ICT Skills and Training Development

A ‘State of Play’ Paper by the AIIA

November 2012
INTRODUCTION

This paper provides an industry perspective of current education, training and skills issues relevant to the ICT sector. It describes the current state of play of ICT education and skills development; identifies issues and deficiencies in current arrangements; and provides a summary of the initiatives the AIIA is instigating to raise awareness of, and address these issues. It concludes with a set of recommendations aimed to spotlight and address current deficiencies.

The AIIA is of the strong view that current issues pose a risk to Australia’s objective of being among the world’s leading digital economies by 2020. Further we believe that without urgent attention, the very considerable investment the Government has made in the NBN infrastructure will not be adequately recognized. In short if we do not have the skills as a nation to leverage the opportunities of high speed broadband as a powerful underpinning of our Digital Economy, we will jeopardise our position as a relevant global economic player.

There are two strands to the ICT skills issue, which equally require attention. Firstly there are a range of deficiencies related to the expertise and capability required to participate in what is characterized as the Digital Economy. This includes skills specifically in the domain of digital technologies and captures professionals as well as the broader workforce. Secondly, there are pure ICT skill deficiencies for example in areas such as programming, informatics, computer engineering, computer science etc. The former is emerging as a serious issue in terms of our collective ability to leverage the opportunities of the Digital Economy and the latter an issue that has experienced a continuing downward trend in recent years, which in addition to the broader implications outlined in relation to digital skills, undermines our competence and competiveness across a range of technical domains. Both of these are impediment to our ability to effectively participate in the world’s global Digital Economy and in the longer term - based on current trends – seriously undermine national productivity and competitiveness.

INDUSTRY OVERVIEW

With an annual revenue exceeding $91 billion coupled with an almost 8% contribution to GDP and some 381,010 technical, professional and management staff and 291,088 industry staff (a total of 672,098 employees), the Australian ICT industry has a critical place in the Australian economy. Indications are that in the next 50 years this growth will accelerate with predictions that ICT will generate some one trillion dollars of revenue by 2050.

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1 Australian Government, Digital Economy Strategy, 2011
2 Australian ICT Statistical Compendium, ACS, 2012
3 A snapshot of Australia’s Digital Future to 2050, IBISworld 2012
ICT employees are broadly grouped into four main categories: consulting and software services, manufacturing of hardware and software, distribution of hardware and/or software, and telecommunications services.  

CURRENT STATE OF PLAY: ICT SKILLS, EDUCATION AND TRAINING

According to the latest Clarius Skills Index (national index of the availability of skilled labor against demand) the shortage of skilled Australian ICT professionals has plummeted between the March and June quarters of 2012. The report showed an ‘extreme’ shortage of 8258 ICT professionals in the June quarter, compared to a shortage of 5500 workers in March 2012.  

In many respects this situation is not surprising. Over the last decade, ICT enrolments in training and education have been falling – some 55% nationally. This is in sharp contrast to industry demand for skilled resources, which has significantly increased over the same period and which is predicted to continue to grow in the foreseeable future.

Figures show that fewer students are choosing ICT as a career and those that do are highly likely to discontinue ICT studies, particularly if they are female.

- The number of undergraduate enrolled in ICT degrees in Australian universities has declined by 50 per cent over the last decade, and in the VET sector by 40 per cent over the last 10 years.
- The number of ICT higher education enrolments as a percentage of total higher education enrolments also continues to decline (from some 4.76% in 2006 to only 4% in 2010).
- Up to 43 per cent of all ICT students at University drop out of their course with a large population of these being females.

While data released earlier this year shows that ICT experienced a 2.9% growth from 2011 to 2012 in students ranking ICT courses as their highest tertiary preference, ICT is still ranked at the bottom of the student preference list overall (when compared to 10 key fields of education interest).

Furthermore, ICT undergraduate courses, rather than attracting high performing school leavers (ie with ATAR greater than 90), is one of the top two discipline areas to admit low achieving students (ie with ATAR of less than 50). In 2011 only 7.3% of ICT University offers were for ATARS over 90 compared to 23.7% for

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4 IBSA, Environment Scan 2012, p1
6 2011 ICT Skills Snapshot – The state of ICT skills in Victoria. Department of Business and Innovation, January 2012
7 ACS response to the Australian Workplace and Productivity Agency discussion paper “Australia’s skills and workforce development needs” August 2012
ATARS under 60.\(^9\) In other words, despite the increasing demand for highly skilled ICT graduates, ICT disciplines in universities are not attracting the best and brightest students.\(^10\)

It is also reported that less than 50 per cent of ICT professionals possess a degree level qualification in ICT.\(^11\)

In terms of the VET sector, between 2002 and 2010 the percentage of VET ICT related course enrolments declined from 5.41% to 2.26% - less than half of what it was 8 years previously.\(^12\) The number of female enrolments dropped by almost 7,000, a 27% decrease between 2007 and 2009.\(^13\) The latest ACS Statistical Compendium (2012) highlights a 6.4% decrease in ICT students in publically funded VET courses between 2010 and 2011.

In parallel new technologies such as cloud computing, mobile applications development, information management and business analytics/intelligence are draining existing skill pools.\(^14\) Michael Fox, the CEO of Shoes of Prey, at the recent Prime Minister’s Forum on the Digital Economy, also identified a specific shortfall in software engineering talent.\(^15\) Anecdotal evidence also indicates a shortfall of health informatics skills, at a time when health data is increasingly critical to inform improved healthcare pathways and outcomes.

### ISSUES

The gap between demand for ICT skills, including both domain specific technical expertise and digital skills and supply of skills threatens Australia’s export and productivity gains, innovation capacity and employment growth across the sector.\(^16\) Even more importantly it critically undermines our ability to be a credible player in the world’s global Digital Economy – now, and if trends continue, even more so into the future. Failure to reverse current trends and build a solid foundation of all ICT and digital skills will limit our ability to maximize the transformational opportunities of the Digital Economy. Rather than be the leader we aspire to be, we will find ourselves laggards in making that transition.

However, we acknowledge that this is not an easy issue. First and foremost it needs to be understood that the ICT skills issue currently facing Australia is multi-dimensional – the issue is not confined to simply developing the right scope and scale of ICT skills to support digital technology development, though of course, this is an important element. And the solution is not simply about ramping up university enrolments, though again this is also important. The issues impacting Australia’s ICT skill base are varied and reversing

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\(^9\) Australian ICT Statistical Compendium, ACS, 2012
\(^10\) ACS, Submission to the ACARA Draft Shape of the Australian Curriculum: Technologies. June 2012
\(^11\) Ibid
\(^12\) Ibid
\(^13\) Australian ICT Statistical Compendium, ACS, 2011, p24
\(^14\) Ibid, p10
\(^16\) APESMA, Recruitment Development and Retention Strategies. March 2011
current trends will require a holistic, integrated approach. These issues, recognized by the industry include:

- Inherent problems in current primary and secondary education curricula;
- The lack of attraction of ICT tertiary and VET courses coupled with the challenges of meeting industry needs;
- The negative perception of the ICT sector, including perceived career opportunities;
- A changing workforce environment that is demanding a different ICT skills base and more business oriented expertise; and
- The need, across the board, for a competent, confident, digitally ready workforce.

Each of these is briefly discussed below.

**Current primary and secondary school curricula**

The primary and secondary school curriculum does not adequately recognize the subject of ICT or digital skills as a core-learning requirement. Unlike English, STEM subjects (science, technology, engineering and math) are not emphasised as core learning competencies. While the current approach of integrating ICT skills development across all curriculum areas is understood, there remains a strong argument for giving greater attention to STEM subjects particularly in primary schools, where research has shown most students are already making up their mind about future subject preferences.

While there is the intention to support a technology strand within the secondary school curriculum, this will only be mandatory for foundation to year 8 students. Furthermore, as evidence shows, enrolments for Years 11 and 12 ICT subjects continue to be low and typically do not attract high achieving students.

Problems within the primary and secondary school education frameworks, specifically the lack of focus on problem solving, technology and innovation were endorsed by Steve Pozel, Director of Object at the Prime Minister’s Digital Economy Forum in October. Mr Pozel argued the need for a new skill set, incorporating the use of technology, focused on learning new ways of creative problem solving.

The proposed new national technology curriculum has the potential to have a significant impact on this problem. Its focus on design thinking and integration with other technology subjects, if taught properly and integrated into the rest of the school curriculum, could achieve Mr Pozel’s goal of improved creativity and lead to a revival of interest in ICT at the year 11 and 12 level – but of course, this yet to be tested.

In addition to these immediate gaps in matching skills to industry needs, there is a longer term challenge emerging insofar as ICT and digital familiarity is not regarded as a true business skill. While we are teaching students the detail and mechanics of using today’s technologies (eg productivity, office, web and networking...
tools), there is an emerging new need, i.e. to turn our attention to focusing on ICT as an underlying economic trend. As the rate of technology change continues to accelerate, students need to understand and have the skills to adapt to, the impact of technology and the implications in terms of future workforce, economic and social change. Elevating technology above simply a technical competency is fundamental to preparing a technology savvy and innovative 21st century digital economy.

**ICT tertiary and VET challenges to meet industry needs**

As noted already, over the last decade the take-up of ICT related tertiary courses has virtually halved. This is in sharp contrast to an increased industry demand for specific ICT skilled resources over the same period.

As university enrolments decline, universities downsize courses thereby also reducing capacity to meet industry demand for skilled graduates. Declining enrolments also results in lowering of university entrance requirements, which further exacerbates the ability to produce graduates with relevant skills.\(^\text{20}\) As a consequence of the ICT disciplines in universities not, in general, attracting high achieving students, many ICT graduates have not been able to secure professional ICT employment. In fact there is anecdotal evidence that a number of large ICT employers prefer to employ high achieving graduates without an ICT background rather than ICT graduates who only have average success in their ICT studies.\(^\text{21}\)

A further consequence of this downwards spiral is that universities are not, by and large, undertaking the curriculum renovation and pedagogical development designed to ensure that they have appropriate curricula and approaches to teaching to meet the needs of a new generation of students as well as industry. In short, there is an increasing deficit in terms of the ICT course materials relevant and required to support a vibrant Digital Economy.

Perceived causes of declining university enrolments in ICT are the quality of ICT teaching in high schools, the quality of ICT education in universities, the perception of ICT jobs and career amongst the public generally and an under appreciation of the specific skill sets relevant to a digitally driven world. Views regarding the inadequacy of careers advice and education for future employment opportunities in the ICT sector were recently raised again in the Innovation and Business Skills Australia (IBSA) 2013 Environmental Scan consultations.\(^\text{22}\)

Since 2002 the number of students enrolled in ICT courses in the VET sector has also nearly halved. Combined with funding changes (across all states), the viability of many ICT courses and the ability of TAFE to supply the skills required by the ICT sector have also declined.\(^\text{23}\)

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\(^{21}\) ACS, Submission to the ACARA Draft Shape of the Australian Curriculum: Technologies. June 2012. P1


Despite evidence that TAFE achieves very high employment outcomes, particularly in ICT compared to a broader range of sub disciplines, it has suffered at the public perception that it is merely the provider of trade training and that ‘real careers’ are only available to those that attend university.

David Lamb, a Professor of Physics at the University of New England, raised an interesting anomaly regarding the current ICT skills situation at the Prime Minister’s Digital Economy forum. Drawing on his knowledge of the farming industry, he made the point that that it is typically the lowest paid worker that will operate the most expensive piece of technical equipment. He went on to say that these workers who are at best, TAFE graduates, like many other workers are simply not equipped to deal with the digital age.  

Innes Wilcox, CEO of the Australian Industry Group made a similar point noting that in research undertaken by his organization, many businesses do not believe they have the skills or knowledge to optimize the proposed opportunities of the Digital Economy. Both examples highlight the extent to which digital skills are increasingly an inherent skill requirement of just about any profession or trade.

The negative perception of the ICT sector, including perceived career opportunities

There is a general misconception that ICT is a purely technical discipline and a view that career advisors, teachers, and parents are largely uninformed about the diverse range of employment pathways and opportunities that exist within the ICT sector. This is exacerbated by a perception – a negative perception – that people employed in ICT are ‘stuck in front of a computer all day’, have limited human interaction and reduced job security in the industry due to IT outsourcing. This reflects a poor public awareness of ICT as a profession and a general lack of appreciation of the vocational opportunities offered by an ICT career – an understanding and awareness that other industries have established over time but with which ICT struggles due to its relative infancy. The irony of this perspective is that the recently released 2012 BRW Young Rich list featured a number of technology entrepreneurs with the co founders of Atlassian Software topping the list with a joint fortune of over $480m.

Arguably a phenomenon of the Digital Economy is an increasing demand for a mix of ICT and business skills where the technology is leveraged to specifically respond to business issues and problems and where ICT is very much at the front line of operations rather than back of office.

All this begs the question of whether there is a fundamental ‘branding’ problem with ICT that requires attention. Without undermining the critical importance of developing specific ICT skills, as we look to the future we need to reassess how ICT is packaged – branded - within our education and training systems to ensure it captures the imagination of students not just from a strictly technical perspective but in terms of being the basis for much broader business, social and economic innovation and entrepreneurship.

25 Ibid. p 58
26 ACS, Submission to the ACARA Draft Shape of the Australian Curriculum: Technologies. June 2012
Increasingly, technology underpins all disciplines and its value needs to be realized in terms of how it is being applied to transform all workplaces, practices and outcomes.

As noted above the number of women in ICT occupations is declining. Between February 2011 and February 2012, the number of women in ICT occupations dropped from 131,099 to 91,400 (24.1% and 19.7% of the total ICT occupation workforce respectively. Such a significant decline in such a short period of time, coupled with an already downward trend, rings serious alarm bells. Needless to say, an ongoing decline in the percentage of females working in the ICT sector is inevitable without specific intervention. Current trends both reflect and reinforce current perceptions and stereotypes of the industry.

**A changing workforce environment that is demanding a different ICT skills base and more business oriented expertise**

The skills required 10 years ago in ICT are not the skills necessarily in demand today. In the context of the global Digital Economy, areas of growing demand such as big data, predictive data analysis, Web 3.0, cloud services and sophisticated business intelligence are not yet generally supported by tertiary courses. Recent analysis conducted by Hudson identifies that the availability of specific technical skills is also becoming increasingly problematic (eg specific programming skills).

With an increased focus on the integration of IT into the business the demand for a more sophisticated mix of digital and business skills is also emerging. Hudson reports a growing demand for solution and information architects (with a focus on bringing technology together with business to solve business problems), ecommerce skills and commercial acumen to drive business outcomes. Similarly important is the need for digital skills knowledge at executive and Board levels of organisations.

Given the rapidly transforming IT environment coupled with the fact that ICT is increasingly closer to the business end of the organization, pure technical expertise is just one part of the skill set required in today’s modern industry environment. Notwithstanding the pace of ICT and digital change and innovation, career development programs and education and training frameworks are slow to respond and adapt. In an increasingly smart and competitive global Digital Economy this will prove to be Australia’s achilles heal if we fail to, or are even slow to, address these issues.

**The need, across the board, for a competent, confident, digitally ready workforce**

The nature of, and the demands placed on our workforce are changing. The ability to effectively participate in the digital economy requires more than familiarity with the web and use of email. It requires the ability to adapt to new business models, electronic workflows, smart business tools, teleworking, mobility, new modes

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27 Australian ICT Statistical Compendium, ACS, 2012
28 Hudson ICT. Industry Leaders Series. Cloud, BYOD & Teleworking: Mastering the Skills Mix for Today’s IT Function
29 Ibid
of communication, paperless transactions etc. These skills are not inherent in our current workforce and in the case of small and medium sized enterprises (SMEs), most are not equipped to take advantage of new digital technology developments. Notwithstanding the opportunities offered by new cloud, mobile and device agnostic applications, almost 50% of small businesses (5-19 persons) and 30% of medium sized business (20 – 199 persons) do not even have an online presence.\(^{31}\)

Put simply, the issue of digital literacy is a whole of community issue that requires concentrated attention. Given the investment Government has directed to the NBN, it is imperative that both business and individuals are properly positioned, ie skilled, to seize the opportunities on offer through high-speed ubiquitous broadband. This includes both the ability to use the tools and applications on offer and more importantly, the ability to develop new innovative applications.

In addition to the issues outlined above, the increasingly limited opportunities offered through skilled migration also needs to be addressed. The number of ICT skilled migrants entering Australia under 457 visas has dropped from over 13,000 in 2007-2008 to around 8,500 in 2009-2010.\(^{32}\) While the percentage of 457 migrants with ICT skills remains roughly the same overall – relative to the total of 457 visa entrants - the drop in actual numbers materially impacts the ICT industry. This will be further exacerbated by the 2012 changes to the Government’s Living Away From Home Allowance (LAHFA). Changes to LAHFA will effectively make it less attractive (indeed less viable) for overseas workers to work in Australia, more difficult for employers to attract overseas workers and potentially much more expensive when they do.\(^{33}\) These changes particularly impact the ICT industry, which represents one of the largest categories of 457 visa holders. As noted earlier in the paper, the ICT skills shortage issue is multi-dimensional in nature. While reliance on skilled migrants is not optimal, it fulfills a critical short to medium term need while other longer term systemic changes are made.

### AIIA FOCUS AND ACTIONS

The AIIA is taking an active role in both driving awareness of the ICT and digital skills shortage as well as looking at opportunities to address it – including working with relevant partners. AIIA acknowledges that industry has both a role and responsibility in halting current trends and in promoting ICT as an attractive and rewarding career option.

AIIA’s strategic intent is clearly articulated: to create a “world class information, communications and technology industry delivering productivity, innovation and leadership for Australia”. Building industry capability, and in particular the capability to support Australia’s Digital Economy, is a major strategic

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\(^{32}\) ACS, Submission to the ACARA Draft Shape of the Australian Curriculum: Technologies. June 2012

\(^{33}\) LAHFA has been an attractive tax free component of most employment packages offered to non-residents moving to Australia. From 1 October 2012 all temporary residents who are not maintaining a home in Australia (that they are living away from), will lose access to the concession.
objective articulated by the AIIA Board. To this end we have initiated a range of measures to encourage the
development of an expert, dynamic and sustainable ICT industry, which is competitive on the global Digital
Economy stage.

In response to the challenges faced by the shortage of ICT and digital skills, the AIIA has established a
national Special Interest Group (SIG). The Group, chaired by Ms Susi Steigler-Peters, National General
Manager, Education, Telstra Enterprise and Government, focuses on three areas:

- Education and ICT: Shaping the future of education with a focus on crafting new ways to integrate
  best-in-class vendor products and services into 21st century learning environments.
- Education through ICT: As key change agents, drive transformative change in direct response to
  market demand, ie drive new education models that utilise smart ICT, including new personalised
  learning options.
- Education for ICT: While not unique to Australia, the lack of interest in Science, Technology,
  Engineering and Mathematics has had a major negative impact on our skills base and consequently,
  on national productivity. As a minimum, we need to work with stakeholders to augment the profile
  and appeal of IT in the workplace and to regenerate commitment to the STEM subjects.

The SIG aims to rally industry support in each of these areas to drive changes within the education and
training sector to increase understanding and appreciation of the ICT industry and achieve improved ICT and
digital skill development outcomes.

AIIA has also participated in a pilot program in Queensland over the five years from 2007 (GroupX). In
partnership with Queensland’s universities, the Queensland Government, the Australian Computer Society,
NICTA and local industry, this program has focused on disseminating information on career opportunities
and sponsoring activities designed to encourage interest in ICT as a career. In contrast to the national trend
data reported above, applications for tertiary ICT places in Queensland have increased over 40%, and offers
have increased by almost 80% without any lowering of cutoffs since 2007 (thereby indicating an increase in
both quantity and quality of applications). This promising program has the potential to assist in improving
the situation around ICT tertiary education if expanded nationally.

AIIA is also taking a proactive approach to better integrate VET courses with industry needs. With the
Victorian branch of the AIIA we have developed a proposal (The Pathways Program), which in conjunction
with the TAFE sector, places students in the workplace and engages them directly in ICT employment while
they are completing their ICT training. The Pathways Program provides a student with an efficient way to
gain industry certification and education qualifications through an apprenticeship style model. A key aim is
to address current misconceptions regarding TAFE versus universities amongst industry recruiters and to
build credibility of TAFE as an alternative source of a talented, certified and experienced workforce. The
model is consistent with the fundamental principle of VET, ie that it reflects industry requirements to
address industry needs. The ICT industry acknowledges that it needs to ‘step up’ and be more proactive in
ensuring it works with the sector to achieve the desired industry wide outcomes.
We are also working with the Queensland Government to provide recent university graduates the opportunity to gain on-the-job experience and professional development in a variety of ICT roles. The program in conjunction with the Queensland Government Chief Information Office, creates opportunities for AIIA members to strengthen their relationship with and understanding of Queensland Government agencies, by sharing graduates. The program is 18 months in duration, includes a 9 month rotation and monthly workshops for all participants.

The broader issue of digital literacy is also of concern to the AIIA. This has two dimensions: (i) enabling a digitally ready workforce and (ii) educating businesses about the transformative impact of the digital economy and associated opportunities. AIIA has been a vocal advocate of the need to ensure Australia’s workforce is skilled to be a competent, high performing player in the global digital economy and to this end supported the development of programs that specifically address digital literacy gaps. We have taken a specific interest in the need to educate SMEs of the sometimes difficult but necessary task of developing new business models and reviewing and revamping old business process models that align with the new mode of our economy and productivity. In Queensland the AIIA is supporting Brisbane’s “CLICK” Digital Expo, designed to assist SMEs across a broad range of industries understand how they can take advantage of the digital economy and use technology to increase their competitiveness.

At a broader level we have also given an undertaking to the Executive Officer of the Australian Council of Deans of ICT (ACDICT) to support them in changing the image of ICT. Like ACDICT we believe the male stereotypical representation of ICT is out-dated and that this in itself, is an issue impacting the attraction of ICT courses and the profession generally.

**RECOMMENDED ACTIONS MOVING FORWARD**

At her recent Digital Economy Forum the Prime Minister explicitly highlighted as a priority action item, the need to address the ‘skills pipeline’ into ICT. With this in mind, and reflecting on the issues raised in this Paper, AIIA recommends, consideration of the following actions and strongly encourages that they be raised in the context of the forthcoming conversations with Senator Chris Evans, Minister for Skills and Tertiary Education who has been asked by the Prime Minister to review the current ICT skills shortage issue. The first of these recommendations is noted as an immediate priority – AIIA strongly believes that a more strategic and coordinated approach across all stakeholders and industry players is essential as a priority. This is necessary to ensure the development of holistic and systemic responses that ultimately combine to form an overarching strategic pathway in which individual recommendations are properly contextualized and supported. As noted above the ICT and digital skills issue is multidimensional in nature and hence requires an overarching rather than piecemeal response.

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As an immediate Priority:

1. Government and Industry to develop a formal Working Group, with representatives from Government, the ICT industry, professional ICT educators (eg ACCE, Australian Council for Computers in Education and related State based groups) and the recruitment industry to develop a strategic pathway that ensures Australia has the skills and talent required to participate in the global Digital Economy and the basis for advanced ICT skills development into the future.

In relation to primary and secondary school education:

2. In light of the need to increase the focus of ICT at the primary and secondary levels, commission a specific piece of research to examine how to give STEM subjects and the integration of ICT in all curriculum areas greater relevance and gravitas, including from a student, teacher and institutional perspective.

3. Incentivise appropriately qualified, enthusiastic ICT educators to take up careers in the primary and secondary school systems. This could also be done using something similar to Teacher Innovation Grants – a scheme used in the US in which private organisations fund grants to help teachers obtain classroom equipment for innovative student projects.

4. Initiate incentive programs for primary and secondary school students to study ICT subjects. This could include competitions; scholarships; prizes; industry supported mentoring programs etc.

5. Develop specific programs that promote an ICT career pathway for secondary school students and ensure this is supported by appropriately informed school based career advice.

6. Require STEM subjects to be integrated as core to the National Curriculum – a measure similar to what the Obama administration is currently supporting in the US.

In relation to tertiary education:

7. Investigate ways to grow and broaden the pool of students interested in ICT careers through improved industry engagement, more comprehensive dissemination of information about ICT career opportunities, and larger-scale activities to stimulate and grow interest in ICT; for example by scaling up the Queensland-based GroupX initiative, which proven to successfully increase tertiary ICT offers by some 80% since 2007.

8. Through DIISRTE review current ICT courses, with a focus on university and vocational offerings, to ensure alignment between course material and outcomes and the skills and knowledge required to effectively participate in the Digital Economy.

9. Invest in university-based research: Expand research initiatives through the provision of grants to the most outstanding early-career ICT based researchers in the country.

10. Similar to countries such as Singapore, Hong Kong and Saudi Arabia require universities to take higher level responsibility for job and GDP growth in the fields they receive government funding. This will fundamentally shift the focus to tertiary studies and research having an outcomes focus.

11. Develop a program of internship supported by the industry.

12. Similar to programs overseas (eg Singapore), offer specific courses in entrepreneurship, supported by funding and industry support with the aim of encouraging business start-ups with a specific ICT
flavour and/or supported by new smart technologies.

13. The Australian Government and industry investigate the barriers to greater collaboration between industry and higher education providers in the delivery of innovative curricula and courses, which meet industry skill needs.

14. Investigate opportunities to extend the Pathways Program AIIA has proposed to the Victorian VET sector to other States and Territories. The aim of the Program is to place students in the workplace and engages them directly in ICT employment while they are completing their ICT training.

In addition to the above we are aware of three specific initiatives proposed in this area by NCITA, which we also support. These are:

- Develop an ICT skills ecosystem mapping tool to identify and match high-levels skills to new industries and business.
- Source and develop advanced courses targeting high-level skill shortage areas and deploy these in partnership between industry, academic and research organisations.
- Develop a broader, industry-focussed curriculum aimed at increasing student numbers, broadening the student profile and delivering an appropriate, revitalised skillset. This must recognize that ICT is not merely an extension of science and engineering, and requires new, cross-disciplinary approaches to teaching.

CONCLUSION

As the peak industry association for the Australian ICT industry, AIIA has, over the last few years, consistently raised concerns regarding the increasing demand for ICT and digital skills, issues relating to ICT and digital skills development, the changing nature of skills requirements and the need to build a robust and highly competent ICT sector and workforce. AIIA is a willing partner in working with the appropriate bodies and stakeholders to ensure current trends are halted and Australia builds a high performing ICT industry and broader digitally skilled workforce that meets the needs of Australia’s broader economic and social objectives, particularly as these relate to the global Digital Economy environment. In developing this paper AIIA is keen to work with DBCDE, and other parties, to identify practical ways in which current issues can be addressed, including with appropriate funding, supporting an ICT and digital skills program through which AIIA can actively assist in the prosecution of some of the recommendations outlined above.

AIIA strongly believes that action is required now to prevent Australia becoming a laggard in the effective use of ICT and digital competencies to drive productivity outcomes and necessary to remain a competitive force in the rapidly developing global Digital Economy. This is particularly important given intense global competition, especially in our own backyard as highlighted by Australia’s recently released Asian Century agenda.  