Tasmanian Information and Communications Technology Workforce Plan

2015 - 2018

Final Report

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Foreword

The offer of support to undertake an industry led, workforce development plan for the Tasmanian ICT sector by the State Government could not have come at a better time.

The sector is vibrant, growing and it is employing more Tasmanians than ever before.

Not only is the sector responsible for significant ICT-related employment, like at Vodafone Australia which is adding an additional 750 new Tasmanian jobs, but it is full of growing Tasmanian businesses competing strongly on a national and international level; and large interstate and international firms expanding their business in Tasmania.

TasICT is excited about future prospects for growth. As we move towards being a $2 billion industry, we strive not only for further improvement, but for recognition that we are sector of our own.

In order for our sector to expand to its potential, business is going to require an increasing number of ICT graduates.

This plan and recommendations contained within are a blueprint for government and industry to work together to deliver more economic opportunities for young Tasmanians looking to make their mark on the world here in Tasmania, or anywhere in the world.

TasICT would like to formally thank Skills Tasmania for the opportunity to go through this process and for its willingness to work with a sector which had not previously been engaged with workforce planning.

I would also like to thank Mr David Morgan and his team at the Worklab for his highly professional work in developing this plan and to all the TasICT members who took the time to participate in the consultation process.

This is a plan that will guide TasICT’s workforce development activity in the near future and I wholeheartedly endorse it.

Jared Hill
President
TasICT

Executive Summary

TasICT’S vision is for a large, dynamic and innovative Tasmanian ICT industry, recognised for its significant contribution to the economic and social wealth of Tasmania. In order to achieve this vision a number of strategic challenges need to be controlled, the most critical being the development of the ICT workforce. The ICT workforce is inherently difficult to manage and plan for. The destination of ICT workers is constantly changing and expanding and the requisite skill set can change completely during the period of training.

Global and national forces that are constantly shifting the consumption and market for ICT products and services and in turn effecting the Tasmanian ICT industry and its workforce. The ICT Industry and its disruption into all
other industries is being constantly changed and re-imagined by “four ‘monster-trends’ – social, mobile, analytics, cloud”\(^1\). Planning skills development in such an environment is not easy.

This report unpacks many of the global and national trends impacting on the ICT workforce and supplements these with local consultations with Tasmanian ICT company and education sector representatives. Whilst the impacts are global many of the solutions are local and Tasmanian companies have ‘an island advantage’ in having the opportunity to dovetail their requirements directly into the education sectors servicing them. There is a large amount of goodwill on all fronts to create a better, more integrated pathway from education to employment.

The compilation of this report involved an agreed methodology (see Appendix E) consisting of an extensive literature review, forums and face to face interviews with industry and education sector representatives, a student survey and input from the project steering committee and board members of TasICT.

The findings from the research are polarised. There are some strong positives with a significant number of businesses well serviced and integrated with the education sector. There are also a significant number of businesses where the opposite is true. There are also many examples of ‘pipeline’ activity where students are moving through certificate levels void of employment outcome as well as strong (unmet) emerging skill requirements for more people/customer service oriented graduates.

The kernel to improving workforce development in the ICT industry is communication. The recommendations arising from the research can be summarised as a series of initiatives aimed at putting in place a structure for communication:

**Recommendation 1:** That TasICT work with all education providers to develop a ‘shop front’ for the industry to post work place learning\(^2\) opportunities and that these opportunities be brokered to education providers through an agreed structured process.

**Recommendation 2:** That TasICT develop and maintain a position description library for the industry and make this accessible to education providers to benchmark skill and performance expectations of their graduates.

**Recommendation 3:** That TasICT reconsider its approach to career promotion in particular by:
- Expanding the scope of career activity into business, finance and humanity fields of study;
- Working with existing initiatives to add value where it can;
- Refocusing the brand of an ICT career as service based, well remunerated with an expanding choice of options and pathways.

**Recommendation 4:** That TasICT work with existing initiatives aimed at improving diversity in the ICT industry to add value where it can.

**Recommendation 5:** That TasICT establish or join existing (non ICT) industry networks to promote and learn about the effects of digital disruption in other industry sectors and Government.

**Recommendation 6:** TasICT continue to promote the importance of workforce development and lobby the State Government to improve the connection between workplace skill requirements and training supply.

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\(^1\) Comment from TasICT Board member Sept 2014 Workforce Planning Forum

\(^2\) Workplace learning is learning that is organised in or by the workplace, and that supports employment role and progression. This includes both formally accredited and informally acquired learning. [www.skillsforhealth.org.uk/component/.../1669-workplacelearning3.htm](http://www.skillsforhealth.org.uk/component/.../1669-workplacelearning3.htm)
Introduction and overview

TasICT is the peak body representing and acting for the Tasmanian Information and Communications Technology (ICT) Industry. Its mission is to provide strategic direction, policies and leadership on key issues facing the Tasmanian ICT industry and advocate these policies to Government and other relevant stakeholders as the united voice of the industry. TasICT’s vision is for a large, dynamic and innovative Tasmanian ICT industry, recognised for its significant contribution to the economic and social wealth of Tasmania.

TasICT has four key industry strategies to ensure capacity is built in the Tasmanian ICT industry and an environment that encourages innovation and entrepreneurial activities is developed further.

Theses strategies are:

1. Build Workforce Capability;
2. Create Economic Wealth and Value;
3. Champion Innovation;
4. Grow the ICT Industries Profile.

There is a common view amongst members of TasICT that there is a considerable disconnect between the employee base they are looking for and that available; and that this situation is likely to get worse. With the support of the Department of State Growth (Skills Tasmania), TasICT contracted The Work Lab to undertake the development of a workforce plan to build upon and further flesh out the actions and strategies necessary to build workforce capability.

The goals of this Workforce Plan

Increased engagement of industry with training providers and the education system:

- Enhanced collaboration between industry and training/education in the delivery of industry demanded training;
- Better articulation of pathways and career opportunities to the potential ICT workforce;
- Documented strategies and action plans to increase workforce development and planning activity in the sector.

What are the performance measures of this Workforce Plan?

<table>
<thead>
<tr>
<th>Target outcome</th>
<th>Measure</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased industry engagement with training/education</td>
<td>Participation in consultation and forums by: -Industry -Training and education providers -Other employment service providers</td>
<td>Ongoing, measured by change over time</td>
</tr>
<tr>
<td>Enhanced collaboration</td>
<td>Number and scale of training programs where industry participates in delivery, validation, assessment and/or work placement/experience.</td>
<td></td>
</tr>
<tr>
<td>Better articulated pathways and career information</td>
<td>Agreed actions relating to career advice.</td>
<td>Improved awareness in students and jobseekers of the true nature of ICT roles</td>
</tr>
</tbody>
</table>

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3 TasICT Strategic Plan, Dec 2012 to Dec 2017 V1.0
Documented strategies and action plans | A documented plan with industry owned actions that are committed to and achievable in a fixed timeframe. | Future evaluation or review against the plan

What is the scope of this Workforce Plan?

The Information and Communications Technology (ICT) sector in Tasmania is broad. The Tasmanian ICT industry can be segmented as:

- IT services systems and integration & software support;
- Internet Service Providers and Telecommunications Carriers;
- Software and digital content development;
- Wholesale and retail distribution of hardware & software;
- Manufacture of ICT products and components;
- Call Centres;
- Internet marketing and sales services;
- ICT units within non-ICT business.

Therefore, ICT employment includes:

- providers of ICT goods and services – usually called the ICT industry;
- the purchasers and users of ICT goods and services, including the government and private sectors, which 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 universities and colleges;
- people who provide technical support to ICT but who might, more properly, be categorised as electrical or electronics specialists, and
- people working in ICT industry call centres, or in desktop publishing and graphics design.

The OECD identifies three tiers of ICT competencies:

- ICT specialists who develop, operate and maintain ICT systems;
- Advanced users of ICT, who are competent users of advanced, and often sector-specific, software tools;
- Basic users of ICT, who are called to use a range of generic tools in the process of their work.

Skills development is essential for each of these groups:

For ICT specialists, a tertiary or higher level vocational (VET) qualification in ICT is an entry requirement for most occupations, and postgraduate qualifications are often required for higher-level positions. Ongoing training and skills development is essential, given the frequent changes in skills requirements for contemporary ICT roles. However, many ICT specialists also acquire essential skills through informal learning including, for example, competency in the use of additional programming languages.

For advanced and basic users of ICT, a firm grounding in digital literacy is a significant part of the skill set required across many occupations.

Links to the TasICT strategy

One of the four strategic aims of TasICT is to build workforce capability. This strategic aim has a number of objectives and associated actions:

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4 Innovation and Business Skills Australia, 2014, Information and Communications Technology Environment Scan pg 11
5 Commonwealth of Australia, 2013, ICT Workforce Study, Australian Workforce and Productivity Agency pg 34
• Work with the Tasmanian Government and industry to identify the technical skills the ICT workforce must have to be competitive
• Create a sector workforce plan that introduces next steps needed for further technical skills development in Tasmania
• Develop stronger relationships with Tasmanian educational facilities to ensure a career in ICT is communicated as an attractive pathway to Tasmanian students
• Establish closer collaboration with education institutions to ensure practical and relevant content is being taught
• Build our pool of workers through more online ICT skills development courses

This report seeks to further these objectives and refine the actions whilst at the same time recognising the strengths and weaknesses of TasICT as an organisation; well positioned to influence but with limited human resources, a large agenda and not yet strategically integrated into the skills supply chain.

TasICT have set a four-year timeframe for this workforce plan. Many of the workforce issues facing the industry are global if not national issues with no immediate quick fix solutions but to which TasICT are and should be part of the solution. Other workforce recommendations are practical short-term services that will deliver benefit to the local industry.

The Environment

The ICT Industry (and its disruption into all other industries) is being constantly shaped and re-imagined by “four ‘monster-trends’ – social, mobile, analytics, cloud”\(^6\)

Global factors

Gartner predicts the following top ten technology trends for 2014\(^7\):

- mobile device diversity and management including bring your own device (BYOD);
- mobile apps and applications – smaller more targeted applications;
- or ‘apps’, to grow while larger, more comprehensive applications to shrink;
- ‘software defined anything’ – better interoperability standards;
- smart machines;
- 3-D printing;
- the internet of everything – expansion beyond PCs to and mobile devices into enterprise assets, such as field equipment, and consumer items, such as cars and televisions;
- hybrid cloud and IT as service broker;
- cloud/client architecture;
- the era of personal cloud, and
- web-scale IT.

National factors

IBISWorld\(^8\) predicts that 13 out of Australia’s 19 industry sectors will derive significant benefits from ICT. An estimated 5 percent increase in enterprise IT spending is expected in Australia, from $69 million in 2012 to $73 million in 2013.

IBISWorld\(^8\) predicts Australian consumers will need a monthly data allowance of almost 200 GB by 2020 and potentially five terabytes by 2030. Superfast broadband and technology will enable an increase in haptic – tactile

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\(^6\) Comment from TasICT Board member Sept 2014 Workforce Planning Forum
\(^7\) IBSA Esan Pg 9
\(^8\) Ibid Pg 5
feedback technology — devices that have the capacity to stimulate the sense of touch, based on a virtual 3-D environment. Growth in data usage will create demand for cloud computing services as businesses try to store more information. Private and hybrid cloud demand is expanding as security and control concerns around public cloud computing remain.

Mobile internet continues as the most rapidly growing form of telecommunications technology, and continuing investments in 4G networks and the rollout and transition to the NBN promise to drive mobile even more deeply through our economy and society. More than 50 percent of mobile data traffic is now via smartphones and 10 percent via tablets. Global mobile data traffic is predicted to grow thirteen fold by 2017 and mobile video to consume more than two thirds of mobile data traffic by 2017.

Of greatest significance is the impact of and uptake of ICT in other industries. Deloitte have developed a ‘Digital Disruption’ map to illustrate this. In the Tasmanian context the top right hand quadrant is of critical interest to the local industry, as health, education, Government services, agriculture and utilities are the States key sectors. Digital disruption in the Tasmanian agriculture industry is most likely to be accelerated through the Sense-T project, although consultations were somewhat circumspect on the immediate flow on effects outside of the University system.

Stakeholders at the TasICT conference noted that the development of an ICT workforce plan is by it nature akin to a Tasmanian workforce plan, given the ubiquity of ICT skills across the economy. Digital disruption — the impact of ICT on other industries, was viewed as the most critical issue driving the demand for ICT professionals as well as a (small but) growing area of graduate destinations from University and the VET sector.

9 Innovation IBSA Escan Pg 10
10 Ibid Pg 7
12 Based in Tasmania and using cutting-edge technology, Sense-T is creating the world’s first economy wide sensor network. Sense-T is combining real-time data from sensors with spatial and historical data to build a digital view of the entire state. The rich data sets allow a view of relationships across the whole economy, not just individual industries or communities. Information will be available through easy-to-use apps that aim to help governments, businesses and communities make better decisions about managing their resources. Sense-T is a partnership program between the University of Tasmania, the Tasmanian Government, CSIRO (through the Australian Centre for Broadband Innovation) and IBM. It is also funded by the Australian Government.
The current contribution of ICT Nationally across industry sectors is shown below.

Cross Industry contribution of ICT\textsuperscript{13}

Regional/Local factors

According to the Australian Computer Society, Tasmania has a number of key strategic advantages\textsuperscript{14} that could be used to attract economic activity, such as:

- Island geographic and demographic characteristics that are perfect for trials/ pilots;
- Tasmania’s renewable energy and environmental credentials represent attractive marketing propositions for many technology companies such as Google, Apple and Amazon;
- World-recognised lifestyle factors are an incentive for attracting a skilled ICT workforce;
- World leading research facilities and communities provide amazing opportunities for development and commercialisation of intellectual property.

There is often an overwhelming focus when discussing ICT on the creation of new industries\textsuperscript{15}. However, ICT has a critical role to play in the growth and survival of Tasmania’s traditional industries. Government programs such as Digital Ready continue to play a role in bringing the skills of the small business sector up to their customers growing expectation, demonstrating that industry development is at a low base for many. Digital disruption will travel at a speed that its customer consumes it, creating new markets for the industry as well as disrupting the offering and dynamic of the ICT industry itself.

In Tasmania, Government remains a large customer of ICT services (internally and contracted) and is not immune to the ‘ICT Monster Trends’ (social, mobile, analytics, cloud). The evolution of service delivery to meet the Government’s three pillars of open data, open Government and citizenship is going to change its consumption of ICT. A number of local industry representatives commented on ‘out of date procurement model’ as being evidence that this is already occurring.

\textsuperscript{13} IBSA Escan Pg 7. Note that the methodology used by CIER to derive this chart is based upon GDP contribution and has a number of known flaws, but nevertheless is currently the best estimate of contribution published.

\textsuperscript{14} ACS Tas, The Role of Technology in Tasmania’s Future Pg 8

\textsuperscript{15} Ibid Pg 6
A key growth sector that drives ICT innovation is the Start Up sector. This sector alone has the potential to contribute $109b (or 4% of GDP) to the Australian economy by 2033, and more than 75% of these Start-ups are expected to be technology based (PwC, 2013). Whilst recognised as a critical part of the innovation chain, industry consultations gave low priority to specific support for the Start Up sector. Start Ups are viewed as early ICT companies as well as way to grow the business offering through merger and acquisition.

All the above set the macro scene for the workforce plan.

Current Workforce Profile

In 2011, the median age for ICT professionals was the same as for all occupations at 38 years of age. However, there is variability across the IT occupations with the median age ranging from 40 years for database and systems analysts and ICT security to 31 years for multimedia specialists and web developers. The Department of Education, Employment and Workplace Relations (DEEWR) concludes that, while ICT professionals are a relatively young workforce, there appears to be a limited number of entry level positions for persons in the 20–24 age group.

Between 2012 and 2013 the proportion of the workforce employed in consulting and software services has increased by over 16 percent, while the proportion employed in wholesale and retail of hardware and software products has declined dramatically, from 25.6 percent to 7 percent.

According to the Australian Bureau of Statistics (ABS), 460,800 workers were employed in the 18 primary ICT occupations in August 2012, as shown in the figure below. The ICT workforce accounts for 4.1 per cent of the total workforce in Australia. The three occupation groups with the most workers were:

- ICT Professionals (233,300 workers);
- ICT Support Technicians (57,000 workers);
- ICT Managers (53,100 workers)

According to DEEWR, the ICT Professionals grouping includes a number of different occupations. Ninety-one per cent of these were further classified into the following groups:

- Software and Applications Programmers (90,400 workers)
- Database and Systems Administrators and ICT Security Specialists (35,500 workers)
- ICT Business and Systems Analysts (32,800 workers)
- Computer Network Professionals (25,400 workers)
- Telecommunications Engineering Professionals (11,500 workers)
- Multimedia Specialists and Web Developers (9,700 workers)
- ICT Support and Test Engineers (6,900 workers).

In the 10 years to 2012, the employment growth was highest among ICT Support Technicians (27,700) and ICT Managers (23,500). The growth in the employment of ICT Support Technicians suggests opportunities exist at the entry level for new VET graduates with ICT skills and perhaps highlights the role of VET in the supply of such skills.

The actual numbers of full time ICT workers in Tasmania cannot be determined with precision. The Census in 2011 suggests there are 3,245 Tasmanian workers in the ANZSIC classified industry: Information Media and Telecommunication. The Australian Computer Society and Centre for Innovative Industries Economic Research

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16 TasICT Strategic Plan Pg 9
17 DEEWR, 2013 ICT Labour Market Indicators
18 IBSA EScan Pg 10
19 AWPA, ICT Workforce Study Pg 10
20 Australian Bureau of Statistics, Census of Population and Housing, ABS 2011, Canberra
Inc (CIEER) (2013) would suggest 4,380 employed by information technology, and at least a further 1000 employed in non-ICT industries\(^\text{21}\).

The following occupations and job roles were reported as in demand nationally in the Information and Communications Technology industry during IBSA’s Escan 2013\(^\text{22}\) industry consultations and validation:

- network security;
- data security;
- cyber security;
- network engineers;
- data analysts;
- ICT trainers;
- software developers;
- telecommunications trades – installers;
- line workers and splicers;
- wifi routing;
- IP networking;
- communication and customer skills, and
- systems integrators.

Locally, industry consultations would support the above list but see the future challenges to be more skill based rather than occupationally based, citing key skill demands and issues as:

- Customer and service orientation;
- Translators and brokers – pre and post sale (customer to technical solution and vice versa);
- Increased specialisation of highly technical roles;
- Increases in data and analytical roles; and
- Difficulties attracting experience.

Nationally Australia is struggling with a shortage of ICT skills\(^\text{23}\). The ACS-TAS expects the shortage to worsen as enrolments in tertiary courses have steadily dropped over the last decade\(^\text{24}\) and VET ICT courses have moved to cater for a younger, education pathway oriented cohort of students.

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\(^{21}\) ACS, 2014 – Note that there are known flaws in the methodologies used to derive both sets of figures and that the actual numbers of full time ICT workers in Tasmania cannot be determined with precision.

\(^{22}\) IBSA Escan pg 14

\(^{23}\) Australian Computer Society Tasmanian Branch, 2014, The Role of Technology in Tasmania’s Future Pg 12
The current workforce priorities

Generic ICT skills and ‘digital literacy’ have emerged as prerequisites or highly desired skills for jobs across the economy, and are also central to the process of learning, as primary, secondary and tertiary educational institutions increasingly utilise technology in the delivery of educational programs. At the higher end of the skills spectrum, advanced ICT skills offer career prospects across a range of sectors as ICT moves from the backroom to the forefront of enterprise activity. As a result, the skills required to understand and use ICT have emerged as a fundamental concept in all levels of education, from the foundational years through to senior schooling and across a range of tertiary education offerings both in ICT and non-ICT disciplines.

Many Australian businesses and workers are integrating ICT into their day-to-day activities. This adoption is not new, but the standardisation of hardware and software has shifted business demand from customised hardware and software, to a range of sophisticated ICT services. In particular, companies are increasingly seeking to utilise cloud computing services to facilitate shared access to a range of ICT resources.

Demand for data analytics has also increased in recent years, as companies across the economy seek to generate, utilise and manage an array of complex information related to business processes and consumer behaviour. The rollout of the National Broadband Network (NBN) is expected to accelerate the effectiveness and use of these services.

24 The new Bachelor of ICT offering at UTAS is anticipated to turn this around
At the same time, however, many Australian businesses, particularly small to medium-sized enterprises (SMEs), are still not engaging effectively with ICT. For example, in a 2010–11 ABS survey, 46 per cent of small businesses (5–19 persons) and 26 per cent of medium-sized businesses (20–199 persons) reported that they did not have an online presence. In addition, small, medium-sized and large businesses report lack of access to ICT-related knowledge and/or technology as a barrier to innovation. Finally, several recent surveys suggest a lack of capability related to computer-based and/or technological skills acts as a key inhibitor to enterprises seeking to improve their digital profile.

Within the vocational training system ‘ICT Training’ covers a range of qualifications, skill levels and ultimately occupation. The bulk of the training delivered is at the lower qualification levels, catering for generalist ‘digital literacy’ skills and preparatory pathways leading to more specialist ICT qualifications.

Qualifications leading directly to ICT occupations commence at Certificate IV, Diploma and Advanced Diploma. When the figures above are compared to the occupational makeup of the industry in Figure 3, Page 14, there is a marked disconnect between the occupational need within the industry and the training effort funded by the Government:

1. Software and application programmers (Certificate IV in Computer Systems Technology) make up 3.4% of the training supply but over 60% of the industry require these skills;
2. ICT support technicians (Certificate IV in Information Technology Support) comprise 2.5% of the training effort and 30% of the industry occupational composition;
3. ICT Manager roles are slightly better supported through the Diploma and Advanced Diplomas, but still make up only 7% of the funded training effort.

There are clearly improvements to be made in better aligning training effort to industry demand and with only one private training provider active in the market (other than direct NBN related activity) there is, on face value, the potential to grow the capacity of the training sector. However the solution is neither simple nor linear – increasing numbers in training alone will not alleviate the problem. Nevertheless the evidence of disconnect is stark and so:

**Recommendation 6:** TasICT continue to promote the importance of workforce development and lobby the State Government to improve the connection between workplace skill requirements and training supply.

Many businesses report difficulty recruiting capable, confident, work-ready ICT specialists. In some cases business demands very specific skills that are generally held by very few job candidates but mostly experience is the missing element. Poaching of staff is common within the industry and interstate recruitment commonplace. Recruitment from University, RTO or school is common although the industry is polarised on its view of the suitability of graduates for work. Some more established Tasmanian ICT businesses have developed innovative approaches to entry-level recruitment such as:

- In house cadetships at TasNetworks,
- Summer internships at ISW;

Data provided by Skills Tasmania
• Pathway programs from school to manager at Anderson Morgan;
• ‘Casual pools’ of labour at Huon Aquaculture;
• Career expos at Vodafone.

In each of the above examples the outcomes have been very positive for all concerned, yet all were developed as in house solutions to a systemic problem and not all employers see managing programs such as these as their role. The education sectors run a number of programs that involve:
• Work experience;
• Work placements;
• Work based projects involving students at school, college or university;
• Work based projects involving students at work;
• Venture based projects through research and development.

The above are all well supported by the industry but could be significantly enhanced if coordinated and incrementally grown to form a visible interface between the education sectors and industry.

Recommendation 1: That TasICT work with all education providers to develop a ‘shop front’ for the industry to post work place learning opportunities and that these opportunities be brokered to education providers through an agreed structured process.

Only five of the 18 primary ICT occupations engage more than one-third of individuals from a particular degree or qualification. In other words, the majority of ICT occupations employ individuals with a range of tertiary qualifications. The highest concordance between occupation and qualification is among Electronics Engineers aged 20 to 29 years, with 70 per cent holding at least a bachelor degree–level qualification in engineering and related technologies, electronic engineering or electrical engineering. Similarly, about the same percentage of Web and Multimedia Designers held a qualification in graphic arts and design studies, communication and media studies, or graphic arts and design studies. At the other end of the spectrum, only 16 per cent of ICT Sales Assistants are drawn from the three most common educational pathways. This indicates that ICT Sales Assistants gain employment from a range of educational backgrounds. Enrolments and completions in ICT-related disciplines in the tertiary education sector have declined for much of the last decade, although there has been some recent improvement in enrolment figures. Accordingly, the focus needs to be on increasing both the number of enrolments and completions in ICT-related disciplines as well as the number of entry-level opportunities available in the industry. Local industry were polarised on their views of the skills fit between graduate supply and business demand. It is recommended that TasICT co-ordinate a position description library that member businesses can post to and that this be available to the education sectors as benchmark requirements for graduates.

Recommendation 2: That TasICT develop and maintain a position description library for the industry and make this accessible to education providers to benchmark skill and performance expectations of their graduates.

Some ICT qualifications do not lead to employment in ICT-related occupations but are used as pathways into further study. This is also borne out by the Graduate Surveys Australia data and discussions with TassTAFE and UTAS. For example, only 15 per cent of students with diplomas or certificates in information technology are employed as ICT Support Technicians, which is the primary ICT occupation for students with VET qualifications. In addition, only 18 per cent of students with a bachelor degree or higher qualification in information technology gain employment as Software and Applications Programmers, which is the largest of the 18 primary ICT occupations. This data also concurs with local consultations that the ICT industry recruits from a wide pool of qualifications, from all fields of education.

26 Workplace learning is learning that is organised in or by the workplace, and that supports employment role and progression. This includes both formally accredited and informally acquired learning. www.skillsforhealth.org.uk/component/.../1669-workplacelearning3.htm.
27 AWPA, ICT Workforce Study Pg 13
28 AWPA ICT Workforce Study Pg 58
In Tasmania, consultations reported the following positions as difficult to recruit:

- Pre sales technical staff
- Senior staff (across all occupations) in particular:
  - Project managers
  - System administrators
  - Business analysts

Retention of staff is an issue for many in the industry, particularly at lower levels of authority. University of Tasmania claim that the majority of their graduates stick with their first job for at least 18 months yet only 10% are still in the same job after 2 years.

The following workforce issues should be addressed:

- Reframing the ICT industry and careers to better promote current and future work. Consultations within the local industry support this as a critical workforce issue. Defining a brand that supports any promotion activity is inherently difficult given the constant shifting sands of the boundaries of the industry and the occupations within it. Local industry representatives thought ICT careers are ‘sold as too techie focused’. What is clear is that the industry has become very service and ‘soft skill’ focused, pays well and has a diverse and growing range of careers. However, TasICT is not the sole stakeholder in this issue and needs to consider how it can best influence and support existing initiatives.

Recommendation 3: That TasICT reconsider its approach to career promotion in particular by:

- Expanding the scope of career activity into business, finance and humanity fields of study;
- Working with existing initiatives to add value where it can (see Appendix F);
- Refocusing the brand of an ICT career as service based, well remunerated with an expanding choice of options and pathways.

- Encouraging technical and professional development of the existing workforce to enable the development and deployment of new technologies and techniques. Industry representatives did not express any concern with accessing training and professional development support for their staff through vendor arrangements, conference or online.

- Engaging the ICT industry in workplace learning to enhance student learning experiences and improve retention and completion rates. The education sectors have a number of programs ranging from work experience to co-venture research and development activity. All agree that this should be enhanced and incrementally grown to be a visible and integral part of the ICT workforce supply chain. Having an industry shop front or market place for workplace learning opportunities would facilitate this (see recommendation one).

- Maintaining rigour of assessment in VET ICA and ICT qualifications and engaging local industry in course validation and development to provide confidence to the industry of the quality and employability of VET students. To some extent this already exists with both TasTAFE and the University pleased of the support they receive from TasICT and its members. Industry consultations uncovered mixed attitudes to the graduate skill base and the fit to their business requirements. Communication at this level could be significantly enhanced through the establishment of a bank of industry position descriptions (see recommendation two).

- At a national level consistent and continuous review of skill sets to address specialist skill requirements for today’s workforce is critical. It is important that this includes alignment with global skill benchmarks such
as ITIL\textsuperscript{30} and SFIA\textsuperscript{31}. In time TasiICT will be able to take a more active and influential role in this activity using its library of position descriptions (recommendation two) as evidence.

**Future Workforce Profile**

While the outlook for the ICT workforce is positive, and the demand for ICT skills is projected to rise in the next five years, there are also a number of significant challenges that will need to be addressed if Australia is to meet future demand for specialist ICT skills. Within Tasmania the supply of skills is expected to become tighter and the business landscape is expected to shift in response to the four ICT ‘monster-trends’ (social, mobile, analytics, cloud).

**What will the future environment require?**

- Demographic data indicates that the ICT workforce is predominantly young and male. The participation rates of women and mature-aged workers in the ICT workforce are lower than the national average. The potential of the ICT sector to engage Indigenous Australians and people with disability also remains largely untapped. Diversity is also an issue with the Tasmanian workforce and a number of programs and initiatives exist. TasiICT need to consider how best they can influence and be involved in such programs.

Recommendation 4: That TasiICT work with existing initiatives aimed at improving diversity in the ICT industry to add value where it can (see Appendix F).

- While recent enrolment trends in both higher education and vocational education and training (VET) have marginally improved since 2008, high drop-out rates from courses, and graduates reporting difficulty finding employment, are causes of concern. Nationally, skilled and temporary (subclass 457 visa) migration programs have emerged as a key source of supply for the ICT sector since the mid-1990s and continue to play a significant role in addressing the demand for specialist skills not available in Australia. In Tasmania experienced staff are generally poached from other companies or recruited from interstate. It is anticipated that the supply of labour will tighten. Consultations indicate that significant improvements need to be made to the graduate recruitment pipe line (in all sectors).

- Employers consistently express difficulties in finding suitable candidates quickly for job openings. Employers increasingly demand so-called ‘T-shaped’ professionals with both broad knowledge and deep expertise, including technical skills, domain knowledge and soft skills which include communication and business skills. Employer demand for experienced workers means that there are fewer entry-level positions available for new graduates. Graduates who are successful in finding employment, however, find the experience rewarding and career enhancing\textsuperscript{32} and according to local consultations, are well remunerated and solid career prospects.

- Recent recruitment data for key ICT occupations indicates that while there are often adequate numbers of applicants for advertised vacancies, employers often considered many applicants unsuitable for the positions. For instance, data from DEEWR’s Survey of Employers Who Have Recently Advertised indicates about 10 per cent of applicants in three ICT occupations—ICT Business Analyst, Systems Analyst and Analyst Programmer—were suitable for the positions advertised, and for Developer Programmer and Software Engineer positions only 5 per cent of applicants were suitable. One of the reasons for the mismatch between employer requirements and applicants is that the positions require between 2 and 10

\textsuperscript{30} ITIL (formerly known as Information Technology Infrastructure Library) is the most widely accepted approach to IT service management in the world. ITIL provides a cohesive set of best practice, drawn from the public and private sectors internationally. http://www.itil-officialsite.com

\textsuperscript{31} SFIA provides a language that is the foundation for consistent, unambiguous and clear definitions of IT based skills. http://www.sfia-online.org

\textsuperscript{32} AWPA, ICT Workforce Study Pg 39
years previous experience, which new entrants cannot meet\textsuperscript{33}. It is also clear from local consultations that, in many instances, there is a mismatch between graduate skill sets and business skill requirements. Significant improvements need to be made to the graduate recruitment pipe line (in all sectors).

**Where are we headed? What is likely to change?**

Further predictions by IBISWorld for Australian business and society that will impact the ICT industry include the following:

- medium-sized companies (revenue $1–100 million) will grow in response to the outsourcing by households and businesses, with small businesses declining in favour of franchises that can provide economies of scale and IP to operate in the ‘Infotronics Age’;
- the rise of the virtual corporation through outsourcing assets and noncore functions and activities;
- one in four people could be working from home at least some of the time;
- changing household expenditure with less spent with traditional retailers and more online shopping and outsourced activities, and
- changing nature of work with more workers becoming their own business, and payment for outputs not inputs\textsuperscript{34}.

This explosion of information is expected to increase demand for data analytics expertise to facilitate effective information management and information and cyber security services to ensure the safety of this data.\textsuperscript{35}

Local initiatives may also have an impact on the uptake of ICT within other industries (other than ICT itself). As illustrated in Deloitte’s digital disruption map, changing a business structure in the order of 25%+ over a 3 – 5 year time period is going to challenge the skills base of the existing workforce and those entering it.

**What is the workforce demand, forecast and supply analysis for the next 1-3 years?**

DEEWR research indicates employment for ICT workers across all occupational groups will grow by 33,200 workers, or 7.1 percent, over the 2012–17 period.

\textsuperscript{33} Ibid Pg 46
\textsuperscript{34} IBSA Escan Pg 11
\textsuperscript{35} Ibid Pg 10
The projected increase in the numbers of workers over the five-year period to 2017 for each of the major occupations is set out below:

- 3,600 (4.4 per cent) for Software and Applications Programmers
- 3,000 (5.5 per cent) for ICT Support Technicians
- 3,400 (6.5 per cent) for ICT Managers
- 4,400 (12.8 per cent) for Electronics Trades Workers
- 3,900 (11.5 per cent) for Database and Systems Administrators and ICT Security
- 3,300 (9.6 per cent) for ICT Business and Systems Analysts.

**What future job roles will be undertaken?**

The ICT jobs of the future demand broad skills that are increasingly difficult to place in existing ABS categories of occupations. For example,

- emerging mobile jobs include mobile product manager, business analyst, project manager, test analyst, developer, and solution architect.
- emerging cloud technology jobs include software engineer, sales executive, developer, systems administrator, consultant, systems engineer, network engineer, and product manager.
- Emerging business intelligence jobs include intelligence manager, business intelligence architect, developer, and analyst.

Local consultations with non-ICT companies regarding their ICT workforce indicates a growing skill demand for data analytics, change management and implementation focused teams and less of a focus on the more traditional technical skills. This is evidence of an emerging pool of potential graduates for what have become key ICT occupations – the business, finance and humanities school. This new emergent pool of potential graduates needs to be considered as part of any career attraction programs supported by TasICT.

**What skills and competencies are required over the next 5 years?**

Industry expectations of ICT graduate competencies have changed considerably in recent years. The evolution of ICT into mainstream business operations across a range of industry sectors has expanded the range of skills required of ICT workers. Many businesses demand flexible generalists rather than narrow specialists—so-called ‘T-shaped’ professionals with deep expertise across a broad range of skill sets. Industry also is clearly looking for customer service orientation and the ability to ‘translate’ a customer’s requirements into technical requirements. Overwhelmingly, experience is the key asset required by employers.

Like employers, the majority of students appreciate the value of integrating meaningful professional experience into education programs. In responses to a recent survey, students requested ‘greater industry involvement in learning and teaching, up-to-date practical and relevant industry-based technologies and practices, real-life examples, and business knowledge to industry’. Students surveyed at the TasICT conference agreed, all stating that they would like to see more industry-based projects as part of their learning experience.

**What values and behaviours need to be demonstrated by the workforce?**

A recent survey of more than 900 Australian IT professionals revealed that 57 per cent of respondents believe their company does not invest enough in training and development; 65 per cent believe they cannot progress to the next level in their current company; 50 per cent would be willing to forgo career progression to work flexible hours; and just 30 per cent indicated that morale in their business is high. The five main reasons given by

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36 AWPA, ICT Workforce Study Pg 48
37 IBSA Esca Pg 12
38 AWPA, ICT Workforce Study Pg 89
39 Ibid Pg 90
respondents who had recently resigned from positions in ICT were no career progression, dissatisfaction with salary, poor relationship with manager, company culture misfit, and limited flexible working hours. Locally, several Tasmanian businesses reported retention as a concern but the reasons were not explored as part of this research.

Despite the increasing complexity of ICT services, driven by the increasing and accelerating use of cloud services and mobile devices, expenditure on education within the sector remains low. According to research by consultants IDC, industry spending on ICT education lags behind the market average, and falls well behind spending on software. ICT training in Australia in 2012 represented just 0.57 per cent of total ICT expenditure (US$408 million of US$71,830 million), and IDC forecasts that training expenditure will drop to 0.55 per cent of ICT spending by 2015 (US$435 million of US$79,601 million). IDC research shows that training is important, and that with a sufficient percentage of team members certified, IT organisational performance can increase by up to an average of 11 percentage points. Anecdotally, access to training and professional development opportunities was not seen as a concern for Tasmanian employers, all of whom expressed a clear connection between the skills of their workforce, the retention of that workforce and the productivity and outputs of the business.

Management capability is a key issue in the ICT sector which impacts on the capacity of organisations to implement work practices for skills development. APESMA calls for better management capability in the following key areas to improve productivity in ICT workplaces, which may improve work satisfaction and the retention of skilled workers: managing innovation, managing workplace culture (including employee involvement and participation in decision-making, staff engagement and motivation, flexibility, workload and work–life balance), managing training and skills development, and fair reward and recognition.

The growing proportion of contract work in some areas of ICT poses additional challenges to the development of workplace culture, and the ICT industry and enterprises—both large and small to medium-sized—need to establish strategies to maximise the contribution of the flexible as well as permanent ICT workforce.
Gap Analysis and Closing Strategies

The ICT workforce in Tasmania (and nationally) faces a significant number of challenges as it grows and boundaries become increasingly blurred across industries. These challenges include:

- Industry image, perception and career barriers;
- Supply issues – not enough graduates in the pipeline;
- Educational issues – perceived outdated courses, poor articulation of pathways;
- Demand issues relating to an ever changing landscape;
- Diversity issues – not enough women, mature workers or indigenous workers;
- Occupational wastage;
- Skill attrition – low levels of upskilling compared to new skills being required.

Industry image, perception and career barriers

The ICT industry carries a legacy of negative perceptions of desk-bound, repetitive, isolating jobs, perceptions that do not bear a close relationship to the contemporary emergence of dynamic, creative, flexible, interdisciplinary ICT jobs. These perceptions have implications for the pipeline of ICT skills from schools to tertiary education. They have to change if Australia is to take full advantage of the digital opportunities of the future.

In addition, a range of stakeholders have suggested to AWPA that the provision of ICT education in schools often reinforces these negative perceptions by presenting an outdated view of the industry. Compounding this, the ICT sector is almost universally critical of the quality of both the ICT curriculum and its delivery in schools (as well as in VET and higher education), and of the inadequate and out-of-date advice provided by career advisers regarding the wide range of ICT occupations.44

At a local level the education sector has its supporters as well as critics and there is clearly a lot that has been done and is being done. This should be continued. It should also be recognised that this issue is beyond TasICT to fix alone and it needs to work in partnership with many other stakeholders.

Supply, and education issues

Within the VET sector demand for courses in ICT outstrips the number of available places. The currency of their offering is managed nationally through the Federal Government and the Industry Skills Councils on a continuous improvement basis. Conceptually the VET sector can tailor their offering to any business requirement.

Within the university sector demand for under-graduate places outstrips the number of available places. The University is introducing a new Bachelor of ICT having concluded a lengthy period of consultation with the local industry and other stakeholders. The new modular based qualification benchmarks globally with the SFIA framework and also integrates with the ACS accreditation.

Both organisations are well networked with the local industry but both acknowledge that more could be done, particularly in relation to integrating workplace learning into the delivery of courses.

Demand issues

Constantly changing models of business as a result of technology disruption creates a constantly emerging skill demand for both ICT skills in non-ICT businesses as well as new domain knowledge within the ICT companies servicing them. Existing examples of this are emergent ehealth occupations arising from the fusion of health and technology creating skill demand within health organisations as well as specialisations in health domain services by ICT companies. It is important that TasICT network itself and its members into industry networks with greatest capacity for disruption such as transport, health, recruitment, utilities, education, construction and agriculture (see Digital Disruption Map Page 9). The issue of disruption is likely of keen interest to existing networks within those industries and so it is recommended that TasICT network with these rather than establish its own groups.

Recommendation 5: That TasICT establish or join existing (non ICT) industry networks to promote and learn about the effects of digital disruption in other industry sectors and Government.

44 Ibid Pg 63
Diversity issues
Skills supply is limited by the low levels of female and mature-aged workers in the ICT workforce. Women occupy less than 20 per cent of positions in the majority of ICT occupations, well below the percentage of women employed in all occupations (just over 45 per cent). A high proportion of workers in ICT Professional occupations are aged between 25 and 44 years (67.8 per cent compared with 45.5 per cent for all occupations). One of the best ways to improve the supply of critical ICT skills is to expand the ICT industry's workforce beyond its current profile, which is largely male and aged between 25 and 44 years. Women, mature-aged workers, Indigenous Australians and people with disability are under-represented in the ICT workforce when compared to other industry sectors.\(^{45}\) 25% of students surveyed for this research saw lack of diversity as an issue and over half the employers interviewed would also like to see improvements in this area.

Occupational wastage
Many students who pursue an ICT education experience difficulty in finding employment in the sector upon graduation, and many graduates use their qualifications to pursue other careers outside ICT. Despite the young age profile of the ICT workforce, there appears to be a limited number of entry-level positions for persons in the 20 to 24 years age group, with many employers complaining that tertiary graduates do not possess the desired combination of technical and complementary business and communication skills to contribute effectively in the workplace. The apparent shortage of entry-level opportunities contributes to the relatively high level of occupational wastage for ICT graduates. In 2011, 37 per cent of ICT graduates aged 20 to 29 years were employed as ICT Professionals, and a further 51 per cent were employed in other occupations. Issues of wastage and attracting students to ICT courses may improve with stronger pathways for graduates at entry level.

However, there is a high degree of occupational wastage for ICT graduates in the 20 to 29 years age cohort, which suggests that employment prospects for ICT graduates may not be as positive as they appear. In 2011, 51 per cent of all ICT graduates aged 20 to 29 years were not employed in ICT Professional occupations. This may suggest that the market for new ICT graduates is soft, or that working conditions are not as competitive as in other similar professional occupations.\(^{46}\) Locally the graduate destinations differ by sector with the VET offering generally providing pathways to further education and the university offering leading to entry level employment in the local ICT industry (60%) from which 90% move on within the first 18 months.

Skill attrition
Despite the increasing complexity of ICT services and the growing demand for these skills, the engagement and investment of industry in ICT skills development remains low. While many multinational ICT organisations have put in place highly effective workforce development strategies, there is limited collaboration between large ICT organisations to build the general pool of skills all employers draw from, and there are issues as well with skills development for contractors. In relation to SMEs, submissions provided to AWPA indicate that many of these organisations have limited capacity to support skills development.\(^{47}\)

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\(^{45}\) AWPA ICT Workforce Study Pg 121
\(^{46}\) Ibid Pg 44
\(^{47}\) Ibid Pg 14
**Proposed solutions**

**Industry image, perception and career barriers**

Recommendation 3: That TasICT reconsider its approach to career promotion in particular by:
- Expanding the scope of career activity into business, finance and humanity fields of study;
- Working with existing initiatives to add value where it can;
- Refocusing the brand of an ICT career as service based, well remunerated with an expanding choice of options and pathways.

**Supply issues – not enough graduates in the pipeline**

The State Government needs to have strategies in place to improve ICT course enrolments and ensure teachers and schools are adequately staffed and supported:

Greater focus in ICT subjects, particularly female participation

Encourage teachers to specialise and the introduction of programs to encourage ICT professionals to contribute to the education process.\(^{48}\)

Improve the suitability of graduates for entry-level position through a more strategic approach to work-integrated learning.

Increase the quantity of workers with the functional knowledge of ICT required to work with ICT specialists—AWPA supports the development of a cross-disciplinary unit to support the integration of a digital literacy component into all undergraduate degrees, and a suite of approaches to improving the engagement of under-represented groups in the ICT workforce. At a local level, trialing the incorporation of ICT intensive skill sets into non-ICT qualifications such as business, finance, transport would support the opening up of ICT careers in non-ICT businesses as well as increase the ICT industry graduate pool.

**Educational issues – perceived outdated courses, poor articulation of pathways;**

Recommendation 1: That TasICT work with all education providers to develop a ‘shop front’ for the industry to post work place learning\(^{49}\) opportunities and that these opportunities be brokered to education providers through an agreed structured process.

Recommendation 2: That TasICT develop and maintain a position description library for the industry and make this accessible to education providers to benchmark skill and performance expectations of their graduates.

**Demand issues relating to an ever-changing landscape**

Recommendation 5: That TasICT establish or join existing (non ICT) industry networks to promote and learn about the effects of digital disruption in other industry sectors and Government.

Special interest networks through existing industry bodies will provide an important two-way communication conduit for TasICT members to gain domain knowledge of non-ICT industry sectors as well as provide non-ICT industry sectors with access to ICT knowledge and advice. To maximise the knowledge transfer it is important that such groups are established within existing industry groups and not formed within TasICT’s internal networks.

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\(^{48}\) Ibid Pg 6

\(^{49}\) Workplace learning is learning that is organised in or by the workplace, and that supports employment role and progression. This includes both formally accredited and informally acquired learning. [www.skillsforhealth.org.uk/component/.../1669-workplacelearning3.htm](http://www.skillsforhealth.org.uk/component/.../1669-workplacelearning3.htm).
Diversity issues – not enough women, mature workers or indigenous workers;

Recommendation 4: That TasICT work with existing initiatives aimed at improving diversity in the ICT industry to add value where it can (see appendix F).

Occupational wastage

Many industry representatives provided comment on the difficulties of recruiting experience and the negative spiral of poaching staff and paying premiums for skills. There are more applicants than places available for ICT educational opportunities yet, in general, only the minority find graduate positions within the local industry. There are clearly no winners under this scenario and it is important that the industry, through its peak body, get to grips with a more strategic and planned approach to workforce development. Clearly there are leaders within the industry who have developed solutions that work well for them (see page 14) and there are pockets of the industry that are very well served by existing education frameworks.

Recommendation 6: TasICT continue to promote the importance of workforce development and support its members to connect with the education sector to work towards an ongoing pipeline of ‘ready for work’ graduates.

Skill attrition – low levels of upskilling compared to new skills being required

“Ensure that employers of ICT workers, including employers of ICT contractors, support ongoing skills development and the effective utilisation of skills in a fast-moving and rapidly changing sector”.50

Whilst this issue is consistently raised through the desktop literature, consultations with the local industry did not uncover a single instance where an employer was unable to access specific skill training for their staff (albeit that this often required travel and/or online learning options). It was also clear from the consultations that skills are very strongly perceived as an asset to be built upon and not allowed to decline. Therefore, at a local level TasICT should continue to reinforce this as part of promoting workforce development (recommendation 6) as well as part of the brand of a career in ICT.

50 AWPA ICT Workforce Study Pg 16
Conclusion and next steps

The key outcomes of this workforce action plan will be:

- Increased industry engagement with training/education through workplace learning activity;
- Enhanced collaboration between industry and education through increased work based project activity and determination of industry requirements via position descriptions;
- Better articulated pathways and career information through
  - matching of industry requirements via position descriptions;
  - the expansion of the perceived pool of potential graduates;
  - involvement of TasICT members in digital disruption special interest groups.

The strategies in this workforce plan should be evaluated quantitatively against the performance measures listed on page 7. From a purist perspective, with the recommendations of this report fully implemented there should be a future expectation from the industry that every student graduating from an ICT qualification in Tasmania has been involved in real, meaningful workplace learning activity and that their skills closely align with position descriptions provided by the industry to guide education and training design.

What are the next steps for implementation of your workforce development plan?

1. Promote the outcomes of this report and the new initiatives arising from it;
2. Meet with the Department of State Growth to understand where potential resources and programs may be available to support the recommendations;
3. Convene a working group consisting of education providers and interested representatives of TasICT to scope out a workplace engagement shop front;
4. Prioritise sectors and establish terms of reference for ‘digital disruption’ special interest groups. Identify members willing to take on the role of ‘forum leaders’ to convene, and establish special interest groups and liaise with existing active industry networks to form such groups;
5. Determine an appropriate maintenance, cataloguing and dissemination strategy for position descriptions and then request members to supply them;
6. Review existing initiatives and programs relating to career promotion and diversity. Ensure such program align with the findings of this workforce plan and determine criteria by which to align TasICT services and support.

What may be the success factors and the barriers to implementing this workforce plan?

The recommendations of this workforce plan will require a commitment of resources, in particular, time and goodwill from TasICT staff and board, its members, non-ICT sector representatives and education institutions who service the ICT industry’s skill needs. A number of the recommendations are purposely ‘service based’ i.e. they aim is to establish a member service that will improve collaboration between the ICT industry, the education sector and other non-ICT industry sectors whilst other recommendations are advocacy based. The TasICT board will need to structure its operations appropriately in order to achieve outcomes in both advocacy and member services.

What will be the ongoing governance around the plan?

It is recommended that the strategies and progress on actions described in this plan (and summarised in Appendix A) are reported to the TasICT Board quarterly and that the Board have ultimate ownership of the plan and achievement of outcomes.
### Appendix A – Workforce Development Plan

<table>
<thead>
<tr>
<th>Strategic Objective</th>
<th>Gap/Issue</th>
<th>Priority Number</th>
<th>Risk Rating</th>
<th>Existing Workforce Development strategies</th>
<th>New Workforce Development strategies</th>
<th>Responsibilities</th>
<th>Resources</th>
<th>Timelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build Workforce Capability</td>
<td>Educational issues – perceived outdated courses, poor articulation of pathways</td>
<td>1</td>
<td></td>
<td>Undertake a review of IT skills sought globally, what is seen as essential capabilities and trends in skills training</td>
<td>TasICT work with all education providers to develop a ‘shop front’ for the industry to post work place learning opportunities and that these opportunities be brokered to education providers through an agreed structured process.</td>
<td>TasICT, Education providers (public and private), school, VET, University</td>
<td>Build action around career start with private RTOs Traineeships – existing and new workers Skills Tasmania – small projects funding</td>
<td></td>
</tr>
<tr>
<td>Build Workforce Capability</td>
<td>Educational issues – perceived outdated courses, poor articulation</td>
<td>2</td>
<td></td>
<td>Undertake an audit to identify the future needs of technical skills on the island with the shift to cloud based services</td>
<td>TasICT develop and maintain a position description library for the industry and make this accessible to education providers to benchmark skill and</td>
<td>TasICT, Members, Education providers (public and private), school, VET, University</td>
<td>Skills Tasmania – small projects funding</td>
<td></td>
</tr>
<tr>
<td>Build Workforce Capability</td>
<td>Industry image, perception and career barriers</td>
<td>3</td>
<td>TasiICT reconsider its approach to career promotion in particular by: • Expanding the scope of career activity into business, finance and humanity fields of study; • Working with existing initiatives to add value where it can; • Refocusing the brand of an ICT career as service based, well remunerated with an expanding choice of options and pathways.</td>
<td>TasiICT working with existing projects and initiatives</td>
<td>Review and enhance existing career material/initiatives</td>
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<tr>
<td>Create Economic Wealth and Value</td>
<td>Diversity issues – not enough women, mature workers or indigenous workers</td>
<td>4</td>
<td>TasiICT work with existing initiatives aimed at improving diversity in the ICT industry to add value where it can.</td>
<td>TasiICT working with existing projects and initiatives</td>
<td>Skills Tasmania – small projects funding</td>
<td></td>
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</tr>
<tr>
<td>Create Economic Wealth and Value</td>
<td>Demand issues relating to an ever changing</td>
<td>1</td>
<td>TasiICT establish or join existing (non ICT) industry networks to promote and learn about the effects of digital</td>
<td>TasiICT leadership, members facilitating as subject matter experts, existing industry networks as</td>
<td>Skills Tasmania – small projects funding</td>
<td></td>
<td></td>
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</tbody>
</table>

1. Develop stronger relationships with Tasmanian educational facilities to ensure a career in ICT is communicated as an attractive pathway to Tasmanian students.

2. Build Workforce Capability

3. Convene a working group to engage with schools, colleges, TAFE Tas and the University of Tasmania to identify the issues surrounding lack of interest in a career in ICT

4. Create tools and case studies to “sell” a career in IT – i.e. a day in the life YouTube clips. Create a buzz about what a great career this can be and that it is not all about programming

5. Expand the “IT’s your career” program to offer more practical experience to young people

6. Introduce or participate in existing annual meetings with educational facilities to discuss future industry needs – so they understand the employability of students and available pathways

7. TasICT reconsider its approach to career promotion in particular by:

8. Expand the scope of career activity into business, finance and humanity fields of study;

9. Working with existing initiatives to add value where it can;

10. Refocusing the brand of an ICT career as service based, well remunerated with an expanding choice of options and pathways.

11. TasICT work with existing initiatives aimed at improving diversity in the ICT industry to add value where it can.

12. TasiICT leadership, members facilitating as subject matter experts, existing industry networks as

13. Skills Tasmania – small projects funding

14. Existing active
opportunities for modern and forward thinking business development opportunities

**Champion Local Innovation**

11. Link skills development for the Tasmanian ICT industry with other growth industries – seek those with funding opportunities

Grow the ICT Industry’s Profile

16. For Tasmanian businesses to take advantage of the latest technologies to accelerate productivity

**Build Workforce Capability**

2. Create a sector workforce plan that introduces next steps needed for further technical skills development in Tasmania

**Occupational wastage**

Supply issues – not enough graduates in the pipeline

2

Identify education institutions nationally and worldwide offering online technical skills development

Work to ensure vendor specific training is available in Tasmania with groups such as Microsoft and VMware

TasICT continue to promote the importance of workforce development and support its members to connect with the education sector to work towards an ongoing pipeline of ‘ready for work’ graduates.

TasICT, Members Department of State Growth

Skills fund to complete qualification at diploma level, or skill set pathway

Tasmania WFD streams

1. Small projects
2. Projects up to 100-150K for implementation
   projects – larger scale via RFQ

<table>
<thead>
<tr>
<th>landscape</th>
<th>Create opportunities for new products to be developed as a result of industry needs through regular government, industry and ICT networking and blue skies workshop sessions</th>
<th>disruption in other industry sectors and Government.</th>
<th>groups e.g. Aged Care Tas, TBCITB (Construction), Transport, EHealth</th>
</tr>
</thead>
</table>
Appendix B – Consultation and Communication Strategies

<table>
<thead>
<tr>
<th>Audience</th>
<th>Key issues discussed</th>
<th>Consultation Strategies</th>
</tr>
</thead>
</table>
| All               | What initiatives are in place to improve the diversity of the ICT workforce  
What policies and initiatives (national, state, local) are being implemented?  
How can the professionals in the industry connect with the demand for general digital literacy and or SME skill development  
How can the professionals in the industry connect with initiatives focused on disruptive technology in non ICT sectors | Interview, Forum workshop |
| Corporates        | Do you track and manage the skills of your staff – is there a need for a framework to do this?  
What are the greatest occupations in demand. Which are hardest to fill?  
Are you looking for generalists or specialists  
How do you work with start ups?  
Do you have difficulty accessing training (in what?) | Interview, Forum workshop |
| Small ICT companies | What are the greatest occupations in demand. Which are hardest to fill?  
How do you work with start ups?  
What are your biggest constraints on growth?  
Do you have difficulty accessing training (in what?) | Interview |
| ICT Departments   | Do you track and manage the skills of your staff – is there a need for a framework to do this?  
What initiatives are in place to improve the diversity of the ICT workforce  
What are the greatest occupations in demand. Which are hardest to fill?  
Are you looking for generalists or specialists | Interview |
| Education         | What policies and initiatives (national, state, local) are being implemented?  
What are the enrolment stats by key occupation destination (areas of growth/decline)  
Are the education sectors gearing up for growth (post NBN etc)  
What are the graduate destination experiences from Tasmanian education institutions | Interview |
| How does the education sector(s) keep abreast if changes e.g. what has happened to curriculum in response to the emergence of the cloud? In an ideal world how could the local industry help
How does the education sector cater for digital disruption (i.e. preparing ICT graduates for work in e.g. the agricultural industry) |
| Recruitment Do you track and manage the skills of applicants – is there a need for a framework to do this?
What are the greatest occupations in demand. Which are hardest to fill?
Are industry looking for generalists or specialists |
| TasICT Board What is the problem? Assuming that the workforce plan becomes the solution
How can TasICT best work with other stakeholders who share the strategies of their workforce plan
How does our strategic direction affect our workforce? What will we focus on?
What are the workforce implications from our strategic plan? |
| Interview |
| Workshop |
Appendix C – Consultation list

The Work Lab would particularly like to thank Dean Winter (Executive Officer of TasICT), Jeremy Rose (Industry Liaison Officer for Skills Tasmania), Wendy Perry (Workforce BluePrint) and the TasICT steering for their guidance and support throughout the project. In addition the following companies, individuals and organisations have provided input:

Telstra
Vodafone
Anderson Morgan
CGI
ISW
Intuit
Ionata
Tasmanian State Government
Australian Computer Society
TasICT Board members
Digital Futures (UTAS)
TasTAFE
University of Tasmania
TasmaNet
Huon Aquaculture
Spirit of Tasmania
Hays recruitment
TasNetworks
41st Degree
Parliament co-working space
TasTAFE and UTAS students (21 responses)
TasICT Conference forum delegates/attendees (43 attendees)
## Objective: Build Workforce Capability

### Actions

1. **Work with the Tasmanian Government and industry to identify the technical skills the ICT workforce must have to be competitive**
   - Undertake a review of IT skills sought globally, what is seen as essential capabilities and trends in skills training
   - Undertake an audit to identify the future needs of technical skills on the island with the shift to cloud based services
   - Review skills development programs adopted in similar economies around the world such as in New Zealand

2. **Create a sector workforce plan that introduces next steps needed for further technical skills development in Tasmania**
   - Develop training plans and packages with RTO’s to offer affordable training to local ICT enterprises
   - Identify education institutions nationally and worldwide offering online technical skills development
   - Work to ensure vendor specific training is available in Tasmania with groups such as Microsoft and VMware

3. **Develop stronger relationships with Tasmanian educational facilities to ensure a career in ICT is communicated as an attractive pathway to Tasmanian students**
   - Convene a working group to engage with schools, colleges, TAFE Tas and the University of Tasmania to identify the issues surrounding lack of interest in a career in ICT
   - Create tools and case studies to “sell” a career in IT – i.e. a day in the life YouTube clips. Create a buzz about what a great career this can be and that it is not all about programming
   - Expand the “IT’s your career” program to offer more practical experience to young people
   - Introduce or participate in existing annual meetings with educational facilities to discuss future industry needs – so they understand the employability of students and available pathways
   - Lobby Tasmanian ICT companies to provide work experience opportunities and traineeships for high school students
   - Integrate the Tasmanian ICT conference with the national ICT Careers Week events
   - Build a closer alliance with the Tasmanian chapter of the Australian Computer Society who have strong links with students

4. **Establish closer collaboration with education institutions to ensure practical and relevant content is being taught**
   - Establish an annual meeting with our educational institutions to discuss their needs, ours and any issues
   - Offer industry scholarship programs with practical work experience opportunities for students
   - Introduce a college program – develop an ICT outcome for a local ICT company – where a team of students are given a project or problem to solve as part of their ICT course.

5. **Build our pool of workers**
   - Identify those institutions Australia wide and globally that offer online ICT courses and promote...
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<th>Create Economic Wealth and Value</th>
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| **6. Transform non-ICT industry sectors by creating proactive opportunities for modern and forward thinking business development opportunities** | Create networks to foster closer and ongoing proactive alliances with Tasmanian industry so that technology can be developed to accelerate productivity  
Create opportunities for new products to be developed as a result of industry needs through regular government, industry and ICT networking and blue skies workshop sessions  
Identify alternative networks for engagement, away from the traditional – to identify niche industry needs i.e. Hobart Mum’s  
Identify targeted industry sectors with an interest in telecommuting, apps development, mobile solutions and cloud based technologies  
Develop a Tasmanian digital business database to connect the ICT industry with business and government  
Ensure all Tasmanian businesses can maximise the use of digital technologies by completing a digital infrastructure paper  
Tell our stories to traditional industries and government so they understand what ICT can do for them |
| **7. Identify Tasmanian’s unique positioning and the opportunities these create to build sustainable Tasmanian industries – don’t be “me too”** | Identify those emerging and niche industries that are growing in demand on a worldwide basis and those that have a fit with Tasmanian and technology solutions that our ICT businesses can solve  
Identify those industry areas that Tasmania has a competitive and unique advantage in such as clean energy and innovative agri-business initiatives and then map this to how we can build greater advantage though ICT  
Introduce niche or smart business development scholarships so businesses have the opportunity to innovate  
Actively seek and attract unique ICT businesses from the mainland and overseas that fit with Tasmania’s unique advantages and positioning. Don’t go after any ICT company seeking to relocate - focus on the right fit. |
| **8. Grow the uptake of sophisticated online business and government presences to compliment bricks and mortar operations** | Lobby the State Government to develop a top down technology policy, focused on the community at the centre of all initiatives and ensure their use and implementation of technology is a key accountability scorecard measure® Provide guidance in the development of customised sector specific technology plans for each industry segment  
Encourage the government to include in its productivity indicators in the Economic Development Plan criteria that measure the Tasmania industry’s progress in implementation, take up and successful exploitation of ICT |
<p>| 9. Build upon the contribution ICT makes to the Tasmanian economy with a target of 20% growth | Work to educate and change the way our government agencies think and deliver their services and build their internal knowledge and understandings of what technology can offer them in delivering better services. Develop inspiring case studies and ideas generation initiatives and distribute these via YouTube to Tasmanian industry, businesses and government. Commission desktop research to identify how innovation and the uptake of technology is transforming traditional industries in other regions. Establish a talent attraction package to encourage experienced ICT professionals to return to Tasmania. Have the State Government contribute to funding for the employment of a TASICT Executive Officer. Lobby government to ensure there is an efficient environment in which Tasmanian ICT companies can do business with particular emphasis on making it easy for small business to compete/operate. Advocate public policy that advances the growth and development of the ICT industry. Work with government to identify how the Tasmanian ICT industry can deliver better services. Work to change the perception of government that Tasmanian ICT companies are too small to deal with and as such too high a risk for high value projects. |
| Champion Local Innovation | |
| 10. Create a highly entrepreneurial environment that has the business skills to allow for rapid acceleration and growth | Seek government support for soft skills development programs designed for the ICT industry. Establish TASICT as the broker for management skills development for the industry. Lobby for a funded ICT focused business acceleration program that includes financial support. Capture the experience and knowledge of successful ICT entrepreneurs and share it with industry. Introduce a Tasmanian business mentor program that introduces the latest business development methodologies and know-how. Investigate the potential of creating a NBN leadership school. Indentify partnership opportunities nationally and internationally to leverage local capabilities. Develop business development assistance packs and know-how on how to access external markets. |
| 11. Link skills development for the Tasmanian ICT industry with other growth industries – seek those with funding opportunities | Investigate funding available for &quot;on trend&quot; industries such as: agri-business, aquaculture, carbon neutral solutions, environmental outcomes, clean energy, Antarctica, e-marine, e-health and tourism. Build management relationships with key stakeholders in these industries to generate new skills. Develop niche sector think tanks and presentations on opportunities for the local industry. |
| 12. Develop a vibrant and inclusive IT community that actively encourages and supports | Hold a series of events where industry champions and innovators present their experiences. Create ICT industry events that inspire new ideas and innovation through the TASICT conference. Develop a paper on global experiences – case studies and examples. |</p>
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<th>new small business and ideas</th>
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<td>Build a program that supports local ICT businesses to attend conferences interstate and overseas</td>
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<th>13. Build IT industry capability through hands on experience</th>
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<td>Seek government assistance to market Tasmanian IT businesses directly to interstate opportunities</td>
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<td>Build greater cooperation between IT groups in Tasmania such as the ACS</td>
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<td>Establish an industry scorecard and key performance indicators to measure progress</td>
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<td>Offer “Take Advantage of the NBN” workshops to build cross industry solutions and to harness the opportunities provided by the NBN</td>
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<td>Lobby the government to provide funding to fully support an entrepreneurial culture that gives innovators the resources so that they can “just do” and develop new ideas – introduce scholarships</td>
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<th>14. Identify and develop strategies to ensure Tasmanian ICT businesses can access capital</th>
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<td>Lobby government for true innovation funding and the introduction of a business environment that makes it easy for small business to operate and thrive</td>
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<td>Lobby government to provide loan guarantees if the business case stacks up</td>
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<td>Produce business case development plans so ICT business can develop a compelling investment story</td>
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<td>Investigate micro finance models and funding</td>
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<td>Identify what can be done so traditional lenders will loan funds to ICT companies i.e. Government guarantees</td>
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<td>Explore small loans program to assist start-ups</td>
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<td>Lobby government for another incubator and base its structure on the successful Silicon Valley models</td>
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<td>TASICT to monitor and distribute to its members relevant tender and government funding opportunities</td>
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<th>Grow the ICT Industry's Profile</th>
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<td>For TASICT to build relationships with political influencers and decision makers so there is a real understanding of what a strong ICT industry can do for Tasmania</td>
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<td>Develop through government assistance a needs analysis of targeted industries to identify what are their problems and where can ICT assist their needs and allow them to be more competitive</td>
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<td>Develop a common purpose for the ICT industry by lobbying for a minister for ICT and an ICT policy</td>
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<td>For TASICT to have a voice for the Tasmanian technology industry in national debates and forums</td>
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<td>Introduce a structured program to inspire, educate and change the culture of innovation in businesses in Tasmania and give them practical knowledge on how they can utilise the benefits of technology</td>
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<td>Promote our ICT achievements both locally and nationally to attract workforce and opportunity</td>
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<td>Use the power of social media to build awareness of our brand both within Tasmania and to global</td>
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| 16. For Tasmanian businesses to take advantage of the latest technologies to accelerate productivity | Develop channels to deliver information for businesses and non ICT industries on the benefits ICT adoption can offer  
Broker expert speaking engagements i.e. Google, LinkedIn and have these as open invitations  
Develop an ad campaign that educations local business on what ICT can do and promotes the local industry  
Hold an annual showcase of ICT companies and their products and services  
Educate local businesses on what the NBN can offer them and the opportunities it creates  
Demonstrate through our own ICT businesses innovative and modern uses of technology |
|---|---|
| 17. Lobby government to have a focused ICT portfolio in Tasmania | Seek a white paper from government on potential participation and partnerships from national and international vendors that could lead to foreign investment in the Tasmanian ICT industry  
Market the Tasmanian ICT industry through Brand Tasmania  
Seek government support to invite venture capitalists to the State for pitch sessions |
Appendix E – Project methodology

A project plan was endorsed by the project steering committee that consisted of four stages:

1. Desktop review of existing literature, research reports and available statistics. From this an issues paper was derived and gaps in knowledge or areas requiring validation were identified.
2. Industry and stakeholder consultations. Gaps and issues identified in stage 1 were itemized and converted into sets of questions to be asked of different audiences. The consultations and stakeholders to consult with were identified by TasICT and introductions and appointments made by their executive officer.
3. A forum was convened with the TasICT board to provide a strategic context to the plan and close off any gaps
4. A draft report was prepared and the recommendations discussed with the steering committee.
Appendix F – Career and diversity initiatives and publications

Careers
5. Groupx.edu.au a consortium of universities, industry, research organisations and government dedicated to increasing interest in tertiary ICT study by debunking misperceptions of ICT careers, and supporting engagement activities intended to build and maintain interest in ICT. Group X members include the Queensland Government, NICTA, University of Queensland, Queensland University of Technology, Griffith University, University of Southern Queensland, Central Queensland University, James Cook University, AIITA, ACS, ACS Foundation, and industry
6. Digital Careers – Commonwealth Government initiative based on Group X
7. National Digital Learning Resources Network (NDLRN) initiative, which comprises a resource collection, delivery infrastructure and metadata standards for digital resources for all areas of the national curriculum, and is collaboratively developed and jointly owned by all Australian school education jurisdictions, www.ndlrn.edu.au
8. Several of the large international ICT companies offer ‘academy’ programs, providing schools with up-to-date industry-relevant and cost-effective academic programs supported by teaching material, equipment, online resources and licences. Examples include Cisco Academy, Microsoft IT Academy, Google’s CS4HS program, the IBM Academic Initiative and HP Institute, CompTIA Career Paths, ITIL from the British Computer Society, Oracle University, Adobe Education Leaders, and Autodesk Education
9. ACS Foundation’s school visits program
10. Big Day In ICT careers events organised, run and hosted by students for students, held this year in Sydney, Melbourne, Perth and Newcastle
11. SAP’s Young ICT Explorers competition which encourages students to apply what they learn in their ICT classes to develop technology-related projects (similarly RoboCup and First Lego League)
12. In Victoria, the Department of State Development, Business and Innovation and Ai Group have worked together to create the ICT ‘Start Here, Go Anywhere’ initiative, which has run for six years and established better links between industry and school students
13. The Code.org website also serves as a portal where teachers and students can connect to online resources
14. Victorian Government and National ICT Australia, Careers that Inspire, video, www.youtube.com/ watch?v=naxXti7ZAaU&list=UUiptK40A0mYvP0a6Iarthng&index=13
15. ‘R U Game?’ competition run by the University of Ballarat and University of Tasmania
Diversity

4. The Cisco Networking Academy for the Vision Impaired (in partnership with Curtin University and the Association of the Blind WA)
6. ACS, 2010, Improving Age Diversity in the ICT Workforce,
7. ITCRA, 2012, Mature Age Workers in ICT
8. DEEWR, Experience + Corporate Champions, deewr.gov.au/experience-corporate-champions
9. Jobs Bonus program which provides $10 million over four years for employers offering ongoing employment opportunities to mature-aged workers.
10. $35 million has been provided to the National Workforce Development Fund ‘to improve the skills of workers aged 50 years and over consistent with their workforce development needs’.
14. IBM, Diversity in IBM, Advancing women.
15. The Women in IT Executive Mentoring program, managed by the Australian Government Information Management Office (AGIMO) and sponsored by Dell Australia, was established in 2007
18. Little Miss Geek initiative, littlemissgeek.org
19. Go girl, go for IT, gogirl.org.au
20. www.digitaldivasclub.org