Australian
Industry and
Skills Committee

Future skills and training

A practical resource to help identify future skills and training

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About Miles Morgan Australia

Miles Morgan Australia is an independent, Australian owned and operated policy and social research and evaluation consultancy led by its CEO, Barbara Macnish.

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CONTENTS

Purpose

This project gathered and analysed data on Australian and international skills trends and megatrends to build an understanding of the potential impacts on Australia's workforce in the future, with particular emphasis on the implications for the VET sector.

This resource is intended to stimulate discussion amongst Industry Reference Committees (IRCs) in considering future changes to Training Packages. In addition, broader VET stakeholders will find it useful for preparing their particular sectors to meet the future skills needs of business, learners and workers.

Australia's megatrends

How will global megatrends impact Australia's future workplaces?

Future skills needs

What skills will workers need to be effective in Australia's future workplace?

Future VET

What education and training solutions can prepare us for Australia's future workplaces?
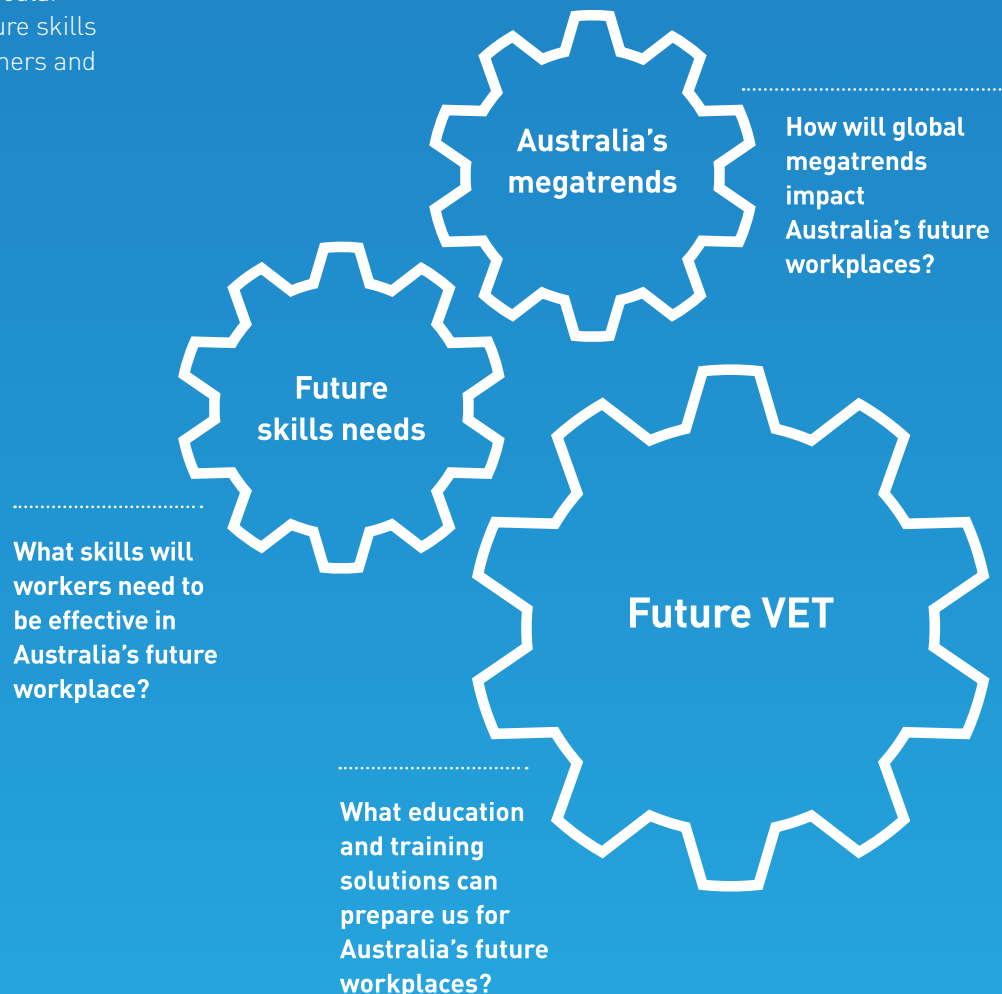
A future focused approach

VET stakeholders generally assess the education, training and skills needs of the labour market by referring to formal labour market data releases, economic and social reviews, and forecast reports.

Foresight, or future, studies have also become increasingly popular among strategists and policy-makers. While emphasising the premise that no future is certain, these studies typically involve consultation with a wide range of stakeholders, knowledge communities, and subject experts.

This resource draws on a strategic foresight approach to present a forward-looking exploration of Australia's potential future ways of working and learning through the relatively novel lens of social and digital media-based conversations and reports, as well as reviewing the more traditional avenues of knowledge and data.

A central feature of this resource is the delivery of a series of plausible future workplace scenarios, under which possible implications and solutions for VET needs are discussed. Users are also equipped and encouraged to develop their own sector-specific scenarios to assist in their planning.

The approach used to develop this resource follows comparable studies by international government bodies (e.g., UK Commission of Employment and Skills), workforce development related industry bodies (e.g., CIPD UK), and others.[1]

Building on existing knowledge

International studies have recently emerged identifying a range of megatrends that are expected to impact future governments, societies and economies[1], ways of working, skills development and needs, and labour market performance.[2] Australian-specific megatrend studies have also been completed.[3]

The trends outlined in this report emerged during the online data mining and analysis phase of the study. The validity and relevance of each trend was determined using a triangulation approach. This means that where the same information was found in three or more reputable sources (including more traditional sources) the trend was confirmed.

Section sources

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Overview of principal research activites

Environmental analysis

This principally incorporated strategic management and foresight research approaches (e.g., STEEP*). This involved the identification, examination, and systematic description of environmental factors influencing future skills needs in Australia.

A desktop review of traditional and grey literature** was conducted to both inform and complement the central social media data mining exercise.

This analysis paid particular attention to Australian and international research into megatrends, and VET systems and reforms.

Online data mining and analysis

Using specialised social media data extraction software three 'macro' searches were conducted.

Each of these macro searches resulted in a substantial dataset that was analysed to inform the scenario building workshop and ultimately the final report.

Each search covered the period starting in October 2015 and ending in August 2016, with geo-filters covering Australia, New Zealand and Singapore; the United States and Canada; and Great Britain and selected European countries.***

The data sources covered Twitter, online news websites, blogs and forums. Various refinements and quality criteria were applied to the macro datasets in order to focus analysis on quality data that met the project requirements.

Through this analysis a number of megatrends were identified, alongside skills and implications for VET.

AISC Guidance

A series of teleconference discussions were held with the AISC Research Sub-Committee to inform the framing and development of the associated research. A focused workshop was also held to refine the future scenarios presented in this resource (Canberra, November 2016).

Digital review snapshot

Random sample of 15,000 pieces of digital media

5,000 for each macro search

Quality filter was applied based on authority

Data was sorted by Australasia, North America & Eurozone

Quota samples were taken from each subset

Data included social media content & blogs

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*   STEEP refers to the commonly used macro environment analysis tool/ approach. It stands for Social, Technological, Environmental, Economic, and Political — associated tools include PEST, PESTLE, and STEEPLE.

**   Grey literature (or gray literature; see spelling differences) are materials and research produced by organizations outside of the traditional commercial or academic publishing and distribution channels. Common grey literature publication types include reports (annual, research, technical, project, etc.), working papers, government documents, white papers and evaluations.

*** Austria, Belgium, Germany, Spain, Denmark, Finland, UK, Greece, Ireland, France, Italy, Luxembourg, Netherlands, Portugal, Sweden (i.e. EU-15 https://stats.oecd.org/glossary/detail.asp?ID=6805), and Norway given its significant resources sector.

Future Skills Trend

The following section presents the trends identified by our research, categorised under five change areas:

- 🟠 Society and Culture
- 🟠 Business and Economics
- 🟢 Technology
- 🔵 Resources and Environment
- 🔵 Politics and Institutional

This section includes descriptions of the common trends derived from the review of digital and social media sources, and traditional literature sources. This section also includes a selection of short case studies to provide further illustration of the described trends.
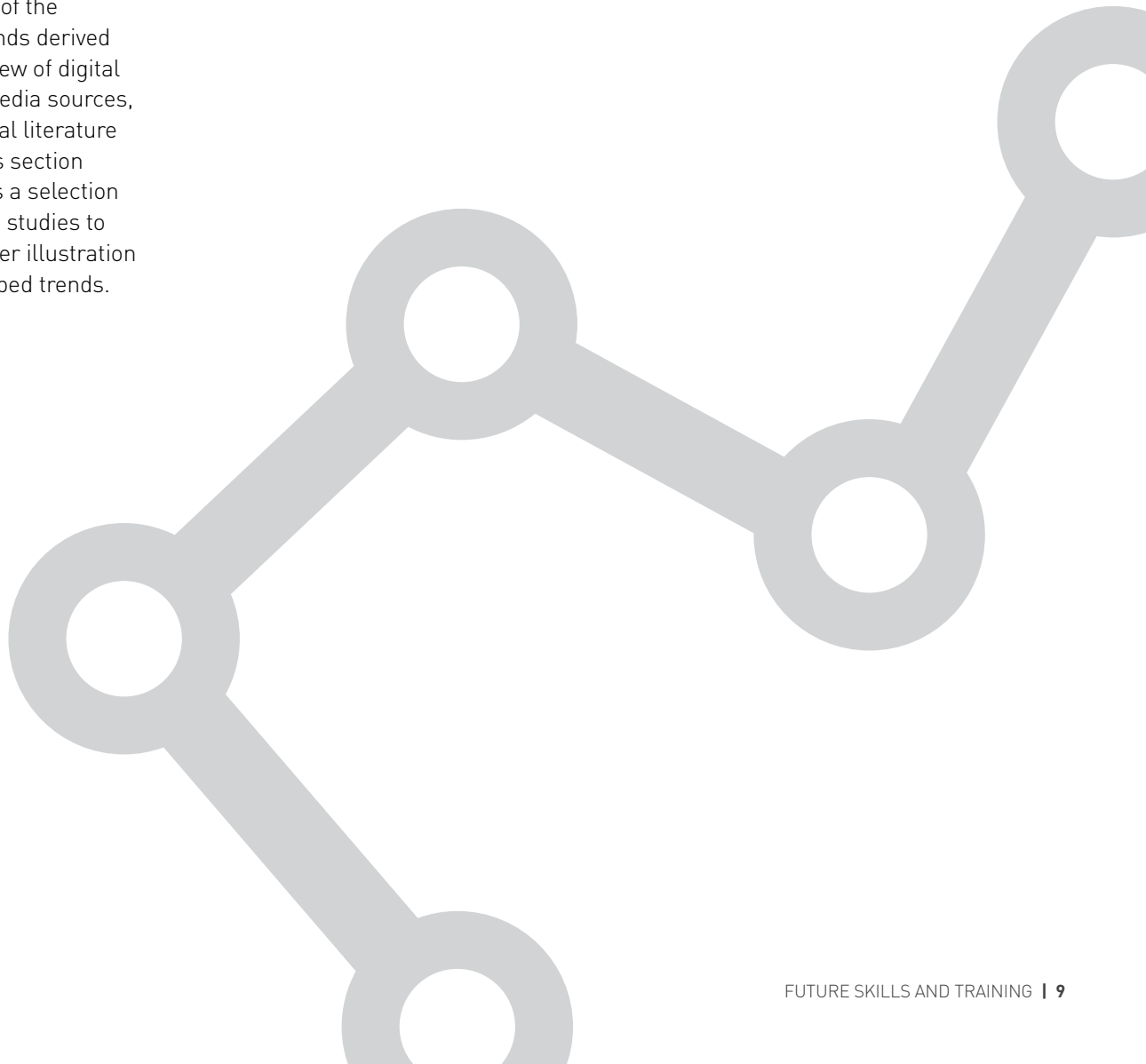
Society and culture

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Global mobility

While migration policies will vary between nations, some countries, including Australia, will see migration as an opportunity to access a much larger pool of talent.

In recent years, more than half of Australia's population growth has resulted from migration. This means growing diversity within the labour force.

Ageing population

People are living longer. At the same time, they are having fewer children. The result is a proportionally smaller number of people working to support retired citizens. This is contributing to fiscal instability and a need for welfare reform.

On the other hand, with improved lifestyles and technological advances in health, older people are likely to remain in the workforce for longer. This will require re-skilling and re-training throughout their careers. Without this change, a significant labour shortfall is expected.

Changing work and career values

In the next ten years, people from Generations Y and Z[1] will account for more than 60% of the workforce.[2] Members of these generations are generally adaptive, open to opportunities, and responsive to innovation.

They tend to value workplaces that offer learning opportunities, collaboration, work-life balance and flexibility. Many members of these generations do not believe the current training and educational system adequately prepares them for work, and would like to see business taking a more active role in training.

For a considerable portion of these generations, success is defined less in terms of dollars earned and more via a sense of wellbeing and purpose, with a seamless transitions between the work and life 'self'.

The search for purpose and for lifelong learning opportunities will translate into fluid and changeable careers. Over a 40-year career, Gen Y workers are expected to have between 10 and 15 different jobs.

Increased urbanisation

The world's urban population is set to double between 2010 and 2050.[3] This unprecedented pace of urbanisation, particularly in regions such as China and Sub-Saharan Africa, brings with it many market opportunities as well as challenges.

Australia is already heavily urbanised, with approximately 90% of the population living in urban areas.[4] However, population density is still relatively low, with sprawling suburban developments being the dominant form of Australian urban centres. However, local environmental pressures and increasing 'in-fill' apartment-style developments may see population densities increase in major metropolitan centres.

Increased participation by women and gender-related disparity

Women have made significant gains in labour force participation and educational attainment. Over the next decade, women's earnings will account for more than two thirds of global disposable income.[5] However, gender differences continue to exist within different skills groups, industries, occupations and VET qualifications.

There is a need for more women to work in occupations historically dominated by men. There are significantly fewer women than men studying and working in STEM fields. This disparity is even greater when considering leadership roles in STEM-related industries.

At the same time, the increasing predominance of service industry roles means that more people — men and women — will be needed in occupations historically dominated by women.

LINKED TRENDS

Global mobility and an ageing population

There is an opportunity to counterbalance the trend of an ageing population in developed countries with a growing youth population in less developed countries.

Technology, changing career and work values, and an ageing population

An ageing population and technological advances in health mean people may live longer.

It remains to be seen if this will result in the willingness of senior citizens to stay in the labour market.

Section sources

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2   Estimated using ABS series 3222.0 Population Projections, Australia

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4   In 2011, 88% of the population resided in inner regional areas and major cities, according to ABS 2011 Census data (estimated using ABS Table Builder 2011 Census - Persons and Relationships).

5   World Economic Forum. (2016). The Future of Jobs: Global challenge insight report. Retrieved from: http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf

Business and economics

High speed competition

The widespread use of the Internet and social media means that customers are increasingly influenced by real-time reviews, and at the same time are able to access products and services from an expanding global market.

To remain competitive in this market, organisations increasingly need to focus on outcome effectiveness and responsiveness to client demands. Innovation cycles already present in the telecommunications, social and new media,

and software sectors are expanding to other industries, meaning the opportunity for businesses to recoup on investments in products or services will become shorter.

Increasing automation and improved infrastructure and logistic options are driving down costs while productivity is improved. Organisations need to constantly monitor global business trends and international trading opportunities, rapidly adapting to any shifts in order to remain competitive.

Start-up thinking

The number of small businesses in Australia is increasing[1], and it is estimated that an increasing and significant percentage of the workforce will consist of freelancers.

Furthermore, a 'do-it-yourself' ethos is creating an entrepreneurial approach to working, learning, and living. Entrepreneurship is becoming a trend driven by a series of push and pull factors, including:

> the increasing size and importance of non-labour intensive industries;

> smaller numbers of employers can rationalise a permanent, full-time workforce, and are increasingly hiring people on casual or short term contracts;

> individuals are adapting to employment scarcity and creating their own income sources, either by freelancing or via novel revenue streams; and

> people are selecting to work less by choice as they see more value in that compared to what current employment opportunities can offer.

Case study 1

Start-up thinking[2]

Companies from all sectors are increasingly adopting start-up thinking to remain competitive. A number of originally small start-ups have been able to grow and disrupt whole markets (e.g., Uber and AirBnB).

Big corporations, however, are trying to catch up by using the combined power of start-up thinking (experimentation, creativity, problem solving) and their vast resources to reassert their dominance over the market. For example, Apple is investing heavily in areas such as digital health, transportation, and entertainment technologies. It also has a start-up-like organisational structure, which allows for functional collaboration amongst all teams on all of its products.

Case study 2

Emerging markets[3]

The Chinese government is using significant financial incentives, including housing assistance and tax breaks, to encourage Chinese citizens living abroad to return to China for work.

With the recent economic and political uncertainty in the West, many higher-educated and unskilled labour expatriates are returning to China. Currently, there is a serious labour shortage in China, so unskilled labourers are experiencing high wages and greater choice.

Emerging markets

Emerging economies such as Indonesia, Chile, South Korea and China are becoming 'talent magnets' and could attract back skilled former emigrants.

This means it may become harder for Australia to attract skilled foreign workers. On the other hand, the development of these markets could also present excellent opportunities for exports and investment.

Skills mismatch

This is already an identified global issue, and it is expected to worsen in the future. Today, Asia lacks 200 million engineers[4], a fifth of Scottish employers cannot find skilled employees[5], and there is a severe skills shortage in cyber security globally.

It has been predicted that by 2020 there will be 900,000 vacant jobs in the EU due to a digital skills shortage[6], the UK will suffer a severe shortage of engineers by 2022[7], and by 2025 the USA will experience a shortfall of 2 million skilled manufacturing workers due to skills gaps.[8]

Skills mismatches disproportionally affect young people, especially young women.

LINKED TRENDS

Changing work and career values, start-up thinking, and high-speed competition

Work arrangements are becoming more flexible, allowing for remote working or flexible hours. Increasingly people search for work opportunities that allow personal development, and companies are progressively moving towards less hierarchical and bureaucratic arrangements.

Future Skills Trend: Business and economics

Workforce vulnerability

This vulnerability relates to the risk of mass unemployment due to automation and cost reduction strategies. Vulnerability to automation is no longer determined by whether the work concerned is manual labour or knowledge-based, but rather whether or not the task is routine.

The World Economic Forum estimates that by 2020, 5 million jobs in 15 major developed countries will be lost to automation.[9] Within Australia it has been predicted that 40% of jobs will become automated within the next 10-20 years.[10]

The OECD estimates that robotics and Artificial Intelligence will replace 57% of jobs across its member countries.[11] However, rather than destroying jobs automation redefines them in ways that reduce costs and boost demand for workers in related occupations and/or industries. For example, it is reported that automation of shopping through e-commerce has encouraged higher retail demand and increased overall employment in the sector.

Network working and producing

There are indications we are moving from a world dominated by centralised corporations to a world where many small companies can outperform the few large ones. Increasing digital connectedness and emerging new technologies allow companies and individuals to do things that previously required the resources of large-scale organisations.

There is a trend towards global but small teams, online platforms, peer-to-peer and on-demand economies. There is also a trend among organisations of employing a small pool of core full-time employees and then engaging external contractors on a project-by-project basis.

If digital manufacturing technologies become more accessible, previous barriers to market entry might be removed, potentially impacting the supply chain dynamic. This would mean that traditional industries such as construction and manufacturing could also start functioning as a network of small businesses because these technologies allow on-demand production.

Case study 3

Workforce vulnerability[12]

Supermarkets are spending less on wages. In 2016 it was estimated that 9.5% of supermarkets' revenue would be spent on wages, the lowest proportion since 2004. Automation has enabled supermarkets to hire less staff, as well as younger, lower-skilled staff for cheaper rates.

Self-serve checkouts are the main factor contributing to this. Instead of having one employee per checkout, supermarkets can hire one employee per eight checkouts. Improved rostering systems, automated ordering, and shelf-ready packaging also played a role.

Case study 4

Network working and producing[13]

WikiHouse is an open-source system that allows anyone to design, share designs and build a house. With access to a computer numerical control (CNC) machine anyone could digitally fabricate the parts, which are then easily assembled like a Lego or IKEA kit.

WikiHouse aims to allow companies to cooperate in creating innovative, affordable, customised and sustainable housing systems. It also aims to equip individuals to perform tasks that were previously only accomplished by expert companies, changing the nature of the construction supply chain. Currently there are several WikiHouse projects being tested worldwide, including in Australia, where they have partnered with Southport State High School to provide CNC workshops.

Changing workplace dynamics

The workplace is becoming increasingly digitised and hyper-connectivity is spreading across businesses. The likely result is higher levels of collaboration, outsourcing, internationalisation, greater flexibility, and less bureaucracy.

As information is more widely shared within and between businesses, talented workers are able to increase their leverage and companies will need to adapt workplace management practices around hiring and retention to keep these valuable employees.

Case study 5

Changing workplace dynamics[14, 15]

A small but increasing number of organisations are adopting a radically different approach to traditional management: holacracy. With this approach, authority and decision-making rests with the team that is actually doing the work, not with the boss.

Zappos, an e-commerce platform for selling shoes, switched to a holacratic system in 2015, with nearly 1,500 employees now operating without any managers. To Zappo's CEO, the new organisational structure is a competitive move that will improve the company's ability to transform itself and stay relevant as the market shifts.

The new structure, he believes, is a way to have every employee act like an entrepreneur, and will enable the company's expansion to different markets. Some Australian companies such as the design start-up, Canva, and the enterprise software company, Atlassian, are following the move.

Knowledge-based economy

Employment growth in the service industries, in particular education, healthcare and areas of hospitality, has been driving job creation in Australia.

This is likely to continue into the future as Australia moves to a knowledge-based economy.

Sectors where there are requirements for high levels of human creativity and interaction, and limited opportunities for automation are predicted to continue experiencing a high demand for workers into the future.

Future Skills Trend: Business and economics

Empowered customers

Consumer empowerment is increasing the demand for creative business solutions, services and experiences over products, and socially and environmentally friendly products and services. As populations grow wealthier, consumers demand products of higher added value. With an increasingly connected world, consumer trends become instantaneously global as people interact to find the best products and services. This increases the power customers have to drive market change.

Behavioural economics and psychology

Organisations are increasingly adopting behavioural economics and psychology thinking, coupled with digital technology to monitor behaviour and attempt to stimulate consumer activity.

The increasing availability and adoption of digital gadgets, apps, and sensors is driving this trend.

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Technology

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Digitisation

Digital technologies are already changing the interaction between businesses and their consumers, customers and fellow customers, employers and employees, and employees and their colleagues.

Digitisation speeds up some aspects of a job, enabling workers to perform better in other areas. The result is that computers often reallocate — rather than displace — jobs, requiring workers to learn new, more varied skills. This is true of a wide range of occupations, not just in computer-related fields such as software development, but also in administrative work, health care and many other areas.

It also changes the way that consumers access products and services — apps will be used more for problem-solving (e.g., financial planning), completing tasks (e.g., project management), or accessing services previously accessed through other media (e.g., using a health app rather than visiting a professional).

Digital fabrication technologies, such as Computer Numerical Control (CNC) machines and 3D printers, are also becoming more common.

Artificial Intelligence (AI) and machine learning

In the past four years, the number of start-ups involving AI has increased 20-fold.[1]

AI will be applied in almost every industry where there is any kind of data, from genes to images to language. Robots have already become established in labour-intensive industries.

Recent developments in deep learning algorithms means AI systems can now perform tasks associated with high-skilled professions, including financial and legal services, advertising, health diagnostics, surgery, dentistry, and veterinary services.

Case study 7

Artificial Intelligence (AI) and machine learning[2, 3, 4]

The Google Cloud Machine Learning Group have created Google Cloud Jobs API, a recruitment software that employs machine learning to make meaningful links between job titles, required skills and experience, and location. It then matches them to jobseekers. Google Cloud Jobs API is designed for careers sites and employment service providers.

As AI becomes increasingly advanced, the trend of automation is spreading out of more traditional sectors such as manufacturing, and moving into new industries. In 2015 a UK-based robotics company unveiled the world's first robotic chef (which they plan to take to market in 2017), while in mid 2016 IBM's supercomputer Watson edited an entire magazine.

Big data

With increased digital interaction and its resulting data, along with the promise of more efficient and consumer-centric products, big data is set to transform how problems are solved in a wider variety of contexts. Energy utilities, consumer banking and insurance, and infrastructure planning are just a few areas investing in the use and exploration of big data.

Big data is more than just a large dataset. The volume of data is created by the systematic, often automated collection, mining and analysis of billions of transactions or data points. From credit card payments, to mobile phone broadcasts and search engine submissions, the world of big data is virtually infinite. However, this is still an emerging field and caution needs to be applied to some claims on what big data can achieve.[5]

Case study 8

Big data[6, 7]

IBM Watson Health and Quest Diagnostics have launched IBM Watson for Genomics, which incorporates AI and big data to provide cancer patients with the best available personalised treatment option. It does so by reading the genetic sequence from a person's tumour and comparing it to an extensive database of clinical trials and medical literature.

The fact that the computer possesses the non-human capacity to read information from all the knowledge bases available worldwide, containing rapidly evolving scientific discoveries, means it is able to suggest treatments from a much wider knowledge set, and at significantly greater speed. The service will shortly reach about 70% of cancer care in the US.

Case study 9

Augmented Reality (AR) and Virtual Reality (VR)[9]

UK tourism company Thomas Cook launched a VR holiday experience called 'Try Before You Fly'. Customers used VR headsets to experience an immersive five-minute sampler of overseas destinations. While some feared this sort of technology could potentially eliminate the need for real travel experiences, the result was quite the contrary.

In three months, 'Try Before You Fly' led to over $17,000 US in bookings and a 40% return on investment. The service was also responsible for a 190% increase in New York excursions. VR technology captures the imagination of travellers, and improves the ability to plan the perfect holiday. It is expected to have a significant impact on the tourism industry.

Augmented Reality (AR) and Virtual Reality (VR)

Gaming and videogames are currently driving much of the innovation in AR and VR. AR and VR are being used in the music, film, education and training, manufacturing, engineering, and tourism industries. There is also scope for workplaces to use AR and VR to increase collaboration, communication, and information sharing. By 2025 the AR and VR market will grow to $80 billion (US), about the size of today's personal computer market.[8]

Future Skills Trend: Technology

Mobility and connectivity

While it may seem that the whole world is currently online, in reality only 47% of the world's population have access to broadband Internet.[10] Connectivity still has huge scope to revolutionise the way we work and live.

Social sharing, communication, and global networking are in an upward trend and will continue to increase. Collaboration technologies allow for real-time communication across a number of devices. The 'office' can be anywhere. It also makes it easier to work together on projects and share information.

Optimising the brain

The disciplines of neuroscience and behavioural science are studying new methods for maximising learning and performance. These studies are resulting in a fundamental shift in attitude towards working, living, and learning. Sectors heavily investing in these technologies include sports and defence. With a world set to work for longer, it is likely that knowledge gained in these fields could later be applied to improve the learning and working capability of the ageing workforce.

Case study 10

Optimising the brain[11]

The US Air Force is experimenting with transcranial direct current stimulation (TDCS) to improve pilots' accuracy in identifying targets for drone strikes from radar images. TDCS delivers a small electrical current to the brain and has been used in training sessions. The use of TDCS has doubled the time that pilots can remain focussed and accurate, while halving the training time. The US Air Force is hoping that TDCS could also be used to speed up retraining and recovery from injuries.
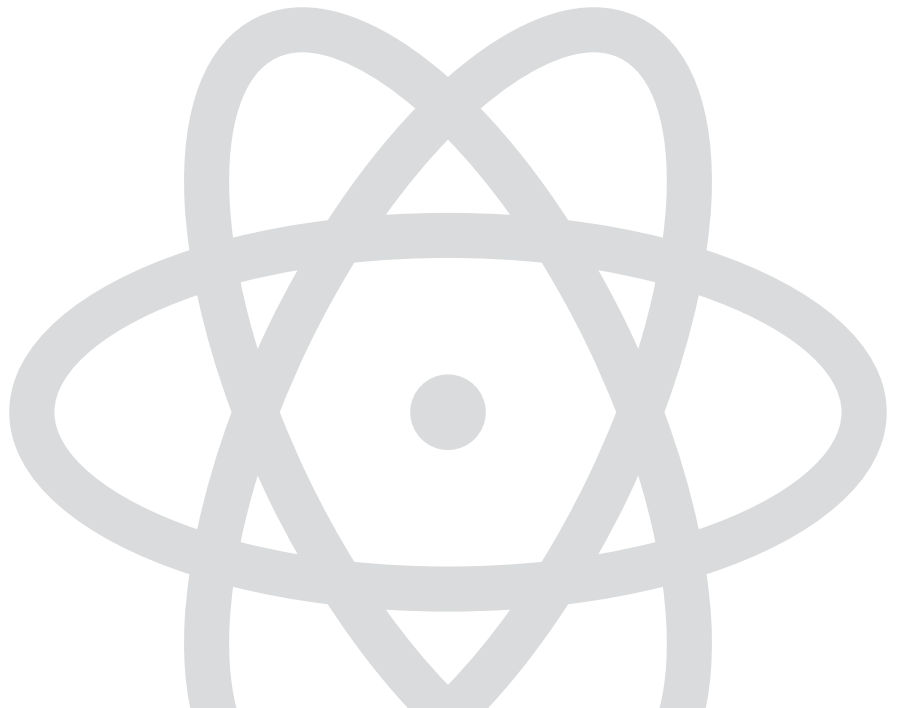
Cross-disciplinary science

Converging technologies and cross-disciplinary skills, particularly the combination of biotechnology, information and communications technology, nanotechnology and cognitive science are already resulting in innovative industry applications.

Examples include: cancer treatment recommendations based on patients' genomic mapping using AI; genetics impacting agriculture; and the manufacturing of synthetic molecules via bio-process engineering which will be critical to pharmaceuticals, plastics and polymers, biofuels, and other new materials and industrial processes.

Case study 11

Cross disciplinary science[12]

The Australian Dairy Herd Improvement Scheme was designed for Australian dairy farmers to genetically test their cows and bulls. In accordance with the preferred genetics traits set out in the National Breeding Objective, farmers can use the genetic testing to decide which cows and bulls to breed.
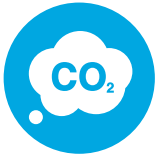
The genetic testing also enables farmers to take the guesswork out of breeding, and speed up the process of genetic gain by breeding genetically superior, and therefore more profitable, calves. Commercial genetic testing has been available for four years, and is becoming increasingly affordable and accessible. In 2016, the number of cows genetically tested doubled, and the number of bulls tested rose by 50%.

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Resources and Environment

International sustainability action

The recent Paris Agreement commits Australia and other signatories to combat climate change and limit a global temperature rise to below 2ºC. In addition it strengthens the ability of these countries to deal with the effects of climate change. The United Nation's Sustainable Development Goals (SDGs) are a set of 17 goals that collectively aim to end poverty, protect the planet and ensure prosperity for all.

Each of the goals has their own specific targets to be achieved, on a global scale, by 2030. The goals include zero hunger, good health and wellbeing, quality education, gender equality, decent work and economic growth, responsible consumption and production, and climate action.

Climatic weather shifts

Extreme weather is already a staple of the Australian weather calendar. Climate change means the potential for more frequent, wider reaching, and more intense weather emergencies. If not mitigated, it could lead to greater urbanisation as those previously living in regional areas seek to reduce their exposure to risks such as bushfires.

Extreme weather events also pose risks to the tourism, agriculture and mining industries into the future if not tackled with cost effective and accessible technological advancements. Increased demand on health care and other human service systems could also be exacerbated.

Case study 12

Climatic weather shifts[1]

In response to an unprecedented number of tropical cyclones, bushfires, and floods, the CSIRO and the Bureau of Meteorology partnered to create the Australian Community Climate and Earth System Simulator (ACCESS). ACCESS is a coupled earth system model that has led to a sharp increase in the accuracy and length of forecasts, providing communities with more time to prepare for natural disasters.

Access to quality Internet

Just like freeways and railways, broadband is an essential infrastructure and the lifeblood of many, if not all, of the future technological and business trends identified. Issues surrounding capacity and reliability of broadband services across Australia are already evident but demand for quality and reach is only likely to increase.

Case study 13

Access to quality internet[2]

A 2016 global Ipsos survey on broadband satisfaction found that Australia ranked 23rd out of 26 countries polled. Only 38% of Australians judge their broadband to be 'very or fairly good', which is below the global average of 54%. The NBN have recently launched two satellites, Sky Muster and Sky Muster II, as part of the NBN rollout to regional and remote parts of Australia. Together, the satellites have the capacity to connect 250,000 houses.

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Financial viability

With climate change as a pressing and unresolved issue, and CO_2 concentration in the atmosphere at unprecedented levels, there is growing discussion about environmental pressures and mitigation strategies amongst government, business, and consumers.

The development of new technologies is already making the adoption of environmentally friendly practices more affordable, but widespread adoption will largely depend on social interest, political will, and more scientific and business innovation to create large-scale commercially viable solutions. Where environmentally friendly practices can create cost-savings for individuals or organisations, they are most likely to flourish.

Politics and Institutional

Innovation ahead of regulation

Australia's approach to regulation means that technological and business innovation is more often able to develop with comparatively little regulatory pressure. Calls for investigation typically come via consumer-led or media-led concerns relating to professional licensing, and safety and quality.

Political instability and polarisation

Brexit and recent outcomes of Australian and US elections indicate that governments globally are finding it increasingly difficult to anticipate the interests of their electorate. Polarisation of voters and close election outcomes make for challenging decision-making and planning.

Political appetite for reform

Education and training reform with a focus on employment, economic recovery and development is present around the globe, in particular in response to the Global Financial Crisis of 2007–08.

There has been subsequent uncertainty, particularly in response to the so-called 4th Industrial Revolution.

Case study 14

Political instability and polarisation[1,2]

Polarisation is evident within the EU, with both far-right and far-left parties gaining prominence. Examples include Le Front National in France (far-right) and Syriza in Greece (far-left).

In the US, the Pew Research Centre polled 10,000 adults and found that Democrats and Republicans have less in common than ever before. Since 1996 the number of Americans identifying as belonging to either party has risen from 10% to 21%. In 2004 49% of Americans called themselves 'moderates'. Today, that figure is 39%.

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Future of Learning and Skills

The following section presents the trends identified by our research, categorised under the following related areas:

→ Future of Learning
→ Future of Skills
→ Future VET

This section includes descriptions of the common trends derived from our review of digital and social media sources, and traditional literature sources. This section also includes a selection of short case studies to provide further illustration of the described trends.

Learning

Pedagogy perspectives

Teaching styles, education approaches, and questions relating to the role of the educator continue to be present in discussions. Systems that enable knowledge exchange and two-way learning within education and training settings are increasingly preferred. With the global growth of standardised curricula and assessment over the decades, the abilities and capacity of educators and trainers are not always fully utilised or encouraged, or in some cases are lacking. For example, knowledge banking[1] is widely recognised as regressive. Criticism persists that it remains practised in classrooms and training settings.

Lifelong learning

The capacity to attain and apply new knowledge, and use new technologies will be the focus of the future. As both knowledge and technologies risk rapid obsolescence, and tasks become susceptible to automation, human skills required by the market and society will constantly shift. In this environment, it is crucial to have systems that support and enable people to retrain, rather than learn how to do one job very well.

Case study 15

Lifelong learning[2, 3]

Udacity is an online education platform (i.e., MOOCs — massive open online course) that offers over 50 short courses, 12 'nanodegrees', and a three-month paid work trial program called Blitz. It is explicitly career-focussed, and their courses are co-designed with 22 industry partners, including Google, Facebook, Amazon, and Mercedes-Benz.

Udacity largely focuses on STEM areas, with nanodegrees in the fields of computer science, software engineering, web development, maths, and entrepreneurship. Short courses are free and Nanodegrees cost around USD 200 per month, running for six to 12 months.

Collaboration with employers

Cooperation between industry and education is expected to be crucial for developing a dynamic, appropriately skilled workforce. This collaborative approach is currently conceived in two ways: public-private partnerships and cross-industry partnerships amongst employers. The first suggests partnerships between business, public institutions, and the education sector, preferably derived from leadership within these areas. The second involves the forming of partnership arrangements between multiple employers from one, or multiple, industries in order to leverage their collective knowledge and expertise.

Cross-disciplinary education

Solutions to current and future problems are being discovered through the convergence of technology, from nanotechnology to artificial intelligence (AI) to genomics. There is a case for developing models that will allow for the acquisition of cross-disciplinary qualifications.

Fluid education

Education and learning is moving away from traditional settings and increasingly towards informal settings. This is being done through the proliferation of digital and offline platforms designed to match people with resources. These platforms are based on collaborative spaces, curated content, peer-to-peer learning, and reputation metrics, and are rapidly increasing and diversifying available choices for working learners.

Case study 16

Cross-disciplinary education[4]

PricewaterhouseCoopers Australia is focussing on creating a cross-disciplinary workforce by providing in-house coding training to its employees and hiring 'T-shaped' workers. Their aim is to create a workforce of 'hybrids' – professionals with a specialty in one area and a good working knowledge in several other areas. They hope hybrid professionals will push the company to the forefront of digital professional services.

Case study 17

Fluid education[5]

42 is a university specialising in coding and software development. With campuses in Paris and San Francisco, it operates entirely without teachers, instead using peer-to-peer learning and project-based learning. Students help each other complete projects, and mark each other's work. 42 has no tuition fees and does not accept students over 30 years old. Both campuses have enjoyed high enrolment.

Skills

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Skills for collaborating

Rather than focusing on individual performance, organisations are more than ever trying to develop a culture where the most valuable employees are those who can collaborate and share information to improve efficiency and achieve organisational goals.

The trends of rapid change in markets and technologies, and of multiple generations in the workforce at the same time, trigger the need for collaboration. As organisations become increasingly dynamic and horizontally structured, this need for collaboration impacts all types of roles. For example, IT employees must now engage with a set of cross-functional colleagues, business partners, vendors and customers.

Foundational skills

Strong foundational skills, such as literacy and numeracy skills, including digital and financial literacy, are extremely important for most jobs in the knowledge economy. Strong foundation skills are essential to develop or train within any new, more specialised skill areas.

Skills for learning and adapting

In a world where vocational and technical skills will constantly need to adapt to new technologies and job requirements, people need to be taught skills that enhance their ability to adapt to new situations and acquire new skills. At the same time, as the world of work becomes more flexible, employees are expected to take more responsibility for their skills development.

Skills essentials 1—Collaborating

- ✔ Transparency
- ✔ Communication
- ✔ Teamwork
- ✔ Relationship management
- ✔ Organisational awareness
- ✔ Social/cultural awareness
- ✔ Sociability
- ✔ Teaching others

Skills essentials 2—Learning and adapting

- ✔ Perseverance
- ✔ Resilience
- ✔ Sociability
- ✔ Curiosity
- ✔ Responsiveness
- ✔ Experimentation
- ✔ Adaptability
- ✔ Self-confidence
- ✔ Initiative

Entrepreneurship skills

There is a widespread view that teaching entrepreneurship skills are indispensable for professional development in the 21st century.

In part, this is about being able to identify problems, create solutions, and take action to implement these solutions, even if you are an employee, not the boss. This is also about preparing people to be self-reliant and resourceful in an economy with increasing participation by small businesses and self-employed contractors.

Analytical skills

Data is becoming increasingly available and growing exponentially, with big data derived from online activity, sensors, the internet of things, new analytical tools, and artificial intelligence. As data becomes more accessible, workers in almost all industries, and across most roles, will be expected to use available data to derive value from it — creating evidence-based solutions, and improving products and services. For some roles, this will require being able to analyse and present raw data, while for others, it will require the ability to interpret data analysis and apply findings.

Skills for adding value

Australia continues to move away from being a commodity industry, towards being a knowledge-based economy. With the ongoing challenge of increasing international competition, resource-related pressures, and empowered and demanding consumers, industry will need to source workers with skills to create valuable products and services using fewer resources. They will struggle where new technologies and increased connectivity is unavailable or inaccessible.

Skills essentials 3—Entrepreneurship	
✔ Negotiation	✔ Financial literacy
✔ Communication	✔ Self-confidence
✔ Customer engagement	✔ Initiative
✔ Persuasion	✔ Critical thinking
✔ Creative thinking	✔ Problem solving
✔ Self-management	✔ Self-marketing
✔ Experimentation	

Skills essentials 4—Value creation	
✔ Creative thinking	✔ Data analysis/ interpretation
✔ Problem solving	✔ Customer engagement
✔ Resourcefulness	✔ Experimentation
✔ Reasoning	✔ Critical thinking

Non-automatable skills

The number of people hired in service occupations that involve directly caring for people (e.g. nursing and aged care, hairdressing, and fitness and rehabilitation professionals) may not increase in volume, despite a growing demand for their services.

As delivery costs are pushed down by the market, there is an expectation that technology will automate aspects of job tasks in order to make services more widely available at a lower price. For example, a residential care nurse may be required to tend to the care needs of an increased number of clients, as their non-care tasks will be managed by lower skilled employees, and/or technology. This could result in professionals working under potentially more challenging and stressful contexts.

This trend of focusing on tasks that are more personally related to the clients will also apply to other service occupations that previously did not have a people focus. For example, as many of the tasks performed by accountants or real estate agents are automated, people in these occupations will be required to focus on personalised customer service, and negotiating with and persuading potential clients.

Social platform skills

Future communication tools will require members of the workforce to be skilled in new media literacies, not just text. Social technologies drive new forms of production and value creation — this will vary from collaboration, to using them to play, experiment and invent.

Skills essentials 5—Non-automatable

✔ Empathy

✔ Sociability

✔ Teamwork

✔ Social cultural awareness

✔ Communication

✔ Persuasion

✔ Adaptability

Skills essentials 6—Social platforming

✔ Design mindset

✔ Cross-cultural competency

✔ Computational thinking

✔ Cognitive load management

✔ New media literacy

✔ Virtual collaboraiton

Digital skills

IT skills will become increasingly important and will have an increasingly large impact on the way professions operate and on employment prospects. The Foundation for Young Australians has identified that in the near future approximately 90% of jobs in Australia will require computer skills.[6] The specific skills required will have an increasingly short shelf life. This is why the human skills of learning and collaborating are so crucial.

Future VET

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Future system of VET

Among the many characteristics and qualities of the various state, national, and international VET systems that emerged during this study, two attributes surfaced most often: fluidity and industry integration. In the next section of this resource, samples of four future skills-related scenarios are presented. All four scenarios also considered the VET system attributes described below.

Fluidity

This demand-side pressure is linked primarily with the concept of consumer empowerment, fast technological change, high levels of competition, and an increasingly unstable labour market. As increasingly empowered consumers and technological innovations drive market competition at unprecedented rates, businesses are seeking the ability to adapt rapidly to new market conditions. To achieve this, they need employees who are prepared and able to take initiative, and adapt and learn quickly.

At the same time, a large — and growing — proportion of the population has grown up in an era of digital technology, empowered consumers, and information sharing. They live and work at a time where personalisation and customisation are the new standard. The result is the growing expectation that training and education should adjust and cater to individual needs, at the right time, in the right way, and at the right price. To meet these demands a training system that does not delay or hinder continued learning and participation is needed.

Industry integration

The research identifies a growing trend (globally and nationally) of more direct and formalised involvement by industry in the planning and delivery of VET. Within the Australian context the new arrangements under the AISC, where industry leads training package development, are an example of this.

In Australia, and many comparable international systems, the views of industry on training and education, and employment planning, is also accessed through a combination of:

> government/industry reports

> consultation with industry representatives (both formally and informally)

> formal labour market and other economic data analysis.

Section sources

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Future Skills Scenarios

Value of scenario thinking

The value of developing a number of possible future scenarios is that it enables decision-makers to conceive a range of strategies and consider the resilience of the system, whatever the future brings.

Each scenario has been abstracted from our review of the common trends derived from our review of digital and social media sources, and traditional literature sources. Under each scenario a description of its principal underlying trends are presented, and its implications for the VET system are explored and discussed.

The following section presents a series of 4 scenarios:

> **Scenario 1: Business as Usual:** Consults with industry and learners, centralised decision-making

> **Scenario 2: Freelance Factory:** Enhanced adaptability of content and delivery will be expected

> **Scenario 3: University of Work:** Industry will drive decision-making related to content, delivery and outcomes

> **Scenario 4: Waste-not Warehouse:** Sustainability and economic policy and regulation will drive behaviour and demand

The scenarios should not be considered as 'one or the other', and trends or events described in different scenarios may occur concurrently to varying degrees, potentially with variations between industry sectors. Their purpose is to stimulate discussion rather than prescribe solutions and we recommend using them to frame related VET agenda discussions and debates.

Business as Usual

The Business as Usual (BAU) scenario assumes a future with a rate of change similar to what we know and see around us today — no particular trend area is more dominant than another. The focus of the scenario's implications is to prepare our systems and sectors for the need to continuously improve and adapt. What does BAU look like in your sector or industry? Are you ready?

Society & Culture

Formal education remains a valued and dominant pathway into employment, with a focus on tertiary education. Most people seek employment rather than business ownership. Generational differences remain in ways of working. Gen Z is more money savvy than Gen Y, a response to having grown up during an economic downturn.

Political & Institutional

No direct business/technologic barriers to the development and introduction of technological advancements. Inward migration policies remain driven by economic needs. Public-private partnership continues. Climate conversation remains at a strategic or niche level only. Government remains a significant employer (direct and indirect).

Business & Economics

Slow economic growth, continued employment challenges, consumers and business remain cautious.

Use of new technologies are offset by poor business climate, slowing task automation. Challenging environment for small and medium enterprises.

Resources & Environment

Population density experiences little/no variation. Extreme weather remains. Population health indicators remain stable. Development of high speed, high capacity internet remains a challenge. Progress on international environmental commitments meet expected hurdles.

Technology

Continued but incremental automation and adoption of time/labour saving technologies.

Reach of change focused on certain sectors or industries including professional support services, manufacturing, construction, mining and agriculture.
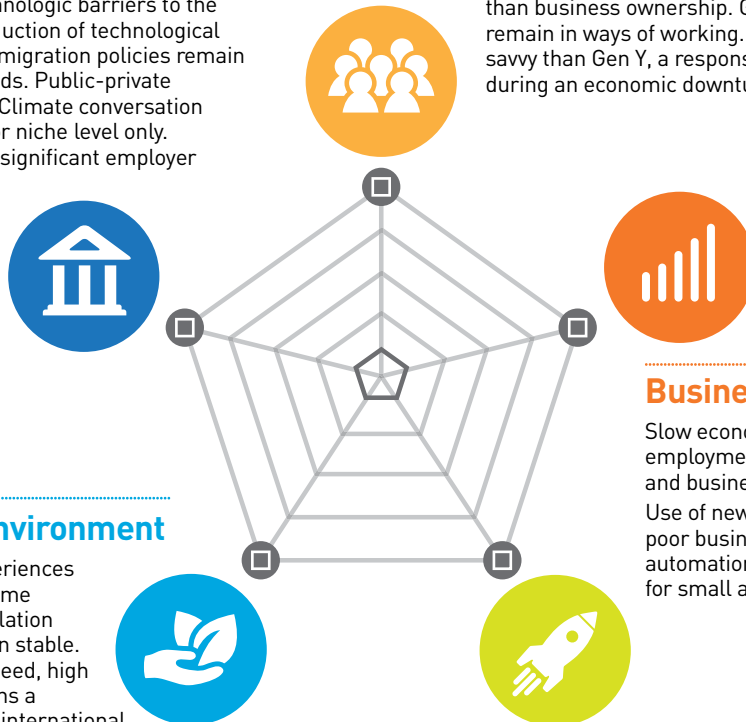
Recommended resources

Kataja, E. K. (2016). Megatrends 2016: The future happens now. Helsinki: Sitra.

UK Commission for Employment and Skills. (2014, February). The Future of Work: Jobs and skills in 2030.

Scenario implications: Business as Usual

Employers/industry

As available funds at the Government and worker level become increasingly strained, up-skilling of existing or new employees will require greater investment or subsidy from profitable, growing sectors of the market.

In some industries the formation of public-private partnerships and/or consortia of industry members will continue or intensify with the aim of sharing the costs of training, ensuring training systems will meet the needs of industry and supporting growth.

Learners/workers

Learners and workers continue to be attracted to education and training programs by their personal interests and labour market trends. However, continued incremental automation and adoption of time/labour saving technologies mean more workers will need to either acquire new skills or be able to recognise how their existing skillsets may be transferable to new occupations and/or industries. Learners in the VET system will continue to have access to funding from a variety of sources, including employers or industry, government programs, loan schemes, and private funds.

Government

Government remains the principal funder of VET in Australia, and continues to manage standards relating to delivery, quality, licensing and accreditation, and monitoring and assessment of learning.

Reforms relating to services procurement, TAFE investment, and loan schemes are likely to continue to dominate the agenda. The purpose and focus of modern VET will require endorsement at a government level to ensure community confidence in its services.

Education and training

VET systems and related services are typically designed to meet the needs and requirements of population cohorts with acute and specialised needs. These cohorts will continue to be assisted but due to a more challenging labour market, there will be a wider range of learners and workers with different needs.

The VET system will need to become more dynamic to deliver outcomes for industry and individuals. While the diversity and volume of learners and workers seeking VET services is likely to expand, the training providers will need to meet them halfway, as many potential learners may be unfamiliar with the VET system.

1. **How has your role's skills changed over the past 5 years? What has driven this change?**

2. **What does Business as usual change look like in your sector or industry?**

3. **How do you or your sector prepare or adapt to these everyday changes?**

Freelance Factory

The Freelance Factory scenario assumes a future with rapid societal, technological and business changes. Increased casualisation of the labour market is combined with expectations of employment flexibility and training customisation. The expansion of distant and independent working and learning is anticipated. The focus of the scenario's implications is to prepare our systems and sectors for the need to manage these expectations. How customisable or flexible are we already?

Society & Culture

Money isn't everything. People opt out of formal education beyond K-12 and prefer to accumulate knowledge in a self-directed way. Self-employment, entrepreneurial culture, and working remotely is the norm. The traditional concept of an occupation or vocation disappears, the death of the question, 'What do you want to be when you grow up?'

Political & Institutional

No direct business/technologic barriers to the development and introduction of technological advancements. Inward migration policies remain driven by economic needs. Public-private partnership continues. Climate conversation remains at a strategic or niche level only. Government remains a significant employer (direct and indirect).

Business & Economics

Commodity prices remain low while wage inflation is high. There is an economic imperative for automation for businesses to remain viable. Economy moves towards a focus on service/knowledge products. Boom of micro-multinationals and interconnected micro enterprises. Continued growth of offshoring, part-time, remote, and casual employment.

Resources & Environment

High speed, high capacity internet is made available and affordable to all Australians. As regional areas become connected urban density decreases with increasing numbers of people choosing to work remotely and live in areas where they can readily access their own space.

Technology

Appetite for AI explodes, mainly in areas not heavily reliant on tasks requiring emotional intelligence. There is, however, some AI penetration anticipated in areas such as health/social care and creative/media arts. Socio-digital spaces expand through AR/VR. Big Data use expands by business, science, and Government.
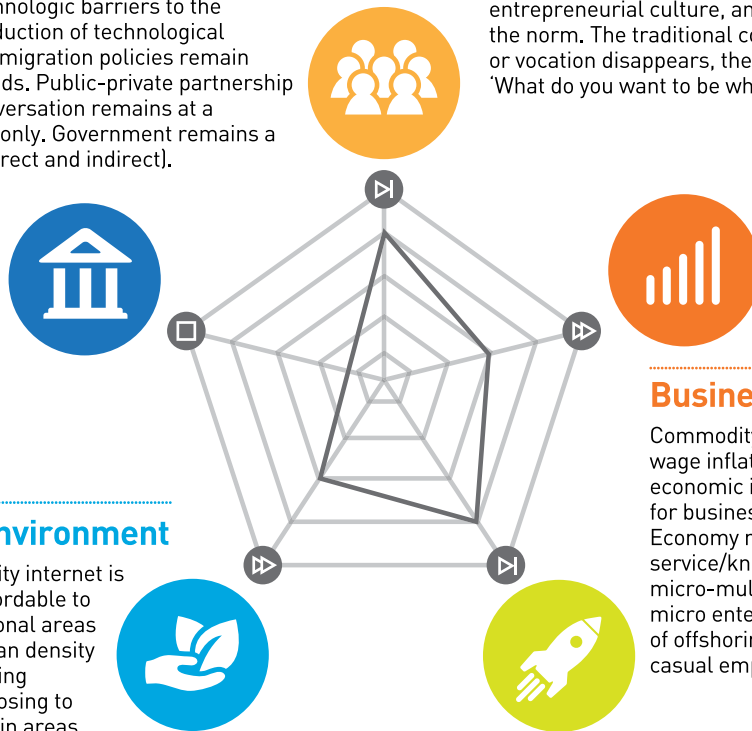
Recommended resources

Chartered Institute of Personnel and Development. (2013, July). Megatrend: The trends shaping work and working lives.

Institute for the Future. (2013). From Educational Institutions to Learning Flows.

Scenario implications: Freelance Factory

Employers/industry

The challenge for industry within the increasingly casual labour market is the ability of organisations to build a robust knowledge and skills bank. In the absence of more conventional employment arrangements, businesses will need to retain core talent, whilst adopting strategies to rapidly secure quality workers as needed. Such strategies are likely to include dismantling traditional employment hierarchies in favour of 'flatter' organisational structures, where short term project teams are formed and individual roles are fluid depending on the needs of a project and the unique skills of an individual. Employers will seek to retain and develop staff who have the right 'team fit' and human skills by guaranteeing them learning opportunities to develop appropriate technical skills later. Employers and industry are likely to become more directly engaged in training systems, via public-private partnerships and industry consortia, in order to ensure ready access to a reliable supply of training in the necessary skills is maintained.

Learners/workers

Growing numbers of learners and workers operate under casual, part-time, and independent contract arrangements. Business development and entrepreneurism is demanded of a wider range of workers, whether business owners, self-employed or company employees. Learners and workers are increasingly likely to self-fund a considerable portion of their training and development pursuits, and in their own time. Their demand for programs will become based in meeting shorter-term knowledge requirements, rather than longer-term career prospects.

Government

Government investment and procurement models will require significant reform. It is likely that government will face challenges relating to increased financial and social service pressures as the market contributes less to government Budgets. The increasingly casualised and freelance workforce will see a decrease in government revenue from sources such as income and payroll tax, at the same time as an increase in demand for social support services previously covered by employment provisions such as sick leave, parental leave and superannuation. Labour market information, and education and training outcome and investment data will need to be closely monitored for the constant refinement of policy level planning and actions. As learners become more independent, there could be mounting pressure for a more responsive and flexible competency recognition system.

Education and training

Given the precarious nature of work, a more diverse and larger volume of learners will access training across their lives to maintain their employability in a volatile labour market. As an increasing amount of training will be student-funded and directed, training delivery will become more competitive at an international level, and service providers will need to use state-of-the art methods and technologies whilst engaging in effective client/learner relations. Learning and training will likely be sought in different delivery modes, as learners will increasingly expect education and training to be available when and where it suits them, at a price they are willing to pay. Massive open online courses (MOOCs) and non-formal education and training will flourish.

1. **Does your sector engage in casual contract arrangements or encourage remote or flexible working?**

2. **What does workplace flexibility or learning/ training flexibility look like in your sector?**

3. **How ready or willing is your sector for this possible future of increased customisation and casualisation?**

University of Work

The University of Work scenario assumes a future where businesses/industries will increasingly design and deliver training and education, and award qualifications based on their own needs. This will result in a reduced level of public involvement in education and training governance and development, and reduced demand for national/state occupation classification, licensing, accreditation, and/or assessment regulation. This scenario helps us consider the impact of this new public-private partnership model on the future quality of education and training.

Political & Institutional

Government holds a strong mandate for widespread economic and fiscal reforms. It rethinks education, including funding and structure. No direct business/technologic barriers to the development and introduction of technological advancements. Inward migration policies remain driven by economic needs. Public-private partnership strengthens. Australian Government remains involved in international climate change mitigation initiatives.

Society & Culture

Formal education remains a valued and dominant pathway into employment, with a focus on tertiary education. Most people seek employment rather than business ownership. Generational differences remain in ways of working. Gen Z is more money savvy than Gen Y, a response to having grown up during an economic downturn.

Business & Economics

Era of global collaboration. Race to be more resourceful, efficient, and consumer-focused due to increased competition and innovation. Big companies thrive but employ less people, increasing labour market competition. High demand for automation. Increasing demand for high level skills leads to wage inflation. Onset of customised work agreements.

Resources & Environment

Population density experiences little/no variation. Extreme weather remains. Population health indicators remain stable. Development of high speed, high capacity internet remains a challenge.

Technology

Selected industries experiment with emerging technologies (e.g., digital fabrication, custom pharmacology, and synthetic biology). Focus is in areas where high production and/or profit gains can be derived (e.g., mining, construction, pharmaceuticals, and manufacturing).

Recommended resources

Wheelahan, L., Buchanan, J., and Yu, S. (2015). Linking Qualifications and the Labour Market Through Capabilities and Vocational Streams.

Institute for the Future. (2015). Learning is Earning

Scenario implications: University of Work

Employers/industry

Increased competition leads to Industry strongly shaping education/training delivery. Organisations will need to become masters of skills development strategy and resourcing to ensure they attract and retain the right learners/workers and provide them with the training that will deliver value to their organisation. They will need to adopt effective ways of identifying and securing quality workers to join their cadetship/traineeship path from a more diverse set of workers and learners.

Learners/workers

Work-based models of training, including apprenticeships and cadetships, experience substantial growth as a training option. A combination of reduced availability of funding for training, and higher levels of employment security than alternative training options, leads to these work-based models becoming increasingly attractive to learners and workers. The search for job security will also drive learners and workers to pursue train-to-job programs, where training providers are able to guarantee that learners will be employed within a certain period after graduation. There will be high competition to be recruited to quality work/training pathways.

Government

Government investment and procurement models will require significant and widespread reform. It is likely that Government will face challenges relating to increased financial and social services pressures as it is left to support those exiting or being made redundant from employer-trainer arrangements. Labour market information, and education and training outcome and investment data will be increasingly collected and used by industry to attract candidates, form partnerships, and track investment outcomes. However, private companies will increasingly own training and employment data, with a commercial interest in keeping such data confidential. Government is likely to experience limited ability to access the data, and what they are able to access will be increasingly fragmented, placing informed policy-level planning and discourse at risk.

Education and training

An increasing amount of training will be industry-funded and directed. Colleges where program and curriculum design and management are undertaken by one company or an industry consortium will become more common, with the highest performing students employed directly by these companies, potentially before they have even graduated. To manage costs or gain competitive advantage, some companies will increasingly bring vocational training in-house, with work-based apprenticeships and cadetships. Education and training providers will need to engage in effective relationships with employers and/or consortia of employers, and will be required to demonstrate return on investment to maintain industry funding.

1. **How does your sector or organisation already fund, design or deliver training and education?**

2. **How ready or willing is your sector for this possible future of increased involvement in formal education and training?**

3. **What would increased involvement look like in your sector? Cadetships?**

Waste-not Warehouse

The Waste-not Warehouse scenario assumes a future with increased emphasis on efficiency and waste, and sustainability. Concern for the environment is being driven by both government and consumers, and business is under pressure to deliver to these new standards and expectations. The focus of the scenario's implications is to prepare our systems and sectors for societal, commercial, and political demand for efficiency-orientated training and education. What might this future look like for your sector?

Society & Culture

Power dynamics begin to disperse among different cultures and age groups. Workplaces become more flexible and horizontally organised, remote working expands. Self-employment and entrepreneurism increases. Knowledge accumulation is self-directed.

Political & Institutional

No direct business/technologic barriers to the development and introduction of technological advancements. Inward migration policies remain driven by economic needs. Public-private partnership strengthens. Increased government investment in climate change mitigation/adaptation, and other policies related to improving environmental and social sustainability.

Business & Economics

Commodity prices remain low. Economy moves towards service/knowledge products. High demand for automation. Increasing demand for high level skills leads to wage inflation. Boom of micro-multinationals and interconnected micro-enterprises. Continued growth of offshoring, part-time, remote, and casual employment.

Resources & Environment

Growing environmental awareness and a widespread view that sustainable development targets are not ambitious enough to address already felt resource scarcity. Customer driven pressure leads industry into a race to become increasingly sustainable across environmental, social, and financial measures. High speed, high capacity internet is made available and affordable to all Australians. As regional areas become connected urban density decreases, increasing numbers of people work remotely.

Technology

Selected industries experiment with emerging technologies (e.g., digital fabrication, custom pharmacology, and synthetic biology). Focus is in areas where production/profit gains can be derived (e.g., mining, construction, pharmaceuticals, and manufacturing).

Recommended resources

Cass, D., and Crockett, L. (2016, June). Nice Work If You Can Get It: Jobs outcomes from renewables growth policies

Martinez-Fernandez, C., Hinojosa, C., and Miranda, G. (2010). Green Jobs and Skills: The local labour market implications of addressing climate change. Paris: OECD Publishing.

Scenario implications: Waste-not Warehouse

Employers/industry

Increasingly empowered and informed customers demand products and services that are delivered in a sustainable and ethical way. Workplaces will increasingly value efficiency, sharing, and resourcefulness. This change will be driven by organisational, legislative, social, and market pressures to deliver more with less, and in a globally sensitive way. Increased competition and a race for best practices will drive high-speed technology and systems innovation, and high levels of automation. In line with the drive for reducing waste and improving efficiency, employers will seek workers with the skills to be able to innovate and increase productivity. The speed of change in technical skills needs will likely push employers to either directly engage in education and training, or closely collaborate with Government for curriculum development, funding, and training delivery.

Learners/workers

In line with consumers of other products, learners will have increasing access to information and be more empowered in determining their training choices. As a result, learners will demand better educational and training systems that are adaptable – and affordable – according to their specific needs. Learners and workers will be increasingly likely to self-fund a considerable portion of their training and development pursuits, and in their own time. Their demand for programs will become based on meeting shorter-term knowledge requirements, rather than longer-term career prospects.

Government

Independently of whether training is delivered by private providers, industry or public institutions, government will need to guarantee that the education and training systems deliver highly developed soft skills, while being able to adapt to ever changing technical skills requirements. Close collaboration between training providers, industry and government (as quality regulators) will be necessary to ensure training remains up to date with regards to technological advancements and sustainable practices. As learners become more independent, there may be increasing pressure for government to create a more flexible competency recognition system.

Education and training

All formal education and training programs will need to focus heavily on the development of soft skills, while collaborating with industry for the development of in-demand technical skills. The education and training system will need to become more flexible, allowing learners to acquire necessary technical skills in short courses, and return to the system for refreshers or development of specific skill sets as needed. An increasing amount of training will be industry-funded and directed; service providers will need to engage in effective relations with employers and/or consortia of employers. MOOCs and non-formal education and training will flourish.

1. **How does your sector or organisation currently talk about efficiency and sustainability?**

2. **What would increased focus on sustainability and efficiency look like in your sector?**

3. **What sort of training or education would your sector require to operate in this new future of increased sustainability and efficiency?**

Workshop template

Using the approach outlined on pages 46 to 47, Industry Reference Committees (IRCs), and other stakeholders, can workshop scenarios specific to their sectors and consider the implications using this template.
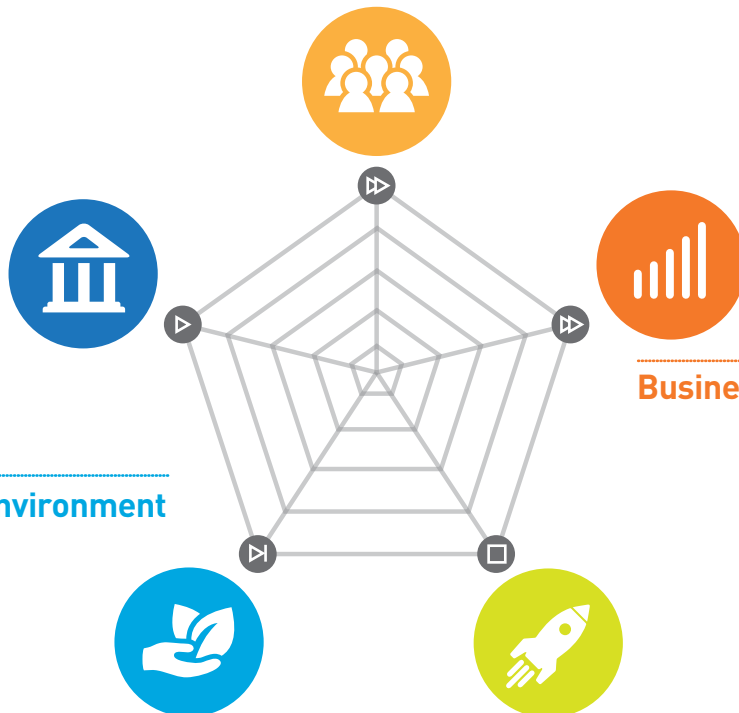
Society & Culture

Political & Institutional

Business & Economics

Resources & Environment

Technology

Scenario implications

Employers/industry

Learners/workers

Government

Education and training

Supporting discussion

• •

Bringing the scenarios to life

It is important to remember that the scenarios in this resource are designed to open up discussion to enable decision makers to conceive of a range of strategies and consider the resilience of the VET system, whatever the future brings.

With this in mind, the series of open-ended questions are provided to support and initiate dynamic and creative thinking across Australia's contemporary VET system. Like the scenarios, their purpose is to stimulate discussion rather than prescribe solutions and we recommend using them to frame related VET agenda discussions and debates.

Scenario Discussion 1 Business as Usual: Consults with industry and learners, centralised decision-making	1. How has your role's skills changed over the past 5 years? What has driven this change? 2. What does Business as Usual change look like in your sector or industry? 3. How do you or your sector prepare or adapt to these everyday changes?
Scenario Discussion 2 Freelance Factory: Enhanced adaptability of content and delivery will be expected	1. Does your sector engage in casual contract arrangements or encourage remote or flexible working? 2. What does workplace flexibility or learning/ training flexibility look like in your sector? 3. How ready or willing is your sector to this possible future of increased customisation and casualisation?
Scenario Discussion 3 University of Work: Industry will drive decision-making related to content, delivery and outcomes	1. How does your sector or organisation already fund, design or deliver training and education? 2. How ready or willing is your sector for this possible future of increased involvement in formal education and training? 3. What would increased involvement look like in your sector? Cadetships?
Scenario Discussion 4 Waste-not Warehouse: Sustainability and economic policy and regulation will drive behaviour and demand	1. How does your sector or organisation currently talk about efficiency and sustainability? 2. What would increased focus on sustainability and efficiency look like in your sector? 3. What sort of training or education would your sector require to operate in this new future of increased sustainability and efficiency?

Scenarios for Australia's Future of Work and Skills

The value of scenario and system thinking

The value of developing a number of possible future scenarios is that it enables decision makers to conceive a range of strategies and consider the resilience of the system, whatever the future brings. This section provides readers with an overview of the methodology applied to develop this resource. This methodology can be used to create a custom scenario using the blank template following.

1. Established a timeline for change

Our future scenarios consider possible change within the next 10-15 years.

2. Developed a scenario building system

We created an easy-to-follow 5x4 level scenario building matrix to help us visualise how the identified trends might evolve.

3. Categorised identified trends to areas:

Political & Institutional	Society & Culture	Resources & Environment	Business & economics	Technology

4. Distinguished between emerging & established trends — long established trends included:

Globalisation	Climate Change	Digitalisation	Customer empowerment	Ageing population

Overview of scenario building methodology

5. Described the trends using this scale:

Minor	Moderate	Strong	Extreme
The speed and reach of the change is small	The speed of the change is large, but its reach is small	The speed of the change is small, but its reach is large	The speed and reach of the change is large

6. Conceived a 'business as usual' scenario

This initial scenario assumes trends maintain current pace and reach i.e. no major source of disruption envisaged and therefore, only minor changes across the five trend areas.

7. Developed a set of probable areas of disruption to conceive further scenarios

Scenario 1: Business as Usual: Consults with industry and learners, centralised decision-making

Scenario 2: Freelance Factory: Enhanced adaptability of content and delivery will be expected

Scenario 3: University of Work: Industry will drive decision-making related to content, delivery and outcomes

Scenario 4: Waste-not Warehouse: Sustainability and economic policy and regulation will drive behaviour and demand

8. Evolved the scenario conceptions and descriptions with report partners*

* This refers to scenario building workshop held with representatives from AISC and the Department of Education and Training in Canberra in November 2016.

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This reference list refers to the resources used as part of the literature review element of the project, which informed the framing of the digital review and the development of the future scenarios.

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