inspiring success

Australian Computer Society Inc
ABN 53 156 305 487
Tasmanian Branch
Level 2 | Suite 22 | City Mill
11 Morrison Street Hobart TAS 7000
T +61 3 6223 2682 | 0438 399 431
E ray.leonard@acs.org.au | W www.acs.org.au

TM AUSTRALIAN COMPUTER SOCIETY

Ms Gabrielle Woods, Committee Secretary
Legislative Council Select Committee on Growing Tasmania's Economy
Legislative Council
Parliament House
Hobart 7000

Dear Ms Woods,

Please accept the ACS Tasmania's submission papers on Legislative Council Select Committee on Growing Tasmania's Economy.

The ACS is one of the largest computer societies in the world on a per capita basis and exists to advance professional excellence in ICT. Over 23,000 ACS members work in academia, research & development, business, government and the community. The ACS is passionate about the ICT profession being recognised as a driver of productivity and innovation and the able to deliver tangible outcomes.

As a member of the Australian Council of Professions, the ACS is the guardian of professional ethics and standards in the ICT sector and the economy as a whole, committed to ensuring the beneficial use of ICT for all Australians. The ACS provides both members and non-members with opportunities for professional education, networking and certification, as well as enabling them to contribute to the development of their profession.

The ACS also represents Australia in the International Federation for Information Processing and the South East Asian Regional Computer Confederation.

The ACS has a strong presence in Tasmania, where the ICT sector employs over 3600 people and generates annual revenue estimated at $1.3 billion. With ICT so intrinsically embedded in all facets of the economy, now more than ever Tasmania needs to focus on the importance of ICT to our State and how it will affect us in ways we may not even yet comprehend. The ACS plays a crucial role in developing strategies that enhance the economic prosperity and employment opportunities across all sectors of the Tasmanian economy.

Ray Leonard

Manager Tasmania

AUSTRALIAN COMPUTER SOCIETY

Australian Computer Society Tasmanian Branch

The Role of Technology in Tasmania's Future

INTRODUCTION

About the Australian Computer Society (ACS)

The ACS is the recognised professional association for those working in Information and Communications Technology (ICT).

The ACS exists to advance professional excellence in ICT. Over 22,000 ACS members work in academia, research & development, business, government and the community. The ACS is passionate about the ICT profession being recognised as a driver of productivity and innovation able to deliver tangible outcomes.

A member of the Australian Council of Professions, the ACS is the guardian of professional ethics and standards in the ICT sector, committed to ensuring the beneficial use of ICT for all Australians. It provides both members and non-members with opportunities for professional education, networking and certification, as well as enabling them to contribute to the development of their profession.

Visit www.acs.org.au for more information.

Purpose of this Paper

The Tasmanian Branch Executive Committee of the ACS (ACS-TAS) has prepared this paper to consolidate the advice it offers to relevant stakeholders of the Tasmanian ICT sector. It has been designed to provide advice to those formulating ICT policy and to encourage informed discussion of important policy issues facing the State.

This document is not intended to support any political organisation.

AUSTRALIAN COMPUTER SOCIETY

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SUMMARY

The Economy:

- Development of a comprehensive policy framework that promotes innovation by removing barriers and fostering connections between disparate but complementary stakeholders (traditional and non-traditional industries, research, community, academia).
- As ICT is the key economic driver across all aspects of the economy, there needs to be a direct link from the Minister for Innovation, Science and Technology, to the Premier on matters of strategic policy advice.
- Provision of support to Tasmania's burgeoning StartUp industry (in collaboration with Not-For-Profit Initiatives (NFPs) such as StartUp Tasmania).
- A renewed focus on driving open government. The ACS recommends open data initiatives be aligned to federal programs and, where possible, data should be published to the central data.gov.au portal.
- Development of a strategy to transition the Tasmanian Government into the publishing of 'Open Services' as the next evolution of open data.
- Support for programs and initiatives that encourage utilisation of open data for community benefit, such as GovHack.

Government:

- Priority should be placed on professionally certifying all ICT staff, including contracted project staff, either through the ACS certification program (CP)[1] or an equivalent recognised professional body (e.g. the British Computer Society, Project Management Institute).
- The Skills Framework for the Information Age (SFIA)[2] should be adopted for ICT position descriptions, talent planning and professional development / career planning.
- Using the international ICT standard ISO38500,[3] the Tasmanian government should adopt a best-practice governance strategy, mandated by the Department of Premier and Cabinet to be incorporated in e-government policy.
- Tasmania must collaborate with the Australian Bureau of Statistics, the Australian Workforce and Productivity Agency, other State governments, industry and the ACS to:
    - Develop a new employment and economic modelling classification scheme that accurately captures the ICT sector.
    - Commit to annual reporting on the ICT sector.
- The Tasmanian Government needs to develop a data storage capability and analytical strategy for capturing all ICT data. This will enable improved data-driven policy development.

Capacity building:

[1] http://www.acs.org.au/sfia-certification/acs-certification
[2] http://www.acs.org.au/sfia-certification/mysfia/about-sfia
[3] http://www.38500.org

- It is necessary to map the current and anticipated skills gaps in Tasmania's ICT workforce in order to create strategies to attract talented individuals and companies to the State.
- 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.
- Tasmania's University and VET enrolments in ICT sit above the national average; an investigation into why this is the case, and how to maintain and raise enrolments, would help strengthen the State's competitive advantage.
- Pathways from other careers into ICT should be formally mapped and incorporated into State workforce planning.

Community:

- Incentives should be implemented to encourage development and commercialisation of eHealth services.
- As part of the implementation of the new Framework for Community Engagement, a 'Service Tasmania 2.0' project should be considered to revitalise online government services and send a strong signal of change to the community.
- Government, industry and professional bodies should collaborate on a strategy to address the low levels of women and mature age workers in ICT.
- Greater priority on compliance with the Web Content Accessibility Guidelines (WCAG) 2.0[4] is required.

Digital Literacy:

Improving digital literacy will be a key enabler to driving any ICT-based improvements in the Tasmanian community or economy. Digital literacy programs must be developed to focus on the following areas:

- Citizens in rural and low socio-economic areas;
- Members of State and local governments; and
- Small-Medium Enterprises (SMEs) and Not-For-Profits (NFPs).

[4] http://www.w3.org/TR/WCAG20/

DETAILED RECOMMENDATIONS

The Economy

The ACS-TAS proposes that Information and Communications Technology (ICT) policy and debate in Tasmania rethink the concept of 'The Digital Economy' and instead focus on the role ICT plays in Tasmania's whole economy. ICT now impacts all facets of our economy, and referring to a 'digital economy' creates the deceptive impression that ICT can be isolated and measured as a separate indicator. Additionally, analysts have created confusion by using the term inconsistently; some use it to refer to purely ICT-based economic activity, while others use the term to refer to all economic processes impacted by technology (Australian Computer Society, 2013, p. 8).

A study of economic activity in 2010 showed the ICT sector contributed nearly 8 per cent of Australia's total GDP; equivalent to the mining industry during the same year, and more than almost all other sectors (Australian Computer Society, 2013, p. 11). Further, ICT has demonstrated consistent and sustained growth in employment and employee conditions and remuneration (Australian Computer Society, 2013, p. 33). Between 2003 and 2011 cumulative employment growth in ICT for Tasmania was 24.95 per cent. This shows ICT is a fundamental driver across all sectors of the economy. In Tasmania it contributes significantly more to the State's GDP than previously indicated due to the economic modelling.

Economic Snapshot of ICT[5]

Employment – Current	
National	597,699 (Australian Computer Society, 2014)
Tasmania	3,231 (Australian Computer Society, 2014)
Employment Growth – 2003 - 2011	
National	31.04% (Australian Computer Society, 2013)
Tasmania	24.95% (Australian Computer Society, 2014)
Economic Contribution	
National	$100.62b (Australian Computer Society, 2013)
Research & Development Investment	
National	$5,412m (Australian Computer Society, 2013)
Export Value	
National	$4,528m (Australian Computer Society, 2013)

Snapshot data taken from the 2012 (Australian Computer Society, 2013) and 2013 (Australian Computer Society, 2014) Australian Computer Society Statistical Compendium.

Note: Further changes to ABS reporting of ICT statistical data between the 2012 and 2013 has improved visibility of some aspects of the sector, but further obfuscated others; see 'Data-Driven Policy'.

Policy Framework

The ACS recommends the development of a comprehensive policy framework with the objective of creating an environment that enables the stakeholders (community, academia, research and industry) to form effective public-private partnerships (PPP). The rationale for PPPs is to share risk between the private and public sector whilst tapping into the different perspectives, drivers and wealth of innovative and entrepreneurial experience available within the private sector. By strategically positioning government to act as the 'connective tissue' between typically disparate sectors of our economy it could stimulate significant economic benefits with minimal capital investment.

[5] Due to the current state of ICT statistical reporting in Australia, Tasmanian figures are not available for all measures.

The ACS-TAS recommends that the policy framework be designed around two key functions for achieving the objectives:

1. A commercialisation strategy for ICT based on positive externalities, including benefits to the wider community. Community and industry engagement should be a priority throughout the lifecycle of this strategy and collaborative models such as co-production should be considered.
2. Foster connections between key stakeholders, namely:
    a. Between ICT and traditional industries, such as agriculture, forestry, tourism and aquaculture.
    b. Between research, academia, industry, finance, and commercialisation.

Links between ICT and traditional industries will be particularly important for Tasmania's future, as many of our traditional sectors are trade exposed and struggling to compete in the global market. Professor Stephen Martin, CEO of CEDA emphasises this challenge in his Australian Innovation Report:

> *Continued technological advances, particularly ICT-related technology, are making goods and services increasingly tradeable on global markets. While this represents a potential opportunity for a highly educated nation such as Australia, it also represents a potential challenge to sectors of the economy that have not been globally integrated or exposed to international competitive pressures in the past. These include significant parts of the services sector such as health and education (Martin, 2012).*

There is often an overwhelming focus when discussing ICT on the creation of new industries. However, ICT has a critical role to play in Tasmania's traditional industries. Difficult terms of trade have had a significant impact on traditional industries in Australia over recent years, with the failing manufacturing industry a perfect example. Tasmania, with its geographical location creating further challenges in the form of higher transport costs, cannot afford to ignore the potential for ICT to enable positive transformations of our traditional industries. The current Sense-T project is a positive step in the right direction, but is not a solution in itself. Active and effective relationships need to be developed to foster innovation and collaboration across the entire economy and possible technological applications.

A key growth sector that needs specific focus is the StartUp sector. This sector alone has the potential to contribute $109b (or 4 per cent GDP) to the Australian economy by 2033, and more than 75 per cent of these StartUps are expected to be technology based (PwC, 2013). Strategic partnerships with industry-based not-for-profits such as StartUp Tas[6] and StartUp Aus[7] are likely to be the most cost-effective mechanism for engaging the StartUp sector and developing growth and support programs.

South Australia has proposed some interesting initiatives designed at building stronger links between ICT, government, and various industry sectors that would be worth reviewing as part of the development of this policy framework, those being the "SA Demo Lab" and the "SA Co-Design Interchange" (Government of South Australia, pp. 23-24).

The Organisation for Economic Cooperation and Development (OECD) has released a detailed report into commercialising public research (Organisation for Economic Cooperation and Development, 2013) which contains a great deal of valuable information.

Open Data and Services

There has been a great deal published on the benefits of open data to communities and businesses. Indeed, the Australian Federal Government has for some years had a strategy for publishing open data on its data.gov.au portal and the Tasmanian government currently publishes a range of data sets in different ways.

[6] http://suptas.nationbuilder.com/
[7] http://startupaus.org/

Worldwide, many governments are running open data (or 'open government') initiatives to increase transparency and community engagement. At the same time they are also cutting costs and providing fertile soil for industry innovation. Vivek Chundra, previously the Chief Information Officer for the United States of America, identifies two key open data policy decisions that "transformed the future of civilisation" – opening up access to both the GPS network and the human genome project through the Bermuda Principles (Wallbank, 2013).

Unfortunately many of these initiatives are failing to deliver the intended value and more needs to be done. A recent report by the UK National Audit Office stated:

> *Opening up access to public information has the potential to improve accountability and support public service improvement and economic growth. What the Government is lacking at the moment is a firm grasp of whether that potential is being realised. If transparency initiatives are to be more than aspirations, then Government needs to measure and monitor both their costs and benefits. This is vital for tracking success and learning what works (UK National Audit Office, 2012).*

The ACS-TAS believes a new framework and policy approach for publishing open data within Tasmania is needed that includes:

- A change in culture from one of government-owned data, to one of public-owned data where the government acts as a custodian.
- Greater commitment to publish data sets to the central data.gov.au portal and to keep the data sets refreshed and current.
- A framework and policies for ensuring utilisation and benefits realisation for data sets are being measured and assessed.
- A master list of public data to be made 'open', prioritised based on the anticipated value to the public. This should also include ongoing processes to continually identify appropriate new data sets to be added to the list.
- A program of initiatives to encourage greater utilisation of published open data sets.

Moving beyond open data, the ACS-TAS recommends a strategy be developed for transitioning towards open services where appropriate. According to Gartner, Open Services:

> *… would be an elementary Web service with a well-defined API that allows a third party (such as a service broker) or another government entity to aggregate and orchestrate open services to deliver more comprehensive public or public-private services (Gartner, 2012).*

Tasmanian Government departments will need to develop their open data maturity, as well as implement some key cross-government architectures and standards, before open services could truly be realised. However, ACS-TAS believes a successful open services environment could help reduce government costs as well as develop a new services ecosystem.

Government

Tasmanian ICT Strategy

ICT has an unprecedented impact on all facets of our lives, in community organisations, business, our social interactions and government. With so many disparate threads and complex relationships a consistent State-driven ICT strategy is needed. This strategy must be developed with expert advice from an appropriate body[8] and in active consultation with the Tasmanian community and businesses. To date, five other Australian States have published either a completed strategy or a draft for consultation. The table below shows the status of State ICT strategies around Australia.

State	Published	Status
Queensland	Draft strategy	Consultation closed, final strategy pending
South Australia	Position paper	Public consultation closed, draft strategy pending
New South Wales	Strategy	Current, published April 2012
Victoria	Strategy	Current, published February 2013
Australian Capital Territory	Strategy	Current, published October 2011

Of the available strategic documents published by other State governments around Australia, the ACS-TAS considers South Australia's position paper to be the most comprehensive in scope. Despite this, each is considered to have key gaps that the ACS-TAS would not want to be replicated in a Tasmanian strategy.

Tasmania faces a number of challenges that are either unique or more severely felt than most of its mainland counterparts. However, Tasmania has a number of key strategic advantages that could be used to attract economic activity, such as:

- Island geographic and demographic characteristics 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.

Expert Advice

ICT impacts all government portfolios and is deeply embedded into daily operations. It is a key enabler for driving improved productivity and makes a significant contribution to the economy. It is critical that the government receives balanced and independent expert advice to ensure effective strategies and policies are developed and implemented. Due to the broad and complex nature of ICT ACS-TAS believe it is mandatory that this advice be provided by a panel with a balanced perspective including:

- Industry,
- Professionals,
- Academics,
- Research, and
- ICT 'consumers'.

The Tasmanian Government currently has the Digital Future Advisory Council, which reports to the Minister for Economic Development, Tourism and the Arts. The Council currently has an impressive membership that

[8] See section on 'Expert Advice.'

provides for an excellent basis for balanced advice to government. However, it is the belief of the ACS-TAS that this group has not delivered on its potential. The ACS-TAS recommends implementing the following changes to ensure appropriate outcomes are achieved:

- Return the Council to its original position of reporting to the Premier. ICT impacts all portfolios of government and its advice should not be restricted to The Department of Economic Development, Tourism and the Arts.
- Refocus the Council's role on strategic policy advice. The expertise of the Council is wasted determining grants. Instead, it should be dedicated to guiding the development of a long-term ICT strategy and associated policies. The departments and ministers should be responsible for operational matters such as awarding specific grants.
- Explicitly include ICT demand-side issues on the agenda of the Council. Historically, strategies and policies are overly focussed on supply of ICT.

Governance and Use of Professionals

It is not difficult to find examples of embarrassing and expensive ICT project failures in government or industry. Some notable examples include:

- National Australia Bank in 2003 – due to irregular currency options trading the bank incurred severe losses, a number of staff faced criminal prosecution, the CEO was fired and there was a complete spill of the board (Toomey, Walzting with the Elephant, 2005, p. 3).
- Australian Customs Service in 2005 – due to the implementation of new management software key Australian commercial ports, including Melbourne and Sydney, effectively shut down for a significant period of time (Toomey, Walzting with the Elephant, 2005, p. 4).
- Victorian Government in 2007 – due to comprehensive project failures, the Myki transport system was delivered years after the due date and more than $160m over budget (Gardiner, 2012).
- Queensland Government in 2010 – a botched implementation of a new payroll system saw delays in up to 78,000 staff receiving their pay for an extended period and the project cost more than $58m more than budgeted (Toomey, Infonomics Newsletter - June 2010, 2010).

In all of the examples above, audits and parliamentary enquiries have consistently found that systematic failure of governance was the primary contributor to the project failures. The second most consistent issue identified is assigning personnel to work on projects without ensuring they have the appropriate skills and experience to fulfil the role.

The ACS-TAS recommends a review of existing governance of ICT across all agencies and the development of a strategy to ensure a consistent governance framework for ICT exists across the entire government based upon ISO38500.

The ACS-TAS further recommends adopting the Skills Framework for the Internet Age (SFIA) as a tool for assessing appropriate staff and project skills, including career development planning.

The Australian Workforce and Productivity Agency report into the ICT workforce highlighted the lack of ongoing skills development as a key inhibitor for ICT in Australia (Australian Workforce and Productivity Agency, 2013, p. 17). The ACS has been a strong proponent of continual professional development since its inception.

ACS-TAS recommends that as part of an overall professional development strategy greater emphasis be placed on hiring / procuring ICT personnel who are professionally certified, either by the ACS or an equivalent (recognised) international professional society. Such professional certifications are significantly different to more common vendor certifications and are evidence of proven ongoing professional development and a commitment to a professional code of ethics.

Data-Driven Policy

Resources are scarce and now, more than ever, it is necessary to achieve maximum return on investment from the allocation of public funds and other resources. The ACS-TAS recommends a renewed focus on data-driven policy as the key to ensuring consistent, effective and unbiased policy development and implementation.

All policy and strategy developed for ICT, including funding grants, should include clearly identified target benefits / outcomes and detail how these benefits will be measured. In order to ensure maximum ongoing benefits from such measurements, the ACS-TAS recommends that:

- A standard framework and guidelines be implemented to ensure consistent and comparable measures are defined across all initiatives.
- All measures, as well as key initiative / policy meta-data and other relevant data (such as industry statistics), be captured in a central storage area so the information can be mined and used to better inform future policy developments.

The ACS has identified some key obstacles that must be addressed before an accurate picture of the ICT landscape in Tasmania and Australia can be developed and used for effective data-driven policy. The following excerpt from the ACS Statistical Compendium (Australian Computer Society, 2013, p. 7) describes the issues in detail:

> [There are] significant difficulties in understanding ICT in Australia, caused by the frequent confusion between analysis of the ICT workforce in labour market terms (e.g. what job the individual performs) and analysing the ICT workforce in industry terms (e.g. what kind of organisation the individual worked for).
>
> Clearly, ICT is evident in every industry sector, but unfortunately ICT is not yet always recognised statistically as an industry sector in its own right. The ACS considers that this confusion will remain until the current industry statistical metrics used in Australia are updated to reflect the pervasiveness and reality of ICT in the 21st century.
>
> ICT broad employment occurs in a number of groupings. These include:
>
> - The 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 who also employ a large number of specialists to help them apply their ICT purchases.
> - The trainers, teachers and researchers into ICT who generally (but not always) operate within the universities and colleges.
> - People who provide technical support to ICT, but who might, more properly, be categorised as electrical or electronics specialists.
> - People working in call centres, or in desktop publishing and graphic design.
>
> There is a significant percentage of ICT professionals in the ICT industry, but ICT industry employment includes not only those professionals but also many ICT non-professional technical, sales, logistical and administrative staff.

The ACS-TAS believes the confusion over what constitutes the 'ICT sector' is present in the industry and statistical classification models (ANZSCO and ANZSIC) as employed by the Australian Bureau of Statistics and most other economic analysts. Significant problems exist in these classification models that prevent an accurate understanding of what is occurring in the sector. For instance:

- *"Information Media and Telecommunications"* is usually used to represent the ICT sector. However, this classification includes less than half of the 'real' ICT industry and adds in a significant amount of non-ICT groups (TV, radio, print media and libraries).
- The numerically larger software and services section of the ICT industry is actually located under *"Professional, Scientific and Technical Services."*
- ICT manufacturing, wholesale, retail and consulting are scattered across a number of different classifications, usually combined with other sectors.

The difficulty of accurately modelling the ICT industry (and thus understanding the impacts of policies and initiatives) is further complicated by the lack of consistent, regular reporting. The Australian Bureau of Statistics measures the ICT sector intermittently and its last report was for 2006-2007. The Centre for Innovative Industries Economic Research does conduct an annual survey, but using a much smaller sample size and the same models as the ABS with all of the inherent flaws.

When extending analysis to ICT education it is impossible to obtain a complete picture of the VET market, as the only publicly available data from the National Centre for Vocational Education Research (NCVER), does not include any data from privately funded VET organisations (Australian Computer Society, 2014, p. 38).

In 2012 the ACS established an ICT statistical working group, jointly chaired by the Society and the Victorian Government, to begin addressing the above issues with current ICT statistical modelling of ICT. The working group included representatives from the IBSA, CIIER, DEEWR and the ABS and confirmed consensus over the issues described above. However, this is only a small step towards rectification of the issues. The ACS-TAS recommends that a Tasmanian working group be created to work on improved statistical modelling of the ICT sector. Further, that a collaborative project be negotiated and initiated with the ABS, other State governments and industry stakeholders, with the objective of developing new industry classification standards and methods.

Capacity Building

State-Based Talent Management

ICT represents significant opportunities for Tasmania. However, if we are to realise those opportunities we need to ensure the State can access the necessary talents. This will require a collaborative process between government, industry and the education sector to identify current and anticipated skills gaps and develop strategies to close those gaps. This is something that all other State governments have failed to address in their ICT strategies, but which ACS-TAS believe is critical in the current job market.

Nationally Australia is struggling with a shortage of ICT skills. This is demonstrated by consistently low unemployment rates for the sector coupled with high vacancy numbers (Australian Computer Society, 2013, p. 39). The ACS-TAS expects the shortage to worsen as enrolments in tertiary and VET ICT courses have steadily dropped over the last decade. Between 2003 and 2010 completions numbers of ICT tertiary students dropped by more than 30% (Australian Computer Society, 2013, p. 17). Since 2011 enrolments and completion ratios appear to have flattened, with little signs of improving (Australian Computer Society, 2014, p. 35).

Education

Tasmania's public and private education institutions are critical to the future health of ICT in the State. If Tasmania is to be able to meet the demands of the digital age it will need appropriately skilled professionals to do so. Enrolment and completion statistics from Universities and VET institutions around the country paint a fairly dire picture, with a looming skills crisis predicted. However, in some key education metrics Tasmania has bucked the national trend (Australian Computer Society, 2013, pp. 16-17):

- Almost 7% of UTAS students study ICT, compared to the national average of 4%;
- About 74% of UTAS ICT students are international, compared to 55.4% nationally;
- Tasmania was the only State to record an increase in VET ICT enrolments (30%) between 2010 and 2011.

ACS-TAS believes it is important to investigate these statistics to better understand why Tasmania performed better than the rest of Australia; this will help to develop strategies to further build on this advantage.[9] Specific attention should be given to the high number of international students studying ICT at the University of Tasmania, and how to keep them in the State to fill job vacancies once they graduate. The ACS' experience in migration skills assessment would be invaluable to develop such a strategy.

While the ACS believes the strong international enrolments at the University of Tasmania is a competitive advantage, attention should also be given to why domestic students are not choosing to study ICT.

In order to achieve strong ICT enrolments in University and VET courses, it is necessary to ensure students' interest is captured during their secondary schooling. Indeed, previous studies indicate that it is during secondary education that 'enrolments' in ICT actually begin to drop substantially – we are failing to make ICT engaging for primary and secondary students. The Australian Workplace and Productivity Agency report into the ICT workforce found that:

> *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*

[9] Note, whilst the ACS-TAS believes the strong international enrolments at UTAS is a competitive advantage, attention should also be placed on why domestic students are not choosing to study ICT.

> *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 (Australian Workforce and Productivity Agency, 2013, p. 15).*

The Australian Curriculum, Assessment and Reporting Authority (ACARA) has been working towards releasing a new national education curriculum for primary and secondary schools that includes a major departure from traditional ICT teaching. Developed over a six year period and with extensive contributions by the ACS, ACCE and many other key stakeholders the draft curriculum represents a significant shift in our approach to teaching ICT. As a major contributor to the national curriculum draft technologies design, the ACS welcomed the specific focus on ICT but believed the current draft contained significant issues. The ACS has welcomed the curriculum review recently announced by the Federal Government as a further opportunity to strengthen the Draft Technologies curriculum (Pyne, 2014).

The ACS-TAS further recommends that a program be developed to assist primary and secondary schools in Tasmania with ICT education. Many schools currently offer very limited subjects in ICT, which are often taught by non-ICT specialist teachers. Greater consistency is required in early ICT education and it is critical that teachers of these subjects be provided with the training and resources necessary to turn around interest in ICT as a career. This will be especially important if the new ACARA curriculum is approved as it significantly expands the scope and content of 'digital technology' education and will require many more 'ICT' teachers than Tasmania currently has.

Finally, the ACS-TAS recommends that programs are developed to encourage more specialist ICT teachers to enter the field. This could include scholarships to encourage teaching students to specialise in ICT, or industry exchange programs to encourage experienced professionals to participate in the education process (this could range from teaching classes, tutoring students and teachers or assisting with developing and reviewing teaching materials).

Pathways to ICT

The University of Tasmania and TasTafe have been working collaboratively and developing effective ICT student pathways between their organisations. While not every person is well suited for a career in ICT, there are many professionals who transition from other careers to ICT every year. The ACS-TAS recommends that these pathways be investigated and mapped as part of the broader strategy of talent management.

Community

eHealth

Utilisation of technology to enable more effective and affordable health care in a wider range of locations (eHealth) has been identified repeatedly as both an opportunity to develop new industries and as a means of reducing the cost to the public of our health care system. To date, the ACS-TAS believes only limited progress has been made compared to many other areas of Australia., Tasmania has higher levels of disabilities, rural communities and an aging population. This poses an ever-growing challenge of meeting the community's health-care needs, but also an opportunity to pioneer. Tasmania's island demographics make it a perfect location for piloting eHealth programs that can be exported to the rest of Australia and internationally. This provides a strategic opportunity for innovative private and public sector developments, should the right environment for such be established. The ACS-TAS believes eHealth should be specifically targeted for support by the State government with programs tailored to encourage economic activity and support new enterprises.

Engagement

The ongoing advances in online services, coupled with the growing maturity of social and geo-aware services are transforming government engagement and presenting exciting new possibilities. Already, States such as South Australia are moving towards co-design and co-production practices when engaging with the community (Government of South Australia) and innovative platforms such as Place Speak[10] are building momentum.

At the time it was introduced, Service Tasmania was an innovative concept – bringing a wide range of government services together into a one-stop-shop. However, in spite of offering a wide range of services online, it has not effectively kept up with the pace of technology.

With the release of the new Tasmanian Government Framework for Community Engagement (Tasmanian Government Department of Premier and Cabinet, 2013) the ACS-TAS believes there exists an opportunity to send a strong signal of change and improve engagement through a Service Tasmania 2.0 project. A revitalised central Service Tasmania online presence, effectively integrated and coordinated with social and other channels, could be an effective mechanism to establish the new engagement framework and improve service delivery to the community.

Diversity

Both women and mature-age workers are poorly represented in ICT in Australia. Of the total ICT workforce in the country, approximately 28% are women (Australian Computer Society, 2014, p. 42), and approximately 32% are outside the ages 25-44 (Australian Workforce and Productivity Agency, 2013, p. 17). A great deal of work has been done to improve gender equality in ICT, with promising results. However, there is still a long way to go. The Australian Workforce and Productivity Agency identified this as a key barrier to greater productivity and alleviating the skills shortage in ICT (Australian Workforce and Productivity Agency, 2013).

Research has shown that the low levels of women in ICT starts as early as secondary school, with low course enrolments continuing from high school through to university and then into the workforce. This suggests early intervention programs are needed in our schools to encourage more female students to enrol in ICT subjects, as well identifying and removing the barriers that may exist to cause the current disparity. Improved programs to support women in the ICT workforce should also be considered and developed in collaboration with existing NFPs working in this space (such as ACS Women in IT and Engineers Australia Women in Engineering).

ACS-TAS suggests that government, industry and professional bodies collaborate on strategies to improve representation for women and mature-age workers in ICT.

[10] https://www.placespeak.com/

Accessibility

Accessibility for online services is a rapidly growing concern that ACS-TAS believes few State governments are tackling effectively. As our government services are transitioned to online delivery models, it is critical that accessibility issues are adequately addressed. Common issues include:

- Websites that cannot be machine-read for the visually impaired;
- Use of CAPTCHA to prove the user is human.[11]

The World Wide Web Consortium (W3C) which administers Internet standards has published version 2.0 of the Web Content Accessibility Guidelines (WCAG2.0). The federal public service has officially adopted WCAG2.0 and published a national transition strategy (Australian Government Department of Finance and Deregulation, 2010). In 2010 the Tasmanian Government published its website standards document (Tasmanian Government, Department of Premier and Cabinet, 2010) setting minimum standards and requirements for Tasmanian Government websites. However, in spite of this document establishing an objective of meeting the WCAG2.0 guidelines, many government websites have only achieved a very low level of compliance.

The ACS-TAS recommends that a greater focus be placed on achieving maximum reasonable WCAG2.0 compliance for government websites. Those websites that provide online services (such as Service Tasmania) should be given highest priority.

In addition to ensuring services are accessible to those with disabilities, ACS-TAS believe it also important to consider customers who do not have Internet access. The CSIRO Broadband Impact Report identified that 20% of Australians (4 million) do not use the internet at all (CSIRO, 2013). A strategy needs to be implemented utilising the current government networks, such as LINC, to encourage this demographic to learn to use online services.

[11] CAPTCHA usually takes the form of a picture with scrambled letters and numbers displayed in it. The user must type the correct 'password' from the image into a field to prove they are not an automated spam program.

Digital Literacy

Community

According to the latest CSIRO study (CSIRO, 2013) as many as 20% of Australians do not use the internet at all. That same study investigated this finding and concluded that a lack of skills and confidence in using the internet was the main inhibitor to online engagement and usage. Addressing this high number of digital non-participants will be important as more and more government and business services are transitioned to online delivery.

Government

The pervasive and transformative nature of ICT has been a challenge for governments worldwide. A lack of understanding concerning the capabilities or functions of technology can (and has) led to significant unintended consequences from legislation. The township of Uxbridge in Canada is still mocked online due to an old law prohibiting internet connections faster than 56kbps.

If Tasmania is to truly benefit from a strong economy and community supported by successful ICT we need to ensure it has world-class legislation drafted with the evolving capabilities of technology in mind. The ACS-TAS recommends programs be investigated to provide non-partisan education and support for State and local government politicians in Tasmania to ensure they have the necessary knowledge and understanding to best serve the Tasmanian people.

Small to Medium Enterprises and Not-For-Profit organisations

Not-for-profit organisations and small-to-medium enterprises potentially have the most to gain from an appropriate use of technology. Unfortunately, they tend to be the most poorly represented. In the 2010-2011 period 46% of small enterprises and 26% of medium enterprises did not have a web presence at all (Australian Workforce and Productivity Agency, 2013, p. 14). For those businesses that do have a web presence, within the retail sector 34% of businesses offer online transactions and yet only 7.5% claim to be able to process transactions securely (Australian Computer Society, 2013, p. 53). The ACS-TAS believes this is a massive risk to businesses and consumers alike and shows a critical lack of 'digital literacy' amongst these businesses.

ACS-TAS suggests the solution is not to run programs that try to push businesses online. Indeed, the CSIRO broadband report found that businesses did not automatically become more profitable by going online (CSIRO, 2013). Benefiting from technology requires the business to actually understand the opportunities that technology presents and how to best capitalise on them. Programs such as 'Digital Ready Tasmania' have been the first step, however more is required.

The ACS-TAS recommends an expanded digital literacy program be developed to specifically target SMEs and NFPs. This program should:

- Have measurable outcomes;
- Be targeted to each participating SME/NFP's market; and
- Be flexible enough to encourage ongoing participation.

CONCLUSION

Now more than ever, Tasmania needs to focus on the importance of ICT to our economy and how it will affect us in ways we may not even yet comprehend. The ACS believes that now is the time for both the Government and the Tasmanian people to take the opportunity to look closely at the State's current ICT policies.

The ACS recognises that much has been achieved over the last few years with regard to ICT and the economy, but we believe that some fundamental changes need to be made in strategic thinking as a matter of urgency. It is imperative that government recognises that ICT is not an isolated entity, but instead is embedded across all facets of the economy and the community as a whole.

Improving digital literacy across the entire community, from school-age children through to adulthood, will see a rise in the success of our community, industries, and government. Indeed, digital literacy is foundational for a dynamic, confident economy. Further, to build upon the digital literacy of our State the government needs a plan for developing talent through government-supported programs. Any such plan needs to be developed in accordance with a single, unified ICT strategy for Tasmania.

To that end, the ACS believes that the government needs to foster stronger links between ICT and traditional industries such as agriculture, aquaculture, and tourism. This can be achieved through strategic policymaking that targets some of Tasmania's greatest resources: industry, research and development, academia, and commercialisation.

We need to target and capitalise on specific opportunities and the competitive advantage our geographic location and lifestyle factors affords us. The government and industries need to support and attract pilot programs like eHealth and open data and services. Further, we need to capitalise on the strong numbers of international students studying in areas of ICT at the University of Tasmania and TasTafe, and to attract more domestic students to these programs.

Finally, the ACS feels strongly that there needs to be a greater focus placed on the use of international standards for governance and skills mapping, based on ISO38500 and SFIA, and for the Government to commit to ensuring that all its ICT staff, across all agencies, are professionally certified. Such a program would strongly help to prevent disasters comparable to the Queensland Health Payroll project, and demonstrate the Government's commitment to securing Tasmania's ICT future.

In order to achieve these goals Tasmania needs a greater vision; a holistic strategy developed with advice from an expert panel and founded on empirical evidence and data. By focusing on digital literacy, the links between ICT, government, research and development, community, academia, and industries, as well as the advantages that Tasmania's location and lifestyle bring, we can develop the necessary strategies for driving the Tasmanian economy into the future.

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AUSTRALIAN COMPUTER SOCIETY

ICT State of the State: Tasmania

Purpose

This paper has been developed by the Australian Computer Society to try and provide more granular insights into Information and Communication Technology (ICT) employment and business activity in Tasmania. It is a "State of the State" report that builds off the 'knowns' to illuminate the 'unknowns' that need to be considered when producing industry policy or a development strategy.

Introduction

It is important for Tasmania to appreciate the contribution its ICT businesses and workers make to the state and the nation's economic success.

In April 2014 there were just under 600,000 ICT workers employed in Australia and the ICT industry contributed some $101 billion or 8% to the nation's gross domestic product.[1] Correctly managing and developing the ICT industry and ICT worker skills is, therefore, an essential component of any national and state development strategy. This is even more important when one appreciates ICT is one of the major drivers of innovation and economic multipliers across all industries.

Unfortunately any examination of the ICT industry in Tasmania is likely to be frustrated by the lack of relevant, reliable data. As a consequence the ICT employment and business activity in Tasmania is largely obscured or harder to assess than most other regions in Australia. This is due to four primary weaknesses in data collection:

1. Traditional Australian Bureau of Statistics (ABS) classifications of occupations and industries[2] offer limited insight into the numbers of workers in ICT or employment trends.
2. Tasmania ICT business activity is very hard to identify as businesses are typically very small (micro or self-employed) and distributed across all regions and locations in Tasmania.
3. ICT is such an essential component of new businesses and innovative activity its contribution is often implied rather than being explicitly measured.
4. Census data on the salaries and income for Tasmanian ICT professionals is being misconstrued.

Numbers of Tasmanian ICT Workers

> *Insomuch as the ICT industry is a 'defined' industry at all, its constituent components will vary and the boundaries, both in terms of employment, occupations, and activities will continue to evolve and blur with the boundaries of other industries...*[3]

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*.[4] This 'total' needs to be treated as a minimum number. Nationally this industry classification includes non-ICT professionals (e.g. journalists) and only accounts for a small proportion of overall national ICT workers (See figure 1 below).[5] Despite arguments by industry and researchers that the ICT industry is not represented by this industry classification, national data is still collected against this grouping.[6] By way of contrast, the Australian Computer Society (ACS) and Centre for Innovative Industries Economic Research Inc. (CIIER) statistics for 2013 would suggest, as a minimum, there were 4,380 employed by

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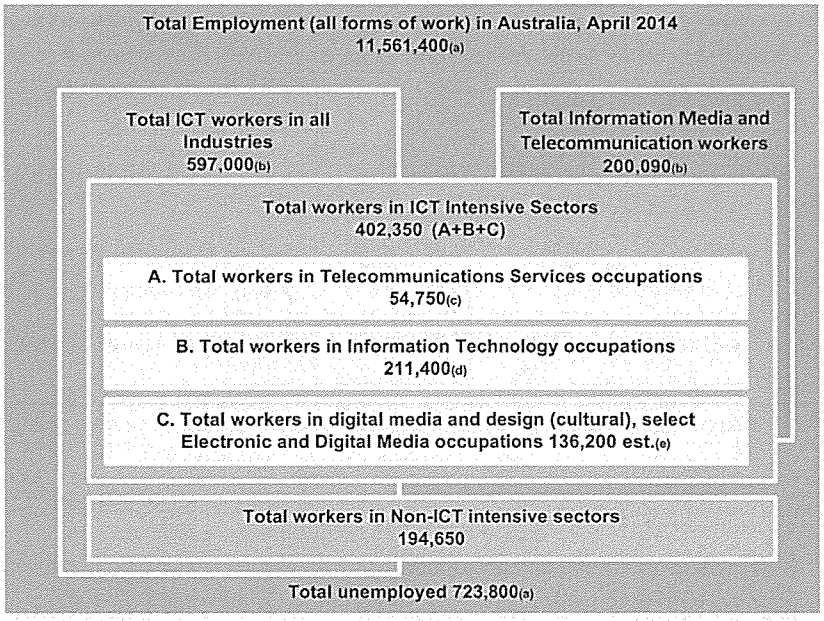
[1] Australian Computer Society (2014), *2014 Australian ICT Statistical Compendium*, ACS, Sydney.
[2] ANZSCO (Australia, New Zealand Standard Classification of Occupations) & ANZSIC (Australia, New Zealand Standard Industry Classification)
[3] Bowles, M. & Wilson, P. December, 2009. *Scoping Review of the ICA05 Information and Communications Technology Training Package v3.0*, Innovation and Business Skills Australia: Melbourne, page 3.
[4] Australian Bureau of Statistics [ABS] (2012), *Census of Population and Housing, 2011*, ABS, Canberra.
[5] ABS, May 2014, *6359.0 - Forms of Employment, Australia, November 2013*
[6] Bowles, M; Wilson, P. (December 2009) *Applied Research Project: Telecommunications Industry*. IBSA: Melbourne; ACS, (2013), Australian ICT Statistical Compendium 2013, pages 6-7.

information technology, computing, creative and digital media, and telecommunications companies in Tasmania.[7] Furthermore, if the national data were extrapolated for ICT workers employed beyond the Information Media and Telecommunication industry, there would be at least an additional thousand people employed in ICT roles in other Tasmanian industries. Using the 2013 Australian Computer Society Remuneration Survey and comparable professional surveys the following are the non-ICT industries where many of these ICT professionals are employed:

- Professional, Scientific and Technical Services
- Education and training
- Transport, postal and warehousing
- Health care and social assistance
- Financial and insurance services
- Mining
- Manufacturing

Just the first two of the above groupings have respectively an estimated 500 and 350 ICT professional are employed. Over half of these professionals are employed in the public sector or higher education. None of these ICT professionals are included under 'total' employment for Information Media and Telecommunications.

FIGURE 1: ICT EMPLOYMENT SNAP-SHOT IN AUSTRALIA, APRIL 2014



(a) ABS (April 2014). *6202.0 - Labour Force, Australia, April 2010. ABS: Canberra.*
(b) Australian Computer Society (2013) *Statistical Compendium*
(c) IBISWorld (March 2014) *Telecommunications Services in Australia: Market Research Report*
(d) Estimates Based on ABS (2013) *1301.0 - Year Book Australia, 2012* and ACS survey data, 2013
(e) ABS, 6291.0.55.003 *Labour Force Survey* and *National Accounts, April 2014:* note: digital and electronic economic activities account for some 43% of cultural and creative industry employment

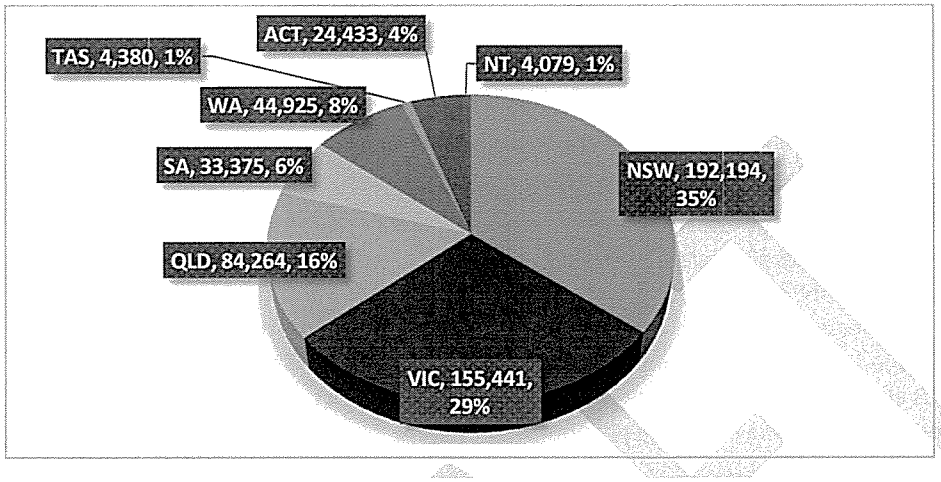
Trends in ICT employment in Tasmania

While the previous section argued ICT employment in Tasmania is being underreported, as an overall percentage of the national workforce ICT employment in Tasmania continues its ongoing decline below national benchmarks. The question remains if this is due to underreporting ICT workers, or if it is an actual decline in numbers of ICT workers as a percentage of the total Tasmanian workforce?

[7] ACS, 2014

Developing a highly skilled and sophisticated ICT workforce is essential if Tasmania is to be well positioned to compete globally. The best available data suggest Tasmanian ICT workers account for 2.3% of the State's workforce but less than 1% of the total national ICT workforce. This suggests fewer ICT workers are employed in the Tasmania, as a percentage of the total workforce, than any other state or territory. This maintains the trend in slower than national median ICT industry growth that, since 2007, has been evidenced through the decline of the local workforce as a percentage of the state and national workforce.[8]

FIGURE 2: ICT WORKERS IN THE ICT INDUSTRY BY STATE AND TERRITORY, DECEMBER 2013[9]



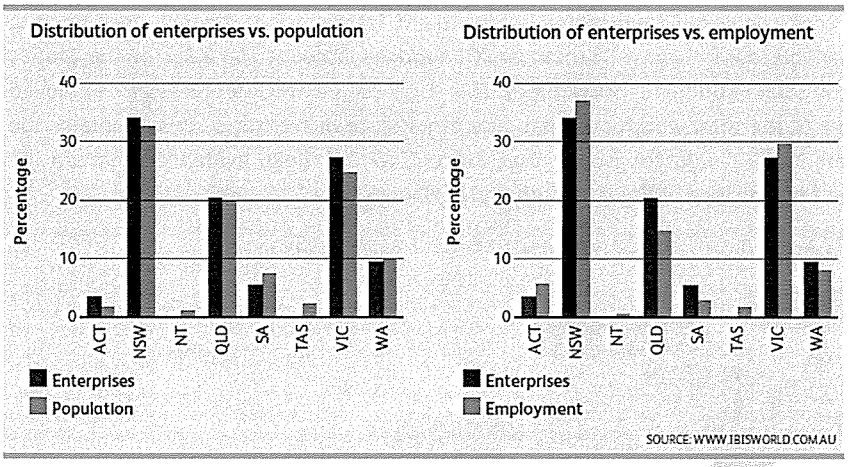
The Tasmanian ICT industry is also dominated by computer services, sales, consulting and software development. Despite the National Broadband Network (NBN) and growth in mobile infrastructure the telecommunications sector has also continued a decline that now places Tasmanian growth rates behind all other states.[10] Business activity in hardware manufacturing and software engineering is at best described as 'boutique' with flat growth comparative to other states.[11]

ICT business activity in Tasmania

The lower overall employment of ICT professionals would tend to suggest in Tasmania ICT business is critically below that in other states and territories. Once again the specific data to evidence this trend by type of business and location is unavailable.

FIGURE 3: COMPARATIVE SOFTWARE PUBLISHING SECTOR PERFORMANCE, BY STATE AND TERRITORY, 2013[12]

[8] The trend was noted in the Centre for Innovative Industry Economic Research (2011), *Tasmanian ICT Sector Assessment Report 2010*, TasICT, Hobart, page 8.
[9] ACS, 2013 Statistical compendium, p.8
[10] Shulman, C. (May 2013), *Industry Report J5801: Wired Telecommunication network operation in Australia*; & IBISWorld (March 2014) Telecommunication Services in Australia, Market Report, IBISWorld, Sydney.
[11] Australian Workforce Productivity Agency [AWPA] (July 2013), *ICT Workforce Study*, Commonwealth of Australia, Canberra.
[12] Shulman, C. (June 2013), *Industry Report J5420: Software publishing in Australia*, IBISWorld, Sydney, p. 17



What we can conclude is that much of the ICT business activity is hidden. ICT in Tasmania is a 'boutique' industry. Over 18% of ICT professionals declare themselves to be employed as independent contractors and over 65% of ICT professionals are self-employed or owner-operators.[13] Equally ICT business numbers and activity is occurring in businesses that are so small standard statistical collections often fail to report this activity. This is evidenced in figure 3 above. It confirms that employment in Tasmania's software development and publishing sector is mostly represented by individual contractors, micro-businesses and loose alliances between skilled individuals working on a project by project basis.

Nevertheless it is known that in Tasmania a number of start-up and established innovative companies are active in software publishing. This includes those working on:

- Educational software
- Game applications development
- Virtual and augmented reality software
- Online games
- Building and construction 3D and virtual graphics
- Health and medications management
- Mining management systems
- Production software
- Accounting software
- Cloud software
- Mobile applications

The importance of gaining more granular insights cannot be understated. Software publishing, as one example alone, is a fast growth sector that has high economic multipliers when compared with traditional primary industries (e.g. every 1 job created in an emerging technology, digital sectors stimulates creation of 5 other indirect jobs in the region)[14] and competitively positions Tasmanian businesses in a fast growth, albeit evolving, global marketplace.[15] Knowing current figures on employment and business activity in this and the other ICT economic activities is essential when establishing a baseline for any industry development strategy.

Intensity of ICT use in a business and innovation

ICT use and workforce skills has a critical role in promoting innovation within existing businesses and stimulating new business and market entry opportunities. This is more than speculation. There exists a

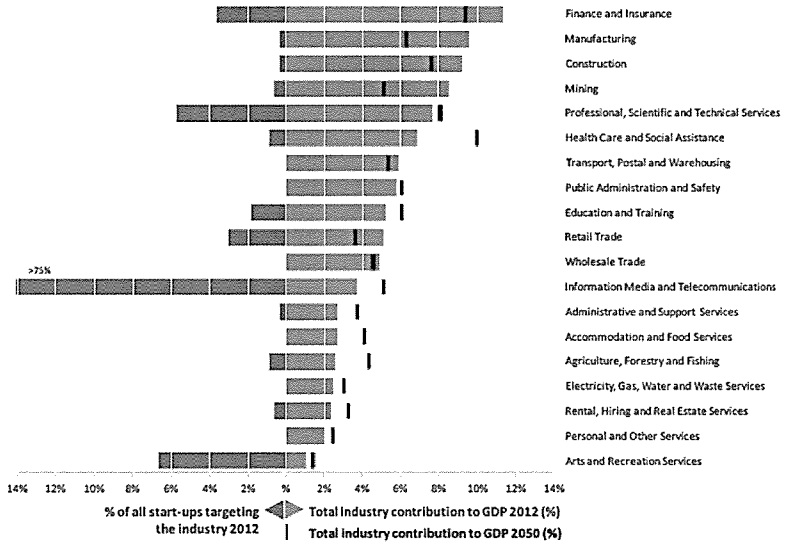
[13] ABS, 2012, Census.
[14] Employment multipliers, OECD and as used by Digital Scotland http://www.scotland.gov.uk
[15] Bowles, M. (June 2014), *How to engage with emerging industries*, Presentation, Skills Tasmania Conference, Hobart.

scientifically proven relationship between the intensity of ICT use and the likelihood a business will undertake innovative activity.[16]

The importance of ICT use and innovation is most obvious in start-ups. New businesses deploying new technology offer a significant opportunity for regional economies such as Tasmania. Not only does it offer early access to new technologies and market access for other individuals and companies, start-ups hold potential for generating new economic activity and income: estimated to be $109b (or 4% of GDP) for Australia by 2033.[17] Such activities can also be undertaken by very small businesses without necessarily requiring significant upfront capital investment. As depicted below, the impact of ICT on innovation and start-ups is also beneficial because it is spread across all industries.[18]

[16] Tiy, L., Berry, O. & Taylor, D. (2012), *Business Innovation and the use of Information and Communications Technology – An Update 1351.0.55.042*, Research Paper, ABS, Canberra
[17] PWC (2013), *The Startup economy: How to support tech startups and accelerate Australian innovation*, Google Australia, Sydney
[18] AWPA, 2013, 32-33

FIGURE 4: TARGET INDUSTRY OF TECH START-UPS COMPARED TO INDUSTRY SIZE[19]



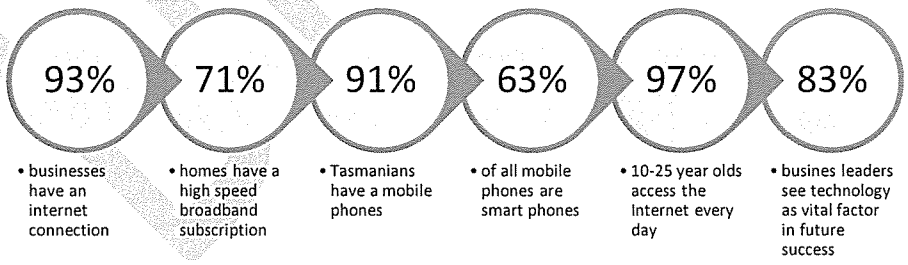
Source: PwC analysis and IBM (2012) A snapshot of Australia's digital future to 2050

Beyond the impact on innovation, ICT is becoming omnipresent in just about every aspect of business activity. For instance in December 2013 it was being reported that:

- Australia's total ICT spend was estimated to reach US$66b.[20]
- 92% of Australian companies in NZ and Australia believed future performance will be directly or indirectly impacted by their ability to seize opportunities from the Digital Economy and related technology changes.[21]
- 95% of all capital projects had an IT component and 50% of all capital spending was technology-related.[22]

Tasmania is not isolated from these trends. Tasmanian business and society isn't the 'digital backwater' many seem to suspect. In 2013 there were more ICT graduates per capita and as a percentage of overall enrolments at university[23] and, extrapolating national survey data, digital technologies pervade all aspects of work and life.

FIGURE 5: TASMANIA'S DIGITAL READINESS



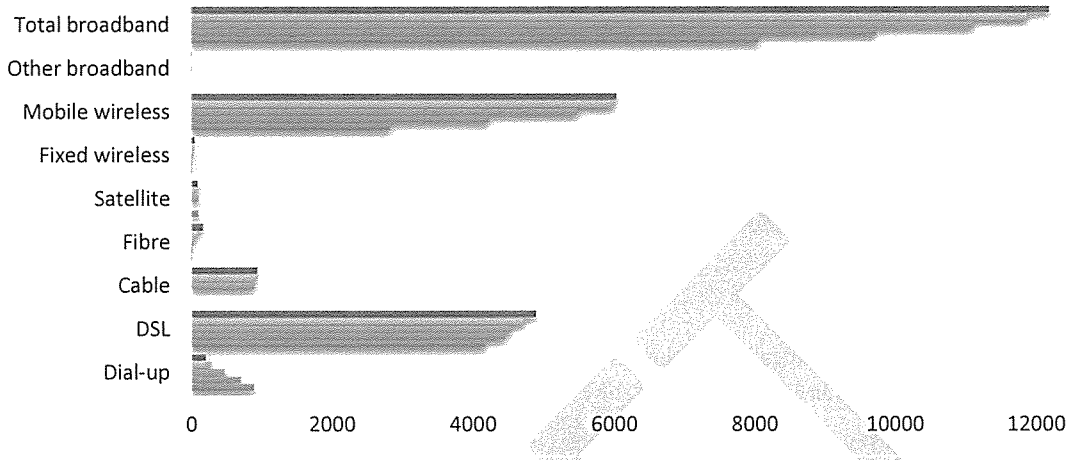
Moreover, penetration of the Internet, especially mobile connections and broadband, has continued. But assessing the actual growth in non-fixed-line broadband connections is a critical consideration in ICT policy and planning in Tasmania.

While nationally fixed digital subscriber lines (DSL) and copper cable network telephony has plateaued[24] the fastest growing trend is for Australians to adopt mobile and satellite Internet connections. While satellite is

[19] PWC, 2013, page 6
[20] AusTrade (2013), *ICT Investment Report, 2013*, as cited in ACS Tasmania, 2014.
[21] http://myob.com.au/myob/backing-aussie-business/myob-business-monitor-1258090877325
[22] http://www.theitsmreview.com/2014/03/learned-devops-gene-kim
[23] ACS Tasmania Branch (April 2014), *The role of technology in Tasmania's future*, ACS: Hobart, Pages 12-13.
[24] ABS (March 2010), *8153.0 - Internet Activity, Australia, December 2009*. ABS, Canberra.

generally a result of the incapacity to access fixed DSL or cable mobile, growth in subscriptions to wireless and mobile services reflect the trend away from home telephones and a desire to always be connected.[25]

FIGURE 6: INTERNET SUBSCRIBERS BY TYPE OF CONNECTION FOR ISP'S WITH MORE THAN 1,000 SUBSCRIBERS, DEC 2009-DEC 2013[26]



	Dial-up	DSL	Cable	Fibre	Satellite	Fixed wireless	Mobile wireless	Other broadband	Total broadband
Dec-13	205	4,898	944	167	91	48	6,040	3	12,192
Dec-12	282	4,727	918	91	92	49	5,995	7	11,879
Dec-11	473	4,553	900	37	100	35	5,491	8	11,123
Dec-10	707	4,458		24		24	4,230		9,739
Dec-09	891	4,178		11	107	22	2,838		8,059

But the mobile broadband 'take off' in Tasmania has taken longer to occur due to delays in extending cellular network coverage, especially with regards rollout of the 4G network. Problems with mobile broadband access have also been compounded in Tasmania by the limited success and now extended delivery time for access to the NBN high speed, fixed fibre or wireless broadband connections.[27] This is a worrying occurrence as such delays are known to negatively impact business growth; particularly for small businesses. Delays of even 6 months or inability to subscribe to high speed broadband, in any of the connection typologies, affects not only the range of digital products and services, it affects decisions on business location, inhibits technology start-ups, and restricts innovations an established business can use to improve access to global digital markets.[28]

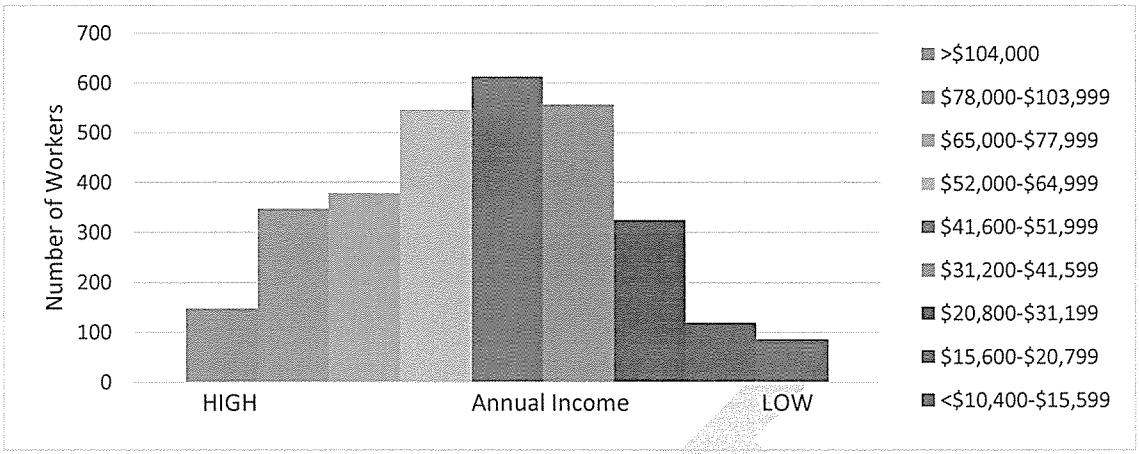
Salaries for Tasmanian ICT professionals

The chart below uses 2011 Census data to confirm the spread of salaries for Information Media and Telecommunication workers in Tasmania. Repeating the previous warning about collection of data using this industry classification, the data presented below can only provide a general picture as to the salaries and income of Tasmanian ICT professionals.

The median annual income of around $50,000 and the high numbers of workers below $31,199 has been used to suggest Tasmanian ICT professionals are paid below the national median salaries. Equally, the workforce is seen to be dominated by lower paid workers. At best these conclusions may be misleading.

[25] In 2013 it was predicted data traffic on mobile devices in Australia will treble by 2017. AWPA, 2013, page 26
[26] Source, ABS (December 2013), *Internet Activity, Australia, December 2013*, 81530DO001_201312, ABS, Canberra
[27] In December 2013 after four years it seem only some 15% of Tasmanian premises have been passed by the NBN and less than 18% of those premises have subscribed to retail services that use the NBN. Hepworth, A. (26 April 2014), Rollout shambles in NBN's first state, *The Australian*, accessed 27 April 2014, http://tiny.cc/1wxfgx.
[28] This impact on business was confirmed in the following national study that included Scottsdale in Tasmania: Bowles, M. (December 2012), *Post-NBN Impact on Enterprises and E-skills*, A Workforce Development Applied Research Project, Melbourne: IBSA.

FIGURE 7: TOTAL ANNUAL INCOME, INFORMATION MEDIA & TELECOMMUNICATION WORKERS, TASMANIA 211[29]



Looking beyond the narrow classification of the ICT industry used by government to collect data we can see some areas where ICT salaries and benefits are healthy, comparative to national benchmarks.

TABLE 1: ICT PROFESSIONAL SALARY AND TOTAL PACKAGES, TASMANIA AND AUSTRALIA COMPARISON, 2013[30]

	Base salary	Total package	Annual Increase
Tasmania			
Lower Decile (10th percentile)	$60,000	$78,072	0.00%
Lower Quartile (25th percentile)	$75,000	$86,609	1.72%
Upper Quartile (75th percentile)	$111,750	$126,405	4.11%
Upper Decile (90th percentile)	$118,000	$136,419	6.54%
Australia			
Lower Decile (10th percentile)	$ 59,867	$ 66,530	0.00%
Lower Quartile (25th percentile)	$78,000	$ 88,986	0.00%
Upper Quartile (75th percentile)	$130,000	$150,420	4.35%
Upper Decile (90th percentile)	$165,000	$200,426	7.14%

Drawing on the 2013 Australian Computer Society Remuneration Survey and comparative analysis with 'all industry' salary data the following observations can be made:

- Tasmanian contractors and consultants are paid as much as 15% below the national median across all salary levels.
- Professionals at the upper quartile of salary levels are fewer and less well remunerated comparative to their peers in other states and territories.
- Lower level managers and professional salaries are keeping pace with or increasing per annum at a slightly higher rate comparative with the rest of Australia.
- Salaries in the Tasmanian Public sector are on average 2% higher and, through a fast growth rate in 2013 (as much as 3.1%), salaries and total packages have caught up to the national median and actually passed their peers in the Tasmanian private sector.

An investigation of the ACS and Association of Professional's salary database also confirms that Tasmanian industries paying above the median annual increases for ICT professionals in 2013 include:

- Mining
- Transport and storage
- Utilities (gas, and electrical supply)

[29] ABS, 2011 Census.
[30] Data sourced using the Australian Computer Society Remuneration Survey, Association of Professionals, accessed 12 May 2014.

- Education and training
- Public administration

An investigation of salaries and total packages provides limited but significant insights at a more granular level. What is confirmed is the importance of looking deeper. The national data is very general and, in the case of Tasmania, often masking significant trends.

In summary

The Tasmanian ICT industry is hard to define and harder to grow without the availability of more accurate data. Much of the discussion as to what constitutes the ICT industry in Tasmania is based on employment numbers and business activity data collected in what is defined nationally as the Information Media and Telecommunication industry. This classification doesn't represent the scope of the modern ICT industry nor does it include those non-ICT businesses highly reliant on ICT or undertaking innovative uses of new technology.

However we interrogate the available data it is possible to reach the general conclusion that after a period of significant investment into the Intelligent Island or the IT industry specifically in Tasmania, business activity and employment growth appear to remain in decline.

The overwhelming sense is of an industry that is not well defined and where existing data has a limited capacity to accurately guide industry and employment strategy formation. Moreover, even where more accurate data can be provided or the flaws in current data exposed, one is left with a sense that the Tasmanian ICT industry is underperforming comparative to employment and economic multipliers being achieved in all other states and territories.

The depth of the problem and the solution jointly rely on improved data collection and, as a direct benefit, more informed decision making.

In summary, ICT in Tasmania is often driven by small businesses harnessing the ICT skills of the owner or a tight network of collaborative partners that are distributed across the state and often perceive themselves to be employed in industries other than those classified as Information Media and Telecommunication. This includes an increased deployment of ICT skills underpinning start-ups and businesses undertaking innovation to compete in 'niche' global marketplaces or in transforming more traditional, mature sectors such as:

- Creative and digital media
- Education and training
- Manufacturing, including production and processing
- Tourism
- Health
- Transport and logistics
- Financial services

Feedback on draft to:

Dr Marcus Bowles | 0412439009 | mbowles@workingfutures.com.au
Or Digital Economy and Regional Futures | UTAS | Locked Bag 1400 Launceston, TAS 7250