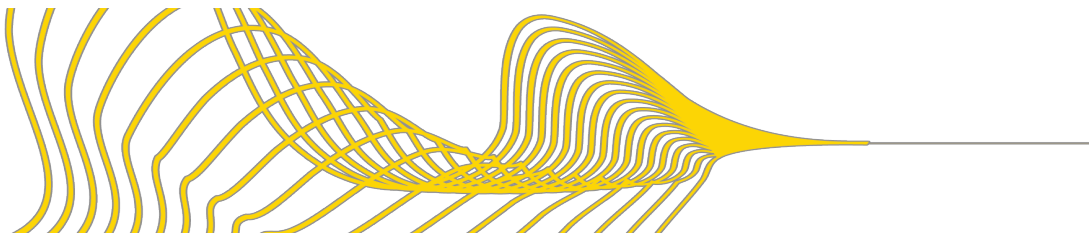


Environment Scan – 2012



Information and Communications Technologies Industry



Acknowledgements

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About this report

The Escan provides Innovation & Business Skills Australia (IBSA) with an opportunity to gather industry intelligence on business directions and emerging workforce development issues and to consider them in light of statistical information on training and industry trends. The Escan examines the key skilling challenges facing the Information and Communications Technologies (ICT) industry.

The Escan is also provided as advice to assist Government consideration of the industry skills and workforce development investment priorities for Australia's Vocational Education and Training (VET) system. The Escan will also be of interest to other audiences including Registered Training Organisations (RTOs) in working with industry to develop and implement strategies to build workforce skills and productivity.

This industry Escan accompanies and underpins IBSA's principal Escan 2012: Securing future workforces and references data from the Australian Bureau of Statistics (ABS), IBISWorld, National Centre for Vocational Education Research (NCVER), Australian Computer Society (ACS), CSES (Tradedata), and the Centre for Innovative Industry Economic Research Inc (CIIER). Industry intelligence, gained from annual Escan consultations, is a vital element in development of this Escan. The research methodology used to prepare the report is explained in more detail in Appendix A.

Terms:

Terminology used to describe occupations and industry sectors varies across jurisdictions and different parts of the industry. In the interests of readability this report has adopted the following terms:

1. ICT Industry – refers to the Information and Communications Technologies industry that produce and deploy ICT goods and services; they are also the industries for which IBSA has responsibility
2. ICT goods and services – these include hardware, software, communications, telecommunications and ICT related services
3. ICT industries sectors – refers to the industry segments that make up the ICT industry
 - Hardware: computing and communications equipment and devices including computers, printers, etc, testing; project management
 - Software: database design and development; software development; systems analysis and design
 - Services: enterprise systems administration and management; web and multimedia technologies, and
 - Communications: generally considered telecommunications: networking and network security; services and support; cabling, wireless, switching, transmission, radio frequency and optical communications and media and internet protocol networks.
4. Tertiary is the post-secondary sector that includes VET and higher education.

Disclaimer

IBSA has produced this Environment Scan as a resource for its stakeholders without any form of assurance. While IBSA aims to provide high quality content, it does not guarantee the accuracy of this information and therefore will not be liable in any capacity for damages or losses to the user that may result from the use of this information.



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**Department of Industry
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Chapter 1 – Executive summary

More than 554,000 people work in Information and Communications Technologies (ICT) occupations.¹ The ICT Industry contributes 4.6 percent of Australia's GDP and 4.9 percent² of economic gross value add.³ It is a complex and comprehensive industry that affects all business activity and is expected to have an increasing impact. With revenue exceeding \$82 billion and investment in research and development at \$5.2 billion, the Australian ICT Industry has a critical place in the Australian economy. Employees in the ICT Industry total 285,000⁴, and are employed across four main categories: consulting and software services; manufacturing of hardware and or software; distribution of hardware and or software; and telecommunications services. While IT employer sentiment is dropping⁵ there is nevertheless an intention to recruit for skills in financial applications, SAP, architecture and customer relationship positions.

Workforce development needs are being driven by the business cycle, new technologies and applications and the Australian government's digital economy strategy, including the rollout of the National Broadband Network (NBN) and prevalence of other high speed broadband platforms. The impact of the trend in declining enrolments in post secondary ICT training is now being felt as organisations recover from the global financial downturn. Increased participation by some groups, including participation by women and people in regional and remote Australia, offers new prospects for meeting future demand for labour which is expected to grow. Network engineers are the most in demand ICT roles in all states. Project managers, business analysts and developers are also in demand nationally.

The ICA11 Information and Communications Technology Training Package was endorsed on 9 May 2011 and incorporates a number of revisions to the ICA05 Information and Communications Technology Training Package. The ICT10 Integrated Telecommunication Training Package was endorsed in April 2010 and was largely developed by the Telecommunications industry to meet the needs of the NBN. Publicly funded enrolments in previous training packages were declining and completions have been low in recent years, however it is expected that the new and revised qualifications and units will attract enrolments from 2011 onwards.

Close engagement between industry and education providers will be critical to ensure that skills needs are articulated and addressed to secure a skilled future workforce for the ICT Industry. Providers need to look for innovative delivery methods that embrace new technologies appropriate for the target audience. The main workforce development challenges faced by the ICT Industry include:

- maximising NBN capability – the ICT Industry has a big role to play in its own right but also in supporting other industries and enterprises to be innovative in the development of new products and services made possible with widespread access to high speed broadband through the NBN
- managing risk associated with network and information security – increased opportunity is often associated with increased risks, both internal and external; the ICT Industry will be challenged to mitigate risks for organisations as they adopt new technology, and
- skills convergence – almost every job has an ICT skill associated with it; while not everyone has to be an expert everyone needs digital literacy skills to meet their workplace requirements.

1 Australian Computer Society, CIIER, Australian ICT Statistical Compendium, 2011

2 Australian Department of Foreign Affairs and Trade, Australia: a snapshot, 2008 – available at <http://www.dfat.gov.au/facts/snapshot.html>

3 Gross value add (GVA) is a measure of the contribution of the value of goods and services to GDP made by an industry or sector.

4 ICT Statistical Summary, Appendix C, Table D.1

5 The Hudson Report, Employment and HR Trends, October-December 2011

Chapter 2 – Industry intelligence

The Information and Communications Technologies Industry

The ICT Industry is comprised of organisations engaged primarily in providing computer and telecommunications services, as well as hardware sales and service. ICT services and professional and technical skills are integral to banking, healthcare, telecommunications, education, transport, resource exploration, manufacturing, tourism, primary and mineral production, security and the sustainable environment. The term ICT Industry is often used to describe a range of different businesses and industry sectors including those that provide ICT products and services, retail ICT, helpdesks and other professional services.

More than 554,000 people work in ICT occupations,⁶ contributing 4.6 percent of Australia's GDP and 4.9 percent of economic gross value add.⁷ Organisation for Economic Cooperation and Development (OECD), Productivity Commission and Australian Bureau of Statistics (ABS) studies estimate that 50 percent of all Australian business productivity can be attributed to the application of Information and Communication Technologies.

ICT exports fell from a peak in 2000 until 2005, after which exports increased a little in the following years before falling substantially again in 2009 with the global downturn. Total ICT exports fell by eleven percent during 2009 with ICT equipment exports falling by 15 percent and ICT services exports by almost seven percent in current prices. ICT services exports continued to fall during the first two quarters of 2010. However, with Australia's comparatively strong economic performance during the global financial downturn, ICT imports have continued to grow and cost almost \$27 billion during 2009. Consequently, Australia's ICT trade deficit exceeded \$22 billion during 2009 – increasing by \$755 million during the year and by more than \$6 billion since 2000 in current prices.⁸

Just under \$143 billion dollars worth of internet orders were received by Australian businesses in 2009-10, up 15 percent on the previous year. Wholesale trade and manufacturing industries continued their lead as the main businesses receiving online orders, both with more than 40 percent. The retail industry came in at fifth place. Nearly all, 94 percent, of Australia's large businesses had a web presence at 30 June 2010. Micro businesses, those employing up to four people, remain the least likely to be online with only about one third offering some form of web presence. Broadband dominated as the internet access method, 97 percent, with little variation between industries.⁹

Workforce characteristics and employment trends

Broad ICT employment occurs in a number of groupings. These include:

- the providers of ICT goods and services, often referred to as the ICT Industry
- the purchasers and users of ICT goods and services including the government and private sectors who also employ a large number of specialists to help them apply their ICT purchases
- the trainers, teachers and researchers into ICT who generally, but not always, operate within the higher and other education providers and research organisations
- providers of technical support to ICT who might more properly be categorised as electrical or electronics specialists
- people working in call centres and help desks, and
- desk top publishers and graphic designers.

⁶ Australian Computer Society, CIIER, Australian ICT Statistical Compendium, 2011

⁷ Australian Department of Foreign Affairs and Trade, Australia: a snapshot, 2008 – available at <http://www.dfat.gov.au/facts/snapshot.html>

⁸ Australian Computer Society, ICT Trade Update, 2010

⁹ Australian Bureau of Statistics, Summary of IT Use and Innovation in Australian Business (cat. no. 8166.0), June 2011

There are eighteen significant occupations in the broad view of ICT occupations taken by Australian and New Zealand Standard Classification of Occupations (ANZSCO). Many other occupations also include elements of ICT related skills and tasks and this may account for the differences in employment figure estimations.

Highlight statistical tables are used throughout this Escan however more detailed material is referenced in Appendix D and on the IBSA website. Table D1: ICT employment summary in Appendix D shows the share of employment for each of ICT occupations categorised by ANZSCO. It is important to note that when ICT professionals who could not be coded to specific unit groups are included, total ICT employment was 428,700 in February 2011. Software and application programmers are clearly the dominant occupation of ICT employment with just under 20 percent of the share of ICT employment.

The ICT statistical summary presented in Table D2 in Appendix D shows a small growth in the total ICT workers of 1.7 percent between 2010 and 2011. However, investment in ICT research and development increased by a significant 20.5 percent over the previous year.

The ICT workforce can be further broken down into categories. In Appendix D, tables C3 and C4: Analysis of ICT employment provide an analysis of six categories of ICT employment across all industries. After professional, scientific and technical services and information media and telecommunications, the greatest numbers of ICT workers are employed in public administration and safety, financial and insurance services and manufacturing industries.

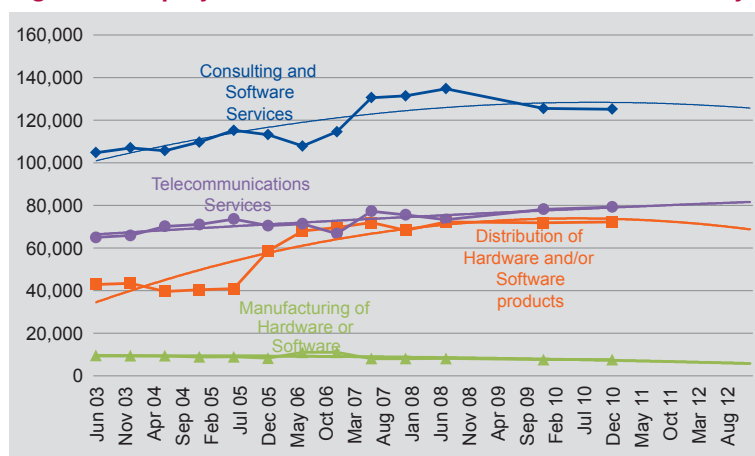
The dominant state for employment of ICT workers in all categories is New South Wales followed by Victoria. Table 1 shows the breakdown of the Australian ICT workforce by state and industry sector and shows little change from the previous year.

Table 1: ICT Industry employment by state

FTE workforce	Consulting and software services	Manufacturing of hardware and/or software	Distribution of hardware and/or software	Telecommunications services	Total
NSW	46,545	2,892	35,302	29,515	114,254
VIC	37,420	1,803	24,462	23,465	87,149
QLD	18,481	883	5,966	10,599	35,930
WA	10,077	314	3,468	7,769	21,627
SA	3,506	1,479	1,723	5,387	12,096
ACT	6,960	122	894	821	8,797
TAS	1,992	56	270	1,376	3,693
NT	555	90	193	333	1,171
Total	125,535	7,638	72,278	79,265	284,716
% of Total	44.1%	2.7%	25.4%	27.8%	

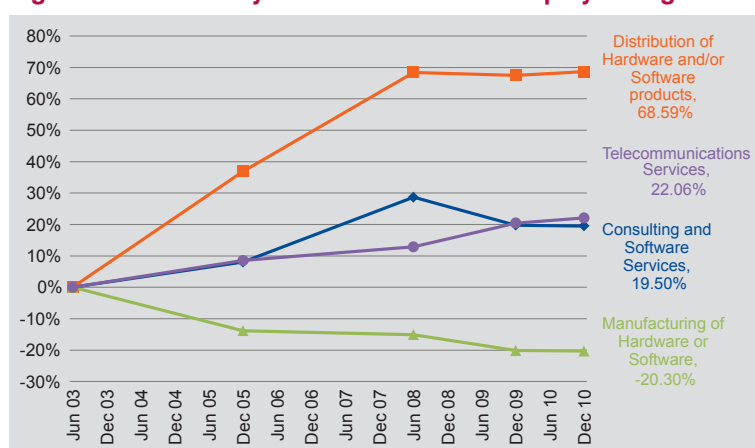
Source: CIIER, Model ICT Industry workforce by state and industry sector, 2010

Figure 1 below shows a plateau in the distribution of hardware and/or software products and a decline in consulting and software services and manufacturing of hardware and software since the middle of 2008 with only telecommunications services increasing slightly. Figure D2, in Appendix D shows employment growth trends in Queensland, Victoria, Tasmania and the ACT.

Figure 1: Employment structure of the Australian ICT Industry 2003–2010

Source: CIIER Whitehorse, Top 250 ICT industry analysis by state and territory, December 2010

ICT professionals have seen a growth of 47.6 percent in the ten years to May 2008 making it one of the most critical sources of employment and a consistent driver of economic growth.¹⁰ Figure 2 below shows the growth of employment across four sections of the ICT Industry to December 2010 as well as predicted growth trends. It appears that growth plateaued in the previous 12 months with only telecommunications services employment forecast to show some increase.

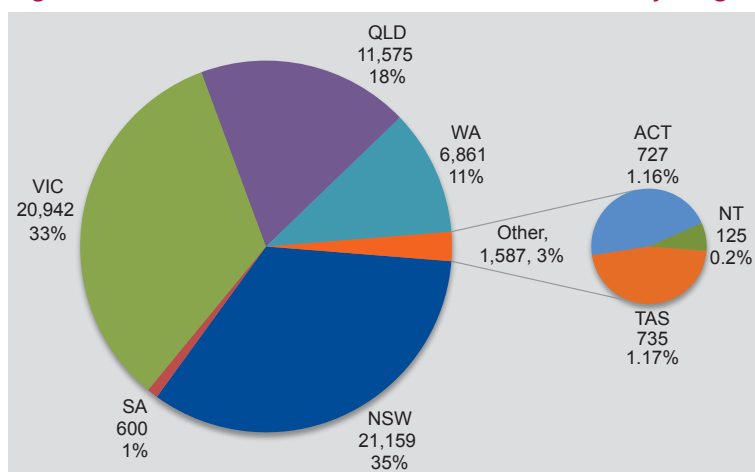
Figure 2: ICT Industry national cumulative employment growth by industry sector since June 2003

Source: CIIER Whitehorse, Top 250 ICT industry analysis by state and territory, December 2010

The earlier data establishing New South Wales and Victoria as the dominant states for ICT Industry employment has been confirmed in Figure 3 below showing job growth patterns following the same geographic spread as ICT employment.

¹⁰ RADAR Report, Recruitment and Development and Retention, March 2011

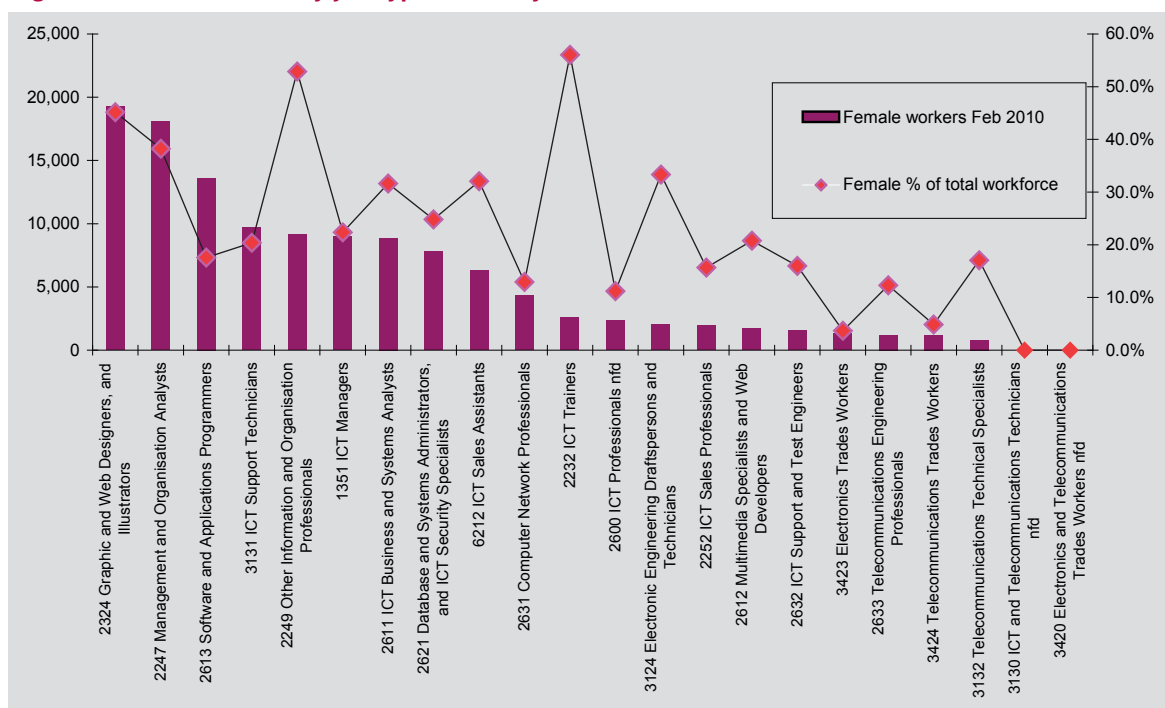
Figure 3: State contribution to national ICT Industries jobs growth July 2003–December 2010



Source: CIIER Whitehorse, Top 250 ICT industry analysis by state and territory, December 2010

Participation by women in the ICT workforce is low in all occupations compared with the all industries average of 45.3 percent but is high when compared with women in other professional and technical categories. Within ICT the exceptions, where participation by women is higher, are: other information and organisation professionals; and ICT trainers. The potential for increased participation by women provides the sector with significant opportunities.

Figure 4: Women in ICT by job type February 2010



Source: Australian Computer Society, Australian ICT Statistical Compendium, 2010

In 2010 the following ICT occupations all had a median age well over the all Australian industries median age of 39 years, with a number in the trade area.

Table 2: Median age ICT workers

ANZSCO job type	Median age
3420 Electronics and telecommunications trades workers	53.5
2232 ICT trainers	46.2
3132 Telecommunications technical specialists	45.3
3124 Electronic engineering draftspersons and technicians	44.2
2247 Management and organisation analysts	41.9
2249 Other information and organisation professionals	40.7
1351 ICT managers	40.4
2600 ICT professionals	40.2
3423 Electronics trades workers	39.3
3424 Telecommunications trades workers	39.1
All Australian industries	39

Source: Derived from Australian Computer Society, Australian ICT Statistical Compendium 2010 and SkillsInfo Median Age (DEEWR special order based on ABS Labour Force, Australia, Cat no: 6291.0.55.003 – 2010 Average)

Industry and workforce outlook

Industry outlook

The digital economy is the global network of economic and social activities that are enabled by information and communications technologies such as the internet, mobile and wireless sensor networks. The Australian Government's aim is that by 2020 Australia will be among the world's leading digital economies. This is based on key indicators such as broadband reach and usage rankings. The digital economy is essential to Australia's productivity, global competitiveness and improved social wellbeing.¹¹ The government has set the following areas for digital economy goals:

- increased online participation by Australian households
- online opportunities for Australian businesses and not for profit organisations to drive productivity improvements, expand their customer base and enable jobs growth
- better management of energy use by households, business and other organisations through access to smart technology
- improved health and aged care through telehealth
- expanded online education between providers and to the home and workplace
- double the level of teleworking, so at least twelve percent of employees have teleworking arrangements
- four out of five Australians will choose to engage with the government through the internet or other type of online service, and
- closing the gap between households and businesses in capital cities and regional areas.

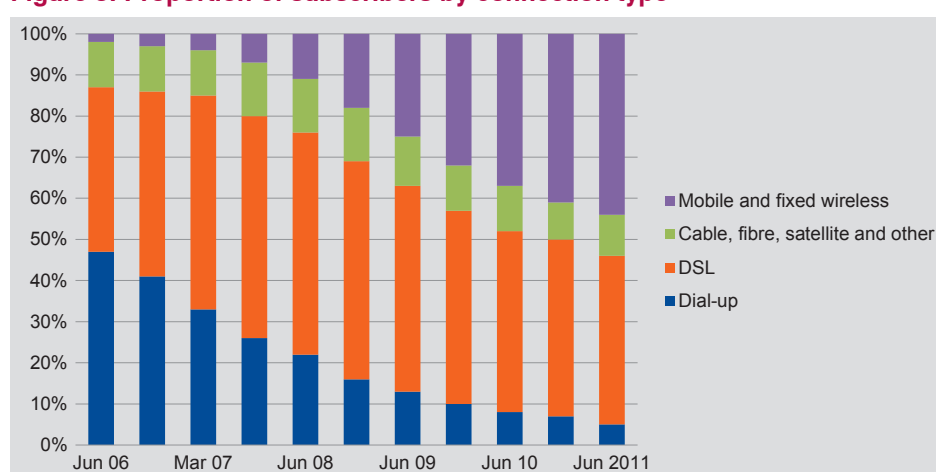
An increasing number of Australians are getting online and using faster speeds to do so. At the end of December 2010 there were 10.4 million active internet subscribers in Australia. Once Australians are online their data consumption increases. In December 2010 Australians downloaded 191,839 terabytes

¹¹ Australian Government, Digital Economy Strategy, 2011

of information. This is a significant increase compared with the 99,249 terabytes downloaded in the 2009 June quarter – close to twice as much.¹²

At the end of June 2011 there were 10.9 million internet subscribers in Australia, excluding internet connections through mobile handsets. This represents annual growth of 14.8 percent and an increase of 4.4 percent since the end of December 2010. The phasing out of dialup internet connections continued with 95 percent of internet connections being broadband, see Figure 5 below. Australians continued to access increasingly faster download speeds with 87 percent of access connections offering a download speed of 1.5Mbps or greater. In Australia mobile wireless internet connections, excluding mobile handset, account for 44 percent of connections and now exceed Digital Subscriber Line (DSL) connections, at 41 percent. Mobile wireless, excluding mobile handset connections, was the fastest growing internet access technology in actual numbers – increasing from 4.2 million in December 2010 to 4.8 million in June 2011.¹³

Figure 5: Proportion of subscribers by connection type



Source: Australian Bureau of Statistics, Internet Activity, Australia (cat. no. 8153.0), September 2011

The NBN and other high speed broadband platforms are expected to have significant impact on the ICT Industry through increased competition. The Wired Telecommunications Carriers industry, historically dominated by Telstra's Public Switched Telephone Network (PSTN), is expected to face increased competition once the NBN arrives.¹⁴ Falling prices and margins combined with increased competition from alternate carriers has seen a number of players exit the industry.¹⁵

The increased competition and declining costs of service provision have created a need for innovative marketing and pricing structures, the major success being product bundling, which has stimulated the demand for telecommunication services.¹⁶ Increased competition has also been seen in the internet service providers sector. This has resulted in wholesale prices falling and subscriber numbers growing, particularly for broadband services.¹⁷

The scope for hardware and server based business and custom software development has largely diminished over the last five years with standardisation of products. However, development of Transmission Control Protocol/Internet Protocol (TCP/IP) network infrastructure and the magnitude of business systems that have evolved out of it will be important over the next five years. Increasing reliance on networks is expected to see data being stored in the cloud (utility computing), operating

¹² Department of Broadband, Communication and the Digital Economy, NBN website, <http://www.nbn.gov.au/about-the-nbn/current-trends-for-online-activity/> – accessed November 2011

¹³ Australian Bureau of Statistics, Internet Activity, Australia (cat. no. 8153.0), September 2011

¹⁴ IBISWorld, Industry Report, **Telecommunications Services in Australia, April 2011**

¹⁵ IBISWorld Industry Report, **Telecommunications Resellers in Australia, May 2011**

¹⁶ *Ibid.*

¹⁷ IBISWorld Industry Report, **Internet Service Providers in Australia, May 2011**

PCs away from desks and thin clients¹⁸ only accessing work related applications. The rate at which network based services can be rolled out is going to be limited by the building of the NBN, though this is expected to bode well for consultants.¹⁹

The NBN is expected to also impact on the workforce with forecasts that around half the NBN workforce will be labourers, earthmoving plant operators and road traffic controllers who will require safety training and construction industry certification. A further third are likely to be telecommunications lines workers, deploying the network in the streets, and cablers. Telecommunications lines workers may require four to 24 months training depending on their existing skills and cablers may need training, but this is dependent on their current skills.²⁰

As with many repair industries, global economic calamity trends has meant a boon for computer maintenance providers however this phase is not expected to last. IBISWorld believes growth in consumer demand for laptops and mobile technology, due to heavy reliance on the internet, will help industry revenue, especially in the computer maintenance sector. However, the gradual demise of desktop PCs in favour of laptops and other similar devices used at home and in the workplace is expected to hurt many small providers who have failed to remain current with technology.²¹

The level of government regulation is measured by IBISWorld on a scale of light, medium and heavy, with the level of regulation differing between sectors of the ICT industry. Those sectors directly related to telecommunications, as well as satellite, television and radio relay operations, are heavily regulated whereas those that provide internet services are only moderately regulated. Online information services, computer maintenance services and computer consultancy services face only light regulation.

The Grattan Institute suggests that:

Instead of productive-enhancing reform Australia has, since the early 2000s, experienced a significant increase in productivity stifling legislation and regulations which has been driven by pursuit of national security and improved corporate governance.²²

IT companies involved in monitoring and analysing energy consumption and carbon emissions are also expected to see more demand for their services.²³ Mandatory disclosure of energy efficiency for commercial buildings and the proposed mandatory disclosure of energy efficiency for residential properties are further examples of legislation impacting the market and driving innovation in measuring and reporting on energy efficiency.

Workforce and employment outlook

The industry has been characterised by significant systemic and cyclical skills issues. The gap between demand for ICT skills and the supply of skills threatens Australia's export and productivity gains, innovation capacity and employment growth across the sector.²⁴

Demand trends for information technology services from finance, banking and insurance industries are important, as they are significant clients in this industry. Also important are trends in the telecommunications services sector, particularly with new broadband and digital services, and the related demand for software services for associated products.²⁵ Any increase in the number of businesses in Australia is likely to boost sector demand and revenue, especially in the finance or insurance sectors.

18 Thin clients are computing devices with no hard drive that connect over a network to a server where the bulk of the processing takes place. http://www.hp.com/sbsolutions/pc_expertise/article/thinclients_consider.html

19 IBISWorld Industry Report, **Computer Consultancy Services in Australia, February 2011**

20 NBNCo Ltd, Media Release: National Broadband Network to open up regional employment opportunities, 2011

21 IBISWorld Industry Report, **Computer Maintenance Services in Australia, November 2010**

22 Saul Eslake and Marcus Walsh, Australia's Productivity Challenge, Grattan Institute, Melbourne, February 2011

23 The Weekend Australian, July 16-17 2011

24 APESMA, Recruitment, development and retention strategies – part of the problem and part of the solution to ICT skills gaps and shortages, March 2011

25 IBISWorld Industry Report, **Computer Consultancy Services in Australia, February 2011**

Consolidation has eased the telecommunications sector's labour demand and this has led to a fall in employment and wages. It is expected that by the end of 2010-11 sector employment will be down 15.2 percent on 2005-06 levels. Having said this, IBISWorld believe that over the coming five years the telecommunications services sector will shift back into growth. Sector revenue gains are expected to increase as demand booms with the arrival of the latest network technologies – 4G and fibre to the home (FTTH). Skyrocketing demand is expected to necessitate an increase in sector employment and wages.²⁶

For the five years until 2010 wage growth outstripped employment growth in the online information services sector. This occurred as advanced and less expensive technology made many labour oriented positions redundant. The jobs replaced by automation were the low skill functions while the remaining jobs require greater education and qualifications. The barrier to future industry growth relates to a recent re-evaluation by businesses of their current IT investment and needs. However, the online search and transactions segment is expected to continue to grow strongly from both existing and new niche and premium products.²⁷

The Clarius Skills Index for computing professionals or managers fell slightly between March and June 2011 and indicates there is currently a shortage of approximately 1,100 computing professionals.²⁸ Supply in this group is expected to decline as recent low enrolment numbers start to impact. The most in demand ICT roles nationally are: ICT professionals, as distinct from managers; network engineers; project managers; business analysts; and developers.²⁹

In a recent salary survey, enterprise applications, eg SAP skills, were in tight supply as were business analysts with a financial background and some categories of senior project management. The strongest markets for the quarter were resources, utilities and telecommunications, while insurance had been good and banking and finance remained steady.³⁰

The Hudson Report for the October-December 2011 period draws on interviews with 3,840 employers across Australia. The report indicates that employer sentiment in IT dropped 15.3 percent over the quarter in the sector's seventh consecutive quarterly decline, largely a result of global uncertainties. However, 41.7 percent of employers planned to increase headcount leading up to December 2011. Skills in financial applications, customer relationship management, SAP and architecture remain in high demand.³¹

A list of occupations in demand is provided in Appendix B. The list is collated from industry intelligence presented in this Escan on the industry, employment trends and the workforce. This list contributes to workforce development and planning strategies highlighted in Chapter 3 and also presents a clear relationship to training packages.

The following occupations and job roles have been reported as in demand in the ICT Industry at IBSA's Escan 2012 industry consultations and validation:

- broadband technician
- chief information officer
- ICT business and systems analyst
- ICT helpdesk officer
- ICT manager
- ICT project manager
- ICT security specialist

²⁶ IBISWorld Industry Report, **Telecommunications Services in Australia**, April 2011

²⁷ IBISWorld Industry Report, **Online Information Services in Australia**, November 2010

²⁸ Clarius Skills Index, June 2011

²⁹ The Weekend Australian, Skills shortage to become critical, 28-29 May 2011

³⁰ The Australian, Technology wages defy economic gloom, 13 September 2011

³¹ The Hudson Report, Employment and HR Trends, October-December 2011

- multimedia specialist and web developer
- professional – virtual database administrator
- telecommunications cable jointer/lineworker/cabler, and
- telecommunications rigger/installer.

The occupational groupings of ICT business and systems analysts and software and applications programmers account for almost three quarters of all vacancies for ICT professionals. In 2010 these occupational groupings accounted for 31 and 42 percent of all ICT professional vacancies respectively. ICT business and systems analysts account for a larger proportion of vacancies than expected based on their relative employment size; ICT business and systems analysts accounted for approximately 13 percent of all employment for ICT professionals, compared to 31 percent of all vacancies for ICT professionals in 2010.³²

Emerging skills include:

- data analytics – data analysis, data mining and event based services
- mobile applications – mobile banking, and
- health informatics.

³² DEEWR, ICT Labour Market Indicators power point presentation, February 2011

Chapter 3 – Identified workforce development needs

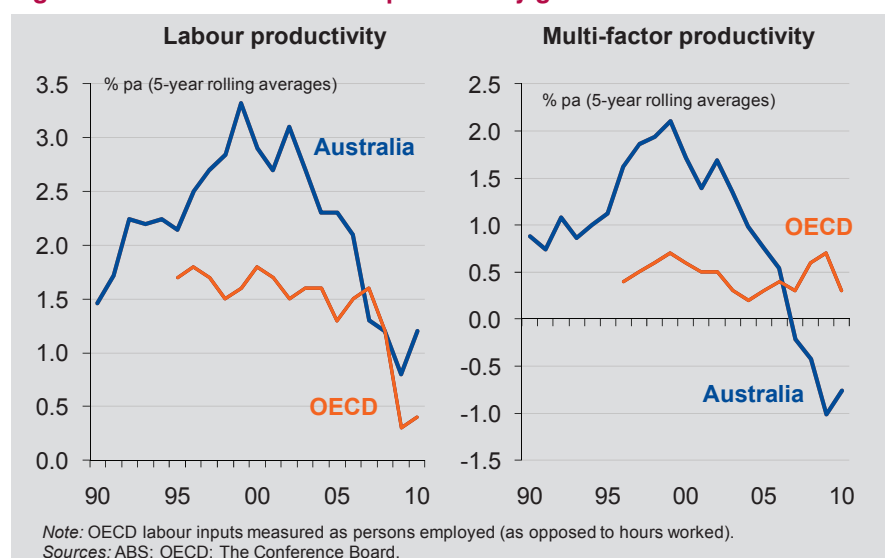
Workforce productivity and innovation

The following information is largely drawn from the Skills Australia 2011 conference, Putting skills at the heart of the economy, which placed skills as a limiting factor for Australia's future prosperity. The conference clearly supported the Australian Government's skills initiatives and challenged governments and industry alike to invest in skilling the workforce. There was strong evidence and support for increasing skilled migration to 180,000 for a short period to address the skilling needs and provide a larger tax payer base to support the ageing population.

The following excerpt from the presentation by Phillip Bullock exemplifies the Skills Australia focus on the importance of increasing Australia's productivity to deal with challenges such as demographic change, environmental constraints on economic growth, improvements in living standards and the side effect of the resources boom.

Both labour productivity³³ and multi factor productivity³⁴ have declined in Australia over the last five years, see Figure 6. Australia has experienced a much more pronounced deterioration in multi factor productivity than the OECD as a whole. For the OECD multi factor productivity growth has not deviated much from its long term average of 0.4 percent per annum since the late 1990s. This is contrasted with Australian multi factor productivity growth which has slowed from a peak of over two percent per annum in the second half of the 1990s to a negative rate in the second half of the 2000s.

Figure 6: Australian and OECD productivity growth



Source: Skills Australia, Conference 'Putting skills at the heart of the economy' presentation by Phillip Bullock 2011

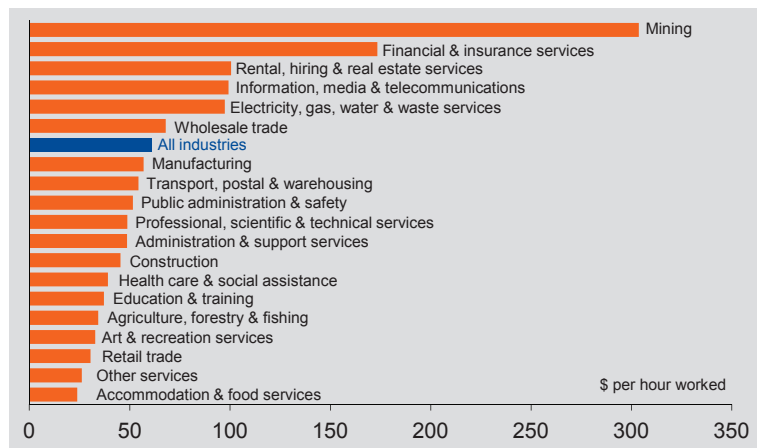
Since the early 2000s there has been an increase in legislation in Australia, in pursuit of national security and improved corporate governance, with some commentators suggesting a related impact

³³ Labour productivity is the ratio of the real value of output to the input of labour. Where possible, hours worked, rather than the numbers of employees, is used as the measure of labour input. With an increase in part time employment, hours worked provides the more accurate measure of labour input. Labour productivity should be interpreted very carefully if used as a measure of efficiency. In particular, it reflects more than just the efficiency or productivity of workers. Labour productivity is the ratio of output to labour input; and output is influenced by many factors that are outside of workers' influence, including the nature and amount of capital equipment that is available, the introduction of new technologies, and management practices.

³⁴ Multifactor productivity is the ratio of the real value of output to the combined input of labour and capital. Sometimes this measure is referred to as total factor productivity. In principle, multifactor productivity is a better indicator of efficiency. It measures how efficiently and effectively the main factors of production – labour and capital – combine to generate output. However, in some circumstances, robust measures of capital input can be hard to find.

on productivity.³⁵ The following graph shows estimates of labour productivity by sector, which shows capital and/or skilled labour sectors including information, media and telecommunications having a higher than average output per hour worked compared to unskilled labour sectors. Increased participation and continued investment in training and skills development by the ICT sector is critical to securing this position.

Figure 7: Gross value added per hour worked, in dollars by industry 2009-10



Source: Eslake, S. and Walsh, M., Australia's Productivity Challenge, Grattan Institute, Melbourne, February 2011

Productivity growth is expected to be the main driver of economic growth and living standards in the future.³⁶ Education and training can improve both productivity and participation in the workplace. In the May 2011 budget the Australian Government released a workforce strategy called Building Australia's Future workforce. The Australian Government is investing in skills reform to provide a platform to maintain and grow Australia's productivity and increase participation. Around \$3 billion will be spent on initiatives over six years including reform of the national VET system.

The program comprises the following key initiatives:

- a \$558 million National Workforce Development Fund (NWDF), which will place industry at the heart of the training effort
- apprenticeships that work for more Australians – \$100 million to support new approaches to training and \$101 million for mentoring to support apprentices and trainees through to completion of their training
- VET to meet the longer term needs of the economy – review of the Australian Government's \$1.4 billion per annum investment in the National Agreement on Skills and Workforce Development and an additional investment of \$1.75 billion over five years from 2012-13 under a new national partnership with the states and territories to make the VET system more transparent and productive, and
- building better skills for workforce participation through policies and programs to improve the workforce participation of single and teenage mothers, and increasing commencements for job seekers in the Australian Government's language, literacy and numeracy program (LLNP).

In terms of the ICT Industry this provides significant scope to access funding for new and existing workers to meet the future skill needs by opportunities such as:

- the NWDF will support subsidised training in higher qualifications and Skill Sets on the priority occupations list, and
- securing support for additional traineeships and apprenticeships and developing strategies to close the gap between commencements and completions.

³⁵ Saul Eslake and Marcus Walsh, Australia's Productivity Challenge, Grattan Institute, Melbourne, February 2011

³⁶ Australian Government, Australia to 2050: future challenges, the 2010 intergenerational report, January 2010

Changes to the 457 visa scheme to expedite the hiring of overseas workers into Australia have been welcomed by the IT recruitment sector. The Department of Immigration and Citizenship Report 2010-11, indicates the number of 457 visas granted for skilled workers in the information and communications technology sector increased, with 5,430 primary visas granted and IT developer programmers the top nominated occupation for the year.³⁷

A recent Skills Australia's report, Skills for Prosperity: a roadmap for vocational education and training,³⁸ provides a blueprint for VET's key role in improving Australian workforce development. The key challenge is workforce participation, and in particular: increasing foundation skills; better use of existing skills and knowledge; and matching skills with enterprise needs.

Three areas highlighted in the report as critical for the VET sector include:

- an increase in participation in vocational learning, acquisition of a deeper level of skills by individuals and improved qualification outcomes
- an increase in skills use and innovation by enterprises, and
- an increase in workforce participation and social inclusion in communities.

The ABS lists ten core skills used by business which can be investigated in terms of innovation and non innovation businesses. An ABS survey shows that the skills used in innovation vary by industry. Table 3 illustrates the difference in skill usage between innovation active and non active business for selected industries. It shows that IT professionals and IT support technicians are important to innovation across sectors.

Table 3: Difference in skills used by innovative ,active and non active business for selected industries 2008-09 (%)

Core skills	Manufac.	Prof., sci & tech. Services	Finance * insurance	Wholesale trade	Mining	Retail trade
Engineering	14.7	-7.0	*	6.2	26.4	4.6
Scientific	9.8	4.6	-1.1	3.3	6.9	1.1
IT professionals	12.5	13.5	12.7	20.1	22.6	13.3
IT support technicians	10.9	11.0	16.2	20.4	20.3	21.2
Trades	14.0	1.6	2.2	4.7	26.4	7.7
Transport, plant & logistics	16.5	-3.1	*	4.9	26.3	10.4
Marketing	19.6	18.7	31.3	25.6	22.4	19.8
Project management	13.1	16.7	9.7	9.7	20.1	6.1
Business management	11.6	13.2	22.6	20.8	19.2	17.6
Finance related	17.6	3.1	16.8	20.5	16.8	14.7

Notes: * this information was not available from the survey

The bold numbers in the table represent the two highest differences per industry category.

Note that some of these figures are subject to relatively high standard errors.

ICT = 60% of the Prof, sci & tech. services category.

Source: John Stanwick, Innovation: its links with productivity and skill development – at a glance, NCVER, September 2011

37 The Australian, ICT 457 visa workers soar by 50 pc, 25 October 2011

38 Skills Australia, Skills for Prosperity: a roadmap for vocational education and training , May 2011

Innovation can be explained in terms of radical or incremental innovation. While radical innovation results in major technological change, incremental innovation occurs from ongoing minor modifications and changes to existing products, services and/or processes. Incremental innovation is the chief source of productivity growth and it is argued that organisational improvements play a momentous role in economic development.³⁹ The links between VET and innovation have implications for the content of training packages and suggest that training packages should focus on the fundamental skills and knowledge of a vocation. This will increase an individual's ability to learn to learn, to solve problems and adapt to different situations. At the same time, VET providers must keep abreast of new technologies and changes in industry practice.⁴⁰

Apprenticeships and traineeships:

Completions, including for traineeships and apprenticeships, are used as a performance indicator for the national VET system and low completion rates have been of concern for many years. In 2010 Karmel and Mlotkowski examined the impact of wages on the probability of completion. They found that differences between the training wage, the wage in alternative employment and the wage on completion had a limited effect on completion. For apprentices it was the premium attached to becoming a qualified tradesperson upon completion that mattered.⁴¹ The NCVER 2010 Annual Report on apprentices and traineeships shows positive trends generally. The results include:

- overall commencements increased from 2009 to 2010 by 15.7 percent, with trade commencements up 21.9 percent
- the completion rate for contracts of training commenced in 2005 was 46.2 percent for trade apprentices and trainees and 52.2 percent for non trade apprentices and trainees
- attrition rates from contracts within the first twelve months for apprentices and trainees have remained steady between 2003 and 2009, ranging from 30.5 percent to 32.9 percent, and
- 30.1 percent of trade apprentices and trainees completing at certificate III and above in 2010 finished their training in two years or less, compared with 20.8 percent in 2000.

Worryingly, the ICT Industry results are not at all consistent with these general positive trends, see Figures 16 and 17.

The current workforce skill demands underpinned by the Digital Economy Strategy suggest there is a unique opportunity to arrest the declining completion trend evident in both the ICT and ICA Training Packages; this may be achieved through a collaborative approach by industry and education providers to increase enrolments and completions to meet the future workforce needs.

Workforce participation

Participation by women in the ICT Industry is well below average, see Figure 4. By developing workforce strategies to increase the participation of women the ICT Industry has an opportunity to address anticipated future skills shortages and gaps.

Remote and regional enrolments in the ICT and Telecommunications Training Packages are low and often reflect the workforce size in those areas. Flexible delivery of training and the use of technology to provide training are expected to improve the engagement of people in regional and remote Australia and contribute to the local workforce required for the NBN roll out. Further data is required to better understand the participation of, and opportunities for, participation by specific target groups in the growing ICT Industry.

39 Toner, P., *Workforce skills and innovation: an overview of major themes in the literature*, OECD, Paris, 2009; 'Tradespeople and technicians in innovation', in *Fostering enterprise: the innovation and skills nexus – research readings*, eds P. Curtin, J. Stanwick & F. Beddie, National Centre for Vocational Education Research, Adelaide, 2011

40 John Stanwick, *Innovation: its links with productivity and skill development – at a glance*, National Centre for Vocational Education Research, September 2011

41 Karmel, T., and Mlotkowski, P., *The impact of wages and the likelihood of employment on the probability of completing an apprenticeship or traineeship*, National Centre for Vocational Education Research, 2011

Impact and opportunities through high speed broadband

Access to high speed broadband is expected to have an impact on all industries but particularly the financial services, ehealth and health records, transport and logistics and e-learning sectors. In these areas applications based service provision is becoming the operating standard.

The use of mobile devices and ongoing access to digital media and social networking is becoming critical and central to businesses and workplaces. This is especially so in relation to cloud repositories. There is a perceived risk with cloud systems that is generating a need for increased information and network security capability.

Skill requirements will be determined by factors such as the level and balance of the use of wireless as opposed to fixed line technologies. Such requirements will impact on skill development through qualifications frameworks and Skill Sets.

Skills convergence in multidisciplinary environments

ICT skills are now commonplace in most industries and are used to varying degrees with some industry blurring, examples are ICT and financial services, ICT and business services and ICT and information management. The roles of technical ICT skills and application based ICT skills are different which impacts on training packages, qualifications and Skill Sets and is driving a need for ICT Skill Sets for other industries. Digital literacy across Australian communities and workplaces is generally considered to be insufficient to support business development. For individuals digital literacy learning needs to complement language, literacy, numeracy and technical skill requirements for their occupations.

Business sustainability and green ICT

Greater use of technology is commonly accompanied by higher energy usage. In responding to business demand for responsible sustainability and green ICT monitoring, measurement and management of carbon footprints will be required by businesses of all sizes. Green ICT is expected to be adopted in practice, theory and training. Workforce flexibility is another important factor with cloud systems becoming optimal and resulting in opportunities for teleworking. Access to high speed broadband is expected to help industry and businesses to adopt more flexible work practices that may support increased employment participation of target groups including women and others marginalised by location.

VET and higher education pathways

Better engagement of higher education providers is needed in training package development, along with better alignment of VET qualifications and higher education qualifications – particularly where there is certification and regulation, practice and theory. These alignments are expected to help the ICT Industry to access target groups for participation, especially women returning to work who have higher education awards and who need upskilling to contemporary technical specifications and methodologies.

VET trainers

The need to upskill existing ICT trainers to deliver and assess ICT qualifications is critical to ensuring students complete with contemporary skills and knowledge in technologies and applications and to assure the industry of the value of the training.

Chapter 4 – Current impact of Training Packages

Update on training packages

ICA11 Information and Communications Technology Training Package

ICA11 Information and Communications Technology Training Package was endorsed by the National Quality Council (NQC) in May 2011. It incorporates a number of revisions to the ICA05 Information and Communications Technology Training Package. The industry coverage has expanded to include the convergence of technologies across a number of industry areas including networking, web development, software development, database integration, sustainability, application implementation, telecommunications, digital and interactive games and digital media technologies.

The ICA11 Training Package review project identified a number of new and emerging technology trends in the industry. The qualifications and units of competency were reviewed and developed to reflect these changes with a number of focus areas specifically identified, including:

- interactive and digital games
- digital media technologies
- broadband/wireless
- cloud computing
- social web technologies
- mobile devices
- network security, and
- digital literacy.

ICT10 Integrated Telecommunications Training Package

ICT10 Integrated Telecommunications Training Package was endorsed in April 2010.

The ICT10 Integrated Telecommunications Training Package contains qualifications and Skill Sets that have been developed by the telecommunications industry to meet the needs of the NBN that is a telecommunications initiative. Projections are that the NBN build involves 75 percent telecommunications work and 25 percent other sectors.

The ICT10 Integrated Telecommunications Training Package is at the forefront of industry requirements. The Australian Government is driving the agenda with a number of initiatives including the NBN, digital economy, digital switchover, digital education revolution and sustainability practices to reduce carbon emissions and greenhouse effects on the environment. The ICT10 Integrated Telecommunications Training Package was designed to address these initiatives and meet the needs of the Australian industry and the community. The emerging technologies coupled with convergence of many industry sectors have been the reason for the name change of this Training Package.

ICT10 covers areas in:

- National Broadband Network infrastructure
- National Broadband Network maintenance
- broadband and wireless technology
- digital reception technology
- optical networks
- radio frequency networks

- rigging installation, and
- telecommunications network engineering.

Qualifications include:

- planning and design
- telecommunications cabling
- telecommunications technology for VET in Schools program
- telecommunications management
- Vocational Graduate Certificate in Telecommunications Network Engineering, and
- Vocational Graduate Diploma of Telecommunications Network Engineering.

Uptake of training packages

The following data are reported from the annual NCVER VET Provider Collection and the quarterly Apprentice and Trainee Collection. The data report publicly funded training and fee for service VET provided by public institutions. They will assist consideration of trends in the uptake and use of publicly funded VET in IBSA's training packages.

The tables and figures should be read understanding that significant amounts of training also occurs outside the publicly funded VET system which may lead to under reporting of:

- fee for service training in national qualifications provided by private training providers
- in house training in national qualifications delivered by enterprise RTOs, and
- non accredited training conducted in house or by external providers, eg vendor training.

Attempts to directly correlate these tables of commencement and completion should be avoided because:

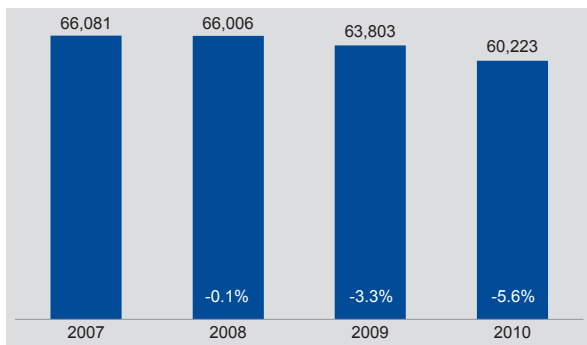
- an enrolment is recorded for each year the course is active – multiple enrolments are recorded when a course is undertaken over more than one year, and
- completions are not uniformly reported, ie some jurisdictions only report completions when they award a certificate, rather than a Statement of Attainment.

These factors may result in an over reporting of enrolments and under reporting of completions.

Information and Communications Technology (ICA) course enrolments and qualifications issued

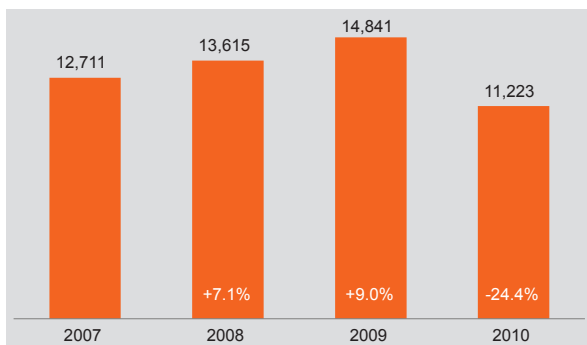
Enrolments in ICA qualifications continue to decline with a 5.6 percent decrease between 2009 and 2010, following a decline in the previous year of 3.3 percent as shown in Figure 8. Figures on ICA qualifications issued provide a closer reflection of demand as they are reported only once. Qualifications issued decreased by 24.4 percent between 2009 and 2010, as shown in Figure 9. Completions data from 2010 can still be expected to be revised slightly upward with further reporting from jurisdictions to NCVER and the comment above on under reporting may provide some explanation for this decline, however, further understanding of industry use of these qualifications including private, fee for service use may be warranted.

Figure 8: Enrolments in Information and Communications Technology (ICA)



Source: NCVER, VET Provider Collection, 2011

Figure 9: Qualifications issued in Information and Communications Technology (ICA)

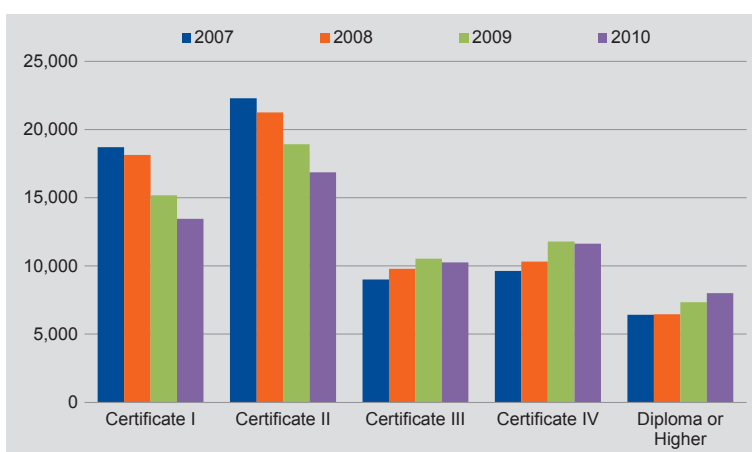


Source: NCVER, VET Provider Collection, 2011

Information & Communications Technology (ICA) enrolments by qualification level

Data presented in Figure 10 highlights that enrolments in ICA Certificates I and II are decreasing whilst enrolments for Certificate IV and higher qualifications are increasing. This suggests that employers are seeking higher qualifications and skills than in the past.

Figure 10: Enrolments by qualification level in Information and Communications Technology (ICA) 2007–2010



Source: NCVER, VET Provider Collection, 2011

Information and Communications Technology (ICA) highest qualifications issued

In 2010 the three qualifications from the Information and Communications Technology Training Package with the highest rate of qualifications issued accounted for 75.8 percent of all qualifications – 11,223 qualifications issued, all of which were from the information technology group.

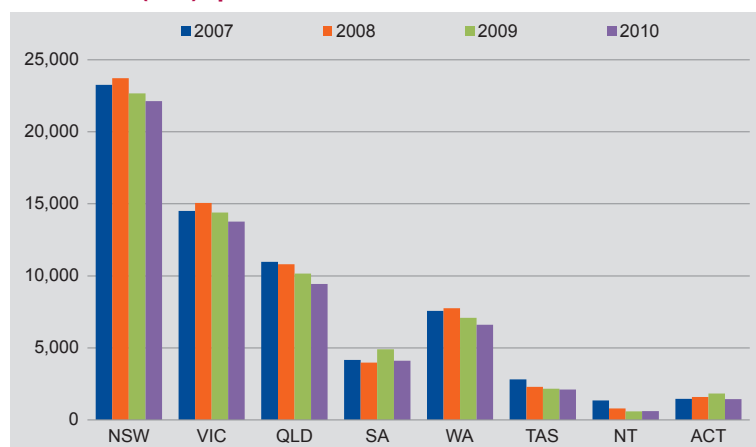
The five ICA qualifications with the highest number of qualifications issued are listed below.

1. ICA10105 Certificate I in Information Technology – 2,718 qualifications issued
2. ICA20105 Certificate II in Information Technology – 2,262 qualifications issued
3. ICA30105 Certificate III in Information Technology – 2,089 qualifications issued
4. ICA40405 Certificate IV in Information Technology (Networking) – 759 qualifications issued
5. ICA50405 Diploma of Information Technology (Networking) – 680 qualifications issued

Information and Communications Technology (ICA) enrolments by state and territory

Chapter 2 identified the dominance of New South Wales and Victoria in ICT employment and employment growth. Figure 11 below shows enrolments in ICT qualifications over the last four years by state or territory. Unsurprisingly, that the states with the highest enrolments in ICT qualifications are the same as the states employing the largest number of ICT workers.

Figure 11: Enrolments by state and territory in Information and Communications Technology (ICA) qualifications 2007–2010

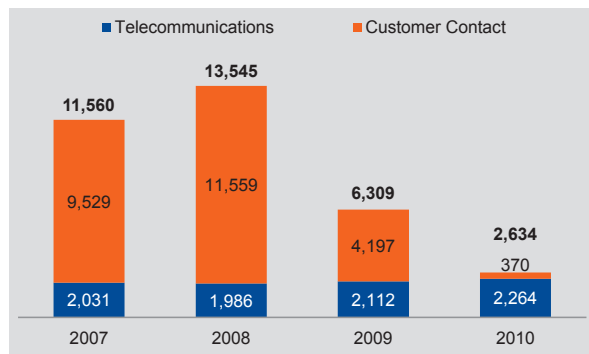


Source: NCVER, VET Provider Collection, 2011

Integrated Telecommunications (ICT Training Package) course enrolments and qualifications issued

As shown in Figure 12 below, overall enrolments in Integrated Telecommunications qualifications are declining, following a peak in 2008. The decline in overall enrolments is explained by the relocation of the highly used customer contact qualifications to IBSA's Business Services Training Package. Enrolments in telecommunications qualifications have increased over the period 2007 to 2010 and industry advice is that anticipated contracts to fulfil NBN commitments have delayed ICT enrolments until 2011 which will be seen in Escan 2013.

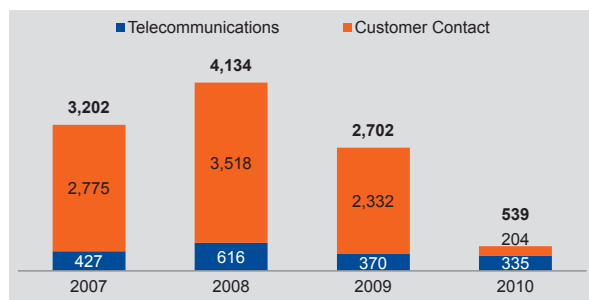
Figure 12: Enrolments in Integrated Telecommunications (ICT) Training Package 2007–2010



Source: NCVER, VET Provider Collection, 2011

Similar to enrolments, overall qualifications issued in Integrated Telecommunications have declined from 2007 to 2010 as shown in Figure 13. For this reporting period ICT30208 Certificate III in Telecommunications had the highest number of qualifications issued.

Figure 13: Qualifications issued in Integrated Telecommunications (ICT) Training Package 2007–2010

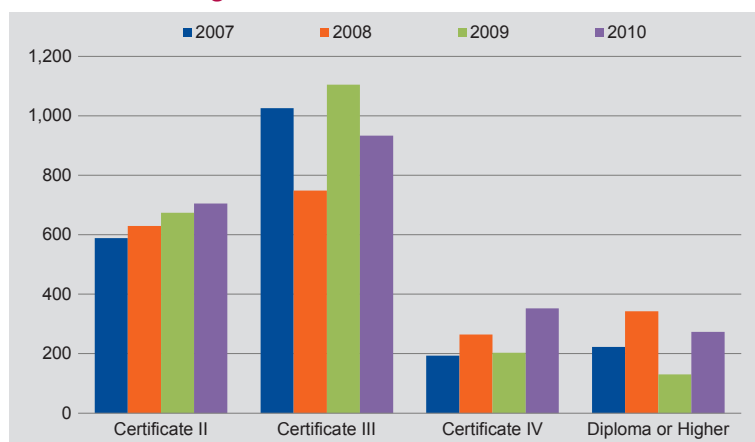


Source: NCVER, VET Provider Collection, 2011

Integrated Telecommunications enrolments by qualification level

Data presented in Figure 14 below highlights that enrolments in most Telecommunications qualifications are increasing. While Certificate III qualifications have the highest enrolments, there has been a decrease from 2009 to 2010.

Figure 14: Enrolments by qualification level in Integrated Telecommunications (ICT) Training Package Qualifications 2007–2010*



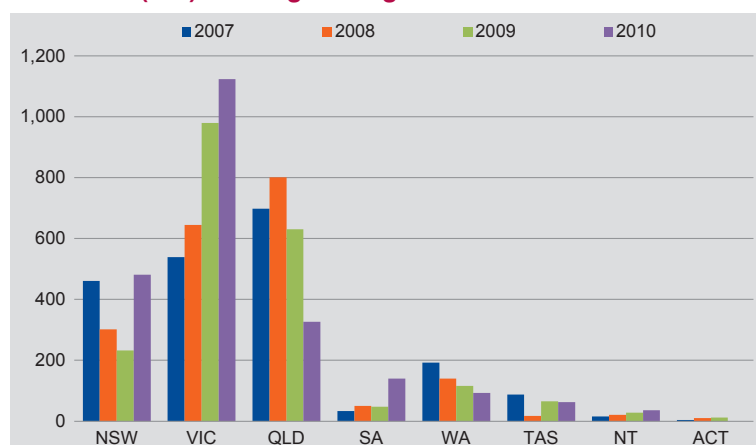
Source: NCVER, VET Provider Collection, 2011

* This figure shows only data for Telecommunications qualifications and excludes enrolments in ICT Customer Contact qualifications.

Integrated Telecommunications enrolments by state and territory

Figure 15 below shows that the majority of publicly funded training in Integrated Telecommunications occurs in Victoria and enrolments have increased since 2007. There has also been a positive turnaround in enrolments in NSW and South Australia from 2009 to 2010. These increases could be due to the funding of a number of telecommunications projects in the Enterprise Based Productivity Places Program (EBPPP). Enrolments in Queensland and Western Australia have reduced; this drop may be explained by the growing interest in Skill Sets and/or training provided by private training providers and vendor training

Figure 15: Enrolments by state and territory in Integrated Telecommunications Qualifications (ICT) Training Package 2007–2010*



Source: NCVER, VET Provider Collection, 2011

* This figure shows only data for Telecommunications qualifications and excludes enrolments in ICT Customer Contact qualifications.

Information & Communications Technologies Industry (ICA/ICT) qualifications enrolment characteristics

The following section highlights enrolment characteristics in both the Information and Communications Technology (ICA) and Integrated Telecommunications (ICT) Training Packages and presents information on enrolments by geographic location, previous highest education level, age, gender, study mode and delivery type.

Enrolments by geographic location

The vast majority of enrolments in both training packages are in urban areas with enrolment numbers in rural areas continuing to decline since 2007. There were very few enrolments in Integrated Telecommunications in remote areas.

Previous highest education level

Most, 63 percent, of participants enrolled in Information and Communications Technology (ICA) qualifications have no post secondary qualification; of those, 41 percent have not completed year 12. Interestingly, 34 percent of participants enrolled in ICA already hold a Certificate III or higher qualification.

Unlike Information and Communications Technology (ICA), the majority of participants enrolled in Integrated Telecommunications (ICT) qualifications have completed year 12 and 40 percent had a Certificate III or higher qualification.

Enrolments by age

The vast majority of participants enrolled in Information and Communications Technology (ICA) qualifications are those aged 19 years and younger. This may be directly correlated to the high number of participants with no post secondary qualification as described in the previous section. There

are higher participation levels in the ages between 30 and 49 years which may reflect participants reentering the workforce or reskilling.

For Integrated Telecommunications (ICT) those aged 20 to 24 years made up the largest proportion of participants. Participants aged 60 years and above represented the lowest levels of enrolment in both training packages.

Enrolments by gender

In both training packages enrolments by men consistently outnumbered those of women. For Information and Communications Technology (ICA) the number of female enrolments dropped by almost 7,000 between 2007 and 2010 – a 27.3 percent decrease. This is contrasted with an overall increase of 1,000 for men since 2007. A similar disparity is also evident in Integrated Telecommunications enrolments.

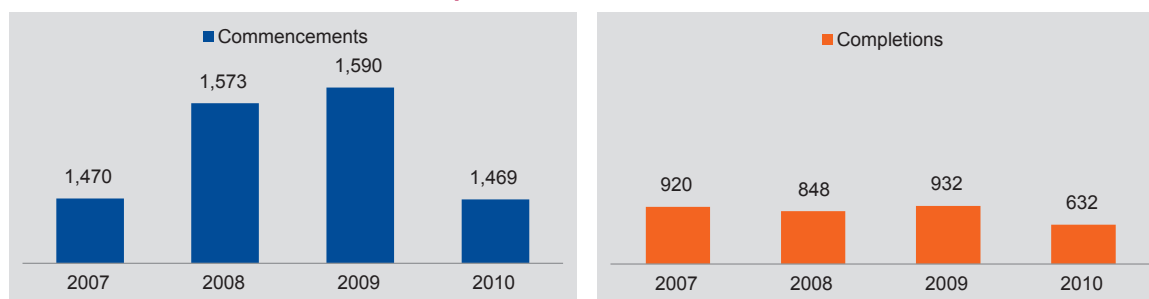
Enrolments by study mode and delivery type

The majority, 70 percent, of participants in both training packages choose to complete their study part time and on campus. Unlike the Information and Communications Technology (ICA) qualifications where eleven percent of participants choose to complete their study online, only one percent of Integrated Telecommunications participants chose this option.

ICT Industry apprenticeships and traineeships

Figure 16 below shows a decline in commencements in Information and Communications Technology (ICA) traineeships between 2009 and 2010 – a worrying trend given the demand for ICT skills by all industries.

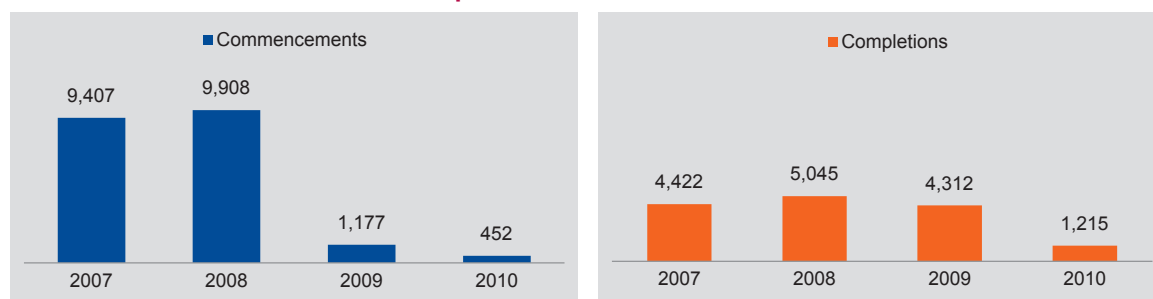
Figure 16: Information and Communications Technology (ICA) apprenticeships and traineeships commencements and completions 2007–2010



Source: NCVER, Apprentices and Trainees Collection, June 2011.

Figure 17 shows a decrease in the number of commencements for Integrated Telecommunications (ICT) from 2009 to 2010 but interestingly completions exceeded enrolments over the same period. This suggests that a significant proportion of commencements of apprenticeships and traineeships in the telecommunications sector were in customer contact qualifications which are now part of the Business Services Training Package. Further data collection would assist in better understanding these trends and the training responses of the ICT Industry.

Figure 17: Integrated Telecommunications (ICT) apprenticeships and traineeships commencements and completions 2007–2010



Source: NCVER, Apprentices and Trainees Collection, June 2011.

For further information on enrolments and qualifications issued in Information and Communications Technology (ICT) Integrated Telecommunications (ICT) qualifications please see Appendix C.

Outlook for training

The ICT Industry is growing in complexity and demand as digital capability becomes embedded in virtually all industries. This means that training needs to meet the needs of all industries to provide both a skilled ICT workforce and ICT skills for the broader workforce. This skills convergence works in concert with the need for specialised technical training to support network and information security and operations.

The demands for ICT skills to support the construction and operational phases of the NBN will mean the industry needs to increase participation of groups with low representations including women and those working in remote and regional Australia and may continue to need migrants to fill gaps. Workforce development strategies to attract and retain workers will be critical and requires a change of thinking from human resources being an expense to being an investment.

The digital economy requires users to be skilled to capitalise on the opportunities available. Better engagement with user communities in developing digital literacy skills are expected to increase the take up of new services and products and protect users. Strategies to support digital literacy amongst users need to be investigated.

Chapter 5 – Future directions

As the Industry Skills Council with responsibility for the ICT Industry, IBSA has a key role to play in ensuring appropriate qualifications and skill sets are available for the ICT Industry and its workforce.

Following the desktop research and industry consultations undertaken for the development of Escan 2012 Table 1 below highlights the workforce development challenges in this industry. Priorities for the Information and Communications Technology (ICT) Integrated Telecommunications (ICT) Training Packages and for enhanced responsiveness of the national VET system follow.

Table 4: Summary: ICT workforce development challenges

Workforce development challenge:	Impact on:	Critical future skills:
Maximising high speed broadband capability in organisations	Business – metropolitan and regional Financial services Education providers Transport and logistics Not for profits Community service providers Qualifications Skill Sets Workforce flexibility Consumers	<ul style="list-style-type: none"> • application development for mobile devices • client service delivery, eg mobile banking • cloud based computing • consumer • data analytics • digital literacy • digital media based products and services • information security • innovation • network security • outsourcing • repositories • risk management • social networking
Risk management	Business Not for profits Training packages Qualifications Skill Sets Industry certification Upskilling Retraining	<ul style="list-style-type: none"> • copyright • digital rights management • ethical advice • information security • intellectual property rights • legislation • network security • risk assessment • risk management • standards
Skills convergence	Training packages Qualifications Skill Sets HR practitioners Training providers Employers Employees Articulation	<ul style="list-style-type: none"> • business acumen • cloud computing • customer service • entrepreneurship • innovation • leadership • marketing • risk management • social networking

Priorities for the Information and Communications Technology (ICT) Integrated Telecommunications (ICT) Training Packages

Findings from Escan 2012 indicate that priorities for IBSA's training packages, in working with industry stakeholders, are:

- Expanding the range of professional development products and workshops to engage enterprise based RTOs and providers of non accredited training in the national VET system
- Responding to skills convergence in ICT, Financial Services and the Cultural & Creative Industries through training package continuous improvement
- In order to better understand the ICT Industry training usage patterns:
 - investigating the enrolment and completion data for traineeships and apprenticeships for ICA and ICT Training Packages
 - investigating wider VET programs enrolment and completion trends for public, private and enterprise RTOs, and
- Continuing the integration of vendor training into the ICA Training Package through continuous improvement.

Supporting a responsive national VET system

To assist in enhancing the responsiveness of the national VET system, support the ICT workforce and to maximise industry skills outcomes, Escan 2012 findings suggest that stakeholders consider:

- Funding accredited and non accredited digital literacy training for consumers and employees to build business capability to take up high speed broadband opportunities
- Developing strategies to engage with SME's and micro businesses offering ICT services to better understand their skill requirements and improve their access to current government skilling programs
- Capturing and reporting accurate student data from public and private providers to inform decision making
- Providing feedback on ICT training and skill requirements, eg through participation on advisory committees, communities of practice and ICT educator networks
- Building capacity for enterprise work placements for tertiary graduates, trainees, apprentices, cadets and work experience students to meet future ICT needs and create a pool for future workforce skills
- Educating enterprises regarding network and information security at business and user levels
- Accessing a wider pool of industry entrants through increasing representation of key demographics, including women
- Using technology to manage and deliver training
- Mapping informal workplace training to units of competency to identify pathways to upskilling and increasing qualifications in the workforce
- Identify strategies for enterprises to access funding for upskilling and qualifying new and existing staff, and
- Investing in professional development and upskilling opportunities to meet industry skills needs, particularly in the areas of: inclusive learning; leadership and management; assessment, including RPL and RCC; LLN; intersectoral alignment; sustainability skills; and maintaining industry currency.

Appendix A – Methodology, acknowledgements and bibliography

Methodology and stakeholder input

Statistical information for this report was gathered through a desktop research process from a range of sources as indicated in the bibliography.

Further input into this Escan was gathered from industry stakeholders via a series of consultation forums held in 2011. Forums were held in Adelaide, Brisbane, Darwin, Melbourne, Perth and Sydney. A webinar gathered views from regional stakeholders and from jurisdictions not represented in the forums.

Survey tools were used at each of the forums to gather information from participants, including advice on occupations in demand.

This Escan was validated by IBSA's Sector Advisory Committee and State and Territory Advisory Network representatives in November 2011.

The following organisations have made valuable contributions to this Escan report:

ABC Content Services	Australian Government Information Management Office (AGIMO)
Academies Australasia	Australian Human Resources Institute (AHRI)
ACE North Coast Inc.	Australian Industry Group (AiGroup)
Achieving Your Career Potential	Australian Industry Training Providers Pty Ltd
ACS Foundation	Australian Information Industry Association (AIIA)
ACT Department of Education and Training	Australian Institute of Credit Management (AICM)
Adelaide College of the Arts/TAFE SA	Australian Institute of Management (AIM)
Advanced Careers College	Australian Institute of Management (AIM) NSW & ACT
AIC National	Australian Institute of Management (AIM) SA
AiGroup Training Services	Australian Institute of Management (AIM) WA
Always-B-Certified Pty Ltd	Australian Libraries and Information Association (ALIA)
AMA Training Services	Australian Manufacturers Worker's Union (AMWU)
Andrea Thompson Consulting	Print
ANZ Bank	Australian Marketing Institute
APM College of Business and Communication	Australian Medical Association (AMA)
AQUEST	Australian Professional Skills Institute
Arts, Communications, Finance Industries and Property Services (ACFIPS)	Australian Red Cross
Ashley Institute of Training	Australian Securities and Investments Commission (ASIC)
Asia Pacific Training Institute	Australian Services Union (ASU)
Association of Superannuation Funds of Australia Ltd (ASFA)	Australian Society of Archivists (ASA)
Ausdance Victoria Inc	Bendigo TAFE
Australian and New Zealand Institute of Insurance and Finance (ANZIIF)	Berkeley College
Australian Chamber of Commerce and Industry (ACCI)	Box Hill Institute
Australian Computer Society (ACS)	BRACE Education Training and Employment
Australian Council for Educational Research	Bremer TAFE
Australian Council for Private Education and Training (ACPET)	Brisbane North Institute of TAFE
Australian Entertainment Industry Association (AEIA)	Business Foundations Inc
Australian Financial Markets Association (AFMA)	Business Planning Pty Ltd
	Business SA

Business Services Industry Skills Board SA Inc	Excellence in Education and Training
Business Skills Victoria	Family Business Australia
Cabinet Makers Association	Finance Sector Union
Centacare Employment & Training	Finance, Property and Business Skills WA
Challenger Institute of Technology	Financial Planning Association of Australia (FPAA)
Chamber of Commerce and Industry Queensland	Financial, Administrative & Professional Services Training Council Incorporated
Chamber of Commerce NT	Finsia
Charles Darwin University	Foxtel
CHARTTES Training Advisory Council	Fuji Xerox
Cisco	Future Now
Communications and Information Technology Training Ltd (CITT)	FutureStaff Pty Ltd
Communications, Electrical, Plumbing Union (CEPU)	Game Developers' Association of Australia (GDAA)
Community Arts Network SA	Gem & Jewellery Institute of Australasia Limited
Community Services, Health and Education Training Council	Global Markets Investment & Financial Services Association (IFSA)
CompTIA	Gold Coast Institute of TAFE
CQ University Library	GOTAFE
Craft Australia	Grace Training
CREATE Secretariat	Great Southern Institute of Technology
Creative Industries Skills Council (CISC)	Heidelberg Print
Crossbow Consultancy	Heritage Building Society
Cultural Immersions	Higher Purpose Training
CY O'Connor Institute	Housing Industry Association (HIA)
Datacom	Hudson Global Resources (Aust) Pty Ltd
Department of Business & Employment NT	Human Resources & Organisation Development
Department of Education & Communities NSW	Hunter Institute of Technology
Department of Education & Training NT	IIT Training
Department of Education and Training QLD	Inforg Information Solutions
Department of Employment, Economic Development and Innovation QLD	Institute of Public Accountants (IPA)
Department of Further Education, Employment, Science and Technology (DFEEST)	Insurance Australia Group Limited (IAG)
Department of Innovation, Industry, Science and Research	Lane Print Group
Department of Training & Workforce Development WA	Learning Advisory Services Australia (LASA) Pty Ltd
DGIT Consultants Pty Ltd	Lennox Institute
Directions WA	Linda Simon, VET Consultant
Durie Consulting	Local Government Association of Queensland
Dymond Institute of Business	Macquarie Business Training Centre
Electrical and Communications Association	Maddisson Training Group
Electrotechnology and Water Skills Board	Major Industries Training Advisory Council (MITAC)
EPIC Industry Training Board	Martin College
ET Australia	MDS Partners
ETAS (WA) Pty Ltd	Media Entertainment and Arts Alliances (MEAA)
	MG My Gateway
	Midel Education Pty Ltd
	Milcom

Money101	Software, Data#3 Business Systems Pty Ltd
Motor Traders' Association of NSW	St George Bank
MP Personnel and Training	STA Qld
MRAEL Group	Staging Connections
Musicians' Union of Australia (MUA)	Sterling Business College
MyFENG	Strathfield College
National Association for the Visual Arts (NAVA)	Study Group Australia
National Banking Industry Association (NBIA)	Suncorp Metway Ltd
National Institute of Accountants (NIA)	Sunshine Coast TAFE
National Insurance Brokers Association of Australia (NIBA)	Sutherland College of TAFE, Sydney Institute
Nationwide Training	Swinburne University of Technology
NBN Co Ltd	Sydney Community College Representing Adult and Community Education
Northern Territory Library	Sydney Film School
Odyssey House Victoria	TAFE Development Centre (TDC)
Olpac Pty Ltd	TAFE Directors Australia
Open Channel	TAFE NSW
Print NZ	TAFE SA
Printing Industries Association of Australia (PIAA)	The Gordon TAFE
Prografica Printing	The Pivot Institute
QANTAS Airways Limited	Therese Hickey
Radio Adelaide	TITAB Australia
RedOxygen	Traditional Credit Union (TCU)
Regional Group Training	Tropical North Queensland Institute of TAFE
SAI Global	Try Youth & Community Services
Salmat Limited	University of Adelaide
Scripture Union Training Institute	UQ College
Self-Managed Superannuation Funds Association (SPAA)	VET Development Centre QLD
Service Industries Training Advisory Council (SITAC)	Victoria University
Service Skills SA	Victorian Curriculum & Assessment Authority (VCAA)
Skilled Group	Victorian Employers' Chamber of Commerce and Industry (VECCI)
Skills Tasmania	WA Academy of Performing Arts
SkillsHub	WEA Illawarra
Society of Motion Picture and Television Engineers (SMPTE)	WestCoast Institute of Training
	Women in Film and Television (WIFT)

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Appendix B – ICT Industry occupations in demand

IBSA reports critical occupations in demand to government and industry stakeholders.

This alphabetical list reflects demand in the Information and Communications Technologies Industry for occupations and job roles reported in Escan research and industry consultations.

Qualifications that correspond with the occupations are also provided. The **bold** occupations and job roles represent newly reported occupations in demand.

A full list of IBSA's occupations in demand is available in the Principal Escan 2012 and on the IBSA website: <http://www.ibsa.org.au/news-and-projects/environment-scan.aspx>

Table 5: Information and Communications Technology occupations in demand

ANZSCO	Occupation/Job Role	Training Package	Qualification/Skill Set
Information and Communications Technologies			
313214/ 342414	Broadband Technician	ICT20210	Cert II in Telecommunications
		ICT20310	Cert II in Telecommunications Cabling
		ICT30210	Cert III in Telecommunications
		ICT30310	Cert III in Telecommunications Cabling
		ICT30610	Cert III in Broadband and Wireless Networks
		ICT40110	Cert IV in Optical Networks
		ICT40610	Cert IV in Telecommunications Networks Technology
		ICT40210	Cert IV in Telecommunications Engineering
263312/ 263111	Computer Network Professionals	ICA30111	Cert III in Information, Digital Media and Technology
		ICA40111	Cert IV in Information Technology
		ICA40411	Cert IV in Information Technology Networking
		ICA50111	Diploma of Information Technology
		ICA50411	Diploma of Information Technology Networking
		ICA60211	Advanced Diploma of Network Security
261112	Data Analysis, Information Management and Mining	FNS40611	Certificate IV in Accounting
		FNS50210	Diploma of Accounting
		FNS60210	Advanced Diploma of Accounting
		ICA50511	Diploma of Database Design and Development
		ICA60311	Advanced Diploma of Conveyancing
262111/ 262112	Database Administrator including Virtual Databases	ICA40111	Cert IV in Information Technology
		ICA50111	Diploma of Information Technology
		ICA50511	Diploma of Database Design and Development
		ICA60211	Advanced Diploma of Network Security

ANZSCO	Occupation/Job Role	Training Package Qualification/Skill Set	
Information and Communications Technologies			
312412/ 313211	Digital Communication Technician or Digital Reception Technician	ICT20410	Cert II in Telecommunications Digital Reception Technology
		ICT30410	Cert III in Telecommunications Digital Reception Technology
		ICT40310	Cert IV in Telecommunications Radio Communications
261111/ 261112	ICT Business, Green and Systems Analyst	ICA40511	Cert IV in Programming
		ICA50411	Diploma of Information Technology Networking
		ICA50611	Diploma of Website Development
		ICA60211	Advanced Diploma of Network Security
263112	ICT Helpdesk Officer	ICA30111	Cert III in Information, Digital Media and Technology
		ICA40411	Cert IV in Information Technology Networking
135199	ICT Managers or Chief Technical Officer	ICA50111	Diploma of Information Technology
		ICA60111	Advanced Diploma of Information Technology
		ICA60411	Advanced Diploma of Information Technology Project Management
		ICA60211	Advanced Diploma of Network Security
262112	ICT Network and Security Specialist	ICA50111	Diploma of Information Technology
		ICA50411	Diploma of Information Technology Networking
		ICA60211	Advanced Diploma of Network Security
135112	ICT Project Manager	ICA50111	Diploma of Information Technology
		ICA60411	Advanced Diploma of Information Technology Project Management
313214/ 313199	ICT Support Technician	ICA30111	Cert III in Information, Digital Media and Technology
		ICA40111	Cert IV in Information Technology
		ICA50111	Diploma of Information Technology
263299	ICT Support and Test Engineers	ICA30111	Cert III in Information, Digital Media and Technology
		ICT40510	Cert IV in Telecommunications Network Planning
		ICA40211	Cert IV in Information Technology Support
		ICA40611	Cert IV in Information Technology Testing
		ICA50111	Diploma of Information Technology
261212	Multimedia Specialist and Web Developer	ICP30310	Cert III in Printing and Graphic Arts (Multimedia)
		CUF40207	Cert IV in Interactive Digital Media
		ICA40311	Cert IV in Web-Based Technologies
		ICA40811	Cert IV in Digital Media Technologies
		CUF50207	Diploma of Interactive Digital Media
		ICA50611	Diploma of Website Development
		ICA50911	Diploma of Digital Media Technologies

ANZSCO	Occupation/Job Role	Training Package Qualification/Skill Set	
Information and Communications Technologies			
261111/ 261311/ 261312/ 261313/ 261314	Software and Applications Programmer and Tester	ICA40511	Cert IV in Programming
		ICA40611	Cert IV in Information Technology Testing
		ICA50711	Diploma of Software Development
262113	Systems Administrators including Virtual Systems	ICA40111	Cert IV in Information Technology
		ICA50111	Diploma of Information Technology
		ICA50311	Diploma of Information Technology Systems Administration
		ICA50811	Diploma of Systems Analysis and Design
		ICA60211	Advanced Diploma of Network Security
342312/ 342412/ 342413	Telecommunications Cable Jointer, Line worker, Cabler, or Communications Officer or Technician ¹	ICT20210	Cert II in Telecommunications
		ICT20310	Cert II in Telecommunications Cabling
		ICT20410	Cert II in Telecommunications Digital Reception Technology
		ICT30210	Cert III in Telecommunications
		ICT30310	Cert III in Telecommunications Cabling
233411/ 263312/ 263311/ 313212/ 313213	Telecommunications Network Planner, Operations, Test Engineer, Designer ² or Technical Specialist	ICT30210	Cert III in Telecommunications
		ICT40210	Cert IV in Telecommunications Engineering
		ICT40510	Cert IV in Telecommunications Network Planning
		ICT40610	Cert IV in Telecommunications Network Technology
		ICT50210	Diploma of Telecommunications Network Engineering
		ICT50510	Diploma of Telecommunications Planning and Design
		ICT60210	Advanced Diploma of Telecommunications Network Engineering
		ICT70110	Vocational Graduate Cert in Telecommunications Network Engineering
		ICT80110	Vocational Graduate Diploma of Telecommunications Network Engineering
No applicable code	Telecommunications Rigger Installer	ICT20510	Cert II in Telecommunications Rigging Installation
		ICT30510	Cert III in Telecommunications Rigging Installation

Development of future qualifications with industry stakeholders in:

1. Certificate II and III in NBN Installation to support the NBN rollout and build
2. Certificate IV in Network Design

Appendix C – NCVER data

Data on publicly funded training activity is provided by NCVER. The tables should be read understanding that significant amounts of training also occurs outside the publicly funded VET system which may lead to under reporting of:

- fee for service training in national qualifications provided by private providers
- in house training in national qualifications delivered by enterprise RTOs, and
- non accredited training conducted in house or by external providers, eg vendor training.

Attempts to directly correlate commencements and completions should be avoided because:

- an enrolment is recorded for each year the course is active – multiple enrolments are recorded when a course is undertaken over more than one year, and
- completions are not uniformly reported, ie some jurisdictions only report completions when they award a certificate rather than a Statement of Attainment.

These factors may result in an over reporting of enrolments and under reporting of completions.

These tables do not include training package activity where totals are ten or less participants.

Table 6: Enrolments in Information and Communications Technology (ICA) Qualifications 2007–2010

ICA Enrolments	2007	2008	2009	2010	Total
APPLICATIONS					
ICA20201 – Certificate II in Information Technology (Applications)	1,287	212	33	0	1,532
ICA30199 – Certificate III in Information Technology (Software Applications)	457	48	4	0	509
BUSINESS					
ICA50399 – Diploma of Information Technology (Business Analysis)	36	0	0	0	36
DATABASE					
ICA40299 – Certificate IV in Information Technology (Database Administration)	34	7	0	0	41
ICA51001/ICA50505 – Diploma of Information Technology (Database Design and Development)	179	217	206	227	829
E-SECURITY					
ICA60401 – Advanced Diploma of Information Technology (E-Security)	19	0	0	0	19
GENERAL					
ICA30299 – Certificate III in Information Technology (General)	659	23	0	0	682
ICA40105 – Certificate IV in Information Technology (General)	1,341	1,639	2,088	2,094	7,162
ICA50105 – Diploma of Information Technology (General)	480	706	907	1,131	3,224

ICA Enrolments	2007	2008	2009	2010	Total
HELPDESK					
ICA40801 – Certificate IV in Information Technology (Helpdesk)	28	1	0	0	29
IT					
ICA10101/ICA10105 – Certificate I in Information Technology	18,707	18,154	15,190	13,467	65,518
ICA20198/ICA20199/ICA20105 – Certificate II in Information Technology	21,008	21,055	18,900	16,872	77,835
ICA30105 – Certificate III in Information Technology	7,640	9,707	10,525	10,265	38,137
ICA60105 – Advanced Diploma of Information Technology	66	81	146	157	450
MULTIMEDIA					
ICA40499/ICA40805 – Certificate IV in Information Technology (Multimedia)	915	1,001	1,147	1,328	4,391
ICA50599/ICA50905 – Diploma of Information Technology (Multimedia)	334	388	455	603	1,780
NETWORKS					
ICA30399 – Certificate III in Information Technology (Network Administration)	261	19	3	0	283
ICA40399/ICA40405 – Certificate IV in Information Technology (Networking)	2,949	3,258	3,426	3,417	13,050
ICA50499/ICA50701/ICA50405 – Diploma of Information Technology (Networking)	2,426	2,374	2,485	2,532	9,817
ICA60205/ICA60208 – Advanced Diploma of Information Technology (Network Security)	159	402	501	473	1,535
PROGRAMMING					
ICA40699/ICA40505 – Certificate IV in Information Technology (Programming)	1,074	1,318	1,514	1,473	5,379
PROJECT MANAGEMENT					
ICA51101/ICA50205 – Diploma of Information Technology (Project Management)	93	138	158	180	569
SOFTWARE					
ICA50299/ICA50705 – Diploma of Information Technology (Software Development)	916	602	666	643	2,827
SUPPORT					
ICA40199/ICA40599/ICA40205 – Certificate IV in Information Technology (Support)	1,139	1,030	1,005	889	4,063

ICA Enrolments	2007	2008	2009	2010	Total
SYSTEMS					
ICA40799/ICA40705 – Certificate IV in Information Technology (Systems Analysis and Design)	17	8	44	49	118
ICA50199/ICA50305/ICA0805 – Diploma of Information Technology (Systems Administration)	871	708	838	740	3,157
ICA50805 – Diploma of Information Technology (Systems Analysis and Design)	77	77	66	53	273
TESTING					
ICA40605 – Certificate IV in Information Technology (Testing)	16	24	23	43	106
WEBSITE					
ICA40305 – Certificate IV in Information Technology (Websites)	1,880	2,024	2,550	2,336	8,790
ICA41001 – Certificate IV in Information Technology (Website Administration)	32	1	0	0	33
ICA41101 – Certificate IV in Information Technology (Website Design)	209	9	0	0	218
ICA50601/ICA50605 – Diploma of Information Technology (Website Development)	761	775	923	1,261	3,720
Total	66,081	66,006	63,803	60,233	256,123

Source: NCVER, VET Provider Collection, 2011

Table 7: Qualifications Issued in Information And Communications Technology (ICA) 2007–2010

ICA Qualifications Issued	2007	2008	2009	2010	Total
APPLICATIONS					
ICA20201 – Certificate II in Information Technology (Applications)	385	15	9	0	409
ICA30199 – Certificate III in Information Technology (Software Applications)	263	17	9	1	290
BUSINESS					
ICA50399 – Diploma of Information Technology (Business Analysis)	17	1	0	0	18
DATABASE					
ICA40299 – Certificate IV in Information Technology (Database Administration)	10	2	0	0	12
ICA51001/ICA50505 – Diploma of Information Technology (Database Design and Development)	37	42	66	61	206
E-SECURITY					
ICA60401 – Advanced Diploma of Information Technology (E-Security)	18	0	0	0	18

ICA Qualifications Issued	2007	2008	2009	2010	Total
GENERAL					
ICA30299 – Certificate III in Information Technology (General)	285	19	2	2	308
ICA40105 – Certificate IV in Information Technology (General)	158	316	405	360	1,239
ICA50105 – Diploma of Information Technology (General)	59	69	106	183	417
HELPDESK					
ICA40801 – Certificate IV in Information Technology (Helpdesk)	25	1	0	0	26
IT					
ICA10101/ICA10105 – Certificate I in Information Technology	3,621	3,689	3,784	2,718	13,812
ICA20199/ICA20105 – Certificate II in Information Technology	2,375	3,694	3,839	2,262	12,170
ICA30105 – Certificate III in Information Technology	1,565	1,958	2,524	2,089	8,136
ICA60105 – Advanced Diploma of Information Technology	19	22	10	48	99
MULTIMEDIA					
ICA40499/ICA40805 – Certificate IV in Information Technology (Multimedia)	81	146	237	244	708
ICA50599/ICA50905 – Diploma of Information Technology (Multimedia)	34	62	113	123	332
NETWORKS					
ICA30399 – Certificate III in Information Technology (Network Administration)	155	20	6	2	183
ICA40399/ICA40405 – Certificate IV in Information Technology (Networking)	554	748	785	759	2,846
ICA50499/ICA50701/ICA50405 – Diploma of Information Technology (Networking)	773	740	870	680	3,063
ICA50701 – Diploma of Information Technology (Internetworking)	38	2	1	0	41
ICA60205/ICA60208 – Advanced Diploma of Information Technology (Network Security)	64	139	120	110	433
PROGRAMMING					
ICA40699/ICA40505 – Certificate IV in Information Technology (Programming)	105	127	200	202	634
PROJECT MANAGEMENT					
ICA51101/ICA50205 – Diploma of Information Technology (Project Management)	25	56	58	46	185

ICA Qualifications Issued	2007	2008	2009	2010	Total
SOFTWARE					
ICA50299/ICA50705 – Diploma of Information Technology (Software Development)	804	690	446	130	2,070
SUPPORT					
ICA40199/ICA40599/ICA40205 – Certificate IV in Information Technology (Support)	345	218	242	191	996
SYSTEMS					
ICA40799/ICA40705 – Certificate IV in Information Technology (Systems Analysis and Design)	20	9	8	25	62
ICA50199/ICA50305 – Diploma of Information Technology (Systems Administration)	317	169	226	202	914
ICA50805 – Diploma of Information Technology (Systems Analysis and Design)	20	10	20	3	53
WEBSITE					
ICA41001 – Certificate IV in Information Technology (Website Administration)	10	1	0	0	11
ICA41101/ICA40305 – Certificate IV in Information Technology (Websites)	336	420	469	500	1,725
ICA50601/ICA50605 – Diploma of Information Technology (Website Development)	190	213	282	281	966
Total	12,711	13,615	14,841	11,223	52,390

Source: NCVER, VET Provider Collection, 2011

Table 8: Enrolments in Integrated Telecommunications (ICT) Qualifications 2007–2010

ICT Enrolments	2007	2008	2009	2010	Total
CABLING					
ICT20302/ICT20308 – Certificate II in Telecommunications Cabling	361	257	250	236	1,104
ICT30302 – Certificate III in Telecommunications Cabling and Customer Premises Equipment	21	46	172	183	422
CALL CENTRES					
ICT20499/ICT20102 – Certificate II in Customer Contact	363	205	98	5	671
ICT30599/ICT30102 – Certificate III in Customer Contact	7,818	10,262	3,666	308	22,054
ICT40599/ICT40102 – Certificate IV in Customer Contact	1,346	1,082	433	57	2,918
ICT50102 – Diploma of Customer Contact Leadership	2	10	0	0	12

ICT Enrolments	2007	2008	2009	2010	Total
COMPUTER					
ICT40302 – Certificate IV in Telecommunications Computer Systems	20	65	81	38	204
ICT50302 – Diploma of Telecommunications Computer Systems	19	36	2	1	58
ICT60302 – Advanced Diploma of Telecommunications Computer Systems	16	23	2	0	41
DIGITAL					
ICT20508 – Certificate II in Telecommunications Digital Reception Technology	0	0	8	15	23
ICT30508 – Certificate III in Telecommunications Digital Reception Technology	0	0	0	15	15
ENGINEERING					
ICT40202/ICT40208 – Certificate IV in Telecommunications Engineering	173	199	122	199	693
ICT50197/ICT50202 – Diploma of Telecommunications Engineering	76	175	47	35	333
ICT50210/ICT50508 – Diploma of Telecommunications Network Engineering	0	0	0	77	77
ICT60202 – Advanced Diploma of Telecommunications Engineering	107	107	79	76	369
ICT60210 – Advanced Diploma of Telecommunications Network Engineering	0	0	0	84	84
TELECOMMUNICATIONS					
ICT20197/ICT20202/ICT20208 – Certificate II in Telecommunications	227	373	416	454	1,470
ICT30202/ICT30208 – Certificate III in Telecommunications	1,005	703	933	736	3,377
ICT40197 – Certificate IV in Telecommunications	0	0	0	115	115
Total	11,560	13,545	6,309	2,634	34,048

Source: NCVER, VET Provider Collection, 2011

Table 9: Qualifications Issued in Integrated Telecommunications (ICT) 2007–2010

ICT Qualifications Issued	2007	2008	2009	2010	Total
CABLING					
ICT20297/ICT20302/ICT20308 – Certificate II in Telecommunications Cabling	46	63	58	45	212
ICT30497/ICT30302 – Certificate III in Telecommunications Cabling and Customer Premises Equipment	5	6	8	9	28
CALL CENTRE					
ICT20499/ICT20102/ICT20499 – Certificate II in Customer Contact	106	107	63	0	276
ICT30599/ICT30102 – Certificate III in Customer Contact	2,207	3,044	2,028	164	7,443
ICT40599/ICT40102 – Certificate IV in Customer Contact	460	356	241	40	1,097
ICT50102 – Diploma of Customer Contact Leadership	2	11	0	0	13
COMPUTER					
ICT40302 – Certificate IV in Telecommunications Computer Systems	2	17	4	2	25
ICT50302 – Diploma of Telecommunications Computer Systems	0	33	2	1	36
ICT60302 – Advanced Diploma of Telecommunications Computer Systems	20	20	1	0	41
ENGINEERING					
ICT40202/ICT40208 – Certificate IV in Telecommunications Engineering	48	108	22	33	211
ICT50197/ICT50202 – Diploma of Telecommunications Engineering	26	83	17	11	137
ICT60202 – Advanced Diploma of Telecommunications Engineering	37	60	9	12	118
NETWORKS					
ICT40508 – Certificate IV in Telecommunications Networks	0	0	0	12	12
TELECOMMUNICATIONS					
ICT20202 – Certificate II in Telecommunications	63	105	135	33	336
ICT30197/ICT30202/ICT30208 – Certificate III in Telecommunications	179	121	114	176	590
Total	3,202	4,134	2,702	539	10,577

Source: NCVER, VET Provider Collection, 2011

Appendix D – Additional ICT Industry data

Table 10: ICT employment summary

ANZSCO Code	Occupation	Employed ('000s)	Share of ICT employment (%)
2613	Software and applications programmers	80.9	19.3
3131	ICT support technicians	52.1	12.4
1351	ICT managers	39.8	9.5
3423	Electronics trades workers	35.7	8.5
2621	Database & systems administrators & ICT security	33.0	7.9
3424	Telecommunications trades workers	23.8	5.7
2631	Computer network professionals	22.8	5.4
6212	ICT sales assistants	22.5	5.4
2611	ICT business and systems analysts	21.9	5.2
2252	ICT sales professionals	20.0	4.8
2633	Telecommunications engineering professionals	14.6	3.5
2324	Web and multimedia designers*	14.2	3.4
2612	Multimedia specialists and web developers	12.0	2.9
2334	Electronics engineers	7.6	1.8
2632	ICT support and test engineers	6.3	1.5
3132	Telecommunications technical specialists	5.1	1.2
2232	ICT trainers	4.2	1.0
3124	Electronic engineering draftspersons, technicians	3.6	0.9
Total employment in these ICT occupations		419.9	100.0

Source: DEEWR Trend Data based on ABS Labour Force, Australia, Cat no: 6291.0.55.003

Table 11: ICT statistical summary

Measurement	Statistic	Period/ currency	Source	Trend ¹
Total ICT workers in Australia	554,700	Feb 2011	ABS Labour Market Survey Feb 2011, ICT Industry logistics CIER 2010	Continuing growth, shortages apparent
Total ICT technical, professional, management, trade staff in Australia	468,773	Feb 2011	ABS Labour Market Survey Feb 2011, CIER extract	Continued growth over 20 year cycle. Decline in 2009-10, and 2010-11
Total ICT technical, professional, and management staff in Australia	383,135	Feb 2011	ABS Labour Market Survey Feb 2011, CIER extract	Steady growth to 2008, static in 2009-10, slight growth in 2010-11
Total ICT domestic annual commencements in Australia	8,704	2010	DEEWR	4.5% increase in 2010, after continuing decline, slowing in last three years

Measurement	Statistic	Period/ currency	Source	Trend ¹
Total temporary ICT migrants to Australia	8,530 per annum	2009-10	DIMIA, CIER calculation	Has been increasing rapidly to start of 2008, declined in 2008-09 and 2009-10.
Employees in ICT Industry	285,000	Dec 2010	CIER T250 2010	Slow growth, recovering from GFC
Revenue of ICT Industry	\$82 billion	Dec 2010	CIER T250 2010	Contraction from 2008 in telecommunications revenue, sectoral variations
ICT research and development	\$5.2 billion	2008-092	ABS 2011	Recovery from long-term decline, continuing to be led by business research and development

¹ No later ABS data available

Source: Australian Computer Society, CIER, Australian ICT Statistical Compendium, 2011

Table 12: ICT occupation groups

ANZSCO Code (4 digit)	ANZSCO 4 level description	CIER ICT occupation grouping
1351	ICT managers	ICT management and operations
2232	ICT trainers	ICT management and operations
2247	Management and organisation analysts	ICT management and operations
2249	Other information and organisation professionals	ICT management and operations
2252	ICT sales professionals	ICT sales
2324	Graphic and web designers, and illustrators	ICT technical and professional
2611	ICT business and systems analysts	ICT technical and professional
2612	Multimedia specialists and web developers	ICT technical and professional
2613	Software and applications programmers	ICT technical and professional
2621	Database and systems administrators, and ICT security specialists	ICT management and operations
2631	Computer network professionals	ICT technical and professional
2632	ICT support and test engineers	ICT management and operations
2633	Telecommunications engineering professionals	ICT technical and professional
3123	Electrical engineering draftspersons and technicians	Electronic trades and professional ¹
3124	Electronic engineering draftspersons and technicians	Electronic trades and professional
3131	ICT support technicians	ICT trades
3132	Telecommunications technical specialists	ICT technical and professional
3423	Electronics trades workers	Electronic trades and professional
3424	Telecommunications trades workers	ICT trades
6212	ICT sales assistants	ICT sales

¹ Electronic trades and professional employment (3123/3124) is included by CIER in ICT totals where such employment is within major ICT Industry categories.

Source: Australian Computer Society and CIER

Table 13: ACS and CIIER analysis of ICT employment

ICT workforce, all industries ¹	ICT technical & professional	ICT management & operations	ICT trades	ICT sales	Electronic trades & professional	ICT Industry admin and logistics support	ICT workers (ACS/CIIER definition)
Professional, scientific and technical services							
	112,028	49,775	19,085	10,200	4,570		
Information media and telecommunications							
	26,837	10,820	20,590	12,903	982		
Professional, scientific and technical services/information media and telecommunications (sub total)							
	138,865	60,595	39,675	23,103	5,552	44,995²	312,785
Public administration and safety							
	16,541	20,194	6,387	0	2,430		45,552
Financial and insurance services							
	16,509	12,818	3,922	0	0		33,249
Manufacturing							
	15,114	8,315	3,303	401	2,872		30,005
Retail trade							
	5,094	4,511	4,396	9,186	3,709		26,896
Education and training							
	9,319	8,481	5,224	399	1,921		25,344
Wholesale trade							
	7,032	4,494	2,631	6,156	2,940		23,253
Construction							
	2,938	2,014	5,624	0	6,802		17,378
Other services							
	4,434	2,271	1,256	411	8,911		17,283
Health care and social assistance							
	5,050	5,612	2,065	0	366		13,093
Transport, postal and warehousing							
	4,042	4,011	2,212	0	721		10,986
Administrative and support services							
	3,050	4,658	365	506	799		9,378
Electricity, gas, water and waste services							
	1,754	3,967	707	342	411		7,181
Arts and recreation services							
	2,932	954	432	0	1,076		5,394

ICT workforce, all industries ¹	ICT technical & professional	ICT management & operations	ICT trades	ICT sales	Electronic trades & professional	ICT Industry admin and logistics support	ICT workers (ACS/CIER definition)
Mining							
	1,222	1,730	1,330	0	699		4,981
Rental, hiring and real estate services							
	1,253	1,152	0	397	492		3,294
Accommodation and food services							
	588	1,286	390	0	0		2,264
Agriculture, forestry and fishing							
	228	107	167	0	0		502
TOTAL	235,965	147,170	80,086	40,901	39,701		554,669³

1 CIER extract from ABS Labour market statistics, February 2011

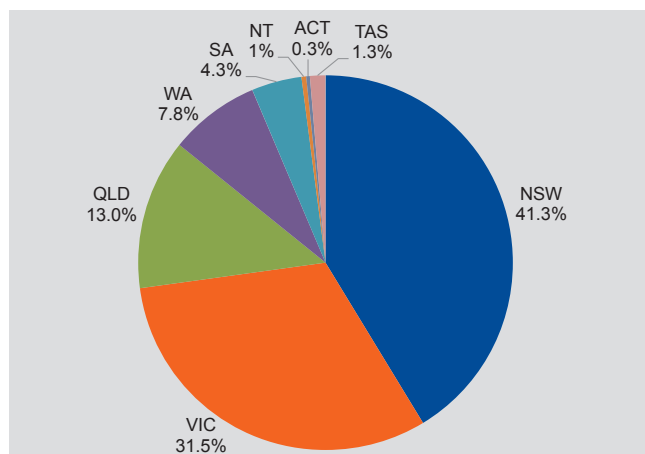
2 CIER estimate from Top 250 ICT industry model, December 2010

3 Excludes electronics employment outside main ICT Industry sectors.

Source: ACS and CIER

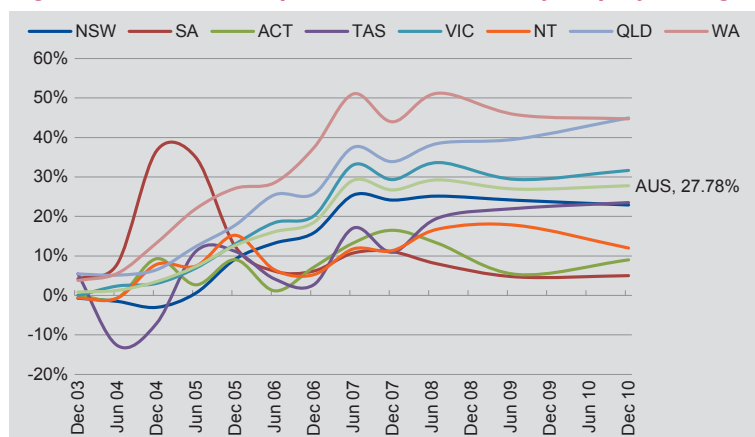
* 6695, Professional, Scientific & Technical Services (above), included in ICT total

Figure 18: ICT Industry employment percentage by state December 2010



Source: CIER Whitehorse Top 250 ICT industry analysis by state and territory, December 2010

Figure 19: Cumulative percentile ICT Industry employment growth 2003–2010



Source: CIER Whitehorse Top 250 ICT industry analysis by state and territory, December 2010

