

Industry-led Vocational Education and Training (VET)

To Support Australian Workforce Digital Capability and Productivity

A Discussion Paper

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Executive summary

"That Australians enjoy an enhanced quality of life and share in the opportunities of a growing, globally competitive modern economy, enabled by technology." ¹

In its 2018 Digital Economy report, the Australian Government recognises the value and impact of technology to the Government Services and the growing relevance of digital technology to every aspect of the economy.

Never has the Australian economy or in fact any economy, been impacted so significantly by the influences of technology enabled by faster broadband and wireless technology. Technological factors as well as significant megatrends including the current health pandemic, are changing the shape and structure of workforces globally.

Rapidly changing environments demand sustainable and agile workforces with mobile and adaptable skills to meet the current and emerging needs of Industry. Rigorous human capital planning includes development of skills needs analysis and strategies to mitigate foreseeable gaps as operational and productivity needs change.

More importantly, it includes the development and verification of high-quality skills as determined by Industry under an "Industry-led" arrangement that meets the requirements and specifications of Industry. This process needs to be a skilling strategy that meets improved capability, increased productivity, ongoing safety, and meeting social needs across economic and business cycles.

For Australia to realise its ambition and ensure its sovereign domestic security is realised it is imperative that an understanding of the digital economy and all it encompasses from infrastructure, social impacts and professional application, is realised and that all mechanisms to skills attainment and recognition is achieved.

To realise opportunities presented by digitisation, government need to understand how jobs and the skill sets demanded by these jobs are changing. Digital skills have transitioned from optional to critical and are best aligned with soft skill for maximum affect.

The content of this paper is designed to take forward the significant opportunities for the digital technology and communications sector that enable society and Industry to pivot to the current and emerging way of operating through appropriately skilled digital technology and communications workforce. This is within the environment of COVID-19, with the rapid change of workforce behaviours and the remote workplace whilst the Australian and State and Territory governments and the Industry undertake the latest process to reform the Australian Vocational Education and Training system.

Given the current efforts to improve and simplify the Australian Vocational and Training System (VET) system, including increasing industry consultation in that process, it is important that industry does not become a defacto deliverer of training outcomes for the VET System in the absence of having a stronger hand in determining skilling outcomes.

¹ Australia's Tech Future, Delivering a strong, safe and inclusive digital economy. Australian Government 2018



Organisational Details

Communications and Information Technology Training Ltd (CITT)

Communications and Information Technology Training Ltd (CITT) is a **'Not for Profit'** independent industry based company incorporated in Australia in 1995 and **is NOT** a Training Provider, nor a Group Training Company nor an Apprenticeship Centre. For the past 25years, CITT has been involved in developing job and career information, promotional materials and other media programs for the technical area of the ICT industry.

This is part of CITT role as an industry body, and with numerous industry and government contracts, CITT was engaged in various projects including updating information in the technical streams of the ICT National Training Packages for the Government funded Industry Skills bodies. In partnership with industry, training providers and stakeholders, these programs and job materials have assisted schools, VET co-ordinators, career teachers, parents, new and existing employees, enterprises, industry, governments and training providers.

CITT is considered by the ICT industry as the expert in technical workforce development and training systems for digital and telecommunications. CITT has been asked to chair numerous training committees that includes developing courses in Cybersecurity, Integrated Technologies, Digital Technicians certification, Cablers' assessments and so on through both the National and Victorian training systems.

Australian Digital and Telecommunications Association Board (ADTIA)

In 2010 the Australian Digital and Television Industry Association (ADTIA) was established as a member based industry association for the digital reception and television industry to promote best practice by way of training and quality assurance for its workforce and the industry.

In November 2014 ADTIA broaden its coverage to include other sectors of the Telecommunications industry including infrastructure, in premises installations, computer and telephony integration FtA/Broadcasting, Digital and Subscription TV, Radio Communications, Mobile phones, Home Integration systems and other digital associated sectors.

The revamped ADTIA board now includes some of the major Telecommunications enterprises such as Telstra, Optus, Foxtel, Tandem, BSA, Downer, FtA TV channels, CITT, TITAB, and so on.

With an emphasis on educating to 'Future Proof Tomorrow', ADTIA focuses on:

- Quality and Standards
- Workforce Training and Skills development
- Industry growth and productivity
- Industry based Professional development

Today ADTIA has the emphasis on *Knowledge, Opportunity and Growth* for the Digital and Telecommunications industry and its workforce. This will assist in meeting the demands of the Digital Economy which will help address productivity levels as well as social, healthcare and education issues.

CITT and ADTIA work closely with **Government** to implement workforce strategies within the digital sector. Importantly, this relates not only to technical and technological matters but also to occupational health and safety practices, customer service and how to operate a small business.



CITT and ADTIA works closely with **industry** and its members to maximize exposure to work opportunities in an open collaborative environment. Industry and stakeholder support the access to relevant workforce programs, skilled workforce and influence programs to ensure workforce is engaged in lifelong learning.

Background Context

The Digital technology and Communications industry participation and leadership is critical in developing relevant VET policy and achieving the productivity goals of the Australian Government and State and Territory governments. This is paramount as the use of digital technology across all industry sectors gathers momentum in meeting social, occupational and functional requirements across the economy.

This is the foundation that will inform the definition, value and acquisition of skills and further adoption of technology as occupations and jobs change due to the take-up of digital technologies and as traditional occupational boundaries blur as the distinction between the application of skills within the social and professional areas particularly during COVID recovery and post COVID become paramount².

A report commissioned by Cisco with Oxford Economics examined the impact of digital disruption on the future of Australian jobs. The report indicates that the number of newly created roles and occupations were likely to be significant, but this would be dwarfed by the number of existing roles transformed by digital technologies. It further highlights that workers will be (and in some respects are) spending less time and effort on routine and more effort on tasks that are less structured.

What is certain is that the digital economy is well entrenched in most Australian's lives through their engagement in digital devices. As presented in Telsyte Australian Digital Consumer Study 2020³, Australian consumers have:

- Traditionally been early adopters of new technologies
- 51% of Australians favour smartphones (Android or iPhones) as their main digital device
- Consequently, there is a boom in subscriptions and streaming services (music, games, eCommerce)
- The internet is now the main source of entertainment for more than half of Australians (52%) for the first time in 2019
- Consumer wearing devices such as smart watches is driving new customer engagements which is directly impacting traditional industry sectors such as health and medical sectors

The demand for accredited digital skills has never been more critical as Australians increase their professional and personal digital footprint. The Smart Home market is taking hold across Australia with a forecast of 2.9m households being classified as 'Smart Homes' or intelligent home automation relates to the homes that are controlled and monitored via internet connection of devices as part of the Internet of Things is a key component of intelligent home automation. Hence the importance of quality connections.

² Future-Proof Careers for Business Graduates and Professionals. Dr. Marcus Bowles, The Institute for Working Futures Pty Ltd

³ Telsyte Australian Digital Consumer Study 2020



As outlined by the Australian Digital and Telecommunications Industry Association (ADTIA), the current Multi Technologies Mix used for the National Broadband Network into homes and businesses provides a broad based model to support a Digital Economy in which technology devices will continue to evolve and require technicians to support installations and upgrades. This will be substantially improved with the 2020 announcements by the Federal Government to upgrade its current network to increase its fibre footprint.

The digital revolution that is occurring includes the concept of smart cities that are more sustainable, efficient, and supportive of citizens. With the expansion of the digital age through Governments, industries, internet services and knowledge flow, there will be a greater requirement for technicians to be upskilled and trained and provided with workforce development to meet technology changes – this is crucial for the existing workforce which most have outdated skills.

It is well known and accepted by Industry and governments globally that the nature of the workforce is experiencing unprecedented change due to technical innovation. With this, the shift from routine to non-routine, cognitive jobs is driving a stronger need to add (to the technical skills) the soft skills including complex problem solving, analytical thinking, creative thinking and personal drive⁴.

Digital Skills are defined as a range of abilities to use digital devices, communication applications and networks to access and manage information. They enable people to create and share digital content, communicate and collaborate, and solve problems for effective and creative selffulfilment in life, learning, work and social activities at large.

Key areas impacting the need to re-set skilling requirements and validation of skills for a sector that is rapidly changing includes:

- a. The rapid pace at which digital technologies are deployed across all sectors and functional areas of the economy;
- b. The growth in the uptake of broadband due to NBN rollout;
- c. The need to prepare for the upgrade of NBN infrastructure to 5G (and beyond);
- d. The impacts 5G infrastructure will have with all areas of the Australian and global economy including trade, communication, security, social constructs, government, and ecitizens; and
- e. Establishing clear and unambiguous ways the Australian government, Industry, and citizens best work together to ensure the national Vocational Education and Training reforms meet productivity needs and expectations to ensure greater take-up and value-for-money for investors.

The Australian Government in its strategy paper Australia's Tech Future 2018, identifies four key areas for focus in its digital strategy:

- People: delivering Australia's digital skills and leaving no one behind
- Services: how government can better deliver digital services
- Digital assets: building infrastructure and providing secure access to high-quality data

⁴ World Economic Forum, Future of Jobs Report, 2018

ARBN: 141 768 934 ABN: 74 596 161 060, www.adtia.org.au,



• The enabling environment: maintaining our cyber security and reviewing our regulatory system

The Australian Government has undertaken several reforms of the VET system with the most recent review undertaken by The Honourable Steven Joyce in 2018. The review received 192 qualified submissions from engaged stakeholders seeking their views, experiences, and aspirations of the VET system. The result of which was 71 recommendations across 6 points within the Plan.

Given the appetite for Government to revamp the VET system by setting a new vision and a new reform plan, the opportunity lends itself for Industry to have a stronger voice in determining the structure of the VET system particularly through micro credentialing and recognition of industry certifications. The goal of this latest structural reform is to strengthen industry's role in order to ensure relevant skills are developed and that the VET system will provide a direct path into the labour market including for career progression, transition to new industries and business owners including independent contractors and sole traders.

What is needed is a clear mechanism for the digital and telecommunications industry to work within a VET system that addresses its skilling needs to meet the pace of change both with technology and occupational definitions.

This paper seeks to drive awareness to the Australian and State and Territory governments overseeing structural and operational changes to the VET system, and to seek greater participation from the digital and telecommunications industry to ensure the skilling needs of the sector is represented in the new VET reforms being undertaken by Government to ensure greater take-up.

Australian Digital Technology and Communications Sector Overview

The Digital Economy Strategy

The Digital Economy is essential to Australia's productivity, global competitive standing and improved social wellbeing. Governments, industry and the community can work together to improve Australia's growth enabled by platforms such as the Internet, mobile and sensor networks.

A successful Digital Economy is essential for Australia's economic growth and our ability to maintain our international standing. It offers new opportunities for businesses to a larger, potentially global, audience and for individuals to connect and collaborate.

The digital economy also refers to the devices used each day such as computers, phones and game consoles, applications such as online maps, web searches and our electronic banking. The use of networked, digital technology spreads across all industry sectors such as the energy, printing, mining, education, eHealth, financial services, waste management etc.

Digital Economy is developing rapidly worldwide:

• It consists of components including government policy and regulation, internet, electricity infrastructure, telecommunications, digital service providers, e-business and e-commerce industry, information and knowledge management systems, Artificial intelligence (Ai), automation, Big Data and Cybersecurity ,emerging digital and platform services



- It's an important driver of innovation, competitiveness, improved efficiencies, productivity and growth, global competitive standing and it holds huge potential for entrepreneurs and small and medium-sized enterprises (SMEs)
- It permeates all aspects of society, influencing the way people interact and bringing about broad sociological changes and improved social wellbeing
- There are some Disadvantages of Digital Economy as we are depending more on technology, we are moving away from the natural as well as human resources in our society. And this is affecting the unemployment ratio which has grown with the advent of technology. Due to this technology and the digital economy; we are losing our jobs.
- The "digital revolution" is impacting everything, from economy, innovation, science and education, to health, sustainability, governance, and lifestyles.
- Digital business, as it relates to business technology, offers companies and individuals new ways to connect, collaborate, conduct business, and build bridges between people
- Use of digital technologies drives innovation, fuel job opportunities and economic growth
- A digital ecosystem is a group of interconnected information technology resources that can function as a unit. Digital ecosystems are made up of suppliers, customers, trading partners, applications, third-party data service providers and all respective technologies.

Studies by organisations like the Organisation for Economic Cooperation and Development (OECD), the Productivity Commission and Australian Bureau of Statistics (ABS) estimate that around half of all Australian business productivity in recent years can be attributed primarily to the application of Information and Communication Technologies (ICT) as the digital economy has developed.

It is a complex and comprehensive industry with revenues in the tens of billions; huge capital expenditure and investments in research and development at about \$6 billion, accordingly the Australian ICT Industry has a critical place in the national economy

Recently the digital technology and telecommunications industry has been characterised by significant systemic and cyclical skills issues and at times the gap between demand for ICT skills and the supply of skills has threatened Australia's productivity gains, innovation capacity, export opportunities and employment growth across the sector.

Digitally enabled growth also requires investments in new technologies, which includes improving the start-up landscape and reducing the gap between Australia's tax settings and regimes in other countries.

Internet and broadband are increasingly commonplace in our day to day lives with the Government having moved rapidly to improve accessibility and service with the National Broadband Network.

Australian Department of Industry 2019 report "Tech Future" details how Australia can maximise the opportunities of technological change by focusing on 4 key areas:

- developing Australia's digital skills and leaving no one behind
- how government can better deliver digital services
- building infrastructure and providing secure access to high-quality data



- maintaining our cyber security and reviewing our regulatory systems
- The strategy sets clear outcomes, identifies opportunities and areas that need further

Defining Digital Technology

Digital technology is commonly used as an umbrella term for technologies that electronic system devices generate, store, and process data. Using data to communicate across software and hardware increases understanding between individuals, businesses and governments and drives us into a new age of efficiency and innovation. Well known examples include social media, online games, multimedia and mobile phones. Digital learning is any type of learning that uses technology.

Digital technology encompasses such a broad scope of ideas, work processes and mediums that the Australian Curriculum, Assessment, Reporting and Authority (ACARA) defines it as:

'Any technology controlled using digital instructions, including computer hardware and software, digital media and media devices, digital toys and accessories, and contemporary and emerging communication technologies. These technologies are based on instructions given, using binary (0 or 1) code, that invariably mean one or more processors are present to respond to these instructions. Computers, smartphones, digital cameras, printers and robots are all examples of digital technologies.'⁵

Reference.com also offers an explanation of digital technology that can help to understand how it works and what it is used for:

'Digital technology is a type of transfer that involves breaking a message or form of communication between two machines down into binary code. Binary code consists of all ones and zeros and can be reassembled upon being read by another piece of equipment that utilizes digital technology. This is a contrast to other, older types of technology that used other forms of information transfer and could not move data as quickly."

Digital technology uses digital code to transmit signals and information between different devices. This can be done with things like television programs or human voices. The data is converted into strings of ones and zeros and moved quickly to the next machine, where it is converted back into media form. In older forms of technology, like analogue technology, this was done with pulses of electricity. However, analogue systems often face size and speed limitations that digital technologies do not.'⁶

Digital transformation is the process of using digital technologies to create new — or modify existing — business processes, culture, and customer experiences to meet changing business and market requirements. This reimagining of business in the digital age is digital transformation.

Smart Homes – it's critical to relate the Internet of Things (IoT) to everyday lives in today's society. Applying the IoT in the context of private homes is known as a smart home. The rapid expansion of smart home growth rates is directly linked to 5G rollout ⁷

The discussion about the future of work centred mostly around forecasting change and or reimagining how jobs will be defined in a new world. The reality is that change is taking place and

⁵ Australian CURRICULUM, 20019. https://www.australiancurriculum.edu.au/f-10-curriculum/technologies/glossary/?letter=D

⁶ What is digital transformation, 2018. <u>https://www.reference.com/history/digital-technology-93efbf266360578c</u>

⁷ Statista Outlooks. Smart Home <u>https://www.statista.com/outlook/283/107/smart-home/australia?currency=aud</u>



the Australian Training and Education system needs to rapidly adapt to meet the rapidly changing skilling needs across all industry sectors. This applies not only to the technology sector but, and importantly, to the users or customers of services and technology. Automation is also reshaping jobs and approaches to employment.

The Australian workplace has undergone significant change over the last decade with about a third of the Australia's working population was regularly working from home pre COVID-19. During the COVID-19 period (to July2020), ABS report indicates nearly half of the Australian workforce (46%)⁸ transitioned to a home office arrangement.

Australia's Digital Technology Workforce

The Australian Computer Society 2019 edition of the Digital Pulse report by Deloitte's Access Economics stated Australia's ICT workforce at 663,100 workers in 2017, up 3.5% from 640,800 in the previous year, forecasts that demand for technology workers will grow by 100,000 between 2018 and 2024 in trend terms, with the technology workforce increasing to 792,000 workers. Prior to the COVID 19 epidemic various reports showed that by 2023, this is expected to grow by 13.4 per cent – adding over 67,800 jobs to the economy. These figures will be impacted by the COVID 19 pandemic.

From a training and skilling perspective, program enrolments across the two ICT training packages have remained stable at around 97,000 over the 2015–16 period. However most recently, in 2018, enrolments have declined to 65,120. Program completions have declined somewhat, falling from a high of 26,820 in 2015 to 19,540 in 2018.

Subject only enrolments had a large increase in 2018 to 52,770, up from 31,410 the previous year and 8,800 in 2016. This suggests students may be choosing one or more subjects instead of whole programs when using this training package.

PwC ISC "Skills for Australia", responsible for industry skills, states that the ICT sector comprises of workers involved in information technology (IT), communications technology and digital media.

Australian Industry Skills Committee (AISC) states that the ICT industry can be seen as comprising of three main areas:

- Information technology this covers all areas related to processing, manipulating and managing information.
- Telecommunications technology this covers cabling, wireless, switching, transmission, radio frequency, and optical communications media and internet protocol networks.
- Digital media this covers design and production of multimedia and games for various platforms.

Some of the ICT sectors that require support in identifying the jobs and career information include:

- Digital Media
- ICT Networks
- ICT Operations and Support

⁸ Australian Bureau of Statistics: Report: Job Situation and Working from Home Arrangements, 25 July 2020



- Programming, Software and Web Development
- Telecommunications Technology.

Currently the training packages covering the Information and Communications Technology industry are:

- ICT Information and Communications Technology Training Package
- ICT10 Integrated Telecommunications Training Package

PwC, the Skills Organisation for ICT, reports anecdotally, some of the IT classifications that appear to be in demand – keeping in mind that accurate national data is almost non-existent – are generally estimated to be:-

- ICT professionals, as distinct from managers
- IT network engineers, IT project managers
- Business and Data analysts
- ICT business and systems analyst. ICT helpdesk officer
- ICT security specialist
- Web developer, Multimedia specialist
- Professional virtual database administrator

Workers in the IT sector use computers to retrieve, store, transmit and manipulate information. IT workers undertake various tasks ranging from designing and developing software applications and systems to meet users' business needs to planning, developing and administering organisations' database management systems.

Workers in digital media plan, design and develop digitally delivered information for promotional, instructional and entertainment purposes. Digital media workers undertake various activities from designing and developing mobile applications or video games to planning, developing and implementing social media campaigns.

Workers in communications technology, also referred to as telecommunications (telecoms), plan, design, commissioning and maintain software and hardware networks, including copper, optical, radio frequency and internet protocol (IP) networks. Telecoms workers undertake a range of tasks from installing and repairing hardware in households and businesses to designing and developing software to maximise the efficiency and efficacy of communication networks.

The Telecommunication industry can generally be identified by the following sectors with each having critical business and workforce requirements:

- Telecommunications carriers network planning, NBN development and infrastructure
- Cabling/Data Communications Customer access network (CAN) and Customer Premises Equipment (CPE) (includes the Government's "National Broadband Rollout" initiative)
- Digital technical sector Digital Reception of Free to Air (FtA), Subscription/Cable TV
- Broadcasting and Satellites
- Computer and Telephony integration



- Radio Communications
- Home integration systems in telephony, security, audio-visual, Television and computers

Industry analysts predicted massive changes in the shape and nature of the Australian Telecommunications environment. These changes will directly impact businesses capabilities that has seen a growth in the business use of broadband networks, E-Business, E-Commerce and technical support. People employed in jobs in Information and Communications Technology (ICT) work across all industries, so it is difficult to capture total employment by industry.

ICT and digital technology organisations engaged in providing IT and telecommunications services, including ICT hardware and software sales and service, are integral to virtually all sections of the economy - banking, healthcare, telecommunications, education, transport, resource exploration, manufacturing, tourism, primary and mineral production, security, entertainment and in support of the sustainable environment.

Numerous industry reports highlight that not only has the ICT industry got a big role to play in its own right, it also plays a major role as an innovative enabler of other industry sectors. In ICT – and many other sectors – employers are demanding skills that will deliver on the promises of new and emerging technologies, including advanced skills in data analytics, software engineering and cloud computing.

Demand trends for information technology services from health, research and development, finance, banking, insurance, education, and the management of government and government services to the public are important, as they are significant clients to the sector with growing reliance on digital technology to function. Equally, the significant growth and reliance on telecommunications infrastructure and IoT enabled technology gives rise to industry sectors in their own right.

Access to high speed broadband is expected to have an impact on all industries, but particularly in the entertainment, financial services, e health/digital health, transport and logistics and e-learning sectors. In these areas, applications- based service provision is becoming more and more an issue as product diversity increases.

The use of mobile devices and ongoing access to digital media and social networking is also becoming more central to businesses and workplaces. This is especially so with "cloud" repositories and there is a risk – both perceived and real - with cloud system security that is generating a greater demand for information and network security capability.

Key Workforce Issues and Solutions

Currently, the industry is facing issues and obstacles to improving workforce productivity and delivering the infrastructure that Australians consumers deserve. The following outlines some of these issues and our proposed solutions to assist in implementing the digital benefits:

 Regulations: There are many overlapping and sometimes contradictory regulations between states and territories and the commonwealth on a range of issues that need to be rationalised such as (cross boarder) recognition of licenses, eligibility for government funding of some training programs, complex traineeships and apprenticeships arrangements, differing requirements across Departments achieving similar outcomes,



local council by laws, recognition of industry endorsement and certifications and so on. This has been outlined by many industry and government reports including the VET review undertaken by The Honourable Steven Joyce in 2018

- 2. Digital television: The transition to digital TV has in broad terms been a success and the principles of accreditation and accountabilities for technical staff, also applicable to the NBN rollout, where a multi technology and contracting/sub- contracting model has been used. Industry recognises and appreciated the excellent work the Digital Switchover Taskforce (DST) undertook to ensure that the rollout was successful and with minimum issues. ADTIA and CITT applaud their ability to involve all the stakeholders in their consultation processes and workshops. For example, the use of the AIES workforce recognition program by the DST was a great success as industry and stakeholders were engaged from the beginning and the relevant technicians undertook a quality process. The DST model should be adopted by the Department of Communications in implementing other Digital programs.
- **3.** Home theatre self installation: The ACMA 2013 review of home theatre and home entertainment guides on cabling and plug and play resolved confusion with self-installation practices and the final outcome was widely supported by industry. This was an important step as broadband access generally and the rollout of the NBN provides customers with more choices. This is another example where industry engagement was vital to the final guides and practices.
- 4. Establishing an industry "Digital Workforce Development and Productivity Body (or Taskforce)" for the Telecommunications and Digital areas: This industry and government co-funded industry driven Digital Workforce body will address the workforce and productivity issues facing the frontline technicians, contractors and enterprises responsible in rolling out the NBN and the implementing the digital services demanded by consumers. Currently the Telecommunications and Digital workforce issues are (poorly) managed by various agencies processes and regulations.

This body could undertake a more collegiate approach to supporting converging technologies and workforce skills by using industry benchmarks and the co-regulation quality model adopted by ADTIA. An objective would be to work to provide flexibility and national consistency within the existing VET system to improve workforce productivity including brokering workplace training places in enterprises. It would also participate in industry audits of the quality of training facilities, resources and delivery of the required programs.

5. National Training Packages reforms relevant to industry and productivity: As highlighted by the VET review undertaken by The Honourable Steven Joyce in 2018, current processes for endorsement and update of industry based competencies, assessment arrangements and qualifications are onerous with many bureaucratic and administrative hurdles to overcome and frustrating employers with more regulations. Industry and VET stakeholders can usually develop draft changes in weeks or months, however, the need to conform to bureaucratic requirements after the industry development stage, can take months and sometimes more than a year as per the ICT10 National Training Package updates to include NBN qualifications - this makes the training package cumbersome and difficult for trainers



and employers to implement. *Streamlining of the national endorsement process is urgently* required

- 6. Urgent support and funding for skill sets: In the Telecommunications and Digital industry, Skill Sets and Vendor (Industry) Certifications are required to meet the technical aspects to deliver the infrastructure support. Under the current Government guidelines these may not be funded unless they are part of a qualification. Perhaps in a joint arrangement with states and territories, Skill Sets should be part or fully funded to provide initial underpinning Skills and Knowledge to "workers" to enable employment on a productive basis and enable employers to take on new entrant workers able to be trained quickly and with an ability to add on qualifications as needed at a later time.
- 7. Existing workers retraining: As a long-term strategy to improve productivity and more targeted training outcomes, a new "existing Workers Retraining Model", should be developed. Workplace mentor arrangements, supervision for the modern workplace and OH&S now need particular attention.
- 8. Industry based Programs for retrenched workers: Although not specifically related to ICT skills needs, opportunities to retrain staff transitioning from Manufacturing to other industries, such as Telecommunications, can be created through a specified pathway that can contribute to the workforce skill demands of the NBN and other ICT projects. For example, the adoption of an industry CADETSHIP program incorporating Customer Premises, Access Network and the more specific skills for the National Broadband Network could be invaluable. The challenge is to provide additional support and possibly incentives for employers to participate.
- **9.** Community impact of the NBN and "digital literacy": There is a widening community impact from the more general use of computer-based applications and the ever more sophisticated telecommunications devices, particularly mobiles. The scale of "digital literacy" across Australian communities and workplaces is generally considered to be insufficient to support adequate business development and productivity. Digital literacy needs to complement language, literacy, numeracy and technical/engineering skill requirements and should be included in all levels of education primary, secondary, tertiary, vocational and "life- long learning" programs.
- 10. Digital and multi-technology training and Group Training company options for Telecommunications: training to meet industry requirements has been more diverse than the previous. Many of the "traditional" skills for cable jointing, remedial work, testing, and fault finding on copper have been in greater demand. In the previous 'monopoly" telecommunications environment, virtually all telecommunications training was in-house. The contracting and privatisation arrangements in recent years has left a policy gap for mid and higher-level technical skills which for a time was mainly filled with ex-carrier redundant staff who have since retired.

The industry is now at a point where intakes of new entrants are becoming a priority and the need for an independent Telecommunications Group Employer or Group Training Company should be considered. The industry has entered an era of the contracting cycles and these are relatively short so apprenticeships and even traineeships, which are a shorter duration, are not supported by most contractors and employers as they are often too difficult.



In many other industries that are more experienced with contracting and privatisation, Group Training Companies (GTC) have been a successful means of overcoming the problems with the cycles of contractors and matching employer needs to Registered Training Organisation (RTO) and government agency funding policy. A GTC for telecommunications is needed and to minimise establishment costs could be piggy backed on to an existing organisations activities and use "telecommunications: badging" to demonstrate a focus on telecommunications needs.

- **11.** Retail service providers: The Communications Alliance has made some important contributions to the role of RSPs and application of industry codes for the benefit of consumers and RSPs. However in the premises this industry must engage further with the RSP's as to ensure that the workforce is meeting their needs and industry expectations.
- 12. Industry support for ACMA cabling rules and industry requirements to improve quality: The customer premises component of the NBN is on the customer side of the boundary and under the jurisdiction of ACMA. There is a significant amount of work in this area and arising from the ACMA Cabling Provider Rules Review in 2011/12 a number of upgrades to competencies are being phased in over two years and will be fully implemented in July 2014. The telecommunications industry - and IT where some cabling occurs - welcomed the changes which were not onerous and will give stability in the ACMA regulatory area for some time. Industry supports a co-regulation audit and inspection Quality Assurance (QA) model and over time has been examining collectively with ACMA a future system that would improve customer cabling quality. There is a lot of concern in industry with customer cabling which often does not meet the technical standards needed for good broadband delivery.
- **13.** Support for Contractors and Small Businesses in the Telecommunications and Digital Industry: The current contracting model requires most small business with few employees to have company structures, ABN etc to work in the Telecommunications industry. There is a need to provide tailored information and an advisory service that will be readily accessible and specialised in nature to these contractors about industry and government programs, business advice and how to improve their capacity to remain productive and informed. This program will enhance the Telecommunications workers and manager's skills and capabilities in such areas as operating a business, understanding financial implications and maintaining and growing a successful business within the Telecommunications industry.

CITT and ADTIA is positioned to initiate discussions with Government on how a cooperative model could provide support and funding to undertake workshops, develop websites and information, establish and advisory service etc to ensure that contractors stay viable during their contract period. This may be an activity that could be undertaken by the Digital Workforce Development and Productivity Body.

- **14.** Other Industry and Workforce Challenges: Industry currently faces further challenges with the following areas:
 - Ageing of the workforce
 - Improving the Telecommunications industry image in schools and providing career pathway information to Job Seekers and agencies



- Relevant and identifiable Industry data on telecommunications
- Engaging and supporting the Workforce Supply Company role
- Supporting contractors with equipment, vehicles, tools and other costs in the NBN and telecommunications industry – ie how can tools be depreciated quicker, finance made available and so on
- RTO partnerships and training infrastructure support

Evolving digital education

Universities, TAFEs, RTOs and private sector organisations are increasingly developing targeted training that link digital skills to a specific profession or task. These are becoming increasingly popular as employer and employees want to increase their digital proficiency and improve their prospects. Andrew Gemino, Associate Dean, Graduate Programs, at Beedie School of Business, said "these programmes are not about learning content, they're about changing practice"⁹

The Beedie School of Business recently partnered with KPMG to develop the capabilities of audit professionals. The program they created was been accredited as a Graduate Certificate programme, it trains staff to utilise advancements in technology and data and analytics. And, incorporate machine learning, artificial intelligence, and other digital advances into their day to day activities. The first entrants begun the course in April 2019 and have not yet completed the program.

In Australia similar courses and programs are being developed, both with the direct involvement of industry and independently. RMIT University recently launched its range of Future Skills short courses, these courses typically take 1-4 months to complete and are run by RMIT or RMIT and industry partners such as Apple. This range of courses are non-accredited but still offer valuable skills for students, they focus on the application of digital technology and systems.¹⁰

ICT Sector Attrition

Reflective of an ageing population and low intakes of new ICT entrants in the industry and previously government agencies in gas, telecommunications, roads and rail due to privatisation, the Skill Councils report that ICT occupations have a median age generally over the all-Australian industries median age.

The Telecommunications and Electro-Technology sectors have an ageing workforce well above the national figure with around 48 years as the median figure. This emphasises the urgent need to increase the numbers of new entrants into the industries with factual and up-to date career and job information.

The diversity and changing aspects of this ICT industry highlights the urgent need for research and identify career, employment, and specific pathways that a new entrant to the industry requires to make a career choice.

⁹ Harnessing disruption – a glimpse into the future, R Eastman, 2019. https://globalfocusmagazine.com/harnessing-disruption-a-glimpse-into-the-future/

¹⁰ RMIT University Courses & degrees, 2019. https://online.rmit.edu.au/courses



To address skills shortages, the Industry and Government need act on the highest policy priority for the digital economy, skills development including supporting the reskilling of workers from other sectors to meet employer demand for technology skills. Ensuring there is in place clear reskilling pathways that do not take workers/learners through extended learning pathways or qualifications will support the productivity needs of the sector and keep learners engaged with the system.

In early 2020 Robert Hillard¹¹, the current AIIA chair, wrote in an article calling for:

"...investment in digital infrastructure as industry leaders are talking about investing in large amounts of infrastructure to kick-start the economy but this should include digital infrastructure that will set the next generation up with the future jobs... "

COVID-19 has accelerated changes that had already been coming to the way we use technology as the myriad of social, inclusion, education, export and economic benefits that these new digital skills create requires new infrastructure.

It ranges from filling-in connectivity gaps through to solving identity and trust issues. Our future is a hybrid of physical and digital and needs to include advanced manufacturing which is rich in IP which can be exported to identical fabrication technology in seconds and in production in minutes.

The case studies included in this report appendices provide an insight into the diverse range of industries that can benefit from the digital economy – health, education, water, transport and banking. They show how new business models can develop such as last-minute accommodation booking services and how emerging forms of news gathering can arise such as citizen journalism.

The case studies also show how digital products that appeal to multi-national corporations and digital content that appeals to global audiences can be developed right here in Australia. As Lars Rasmussen, co-founder of Google Maps, a tool that was developed here in Australia and the focus of one case study, says:

"The Web means that it doesn't matter where you are...you can live here in Australia and build products for the world thanks to the internet."

Skilling Needs of the Digital and Telecommunications Sector

As technology and the utilisation of digital technology ramps up, it is challenging to keep ahead of where the skilling needs are. This requires regular forecasting insights on technology developments, technology and productivity investments, learning and development trends and community sentiment informing the Australian VET system.

Issues relating to digital skills applied to non-technical companies as well as those identified by technology and telecommunications companies are in some respects align. Virtually all businesses and consumers are "Internet-dependant". The internet, whether enabling communication via email, social media, online transactions, storing and managing data via data cloud storage, utilising operating systems in the cloud, or simply obtaining information off the web and providing web accessed services. This growing dependency is expected to grow exponentially in coming years with the adoption of the Internet of Things enabled by the rollout of 5G.

¹¹ Robert Hillard is Chair of the Australian Information Industry Association (AIIA). He is also Chief Strategy and Innovation Officer at Deloitte Australia and is a member of Deloitte's global board of directors.



The Telecommunications industry, through its Communications Advisory Group (CAG) members (a telecommunications industry technical group) have highlighted many issues that require attention confronts a wide range of matters and this section is a snapshot of the technical issues.

Below is a summary of identified current issues within Telecommunications that will impact the capability of the Digital Economy and consumer transformation to maximise the usage of Internet of Things (IoT), applications, data and video streaming and so on:-

- The problems/challenges associated with the growing use of Power over Ethernet (PoE) and Fire-stopping activities are becoming a significant issue relating to the general power supply in the context of safety and responsibility as many current and legacy installations are not capable of handling PoE safely. Government and industry policies and training programs need to be developed or enhanced as part of a Professional Development (PD) program to new and existing workers where regular installation and training breaches occur that cause both customer service problems and safety risks to users and cablers from electrical shocks or fire or alarm system failures
- Legacy cabling remaining in buildings is becoming an expensive and major issue for building owners and telecommunication installers as its causing poor wiring and connectivity as in Australia this has generally been "left to the market" to provide a solution which is causing frustration and extra costs to customers. Telecommunications needs were often unplanned in the older buildings requiring a number of ad hoc solutions. But for newer commercial buildings there should be provision of space for telecommunications capacity, data cabling and associated equipment including access to buildings for RSPs and carriers to cable between floors for connection frames, equipment panels, and communications/radio antenna systems such as Distributed Antenna Systems (DAS) that are growing in number and diversity
- Of concern are the successive cut backs of funding has diminished the role of the ACMA's ability to field regulate and monitor the quality of spectrum interference, OH&S, customer cabling, support consumer equity and access issues, and equipment installations sector. ACMA and industry evidence highlight an alarming amount of non-compliance to technical standards relating to service quality and importantly safety
- The skills levels of cablers and thus the quality of work is a major concern to the integrity of the Digital Economy, particularly where widespread sub-contracting occurs in the industry. There is a tendency for the responsibility for mandated registrations, training and development of workers in many cases to be cascaded down the contracting levels and hence no quality system is in place other than commercial requirements
- The costs to consumers is also higher than needed due to rework and remedial work, and the growing use of the broadband network has highlighted limitation of the current systems in coping with high demands in many communities. This highlights the need for an industry Professional Development/Skills Maintenance programme every 5 years for the telecommunication workers as the MTS, 5G and so on does provide a number of training problems due to the need for a diversity of skills and limited ability to deliver training for this field by RTOs/training providers

Network Infrastructure:

Virtually all businesses and consumers are "Internet-dependant". The internet, whether it is communicating via email, transacting online, accessing data stored off-site in the cloud, utilising



operating systems in the cloud, or simply obtaining information off the web. This dependency is expected to grow exponentially in coming years with the adoption of the Internet of Things (IoT) and 5G.

• NBN Infrastructure:

The multi technology broadband system (MTS) finalised by NBN Co has coped well under the pandemic demand of working from home. There were pockets of concerns but this manly dealt with poor installation or internet products purchased. The Federal Government announced an upgrade to its NBN network to increase its fibre footprint. This will have an impact on the availability of workers with fibre skills and the VET system needs to recognise that these workers require upskilling and support for short courses.

In the longer term, the increased use of broadband and in particular more people working from home, requires future upgrading of core network infrastructure and improved connectivity. Based on global experience the fibre to the node installations will need to be upgraded to fibre to the kerb or fibre to the home and this brings about the issue of costings and who will bear these most significant costs.

The current infrastructure will be enhanced with the deployment of other telecommunications connections such as enhanced wireless spectrum including 5G, satellites and so on. This should improve the capacity to increase the opportunities of the Digital Economy but its limitation will still be driven by the workers skills and capabilities for installing the infrastructure and equipment to a relatively high level.

• 5G Wireless Infrastructure:

Currently 5G is being rolled out throughout Australia and 5G is the most recent stage in the evolution of cellular mobile networks. It represents, in the first instance, a response to the exponential growth of mobile data traffic and digital products, especially data and video, over the last decade as 5G is designed to be a more pervasive technology set than its predecessors, supporting a wide range of social and industrial uses over both fixed and mobile access platforms.

As wireless connectivity sits at the heart of this larger 5G "ecosystem", radiocommunications skills and knowledge will be increasingly in demand not only within the telecommunications sector but across all sections of the economy and to achieve this they will need to be flexible and rapidly responsive to demand.

In the course of this evolution many existing workforce roles will disappear while new skill needs will arise. Industry reports that the skills available in the current radio-communications workforce have not kept pace with network evolution and that there is a lack of publicly available training to remedy such shortages, at least at the VET level.

Work Health & Safety

Work health and safety has become a more commonly used term and for telecommunications and the digital economy. Emerging technologies have introduced new problems for example with radiation, electrical shock risk from associating with power and more general risks associated with alarm failures where monitors are linked by telecommunications infrastructure with digital technology in the alarm system.



A recent review by ACMA demonstrated a high level of non-compliance to safety standards where there was close proximity of telecommunications cable to mains power and that safety switches in small commercial and domestic situations do not provide the level of safety that is commonly perceived - and it will probably take decades for retrofitting to be complete.

There is sometimes overlap with state/territory (jurisdictional) authority laws, insurances and compensation regulations in workers safety and consequently variations in some requirements for areas such as confined spaces, working overhead and other work situations.

The telecommunications industry has been a national responsibility from Federation and in the main, the larger telecommunications and data enterprises have very good systems in place but there is a significant problem with shortcuts being taken by sub-contractors once in the field, due to time and commercial pressures, where a significant number of serious accidents occur due to these short cuts.

Review of Telecommunications and allied standards, that apply to the installation and maintenance of fixed or concealed cabling or equipment connected, being undertaken by Communications Alliance will include new requirements and standards for:

- Fire Stopping
- PoE (Power over Ethernet)
- Introduction of new energy source classifications (Response to IoT and PoE related products and associated dangers)
- Redefine the Network Boundary
- Update of ICT equipment safety requirements
- Introduction of one-pair cable and connectors
- Remote Power Feed requirements
- Revised labelling requirements for fibre optic enclosures
- New "fit for purpose" requirements to ensure products provided actually do what they are supposed to do

These areas have become more pervasive in the industry and as end users demand it more and more, the safety and network integrity risks, particularly for end users, escalates. Cabling regulation and standards regime contribute to the dependability of telecommunications across emerging digital and community services. It provides the platform for Government, Councils, industries and business to deliver Smart Cities and a productive and growing economy.

Within this current position of VET reform, the primary function of vocational education and training as applied to the digital technology sector is to provide high quality, industry relevant and assessable education and training and needs to be reviewed within the context of the following digital skills learning cohorts:

- 1. Foundational Digital Skills (digital literacy)
- 2. Extension Digital Skills (applied to existing worker upskilling or reskilling acquiring new or higher level unique and specific skills related to jobs and/or professions such as digital health)
- 3. High end technical skills, most commonly referred to as the Information Communications and Technology sector (related to telecommunications and network infrastructure, devices, systems design, cybersecurity, etc.)



These types of digital skills provides structure around levels to deliver digital literacy necessary to ensure that people across all industries, occupations, sectors of the economy and locations can equitably participate in the digital economy (or rather economy)¹²

Underpinning these broad three themes lies the need to understand how skills acquisition and the recognition of statements of attainment through a blend of micro-credentialling (comprising competencies and vendor certifications) can be defined and maintained within the AFQ and VET system. This is essential in recognising the investment industry and individuals make to the VET system.

Australian VET System – Current Changes

As indicated in the Joyce Report, with the growth of digitisation across the economy more people with digital technology skills is increasingly critical to successful performance of the Australian economy.

Employer satisfaction rating on the Australian VET system indicates a decline in recent years and is at its lowest rate in a decade¹³.

Respondents to the Joyce study (192 valid submissions) indicated that overall their satisfaction of the Australian VET system was adequate, particularly in relation to the flexibility of the current system and "its ability to support students to design their study around their individual needs, the 'hands-on nature of training and the delivery of job-ready graduates were all positives cited by respondents"¹⁴.

The question remains, was there adequate spread of the digital technology industry and mix of businesses as users or "buyers" of the Australian VET system represented in the report? How can Industry be best represented in a determinative way to ensure the Australian VET system meets the productivity needs of Industry, particularly as the Australian economy works to move out of the current recession due to COVID-19 where speed is of the essence and both employers and current and future employees seek security in work.

With the tension between VET and higher education sectors and with the absence of formal recognition of industry certifications, the competition for market share is causing confusion for students seeking to make the right decisions about training/education for their career development. The opportunity exists to present the broad range of learning and skilling options to underpin lifelong learning pathways incorporating VET, higher education, and industry certifications depending on skills required to perform in the workplace.

The Joyce review reports that of the industries and employers that are no longer using the national VET system are focusing on credentialling (private qualifications) instead¹⁵.

¹² Telecommunications Journal of Australia Vol 63, No1 (2013), The critical role of e-skills in raising NBN adoption and Australia's competitiveness in the global Digital Economy, Marcus Bowles

 $^{^{13}}$ NCVER 2017, Employers Use and Views of the VET System 2017

 ¹⁴ Strengthening Skills. Expert Review of Australia's Vocational Education and Training System. The Honourable Steven Joyce, 2019
 ¹⁵ ibid



This will presumably provide an opportunity for industry to increase it's use of the VET system with confidence, particularly following the issues of quality and inflated costs from providers associated with VET FEE-HELP.

A key recommendation from the Joyce report (2.5) seeks more emphasis on work-based learning to meet the expectations of VET as incorporating work experience. This is further supported by the OECD proposing that vocational education and training should include significant work-based training¹⁶.

With regards to competencies and nominal hours, the Joyce report requests that benchmark hours be specified in qualifications by qualification developers as a guide to the average amount of training required for a new learner (one who hasn't held a position equivalent to the training), in order for the RTO to develop the required competencies within the qualification¹⁷.

Underpinning the refinement of developing and the recognition of digital skills within a period of significant change lies key structural reviews within the vocational education and training sector. COAG recognised that jobs that will emerge post COVID-19 may differ to those entering the health and economic crisis. The National Cabinet recognises that the higher education and VET system needs to immediately provide additional support to job seekers to enable them to reskill and upskill, and ensure that all school leavers have access to training and that businesses are able to access the skilled workers when and where needed ¹⁸.

The COAG tasked Skills Council is reviewing a draft Vocational Education and Training Reform Roadmap part of which it seeks to provide clarity around the definition and value of microcredentials and deliver an operational framework for how micro-credentials can work in the national VET system.



Training Package development and endorsement process policy¹⁹

¹⁶ Martin, John P 2018, Skills for the 21st Century: Findings and Policy Lessons from the OECD Survey of Adult Skills, OECD Education Working Paper No. 166, Paris: OECD

 ¹⁷ Strengthening Skills. Expert Review of Australia's Vocational Education and Training System. The Honourable Steven Joyce, 2019
 ¹⁸ Heads of Agreement for Skills Reform press release

¹⁹ Department of Education and Training 2016, Training Package Development and Endorsement Process Policy, Australian Industry Skills Council, Canberra: Australian Government



Schematic of the current VET system²⁰



Note: There are currently only two formal access points for Industry to inform the Australian VET system including competency definition, input into qualifications and assessments: the AISC and its Committees (IRC and SSO) in an advisory capacity only.

²⁰ Strengthening Skills, Expert Review of Australia's Vocational Education and Training System, The Honourable Steven Joyce, 2019



Industry and Vendor Certifications and Accreditation

In the ICT and Digital sectors there are many other means of skilling the workforce which employers use a means to determine the capability of the worker – this includes industry based accreditation, Vendor certification, short courses, Enterprise based training programs etc which support workers development but are not recognised within the VET system – unless they are "mapped" to the competencies and with the current processes this proving harder to achieve.

Below are some examples of Vendor certification and training programs (from 1995 – emergence of IT vendor certification programs globally)²¹

- Vendor school programs
- Vendor certifications remain relevant as they relate directly to technology products. The IT industry plays a crucial role in determining the skills they require (and define)
- Vendor-neutral certifications (for instance ICDL and CompTIA a global vendor-neutral body that develops global certification standards through consultation with Industry)

A Digital Technology Industry-led Pathway

An Industry-led pathway would compliment the AQF and relevant qualifications aligned to digital technology skills. By mapping and recognising industry competency standards represented in vendor certifications, skillsets and micro credentialling, learners will be encouraged to be connected with their learning pathways and career development aligned to jobs.

An Industry-led pathway is the skilling framework defined by Industry requirements which complements the broader obligations of a national training system but focusses on skills rather than qualifications. This addresses concerns around speed to achieve skills attainment and would complement the new VET arrangements.

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National Training System		Industry-led Pathway		
 Curriculum / Course Employability preparation Community service obligation Language, literacy, numeracy, digital (incl. regulation, legislation such as data privacy, IP, etc) Capacity to learn to learn and live in the digitally enabled world 		Industry Competency Standards – workplace relevant (delivered as vendor certification or micro credential)		
+		+		
RTO		Workplace / Industry validation		
Educational System Qualification		Industry certification or micro credential		

 $^{^{21}}$ CITT

 $^{^{\}rm 22}$ Industry Leadership Forum, Discussion Paper, SkillsDMC, May 2016



In this context, the Digital Technology Industry will be empowered to determine the specifications for a competent worker (the vehicle being what we now know in Australia as an Industry Training Package domestically and a global framework base based on the Australian best practice standards for the global market).

Essentially skilling (including vocational education and training arrangements within a national training system) relates to entry level and existing workers and must focus on the following three key areas:

- a. The allocation of resources driven by economic need around current and future jobs that will sustain economic growth (setting priorities);
- Determining the specifications for what is required for an employee to work safely and productively in a current workplace and the workplace of the future (units of competence); and
- c. Validating the relevance and quality of the outcome of the skilling experience against the Industry determined specifications such that an employer has confidence that the person has the skills to safely operate in the workplace (return on investment).

These three areas reflect that skilling is a "market" activity and has the characteristics of any market. Supply is what is offered by training service providers and demand is what Industry specifies as its requirement. Normally, demand and supply theory will allocate resources in the most efficient way possible. Traditionally due to influences from third parties including government policy and funding interventions, the ability of Industry to drive the behaviour of the suppliers has been limited.

Skills Organisation Pilot Programs – Digital Technology

Following the Joyce Review (2019), the Australian Government is exploring potential design approaches and opportunities to deepen industry engagement and improve the long-term outcomes of the VET system. Three Skills Organisation Pilots have been established in three key industry sectors:

- Human services care
- Digital technology
- Mining

Under the proposed Skills Organisation Pilot, these programs can be tested and proven if the mechanism and processes are followed from past examples – see Asbestos, Digital Technician licences, ACMA Registration processes, Microsoft, CompTIA, and Cisco programs etc mapped to ICT qualifications.

The Productivity Commission Interim Report released May 2020: National Agreement for Skills and Workforce Development Review, a body of work in response to a high-level agreement that identifies the "long term objectives of the Commonwealth and State and Territory Governments in the areas of skills and workforce development, and recognises the interest of all governments in ensuring the skills of Australian people are developed and utilised in the economy". The review is considering various approaches approach to improving overall performance including, reform directions, roles and responsibilities, funding models, transparency and strengthening information sharing arrangements.



The Interim report indicates that lifelong learning is mostly achieved in non-formal environments with around 85 per cent being funded by employers and is considered therefore a major contributor to the attainment of skills relatable to the workplace ²³.

As expressed by Brett Schimming, CEO, Construction Skills Queensland, "we must create a workforce that is comfortable working with sophisticated technology, and embodies a spirit of continuous learning. Because in a future of rapidly evolving technology, it will not be good enough to stop learning after the first four years of your career²⁴".

Digital Skills and the role of Soft Skills

As stated in the CompTIA paper Workforce and Learning Trends 2020 "available technologies – AI, people analytics, AR/VR, everything-as-a-service and more – promise to reshape the way learning is delivering and consumed." ²⁵. When it comes to designing workforce and learning or skilling models, it is critical to ensure that the development of frameworks, learning materials and assessment tools (competencies, micro credentials, skillsets, or full qualifications) engage a balanced spread of stakeholders for consultation to best inform the structure and content development. This will help to alleviate over emphasis on either early adoption technologies or lag technologies as a reflection of the Australian workforce.

Due to the rapid change of technological innovations across all sectors economy, agility in the development and maintenance of learning and assessment for the digital technology sector is critical. What training programs that are developed today will be in part obsolete in 5 years. This is a compelling reason to ensure the technology industry informs the skills required within their workplace. Embracing the "always learning" mindset is the new norm for training²⁶.

According to a CompTIA survey, eight out of ten HR professionals rate certifications from recognised certifying bodies as valuable or very valuable in the hiring and evaluation process. Certifications that closely align to employer job requirements play a vital role in agility in talent development efforts²⁷.

Increasingly soft skills are growing in relevance for the digital technology worker of today. This aspect of skills requirements has been recognised for many years without clear definition on what type of soft skills are in demand. Technology roles of today increasingly require customer interaction or deeper teamwork aspects. McKinsey Global Institute indicate the shift in jobs to more automated in nature²⁸. The need to draw on more creative, non-technical and cognitive skills is fast becoming an expected component of skills development and part of the recruitment process. In today's market, employers value employees with blended technical and soft skills so they can shape a workforce with the talent and potential to function with agility and awareness of customer needs ²⁹.

 ²³ National Agreement for Skills and Workforce Development Review. Productivity Commission Interim Report. May 2020
 ²⁴ Are you ready for change? Farsight for Construction. Construction Skills Queensland and CSIRO Data61, 2016

²⁵ Workforce and Learning Trends 2020, Research Report, CompTIA, January 2020

 $^{^{26}}$ ibid

 $^{^{\}rm 27}~{\rm ibid}$

²⁸ McKinsey Global Institute, Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation, December 2017

²⁹ Tertiary Education Trends in 2020, Australia and New Zealand, Dr Marcus Bowles, Institute for Working Futures Pty Ltd, December 2019



Results from the CompTIA survey³⁰ with 400 HR and Learning & Development professionals from US technology companies indicate that nearly two-thirds (62%) of respondents ranked soft skills with equal importance to har skills when it came to hiring and professional development.

With the development of the various improvements in the Telecommunications pipeline it has opened up increased applications and usage of digital, data, video streaming and networking requirements. This has had an impact with businesses and industry demanding better skilled workforce with current capabilities and flexibility – which the current VET (and University) system does not provide.

Digital, IT, Telecommunications and Broadcasting Sectors

The "Digital" area has different connotation to different people and if it is accepted that digital is integrated and an enabler to using applications, programs, and activities then it can identify as a broad technology to improve productivity and economic well-being. The technologies and tools rely heavily on IT, broadcasting, and telecommunications skills and these are an integral part of the Digital sector.

IT, telecommunications and broadcasting training, skills and competencies are included in the current ICT National Training Packages in one form or another however these need to be reviewed immediately as they are NOT "Fit for Purpose" and the current structure and processes do not provide this flexibility – as proven by the many State and Territory courses ad qualifications including Cyber Security and Integrated technologies in Victoria³¹.

Fundamental Principles for inclusive and equitable digital skills development

Underlying principles to apply to the digital skills echo-system:

- Clearly articulate the problem being solved?
- Ensure the skilling policies and reforms apply to all cohorts from consumers, users, developers, investors
- Ensure success productivity indicators are agreed by all cohorts and reported in transparent ways including organisations that use cutting edge technology and those that use legacy technology (consider digital literacy skills application within a 2-speed market)
- Understand the application of life-long learning in formal and non-formal ways
 - Recognise formal and informal learning pathways and the relationship:
 - Formal: schools, VET, University, Industry certifications, workplace
 - Informal: social environment, technological device use, workplace, consumer/retail
 - Operating in legal and regulatory environments: IP protection, cybersecurity, data privacy, legislation, regulation (commerce, finance, IR)
- Ensure accessibility is applied meaning address inequalities (defined by those who are experiencing inequality) including³²:
 - Socio-economic status
 - o Age

³⁰ CompTIA Workforce and Learning Trends 2020, January 2020

³¹ VET Digital and ICT Training Bodies – History and Lessons Learnt, CITT, November 2019

 $^{^{32}}$ UNESCO Digital Skills Critical for Jobs and Social Inclusion, March 2018



- o Educational background
- o Geography
- o Disability
- o Race

Recognition, Certification, Endorsements and Quality

Industry, Governments and stakeholders must be able to ensure that the Digital workforce, especially in the technical area, must be given the opportunity to be skilled and capable through a quality VET system.

This includes:

- Ensure language is consistent across policies and programs relating to digital skills
- That both federal and state Government Training Funds be provided to develop an (online) Industry Program that bridges the gaps in knowledge required to ensure that the existing technical workers across Australia are upskilled to meet required skills and standards.
- 5G Recommendations:
 - Training Products
 - That training products be developed for those sections of the telecommunications workforce involved in the construction, operation, and maintenance of 5G networks provide a thorough grounding in underlying radio-communications principles and technologies such as may be applicable across other industry sectors
 - Quality Assurance
 - Need to investigate what mechanisms may be required to support upskilling and cross-skilling of the sub-contractor workforce in the 5G context
 - That Australian Communications Media Authority (ACMA) and/or government support mechanisms for improving the quality of customer premises wireless installations
 - Related Activities
 - The need to develop a 5G information/awareness programme suitable for delivery to local government representatives and officers, RSPs, businesses and consumers
- Implement a Vocational Education and Training operator aggregated score to support transparency. This platform (operates like <u>Travello</u>), will empower buyers of education and training to make informed choices and promote positive experiences
- Ensure the AQF allows for recognition of skills across multiple and diverse specialisations and levels (promote job capabilities that allow for career management and progression to ensure agility and flexibility to accommodate changing economic and work environments)
- Significantly improve data collection to better inform Government and industry on matters relating to the Australian digital economy at the broad in terms of economic impact and skills forecasting



This VET system must recognises current skills, industry certification and government endorsements through around a rigour of processes and quality that is not too bureaucratic and industry based – too allow a market place that can decide and not have a race to the lowest level of laissez-faire.

Summary and Conclusion

There has never been a more critical time to put adaptive and responsive learning and development strategies in place. As the Digital Technology and Communications Industry continues its efforts to provide secure and reliable platforms for innovation across the Australian economy, it is increasingly important that Industry affirms its position as definer of workforce skills.

This is best achieved by ensuring the Australian VET system and the training products developed meets standards collaboratively agreed up and accepted by and across Industry as best practice.

Within the current arrangements, Industry lacks a determinative role to fully inform and shape the quality of endorsed vocational education and training. The challenges that will be faced during this current review phase, will need to incorporate the rapid change of the Australian workforce, living and social environments as the digitally enabled world becomes ever more normalised across the economy.

Where National Training Systems are in place, compliance is or becomes the essential instrument of compliance which may not always be in the interests of Industry. Such regulatory frameworks rarely contain the breadth and depth of knowledge Industry deems necessary for safe and productive operations. Industry concerns related to its opportunity to determine specifications for skills (competence required to perform effectively and safely in the workplace) and validation of the attainment of skills persist.

The Government's current consideration of micro credentialling offers an opportunity for the Digital Technology and Communications Industry to reinforce the value of industry certification and the need to ensure industry relevant qualifications and assessments and reflects the changing nature of the workforce and application of technologies.

If the Industry does not communicate a unified voice for skilling of their workforce then it is likely to further lose its representation and control under regulatory burden and policies.



Appendix 1

Case studies

Below are a series of case studies showing how digital technology changed the operations and how goods and services are delivered within leading national and international companies.

Case Study 1

BlueScope Steel

Based in Australia, this international company was facing growing pressure from increasing competition and fluctuations in the price of steel and in the construction market. The company decided to undertake a broad scope digitalisation process to put it ahead of its competitors and make long term savings.

The first step they undertook was enterprise-wide implementation of communication systems that integrated supply chain and logistics systems affecting rail, truck and marine traffic. The new digital system automated tracking and customer relations services, it also made information available across departments increasing efficiency.

From there they identified three areas that needed improvement or modernisation and four more large scale digital transformations that could address them and improve overall business operations.

Areas for change:

- **1.** Modernise infrastructure and adopt new technologies
- 2. Improve operations and supply chains
- **3.** Maintain and update ageing application portfolio.

Digital solutions:

- 1. Having an analytics platform this is software capable of taking data from any part of the business and analysing it to produce insights into sales, customer and employee needs, future operating costs and more
- **2.** Bringing in consultants from leading firms to provide ongoing technical support to employees and clients across all digital services
- **3.** Expanding their use of the Internet of Things (IoT), thereby enhancing communication and collaboration
- 4. Increasing investment in cyber security to protect intellectual property.

Due in part to digitisation, BlueScope Steel has grown its position in a volatile market and asserted itself as a company of the future. It has already recorded savings of \$2 million a year on staffing and streamlined logistical services. Its smart secure cloud platform has encouraged investors and new business partnerships, further expanding its operations and potential. And with a suite of communication and analytics software in place it is prepared for sustainable growth in the coming years. ³³

³³ DXC.technology, BlueScope Steel on path to digitally transform operations and IT, 2017.



Case study 2

Cabrini

Cabrini Health, Brighton Hospital, is a facility designed for an acute care specialising in cancer related services, women's health and surgery. The hospital was well known for providing excellent individualized care and boasts state-of-the art operating rooms. However, its data management system archaic, based on paper files and files that were digitised were available only from siloed repositories.

The separation and inaccessibility of important patient and business information made completing everyday tasks, such as rounds, and providing the best care for patients very time consuming. This led to them to the adoption of digital technologies.

As they began their digital transformation, they set the following goals:

- 1. Remove reliance on paper records and siloed data repositories
- 2. Improve access to patient data
- 3. Reduce medication-related errors and increase time spent with patients.

With this in mind they enacted the following digital solutions:

- **1.** Develop a mobile system that gives clinicians a unified view of clinical and administrative patient data
- 2. Implement an electronic medication prescribing and administration system
- **3.** Train and engage staff through peer-to-peer assistance and online instruction.

The digital system they implemented works fantastically well. They chose to use a mobile system of smart phones, tablets and laptops on mobile working platforms, so that medical staff can use them on the go. These devises allow staff to access patient data, share files and information, and take action from anywhere with internet connection.

The hospitals administration boasts numerous benefits from this system: improved efficiency and faster decision making. A doctor at Cabrini Health, Brighton, Dr. Tesfai, showed that he can now complete his rounds in about 40% less time, than before the digital transformation.

There is better collaboration and communication among doctors, nurses and pharmacists at the hospital and improved medication safety via proven error reduction. Thus, they met all initial goals and have gone further than initially hoped.

Digitising their data and communication methods have also improved patients' responses to staff. Doctors report that when they have clinical information and images at hand on mobile devices, patients are quicker to accept advice and feel more comfortable because they have a better understanding of what's happening.

Home care has also been substantially improved - now with their secure cloud services, doctors and nurses can now see test results in real time and act accordingly during visits to the patients.³⁴

³⁴ DXC.technology. Expediting and Advancing Patient Care at Cabrini, 2017.



Audi

Based in Germany Audi generates €8 billion a year in revenue by engineering, manufacturing, designing and distributing automobiles. Over the last 5 years, dealerships have been reporting lower numbers of visitors, there has been large increases to website traffic but this wasn't translating into as many sales as they would like.

In 2017 Audi UK launched beta.audi.co.uk: a mobile-first, fully responsive online experience that was designed to put the customer back at the centre of the car-buying process. This received very favourable reviews from customers and increased sales.

At this stage like many companies Audi UK had two separate digital portals: the desktop website and the mobile website. An internal review concluded that this was undesirable for a number of reasons. At this point the company created its premium web experience, building on the immersive customer focused mobile site previously created, while simultaneously increasing efficiency by creating one platform for tracking, tagging and reporting on campaigns.

Brand management is a very important concept to a luxury brand like Audi, seeing their success on online digital transformations they decided to make a bold new strategy to reinvigorate their dealerships. They designed another premium service, again placing the customers' experience and the prestige of the product before everything else.

Flagship dealerships across the world use virtual technology, multi-touch tables, tablet-user interfaces and 'powerwalls.' With these devices in place:

- Customers can seamlessly configure their Audi virtually in full size, on 'powerwalls' throughout the store, they can even open the doors or watch the vehicles drive off, complete with authentic engine noises
- Audi dealerships only holds four cars in stock, reducing the cost of having to hold a large volume of stock that often does not match a customer's criteria
- Large financial savings were recorded due to reductions in shipping costs, along with a positive environmental impact
- An entirely unique brand experience is given to the customer.

Most crucially after the digital transformation of the Audi City London branch sales went up by 60%, proving the success of this daring and innovative approach to digital technology.³⁵

³⁵ World Economic Forum, Digital transformation: Audi, 2018.



Amazon Business

Amazon is one of the most successful and influential companies when it comes to integrating digital technology and creating a successful online presence. Its incredible rise to prominence has been achieved using different tools and approaches. Now it continues to defy conventional logic, still innovates, experiments, takes risks, and invests heavily in its own digital research.

The starting point of Amazon Business's digital reform was an ethos they have used since the company's creation - an 'obsession' with the customer. It doesn't aim for customer satisfaction, it doesn't reach a point of acceptability and look elsewhere, the core of every project, every big transformation has been to bring Amazon business closer to its customer base and establish loyal clients. Amazon realised long before many others that digitisation gives independence and advantage to shoppers and that, companies that service them best will be the most successful in the world. The following are five key tenets to Amazon's relationship with customers:

- 1. Offer products at the lowest price by automating the checkout process, Amazon reduced its labour costs, allowing them to lower prices.
- 2. Ease of shopping the automated checkout allows customers to shop from home, crucially it has spent millions in creating and updated software that reduces steps in the checkout process and gives customers simple yet comprehensive information on the product.
- **3.** Partnerships with other businesses Amazon has opened itself to partnerships with both large and small vendors, even when some are running at a loss because shoppers find it easier to have one central location to buy products, enhancing the company's reputation.
- 4. Cyber security online identity theft and the possibility of stolen credit information is a big deterrent for people to use online platforms. Amazon Business has cultivated a reputation as one of the most secure online vendors, it has done this by staying at the forefront of digital security technology and giving the customers a range of seamless options for payment, they can choose the option they are most comfortable with.
- 5. Reliability It has taken responsibility for the quality of products, payment and delivery. Its automated systems mean there are very rarely mistakes and the customer is always informed of the situation. Amazon is known globally as one of the most reliable and efficient retailers in the world.

As part of growing their customer base Amazon moved in automated advertising campaigns. It realised it could use digital technology to collate, how people relate to the shopping experience, how an interest in one product relates to interests in other products, and the best ways of encouraging shoppers to buy more. The automated system can also actively sell to shoppers by:

- Automatically optimising content to improve customer experience
- Growing libraries of automated email programs for new releases and recommendations
- Showing content that is most likely to appeal to individual customers
- Customising recommendation sources depending on the customer.³⁶

³⁶ Amazon's business strategy, revenue model and culture of metrics: a history, D, Chaffey, 2018.



LEGO Group

Best known for the sale and manufacturing of LEGO toys, mostly plastic bricks, LEGO enjoyed steady growth for most of the second half of the 20th century, however in the 21st century the company was on the brink of bankruptcy. This promoted a major restructure of its remaining assets and a new strategy to pair its products with digital counterparts while engaging with its customers on digital platforms.

One of the most interesting parts of LEGOs transformation is that it has been able to intertwine its traditional building block product with digital technology, here's how they did it:

Social network app:

LEGO created LEGO Life, a social network community, where users are encouraged to share their physical play experiences. This move gives LEGO the power to play in the mobile and online space.

Crowdsourcing design:

Through LEGO Ideas, the company is able to crowdsource product design ideas from its users. The platform enables fans to create and vote on designs and gives LEGO a strong online presence, as well as a stronger user base who continue push innovation for the company.

Bridging the gap between the physical and digital worlds:

LEGO combined its physical bricks with a digital gaming application, which interacted with the constructed models. Through this combination, LEGO became a toys-to-life manufacturer by creating games and challenges for the user, who would be tested on their building skills along the way.

Incorporating coding:

LEGO launched LEGO Boost, which teaches children how to bring their creations to life. The kit comes with a combination of sensors, motors, and a companion app that teaches its users to code so that they can program their creations.

Entering video game industry:

LEGO Dimensions is a LEGO-themed action/adventure video game that brings LEGO into the lucrative video game market. For this component, LEGO partnered with Warner Bros. and the games were compatible with the Playstation, Wii, and Xbox consoles.

In 2018 the LEGO Group recorded earnings of 14.3 billion globally, an incredible turnaround from the dire straits it found itself in in 2004.

LEGO is a case study that shows the dangers of not moving with purpose into the digital age and how digital technology can bring a company closer than ever to its customer base and bring it booming success.³⁷

³⁷ LEGOs: Still "The Apple of Toys"?, R Park, 2018



Starbucks

In the global financial crisis, Starbucks along with most retail businesses suffered but it did cause them to consider the future more carefully and create a strategy on the burgeoning digital marketplace. Starbucks is now in a stronger position than ever and this is largely due to the success of its digital transformation.

Starbucks has achieved this by building what they call their 'Digital Flywheel', it focuses on 4 key pillars:

- Rewards
- Personalisation
- Payment
- Ordering.

The company's primary software for engaging the customer is the Mobile Order and Pay app. This app was truly an investment in customer focused technology, as it works to address consumer desirers.

- The app is convenient and user friendly
- Users no longer have to line up for coffee or wait for it to be made
- Customers have the option to pay over the app
- And, it comes with loyalty benefits.

In the third quarter of 2017 9% of orders in the USA were placed in advance and 30% were paid in advance of arrival. This out stripped even Apple who had already established Apple Pay.³⁸ This reduced labour costs for Starbucks and increase speed of service for all customers, further promoting the brand.

Discussing its digital transformation Starbucks CEO Kevin Johnson said, "Where others are attempting to build a mobile app, Starbucks has built an end-to-end consumer platform anchored around loyalty." And it is working, in 2018, 18% of its worldwide customer base were members of its mobile loyalty program but they represented 36% of sales. Membership is growing and Starbucks have been able to translate that into sales growth, this is because they have the perfect platform to advertise, incentivise and upsell.

The app is also Starbucks fundamental portal for understanding consumer habits and wants, it gathers and sends huge amounts of data that is keeping Starbucks ahead of competitors and customers in love with their service.

Its estimated Starbucks spends around \$250 million US on technology, the investment is paying off as it takes on a greater market share of the digital arena and has surging repeat business levels.³⁹

³⁸ Starbucks: a tech company or your neighborhood coffee shop?, K Franklin, 2018

³⁹ 3 Real-World Examples of Digital Transformation Success, M Rosner, 2016



Appendix 2

Amsterdam Digital Conference Summary

The conference was held in Amsterdam on the 3rd of October 2019. It was organised and led by Roar Media in conjunction with 13 other companies and organisations, 6 of who participated by sending keynote speakers to discuss various subjects regarding their ongoing journeys through digital transformation. They were: The City of Rotterdam, L'Oréal, E.ON, Aegon, Phillips and KLM. Topics of discussion were wide-ranging; however, 3 themes were common throughout the conference.

- 1. Where does digital transformation fit into an organisational structure?
- 2. When and where to use digital technology?
- 3. How can digital technology be used to improve the customers experience?

These 3 questions were explored directly and indirectly in the presentations and discussions held. A brief description of the experiences of the keynote speakers, including data that related to the questions above is provided.

Almost every speaker and a number of other participants in panel discussions spoke openly about mistakes they have made and the probability of mistakes they will make. But all agree that effective digital strategy is crucial to the future success of their businesses and were happy to learn and share from the experiences of others.

Applying the lessons of the conference to the Australian marketplace.

The digital age is here and with it comes greater connectivity, disruption to traditional working models, massive opportunity for business and social growth, but also risk. There is no way to completely protect ourselves from the risks of cyber-attack. Individuals and organisations with the motivation and resources will continue to try to develop ways of accessing private data. The means of disrupting such activity lies with us and there are several steps that can be undertaken to improve cyber security. The steps include:

- 1. Adopting a collaborative approach to regulation. Industry agrees there needs to be frameworks in place to ensure safe procedures are practiced across the digital market and there is a cooperative approach to cyber security. Debate on data management laws is ongoing in Australia, and there will need to be updates and changes made as the digital age develops. Now is the time for government and industry to come together and develop a system that protects Australian businesses and citizens while allowing continued innovation.
- 2. Placing Cyber security issues in the spotlight throughout a project development cycle. The best ways to combat digital attacks are to use digital defences and train staff in best practices. Sharing the responsibility between IT departments, executive teams and individual employees will go a long way to protecting business operations.
- **3.** Considering and understanding the risks of using new technology such as cloud platforms and 5G, as well as the benefits. There are numerous ways to further secure these services, but it takes a considered approach to achieve the best results for a specific entity, and in an evolving environment these new products and services will be the best form of protection against malicious operators.



4. Taking an ethical standpoint on how private and public sector approach the digital age, and the mass amounts of private data becoming available. At what point is privacy being breached and who should have access to what information? There are no easy answers to such questions, but they must be asked and, once again a collaborative approach must be taken as we attempt to provide solutions.

Amsterdam Cyber Security Conference Key Themes

Unleashing Cyber Security conference was held in the Rode Hotel, Amsterdam, on the 7th and 8th of October 18, 2019. It was organised by Global Executive Events, who brought together a wide range of industry groups and professionals, including the European Commission, the European Center for Data Innovation, Booking.com, the Leiden University and many more.

In 2019 cyber security, data management and privacy were a key focus for most organisations, these subjects represent opportunity and risk. The rapidly evolving digital landscape is increasing the level of threats and 'attack points' for every kind of organisation and for individuals. Consequently, demand for cyber security personnel has never been higher and the range of cyber responsibilities continues to grow. Professionals are also required to be flexible in how they approach their work, problem solve and innovate. It is imperative now to continue innovating and working together to stay ahead of malicious acts.

The conference objectives were to:

- Bring together industry leaders so they can better identify cyber security strategies
- Encourage and share innovative solutions and thinking, while managing existing privacy and systems
- Examine new security threats and evidence-based solutions to help organisations do business in the digital marketplace
- Discuss means of building resilience through the use of technology, employees and legislation.

The presentations and workshops discussed a wide variety of topics and often participants had very different opinions from each other. However, over the course of the conference several themes continued to resurface. They were:

- 1. Organisations must invest in greater risk management against cyber-attacks and methods of building organisational resilience.
- **2.** The absolute necessity of updating security by incorporating digital technology and processes into the design of new systems.
- **3.** New legislation and reforms to existing regulations are already impacting businesses, how can they best manage this and use it to their advantage.
- **4.** The ethics of data collection and management.

This report addresses these themes and extrapolates from the discussions and experiences of the speakers at the conference.



Appendix 3

Cadetship Model

Skilling the Telecommunications Workforce: Four Models for Apprenticeships/Cadetship/Internship Programs





Appendix 4

Major ICT Bodies

Australian Digital and Telecommunication Industry Association (ADTIA) Inc

ADTIA was established in 2010 for the Digital and Telecommunication industry as a member-based industry association to promote best practice in the industry through technical standards, workforce development, skills training and quality assurance processes. ADTIA works closely with its organisational members, networks, technical committees, governments and other stakeholders to implement strategies relating to digital technology.

ADTIA is a key player in the telecommunications infrastructure rollout program including the National Broadband Network (NBN), IP networks and the convergence of these technologies in customer premises, mobile telephony, wireless and complex building cabling. ADTIA was the industry association engaged by the Digital Switchover Taskforce to assist with the rollout of the analogue to digital national project.⁴⁰

Australian Computer Society (ACS)

The ACS sees itself as the peak body representing Australia's ICT sector. The mission of ACS is to deliver authoritative independent knowledge and insight into technology, build relevant technology capacity and capability in Australia, and to be a catalyst for innovative creation and adoption of technology for the benefit of commerce, governments and society.

The ACS actively promotes collaboration of business, entrepreneurs, people employed in the ICT industry and students in Australia. It runs and creates research projects encouraging members to work together to produce new innovation and promote the sharing of ideas. Members gain access to all of ACS's digital information and platforms to connect with other people from their industry. Members also receive discounted or free personal indemnity insurance, depending on their income.

ACS offers members two forms of certification: Certified Professional and Certified Technologist. These certifications analyse skills and competencies, assessed from education levels and experience.⁴¹

Australian Information Industry Association (AIIA)

The AIIA is one of Australia's largest representative body and advocacy group for those in the digital ecosystem. It is a not-for-profit organisation which encourages participation from its members by providing them a vehicle to affect policy formation and discussion within government and industry.

Since 1978 the AIIA has pursued activities to stimulate and grow the digital economy, to create a favourable business environment for its members, and to contribute to Australia's economic prosperity. It does this by:

- Providing a strong voice of influence
- Building a sense of community through events and education

 ⁴⁰ Australian Information Industry Association, 2019. https://adtia.org.au/about_adtia.ph
 ⁴¹ The Professional Association for Australia's ICT sector, 2019. https://www.acs.org.au/home.htm



- Enabling a network for collaboration and inspiration
- Developing compelling content and relevant and interesting information
- Engaging directly with policy makers and influences outcomes, particularly in the areas of innovation, skills, and government digitisation
- Providing members with privileged access to key decision-makers, at both federal and State/Territory levels
- Creating events and meet-ups to provide members with greater networking and business opportunities
- Regularly communicating with members regarding activities and outcome.

Communications and Information Technology Training Co (CITT)

CITT delivers strategic analysis and advice for the digital technology and Telecommunications sectors. This includes technical and call centre training, and analysis and commentary on industry skills matters. CITT also promote Training Packages, Apprenticeships and Traineeships within these sectors. CITT is an association, not a training provider.

CITT notes that the ICT industry over the last few years has expanded to include the convergence of technologies across a number of industry areas. These areas include networking, web development, software development, database integration, sustainability, digital and interactive games and digital media technologies.

In addition to its commitment to the NBN rollout, the Federal Government has recently committed to initiatives such, the Digital Economy, Digital Education Revolution (DER) computers in school program and the implementation of the "Green ICT" sustainability strategy, all which will impact significantly on the ICT sector.

CITT supports ICT training for those seeking a professional career pathway in ICT as well as those seeking the ICT skills to support careers in a myriad of associated industries. Areas within the ICT industry include:

- Interactive and digital games
- Digital media technologies
- Broadband/wireless
- Digital literacy
- Cloud computing
- Social web technologies
- Mobile devices
- Network security
- IP based communications, broadcasting, switching and transmission.

CITT notes that there is a huge importance on the reliance of ICT to economies and societies through increased productivity and innovation.⁴²

⁴² Australian Information Industry Association, 2018. https://www.aiia.com.au/



The Information Technology Industry Council (ITI)

ITI advocates on a wide range of issues that promote growth and innovation across the globe through an expanding use of digital technology. They have listed the following areas of priority: privacy, security, trade, forced localisation, standards, tax, over the top services, regulatory compliance, internet governance and accessibility. ITI represents a number of major global tech companies and works as an advocacy group linking them to various governments to pursue the afore mentioned policies, its members include:

- Adobe
- eBay
- Apple
- Dell
- And many more major digital based companies.

Association of Information Technology Professionals (AITP)

AITP offers industry recognised accreditations in various IT fields including digital services and technologies. Courses have been specifically designed to meet the needs of different operating systems and platforms. The three primary sectors they provide courses for are:

- **1.** IT fundamentals and basics, which is attained through performance-based exams that certify foundational IT skills across a variety of devices and operating systems.
- 2. Network certificates these are essential skills needed to confidently design, configure, manage and troubleshoot any wired and wireless devices.
- **3.** Security courses providing a global benchmark for best practices in IT network and operational security, one of the fastest-growing fields in IT.

ATIP invests in the future of the technology workforce, as well as leadership development by giving students the tools they need to succeed in IT and become technology leaders. The AITP Student Program connects students to mentors and provides career advice and resources to build a strong foundation as an IT professional.⁴³

⁴³ Association of Information Technology Professionals, 2019. https://www.aitp.org/programs/



Appendix 5

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