption to long-term employment since the Industrial Revolution as technology automates work that has until now been done by humans. Ironically, others argue that economic growth is being held back by our inability to fill thousands of new technology jobs with suitably trained people.

White-collar work suits robots

Some examples of industries that are changing or even disappearing due to technology have already been given, but it is increasingly difficult to identify an industry that has not, or will not, be affected. Automation has methodically replaced lower-skilled jobs for hundreds of years, increasingly pushing workers into the services sector. The final frontier is the services sector itself, with risks to workers in this sector clearly growing.

⁵ See <http://www.westpac.co.nz/assets/Business/Economic-Updates/2016/Bulletins-2016/Industry-Insights-Tourism-March-2016.pdf> and <http://www.westpac.co.nz/assets/Business/Economic-Updates/2015/Bulletins-2015/Industry-Insights-Retail-December-2015.pdf>

Whereas in the past, machines were only used to perform highly repetitive tasks in production lines, machine learning and other leaps in technology are allowing machines to make more of the decisions, and to adjust their behaviour based on new data. Machine learning means that in addition to even more automation in manufacturing (e.g. through 3D printing), we expect to see roles in industries from weather forecasting to legal services becoming increasingly automated in the years ahead.

A universal truth?

Yet industry sources agree we are desperately short of people with the right skills for the types of jobs that are emerging. Media and ICT employment tends to be based in regions with strong tertiary education sectors, most notably universities. While city size does matter – the four largest cities in New Zealand are the four largest employers in Media and ICT – regions notable for their universities tend to over-perform. Auckland, as commercial capital and home to several university campuses, has around 54% of employment in the sector, followed by Wellington, Canterbury and the Waikato. But Otago is fifth, followed by Taranaki/Manawatu-Whanganui, home to Massey University.

The Bay of Plenty, the fifth most populous region in the country, is notably absent from the top six, as is the Hawke's Bay and Gisborne, another populous region where a university is absent.

The link between tertiary education and ICT has long been established in the United States, so a similar picture here is unsurprising. But industry sources highlighted concerns about the low number of ICT students being trained, and how they are being trained. Some had strong views that it was unusual for a quality programmer, for instance, to have less than a Bachelors degree. Yet over the last several years, tertiary institutions in New Zealand have continued to produce far more Level 4 certificate and Level 5 and 6 diploma graduates than Bachelors graduates in information technology.

Worse still, the overall number of qualifications completed in ICT are falling. The drop of nearly 20% in the total number of information technology graduates being produced in the last three years is in stark contrast to demand although the biggest change appears to have been at the lower end of the qualifications spectrum.

Or switching off formal education?

In contrast, other industry sources suggested there was a move away from university-type education to more informal on-the-job training. Major global technology companies as well as ICT businesses in New Zealand are increasingly looking to school-leavers rather than university graduates. Some pointed out that many of the most famous and profitable global technology companies were started by people who did not complete formal tertiary study. ICT skills are being seen more as a vocational skill, with apprenticeships becoming more common. High school students who develop their software skills as a "hobby" will be recruited partly based on a portfolio of software projects they have completed in their spare time.

Some industry sources commented that the tertiary education sector in New Zealand was slow to change. Courses are often taught using years-old technology, and education providers may be hamstrung by a regulatory framework that is slow at getting new courses approved. Yet there is no doubt that the education system will need a radical overhaul to deliver the kinds of workers with the way of thinking and skills required to succeed in ICT jobs that may not even exist yet. This tension between traditional providers and changing needs is likely to see more flexible new education providers develop that are funded and/or run by large technology businesses.

From good to great

Software developers are particularly concerned about wide variation in the quality of programmers. Many believe the "factor of 10" difference in productivity between the best and worst programmers (regardless of years of experience) still exists today, 50 years after being suggested by Sackman *et al.*⁶ Finding the right people is thus a matter of business survival for many of these companies.

This lack of certainty over the quality of a worker's skills is likely to lead to even more project-based work. Individuals are contracted for specific projects, with the team disbanding at project completion. This model allows software companies to evaluate performance and perhaps offer full-time or more regular employment to workers who perform best.

Media reach: changing channels

The rise of digital media has forever changed the way businesses, and the advertising and marketing agencies they employ, communicate with customers. The advertising budget is now split many more ways, with the company's own website, and social and broadcast media being added. In many cases spending on this is surpassing the role of print, radio and TV advertising.

The multi-channel approach means that traditional media are missing out to spending on digital media. It also means businesses are thinking more carefully about how they target different kinds of customers across many channels.

Technology is also allowing businesses to target the people most likely to purchase their products or services, improving bang for marketing buck. This can be passive or active. An example of passive marketing is marketing aimed at people who have already shown an interest in a company's offerings by following them on social media. As these people already have an interest in what the company offers, they're likely to pay some attention to broad-based marketing on the company's social media pages. But technology also allows much more active marketing through data collection, analysis, interpretation and an implied response, as we have already discussed.

⁶ Sackman, Erikson and Grant. (1968). *Exploratory experimental studies comparing online and offline programming performance.*

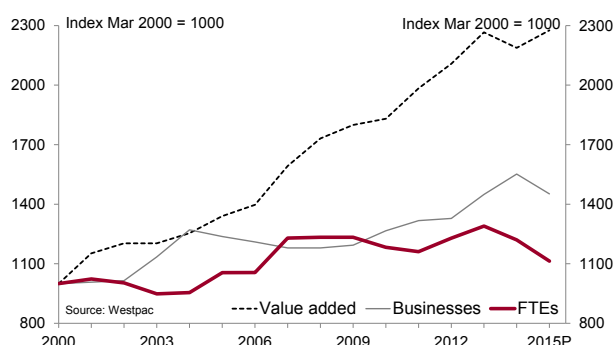
Telecoms and data storage providers

- Telecoms and data storage providers are having to change rapidly.
- They have recorded strong growth in value added until recently, but face declining fixed line connections, and mobile phone market saturation.
- Further, the commoditisation of cloud data storage solutions and the rise in uncapped data plans will limit revenue growth.
- The potential for increased global competition, through global SIM-cards and potential entry of large global technology players into the telecoms space, constitute further threats.
- As a result, we expect to see some consolidation in internet service providers (ISPs). We also expect telecoms companies to continue to develop other revenue streams such as broadcast media offerings.

Ultra-fast value added

The telecoms and data storage providers sub-sector has seen strong growth in value added in the midst of weak employment growth. The sub-sector has recorded 128% growth. At the same time, there has been some growth in the number of business units (or front doors) serving the sub-sector, up 45% since 2000. This is quite impressive growth in physical footprint, given the rise in online servicing within the telecoms and data storage providers space.

Telecoms & data storage providers. Employment, value added and business numbers



Weak employment growth, combined with the strong increase in value added, implies strong productivity increases. Workers are more than twice as productive as they were 15 years ago by recorded value added measures, which equates to growth of 4.9% in value added per worker each year since 2000.

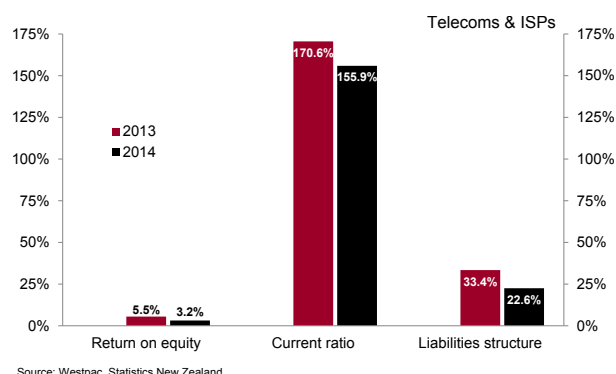
That said, the sharp growth in value added has plateaued over the last couple of years, partly as the mobile phone market has become saturated, and the switch to smartphones has been largely completed. Room for growth in the sub-sector will be limited without branching further into other areas such as broadcast media.

Businesses are becoming smaller in employment terms, however. On average, each "shopfront" in this sector employs 23% fewer workers than in 2000, a result of the proliferation of businesses, and the increased automation in the sub-sector.

Benchmark indicators

Businesses can monitor their own commercial performance against that of other businesses in their sub-sector by comparing themselves to sub-sector averages. Where possible, this report provides the most recent available information on three key commercial ratios for each sub-sector. The three indicators are return on equity, current ratio (current assets divided by current liabilities), and liabilities structure (share of total liabilities provided by shareholder or owners' equity).

Key commercial indicators



Overall, the telecoms and data storage providers sub-sector is characterised by weak returns on equity, a strong ability to meet short-term debts, and yet a high level of overall debt.

Return on equity in telecoms and data storage providers tends to be quite low, averaging just 5.5% and 3.2% over the last two years for which data is available. This rate implies a large shareholder capital investment (estimated by Statistics New Zealand at \$4.4 billion in 2014) with profits not sufficient to yield a good return on equity.

Current ratios over 100% are generally seen as the benchmark. Ratios over 100% imply that the business has more than sufficient current assets to meet its current liabilities. The current ratios for this sub-sector have remained strong across the two years of analysis, at 156% and 171% respectively.

The liabilities structure of the sector implies significant debt levels across the sector, with shareholders' equity accounting for just 23% of total assets.

Upstream and downstream

The telecoms and data storage providers sub-sector sources 43% of its inputs from within its own sub-sector or from imports, with significant portions of capital equipment brought in from overseas. The sub-sector also relies on a number of other input industries, mostly in services such as banking and finance, advertising and marketing, broadcast media, commercial property, and computer system design.

Outputs are primarily consumed by the public (35% of all output), with much smaller shares consumed by the telecoms and data storage providers sub-sector itself; exported; used to form capital; or consumed by government and the banking and finance sectors.

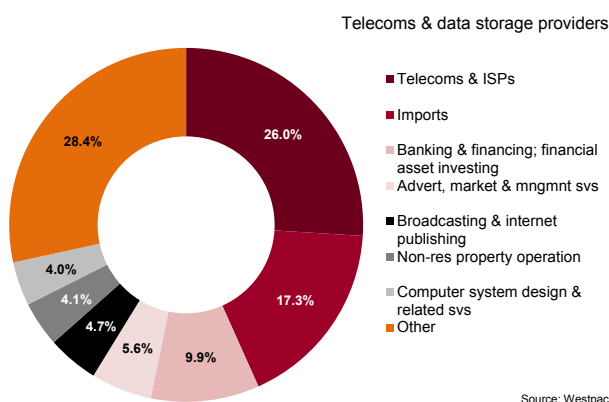
Key issues and outlook

The telecoms and data storage providers sub-sector is expected to undergo a number of major changes over the next two to four years.

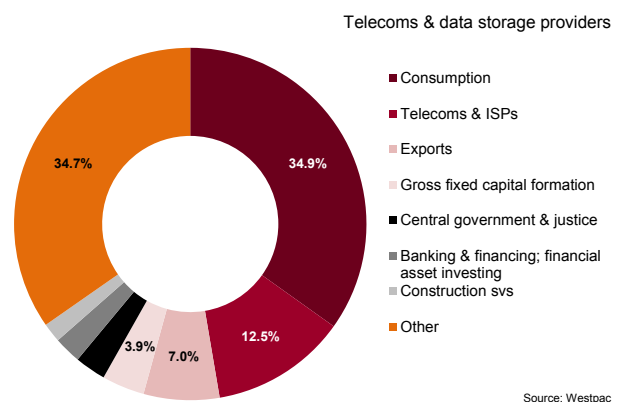
- **Home phone line connections will decline further.** This reduction in users will raise the unit cost to serve the remaining users. This will have an effect much like that seen in the postal service, whereby cost per user will rise.
- **Limited growth will occur in mobile services.** Market saturation means growth in the number of users will be limited to little more than population growth. With the switch to smartphones and associated higher use data packages now largely complete, little growth will come from that either.
- **The shift to uncapped data will stunt revenue growth and consolidate the industry.** Competition among ISPs is leading to better prices for consumers. The most notable shift in recent times has been the move to uncapped data plans. But New Zealand has over 50 ISPs. With revenue growth likely to be limited, we expect to see some consolidation in the number of ISPs.

- **Potential for major disruption in SIM-card market will grow:** People are travelling more than ever for work or leisure. They expect to be able to access the internet, calls and texting capabilities from their mobile devices cheaply and efficiently. Currently, country-specific SIM-cards with high roaming charges for accessing data from a foreign jurisdiction are the norm. Some companies independently offer a global SIM-card, but it is likely a major existing telecoms or technology company will disrupt the current market through mass-market global SIM-cards or roaming technology that reduces costs to consumers.
- **New cables will increase resilience but have little impact on data prices.** There is currently just one trans-Pacific undersea cable connecting New Zealand to the rest of the world, and a further low-capacity cable to Australia. Another connection to Australia is being funded by the major telecoms and is expected to be completed in 2017. In addition, in April 2016 a new cable connecting New Zealand to the US was announced. If and when this is completed, it will add further resilience to New Zealand's cable connectivity to the rest of the world. The impact on user prices will be small, however. The share of a typical \$80 consumer's internet bill that accrues to the cable operator is around 5%. Even halving the price at which data is delivered internationally would equate to a 2.5% reduction in the cost of a typical internet plan.
- **Further re-invention of what a telecoms company does will occur.** Successful telecoms firms will be those that can smoothly transition away from the fixed line business, maximise their share of the mobile market, and even more importantly, diversify into other areas such as digital broadcast media.

Where inputs come from



Where outputs go



Software & computer system design

- The software and computer system design sub-sector has seen the strongest employment gains of all sub-sectors in this report over the last 15 years, led by software development.
- Yet many in the sub-sector believe growth would be even stronger if more people with the right skills were available.
- As a result, changes to how workers are educated and recruited are afoot.
- Other long-standing challenges the sub-sector will need to overcome include difficulty in getting funding, and monetising new software apps.

Computer says yes

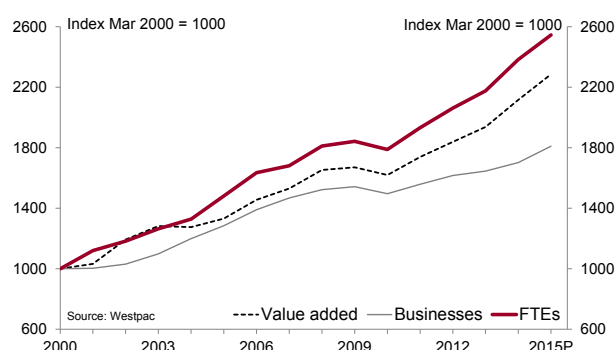
In contrast to most other sub-sectors, growth in employment, value added, and business numbers in software and computer system design has been largely aligned. Employment has grown fastest, up nearly 160% since 2000, while value added by these businesses has grown around 130%. The number of businesses is up 81%.

These changes imply that the average value added per worker has in fact fallen, as the number of businesses has proliferated, and as some businesses have struggled to monetise their software developments. Yet businesses in the sub-sector are now much bigger than in 2000, both in employment and value added terms.

The software and computer system design sub-sector consists of two main industries – software development and publishing, and computer system design services (the traditional “IT” industry). There are overlaps between these two sub-sectors. It is very likely that a number of businesses classified as IT businesses are in fact involved in software design, or at least modification. The software

development industry is manifestly under-recorded, at just 430 FTEs in New Zealand as of 2015, or 1.1% of employment within software and computer system design.

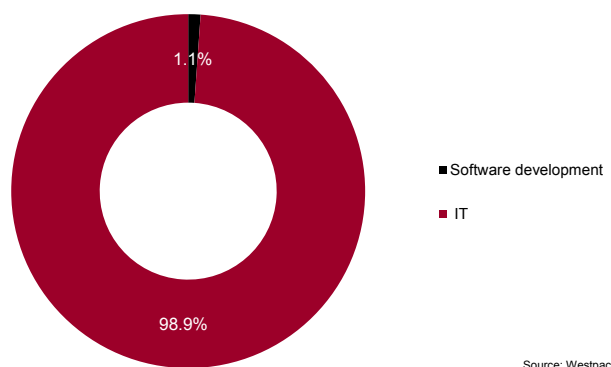
Software & computer system design. Employment, value added and business numbers



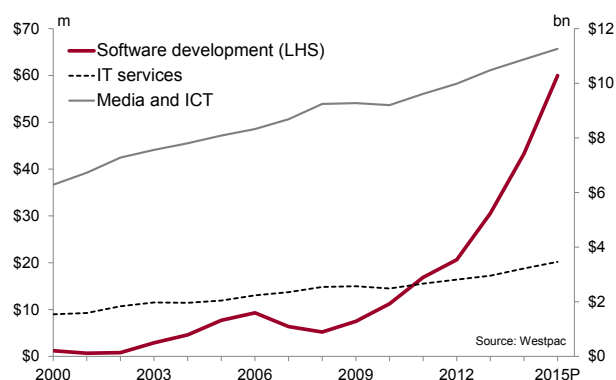
Nevertheless, examining changes in recorded data for the two industries – software development and IT – since 2000 highlights the fact that most growth is in software development rather than in traditional IT businesses. Employment in software development has surged since 2000, when it barely registered as an industry. Value added has grown even more dramatically.

This burgeoning employment and value added picture reflects two important trends. First, it suggests a dramatic increase in the role of software development in world economies overall. Second, it likely shows the global nature of the software and computer system design sub-sector. Growth in New Zealand companies is not limited by economic growth here. There are a vast array of opportunities abroad for New Zealand’s software and computer system design businesses.

Software and computer system design, 2015 employment



Growth in value added, 2000 to 2015

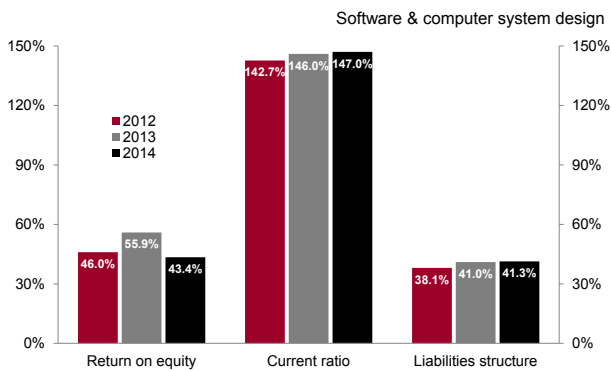


Benchmark indicators

Returns on equity in the software and computer system design sub-sector tend to be high. Capital requirements are low, with much of the value generated accruing to labour rather than to reward capital investment. In owner-led small software companies, this will be reflected in high returns.

The relatively low levels of capital investment also mean the sub-sector maintains solid current ratios, averaging between 143% and 147% over the latest three years of data. Debt levels are also lower than in many sectors. Shareholders' equity accounted for around 41% of assets in 2014, much higher than the 23% in telecoms and data storage providers.

Key commercial indicators



Source: Westpac, Statistics New Zealand

Upstream and downstream

Inputs into software and computer system design come from a variety of sources, led by imports (20% of all inputs). The importance of office space for these businesses is evident in the fact that non-residential property operation is the second most important input. In addition to inputs sourced from within the sub-sector, software and computer system design relies on a number of other service industries to provide the bulk of its inputs – employment, rental, banking, legal and accounting services.

Just 10% the sub-sector's outputs are consumed directly by the public. Instead, more than a quarter of output is in the form of capital. This emphasises the role of the sub-sector in building soft infrastructure (intangible fixed assets like software). Other major

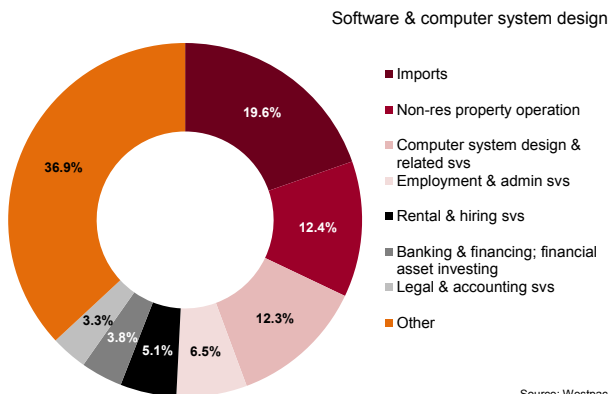
beneficiaries of the services and products generated by the software and computer system design sub-sector include government, banking and finance, and telecoms and data storage providers.

Key issues and outlook

The software and computer system design sub-sector is expected to face a number of changes over the next two to four years.

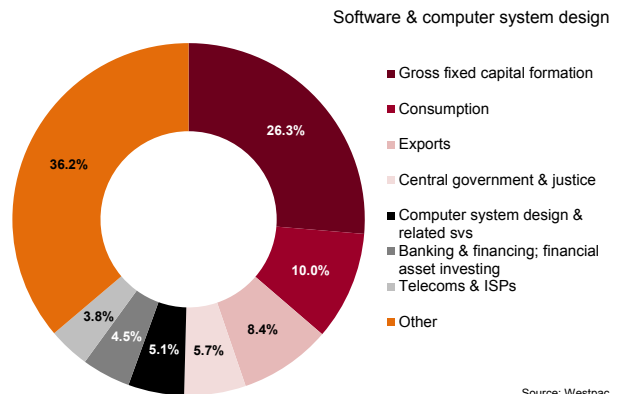
- **Skills will continue to be in short supply.** In New Zealand, the worry over having enough people with the skills to work at software companies or the entrepreneurial spirit to run their own businesses will remain. While the ICT-university complex may linger for some time, increasingly businesses will hire workers who can show they have the right way of thinking and the ability to adapt to new software and computer system design approaches, rather than necessarily having a degree from a particular tertiary provider.
- **Commercialisation will continue to be a struggle in the consumer-oriented space.** The opportunities to make money will be in B2B software and systems development, where customisable solutions are more important. Nevertheless, threats from an increasing number of free or low-cost tools available even to businesses will hamper profitability.
- **Winner-takes-all will become more prevalent.** While technology has made it easier than ever for New Zealand software and computer system design businesses to compete globally, this goes both ways. New Zealand businesses needing ICT solutions have more global solutions to consider than ever before. Global players competing with New Zealand businesses may lead to a winner-takes-all outcome.
- **Software, platforms and infrastructure will increasingly be provided as a service, not a product.** Less than a decade ago, businesses and households would buy their word processing and spread-sheeting software, install it, use it for a few years and then purchase the next edition. That model has been replaced by the subscription or rental model. Users don't buy the software; they rent it and updates and patches are downloaded automatically as they become available. This dramatically streamlines the updates process and ensures subscribers have the most up-to-date version of the software at any time. This change has been facilitated by the "cloud" – software is stored on external servers rather than on individual computers – and by connectivity between servers. But this is moving one step further, to include platforms (such as the

Where inputs come from



Source: Westpac

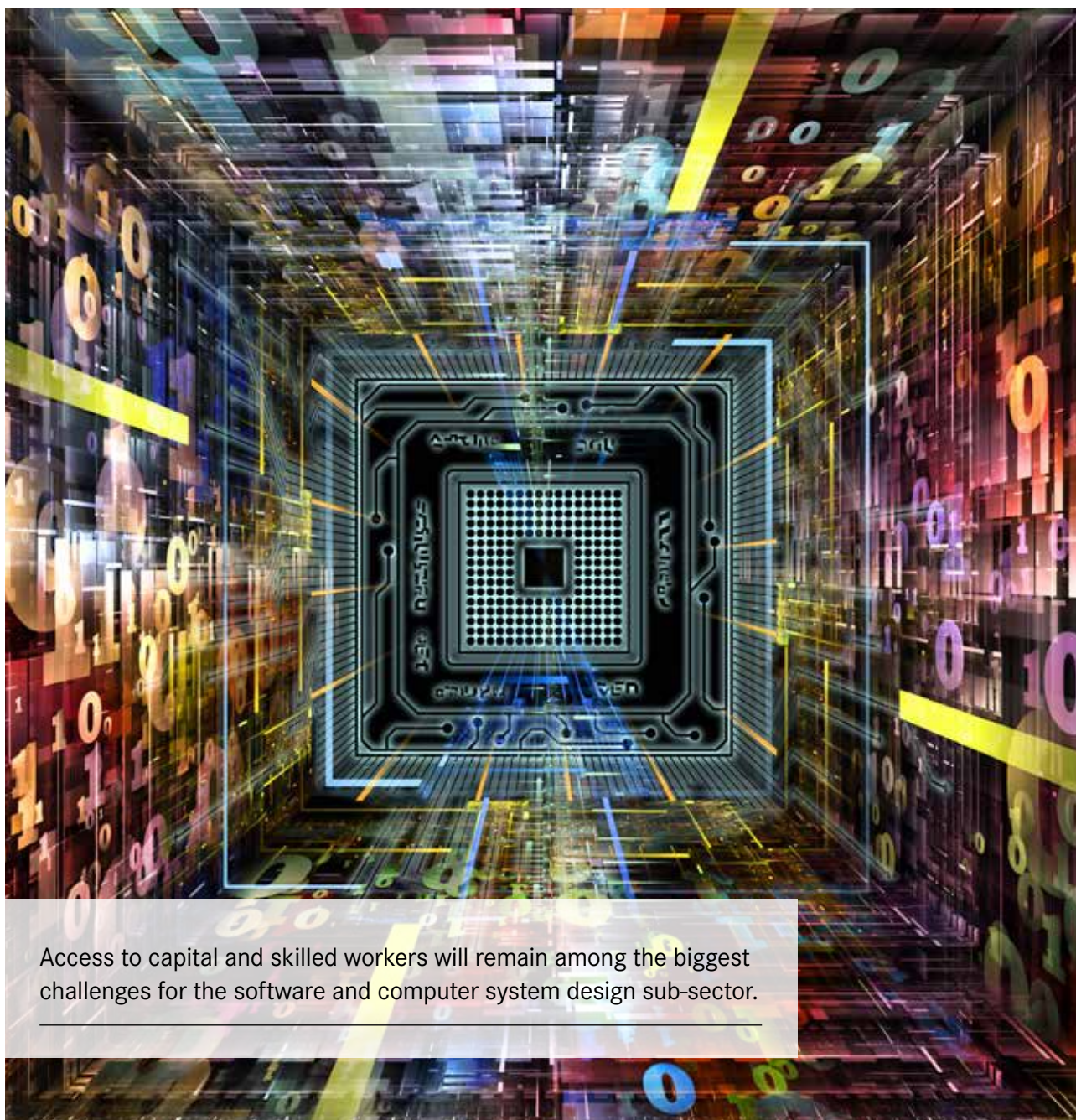
Where outputs go



Source: Westpac

operating systems that run computers) and even infrastructure itself. Firms can now rent both space on external servers and hardware. This will save upfront hardware and software spending by firms, and will concentrate the management of computer systems in the hands of specialist providers.

- **It will remain difficult to raise capital for a while yet.**
The software and computer system design sub-sector is not well understood by many outside of it. Further, the dot-com bubble bursting in the early 2000s is still relatively fresh in people's minds. This makes funding for new technology ideas more challenging. The size of this hurdle may fall in future with crowdfunding, a broader acceptance of the value of technology, and the development of metrics to measure success, and of standardised processes.



Access to capital and skilled workers will remain among the biggest challenges for the software and computer system design sub-sector.

Print media

- Traditional print media businesses will largely cease to exist in their current form over the next few years.
- Instead, today's print businesses will become digital entities in order to succeed.
- The future is somewhat brighter for printed magazine circulation than for printed news circulation. Still, resilient magazine readership via traditional channels is expected to last only another decade.
- The much shorter news cycle, facilitated by digital media, will require print news media businesses that do move on-line to ensure rapid uptake of local views and content (including video) in reporting.

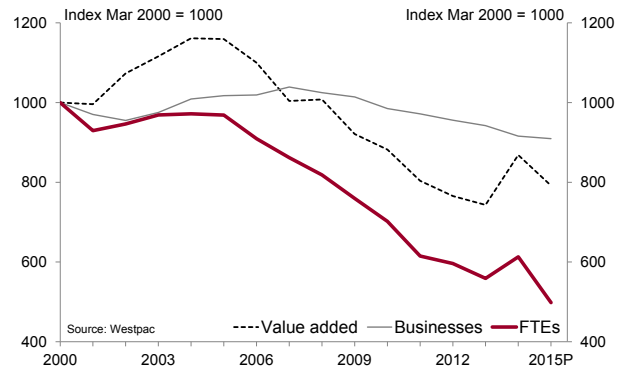
Stop press

Print media has been the most challenged of all the Media and ICT sub-sectors over the last decade. Since 2005 in particular, as digital media became ubiquitous, employment and value added by this sub-sector have plummeted.

Employment has halved, while value added has fallen 21% since 2000, and even more since the peak of 2005. The more surprising aspect of these changes has been the resilience of the number of businesses, which is down just 9%. This means the average number of workers per business has fallen by 45% since 2000, and the value added per business is down 13%. Yet value added per worker is up 59% due to the reduction in number of workers.

Businesses that remain in the printing and publishing sub-sector are therefore smaller in employment and value added terms, but are a lot more productive per worker than they were in 2000.

Print media employment, value added and business numbers



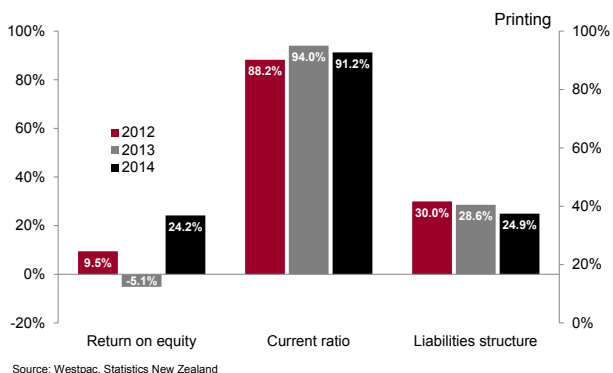
Benchmark indicators

Two industries within printing and publishing are analysed below. The printing industry has been characterised by fluctuating returns over the three years for which data is available. Returns varied between -5% in 2013 and 24% in 2014.

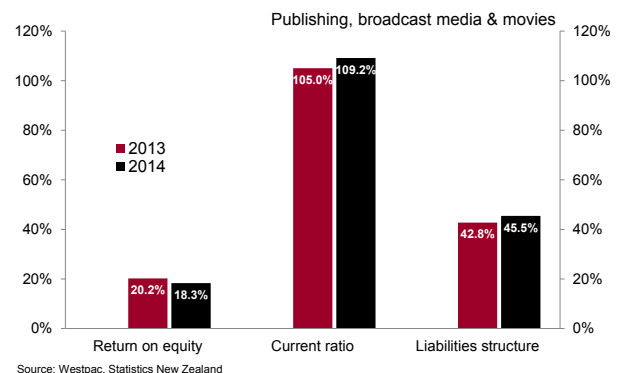
The printing industry has been struggling to maintain liquidity in recent years, at least in part the result of falling revenues. Liquidity ratios hovered between 88% and 94% in the period of analysis. The industry is also characterised by relatively low levels of equity. In 2014, nearly 75% of assets were debt-funded.

Separate data just on printed media publishing is not available. Instead, data includes broadcast media and movie and video production as well. Nevertheless, some key trends are identifiable from this data.

Key commercial indicators



Key commercial indicators



Returns on equity in this industry are more stable than in printing, partly due to lower capital requirements in the industry. Liquidity ratios, while not excellent, are above the 100% mark, while lower levels of debt and lower capital requirements also support a much higher shareholders' equity as a share of total assets.

Upstream and downstream

Print media, as a mix of manufacturing and services, has a more diverse range of inputs than the other sub-sectors in this report. Pulp and paper manufacturing, petroleum products, and metal manufacturing play important roles alongside commercial property operation and inputs from within printing and publishing.

On the outputs side, similar shares are consumed by the advertising and marketing sector and directly by the public. Smaller shares are exported, while the move toward recycling in the last two decades has resulted in many of the same industries that provide inputs to printing and publishing also being where its outputs end up – metal manufacturing, petroleum products, and basic materials wholesale.

The wide reach of printing and publishing is highlighted by the fact that 50% of its outputs end up in industries not listed here.

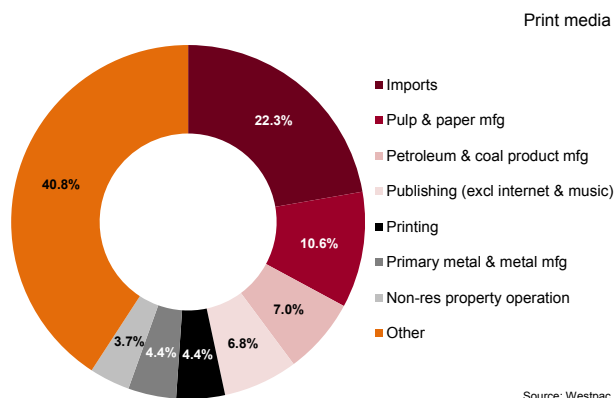
Poor circulation?

The fall in employment in print media reflects the sharp decline in newspaper readership in particular. Yet not all forms of print media are struggling in the same way. Magazine readership is up in many cases, with readership across the five leading stand-alone magazines (as opposed to out-take magazines within newspapers, or TV guides for instance) up 5% in 2015. But print newspaper readership was down by 10% in the year.

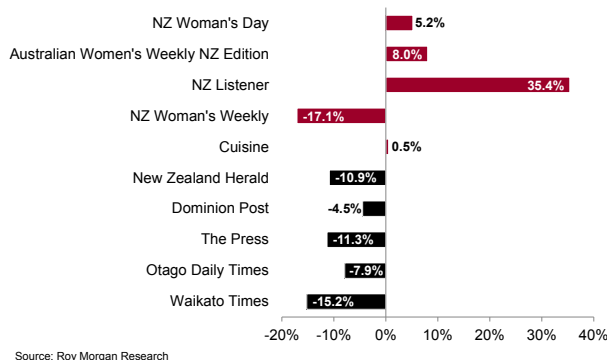
The most-read magazines include five women's magazines, two focusing on gardening and home decor, and one food magazine. This pattern is consistent with trends in TV broadcasting in recent years, with the rise in food and home-related shows.

Meanwhile, readership of printed news is down across the top five daily papers, continuing a trend that has lasted for several years. There does not seem to be a pattern of readership falling more in urban or rural centres, or in the largest cities versus the smaller cities. People are simply sourcing their information in different ways, most notably on-line, leading to the inevitable decline in print news.

Where inputs come from



Change in annual readership, 2014 to 2015



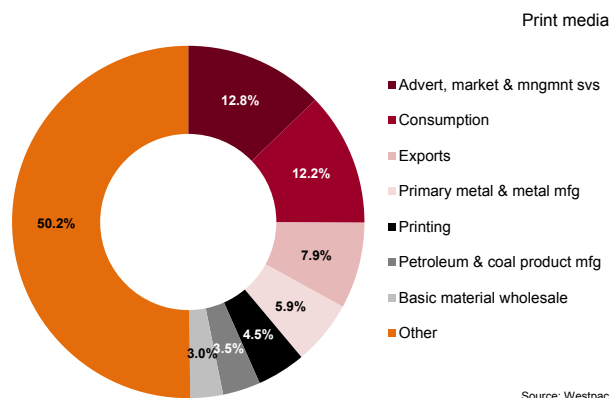
These trends indicate that many people are still willing to pay for a hardcopy of a magazine that they can touch and peruse offline, when it focuses on a particular area of interest. However, few if any of the top 20 magazines by readership focus on the under 30 demographic. The ageing population may help many of the larger publications maintain readership for now. But unless under-30s are attracted to this media, readership growth will be challenged.

Key issues and outlook

The print media sub-sector is expected to face a number of changes over the next two to four years.

- **The decline in printed news media is expected to continue:** The future of news media is on-line, massively impacting print and traditional broadcast media. We expect to see more publications move to an on-line only presence as advertising and readership shifts that way.
- **Print advertising revenue will fall:** As already suggested, as readers move on-line, advertisers will place decreasing value on a printed advertisement that is seen once and then discarded, versus on-line advertising that lasts as long as the advertiser wishes. The cycle of lower readership of print media and lower advertising revenues will self-reinforce as print media businesses find it harder to produce a quality product profitably.
- **The paywall approach to news media revenue-generation is unlikely to succeed:** For those print media that do successfully transition to largely on-line based content,

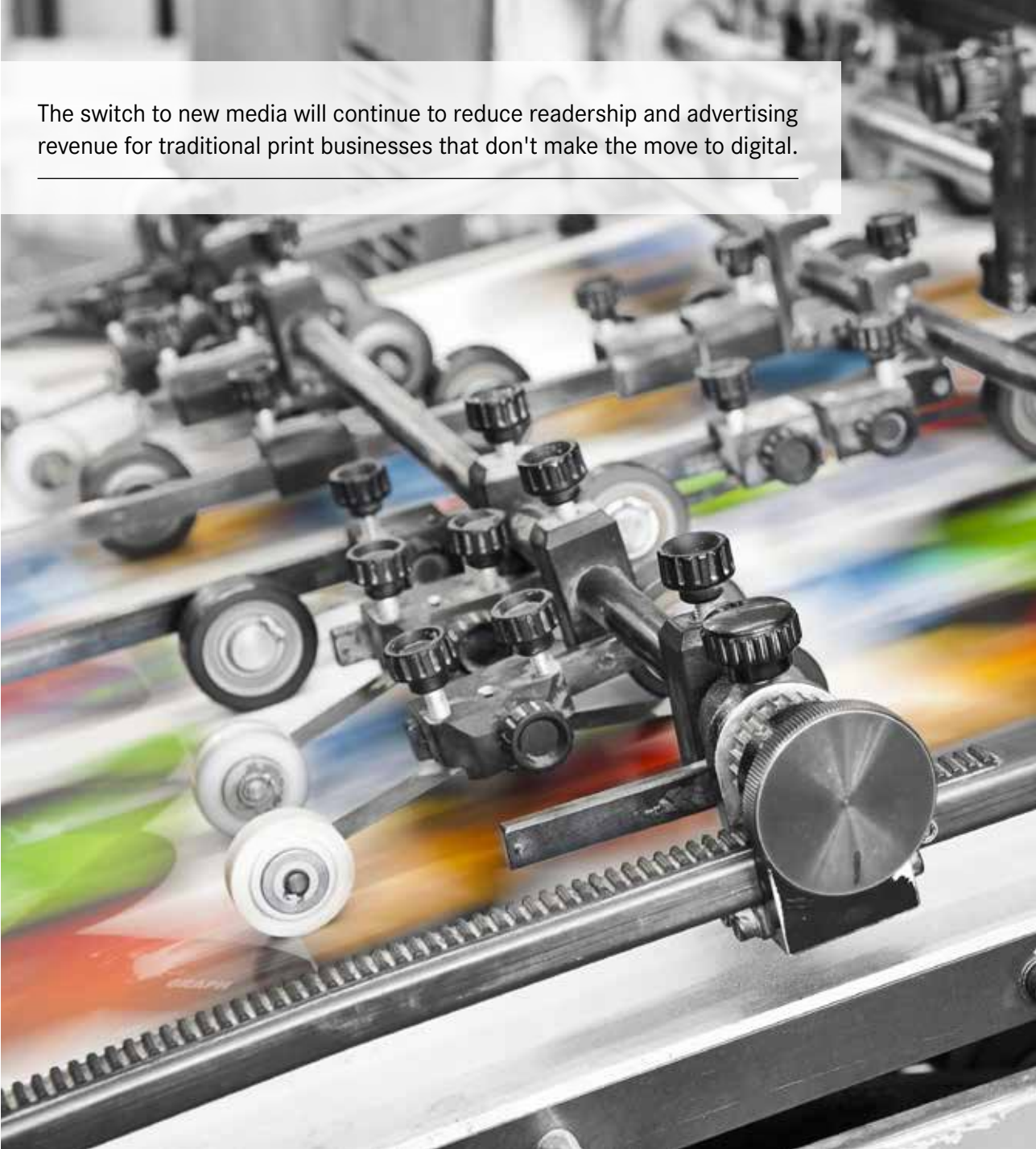
Where outputs go



paywalls are unlikely to work. After years of getting news and many other on-line services for free, consumers are unlikely to stomach paying for news again. Instead, advertising-driven models will remain the norm.

- **Limited growth opportunities for niche magazines will persist:** Persistent strength in physical magazine sales will not be indefinite, but strong brands are expected to see sales hold up for a few years. Unless magazine publishers are able to attract the under-30 demographic, which they have largely failed to do thus far, even magazines will inevitably see decline over the next 10 years.

- **Localisation and speed of content and reporting will increase:** As people check their smartphones 30 times or more a day, the desire for up-to-the-minute news has grown. Localisation of news, and the importance of a local connection or human side of the story have also increased. This change has driven the growth of shorter news cycles, more regular daily news updates (several times a day rather than once a day), and public-led reporting through social media and video uploads. This trend will dictate the responsiveness needed by print and on-line channels to stay relevant, and the need to incorporate local views and content in reporting.



The switch to new media will continue to reduce readership and advertising revenue for traditional print businesses that don't make the move to digital.

Broadcast media

- By far the strongest growth in broadcast media is in internet broadcasting.
- The consumer preference for a wider variety of on-demand content is eroding the market share of traditional Pay-TV services as they are unable to constrain access to content in their jurisdictions.
- Instead, global on-line streaming services will gain market share, with live sport as well as original content expected to play a major role in revenue growth.

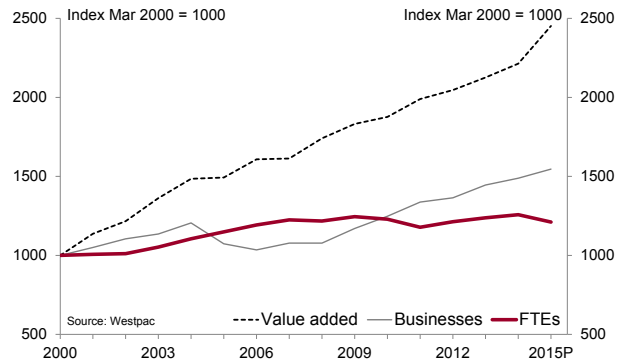
Value streams in

Despite almost no growth in employment or business numbers, broadcast media has seen heady growth in value added. The sub-sector has more than doubled the annual value it generates since 2000, but employment is up just 21%. Meanwhile, the number of businesses has increased by more than 50% since 2000, led by a surge in internet publishing and broadcasting businesses.

As a result, the value generated per business has rocketed by 59% in 15 years, while the value generated per worker is up 103%. In other words, the use of technology has enabled far more efficient operation.

This result is particularly strong given the current transition away from traditional TV and radio broadcasting and toward on-demand on-line streamed content. Many New Zealand TV and radio businesses have been shedding jobs, while many newcomers, from among the telecoms providers, for instance, are entering broadcast media. As the value added by those telecoms is not captured in the broadcast media data, it makes these results all the more impressive.

Broadcast media employment, value added and business numbers

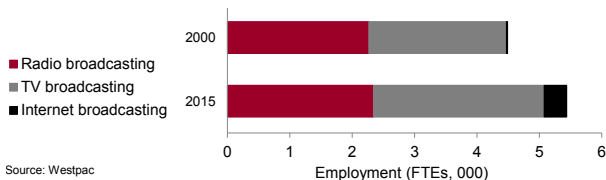


Looking at which sub-sectors within broadcast media are accounting for growth over the last 15 years, in absolute terms the answer is clearly still TV broadcasting. In growth terms over this period, however, the strongest gains have been in internet broadcasting. But the years between 2000 and 2010 were the formative years for internet broadcasting, during which technology developed in such a way as to allow smooth streaming of video content.

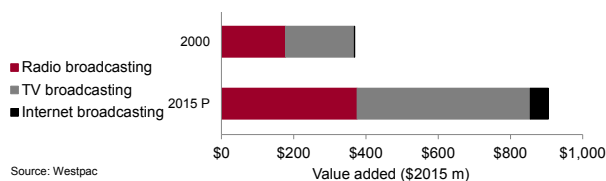
Since 2010, the maturity of internet-based services and the ubiquity of smartphones have supported stronger growth in internet broadcasting than in TV and radio broadcasting, which have both seen a fall in employment and modest growth in value added.

This data is also somewhat misleading. In an effort to survive and appeal to modern digital users, many radio stations are now also available to live-stream on-line. In other words, many traditional

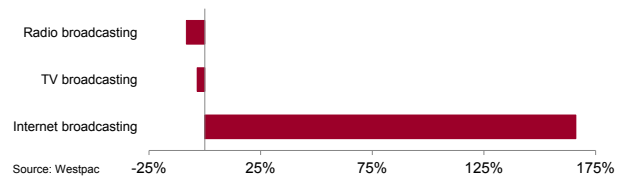
Employment, 2000 to 2015



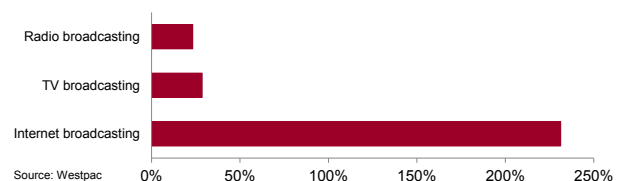
Value added, 2000 to 2015



Growth in employment, 2010 to 2015



Growth in value added, 2010 to 2015



broadcast media businesses, which are still classified as such, will be as much an internet broadcaster as they are a radio or TV broadcaster. This would actually increase the growth of internet broadcasting over TV and radio broadcasting if the data was able to be split more accurately.

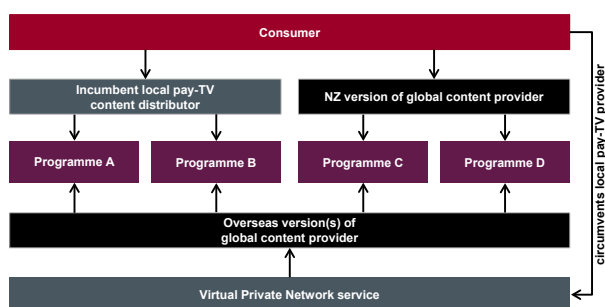
Scheduled TV doesn't pay

Consumers want to access a wider range of content when and how it suits them, not at a particular time of the day, once a week. And they have shown a willingness to pay for on-demand access to content that is not available in New Zealand. Many prefer to pay \$10 to \$15 a month to be able to access a variety of content on their TVs, computers or mobile devices rather than to pay several times that price to access scheduled shows on multiple traditional TV channels.

As a result, the rise of on-line based content streaming services, whether free (e.g. Youtube or free TV on-demand options) or paid (e.g. Netflix or "Game-pass" type services for particular sports) is eroding the market share of traditional incumbents.

The graphic below illustrates how limited choice due to exclusive broadcast rights incentivises consumers to find other ways to access global programming. Eventually this will lead to the same content being offered across the globe.

How consumers access digital programming



Consumers now have the option of traditional pay-TV, or accessing a local (New Zealand) version of a global content provider like Netflix. But some shows are only available on pay-TV services in New Zealand, which have purchased the rights to distribute that content here. As a result, consumers who want access to a wider variety of programming are using Virtual Private Network (VPN) services to access overseas (usually US or UK) versions of services such as Netflix. This allows consumers to access content that may otherwise only be available from pay-TV networks in New Zealand.

Local pay-TV services with broadcast rights based on geographic jurisdictions will be less willing to pay producers of content (movie studios for example) as their ability to constrain access to that content in a particular jurisdiction diminishes. We expect the current versions of online services such as Netflix to converge to a single global offering as they compete directly with traditional distributors.

This movement toward new pay-TV models will extend to live sports, a revenue growth area. There are already several examples of new providers securing the rights to broadcast live sports content online. Once again, rather than one pay-TV business providing numerous channels of sports, the consumer is likely to pick and choose which sport streaming services to sign up for.

This may include signing up for specific events, such as a world cup, or subscribing for a whole season of football, for instance.

Slowly tuning out of radio

Radio listenership has dropped to around 75% of over-15s from 96% in 2000. While the hardware listeners use may have switched from a radio or hi-fi to a smartphone or other digital device, the fact is that a relatively high proportion of people are still listening to live radio stations, and are therefore exposed to the advertising that drives revenue growth for the sector.

A range of other audio options, most notably on-demand music services, and a switch from audio to video facilitated by digital devices means that radio broadcasting is nevertheless losing out. The biggest losers in the battle for listenership appear to be smaller local stations as opposed to larger nationally-broadcast stations, according to data on regional listenership. The most successful stations are those that are national in reach, but with some local programming at certain times of the day. e.g. breakfast shows.

The fact that radio listenership has remained as high as it has is largely because of the penetration of car radios. But this is changing. Fewer young people are learning to drive and owning cars, while public transport patronage is growing. Newer cars with Bluetooth connectivity and adapters that allow smartphones to be connected to the car radio mean more people are able to stream personalised content rather than listen to live radio.

Key issues and outlook

The broadcast media sub-sector is expected to face a number of changes over the next two to four years.

- **Profitability challenges for pay-TV incumbents will grow:** As on-line streaming services erode the geographic constraints on access, traditional pay-TV services will see profitability squeezed as they may not see revenue rise commensurately with what they have spent on content.
- **Advertisers will need new ways of reaching target audiences:** Several paid or even free versions of on-line music and video streaming services have little if any third party advertising. This is part of the attraction of a paid service, but means that third party advertisers are more limited in their advertising options. Alternatively, we may see the rise of global "freemium" models of video streaming, as already exist in music streaming. In these models, content is free but the broadcast includes advertisements.
- **More multi-media shows will emerge:** Examples already exist in New Zealand of shows that are broadcast live on radio, TV and the internet. This will smooth the way into what will eventually be a digital-device driven model rather than a TV-driven model. As smart TVs become ubiquitous, they will simply be another extension of the on-line platform.
- **The role of government funding may change:** Publicly-owned broadcasters are not immune from changing consumer preferences. How, when and where consumers listen to or watch content is changing. Increasingly, questions will need to be answered as to what government-funded public service broadcast media looks like, as the consumer moves away from live radio and TV content to streamed on-demand content.

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