

Super Connected Jobs

Understanding Australia's
future workforce



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The great Australian work shift

The Australian nation and economy will change profoundly over the decade to 2025. The population will increase from 24 million to 28 million. The workforce will increase from 11 million to 13 million. And the way Australians work, where they work and the type of work done, will change.

The Australian population will age; there will be more people—baby boomers mostly—hanging around the retirement edges of work. New generations of workers, Xers, Gen Ys and whatever lies beyond, will be better skilled, perhaps more entrepreneurial and in possession of more sophisticated soft or social skills that will drive change in the workforce.

But there is more to the evolution of the Australian workforce than demographic change. New technology and a new accessibility to technology driven largely through the roll out of the **nbn™** network, is designed to liberate workers from the confines of working nine-to-five and working from dedicated workplaces. Work and workers in the future will demand ever greater levels of technology induced flexibility. Perhaps an addendum to the great Australian dream of home ownership might be the ideal of working when and where it suits individual workers. And this is on top of the new jobs that are anticipated to be facilitated by the new and evolving technology.

“Perhaps an addendum to the great Australian dream of home ownership might be the ideal of working when and where it suits individual workers.”

This of course raises the issue of what the jobs of the future will be. One way to look at jobs of the future is to simply cite new activities associated with new technology and with new businesses. Some new technology will beget new businesses in the future that will require new skill from their employees. But this also means that demand for some jobs and for some skills will subside.

Jobs like typist, petrol-filling attendant, bank teller, ticket collector, even the humble farm labourer is on the decline either as a consequence of mechanisation, the introduction of new technology, or through altered workplace behaviour. Other jobs have morphed into forms that are better adapted to modern work.

The role of secretary for example once involved typing memoranda. Today, because senior management has learnt how to type, the role of secretary has changed to that of personal assistant or to executive assistant. The number of bank tellers is declining because new technology (ATMs



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and internet banking) and changed consumer behaviour (people don't want to go into a bank to get cash) have altered the narrative of modern life. The demand for secretaries and bank tellers is contracting whereas the demand for personal assistants and computer programmers is expanding.

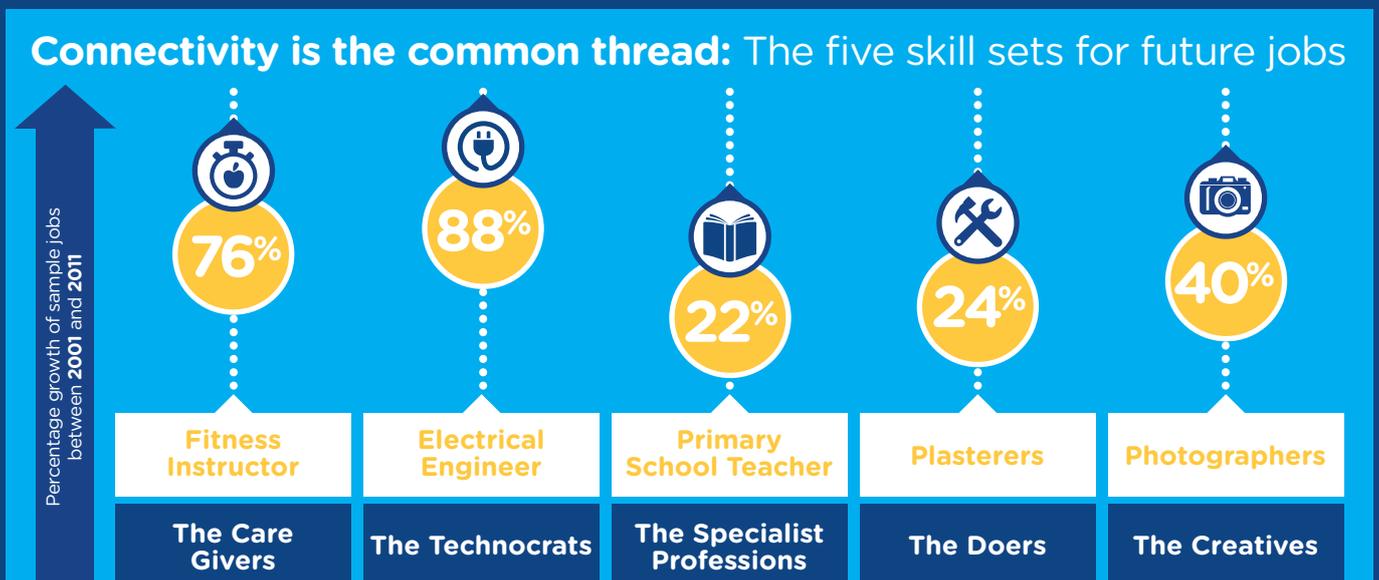
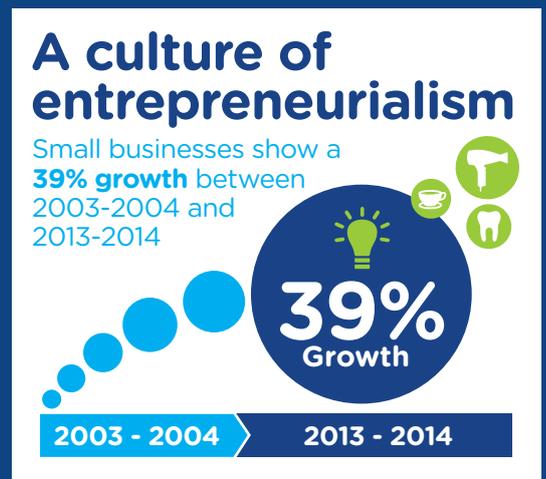
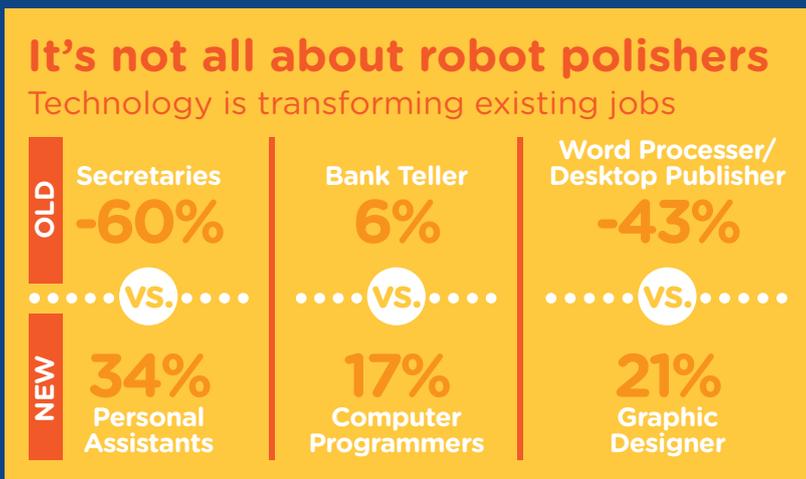
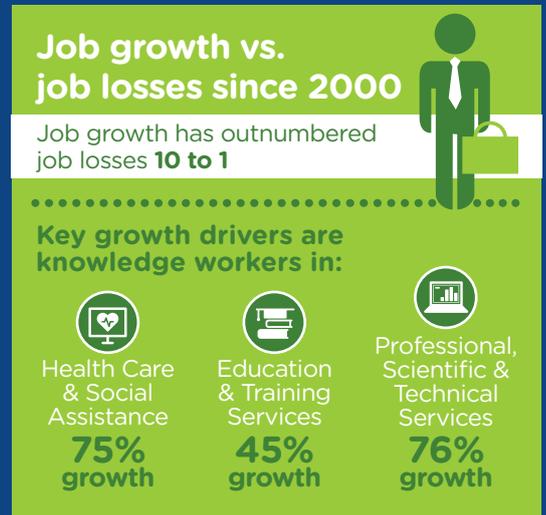
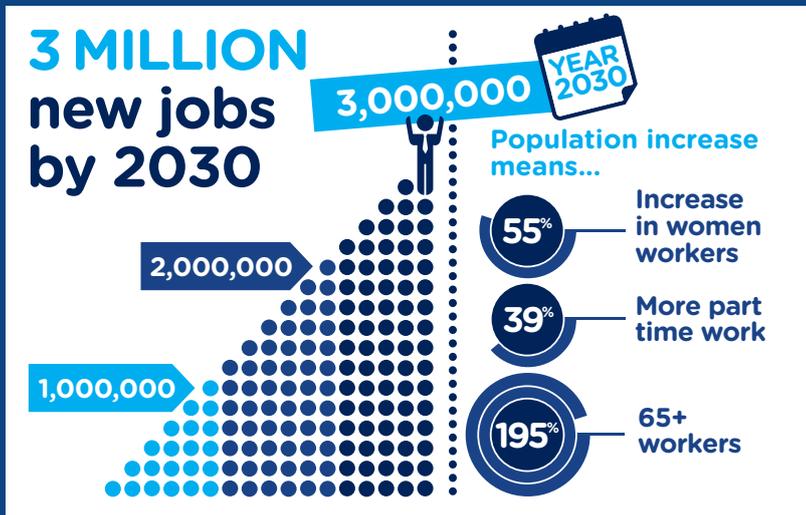
There is more to understanding the future of work than being able to recite the newest labour saving devices, the latest smart technologies, or the most recent examples of digital disruption impacting the corporate sector. Unlike other developed nations, many of the jobs of the future in Australia will be underpinned by strong population growth. Over the coming decade Australia will need more teachers, nurses, policemen and more builders as a consequence of population growth.

High levels of immigration and a strong birth rate will lift the base population over the next decade. Australian jobs of the future will be different to jobs of the future in Japan or Germany, where the change emphasis lies with the way technology is reconfiguring labour demand. The Australian workforce will also be reshaped by the impact of new technology but there is the added fact that many quite traditional jobs will remain in high demand because of population growth in this nation.

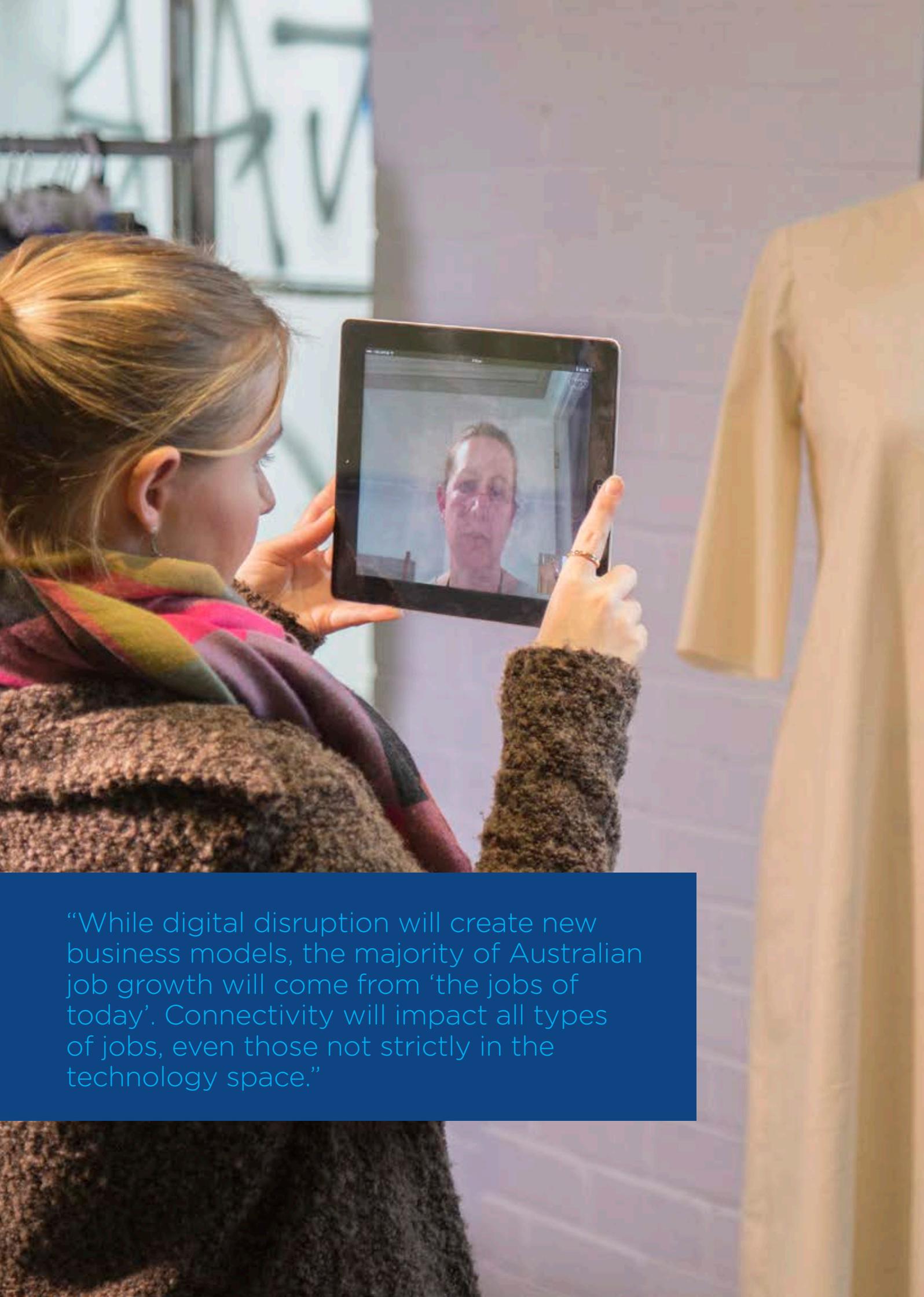
Australian jobs of the future will have two layers: jobs created by new technology and jobs created by increased population levels.



Beauty and the Geek: Jobs of the future unveiled



Source of all statistics and trends from Australian Bureau of Statistics (ABS)



“While digital disruption will create new business models, the majority of Australian job growth will come from ‘the jobs of today’. Connectivity will impact all types of jobs, even those not strictly in the technology space.”

How technology is transforming jobs

The relationship between job loss and job growth

Over the first 15 years of the 21st Century the Australian workforce increased by around three million workers or 32 per cent. Over this time there has been a greater emphasis on part time work, work for women as opposed to men, and on work for older as opposed to younger workers. There is no reason to assume that over the 15 years to 2030 the demand for jobs will be any less than over the last 15 years. Australia will need jobs for around three million more workers over the next decade and a half.

But new jobs are comprised of job growth and job losses. And over the last 15 years there have been job losses in manufacturing, agriculture and in information, media & telecommunications. On the other hand there has been job growth in health & social assistance, professional services, construction (mostly prior to the global financial crisis) and in education & training.

Job growth has outnumbered job losses in the 21st Century in Australia by a ratio of 10-to-one. Job growth has largely derived from the advent of knowledge workers and especially in the health, education and professional services sectors. New technology in medical imagery, data management, robotification, diagnostics and in overall patient care, combined with an ageing population, is driving up demand for labour in the health care sector. Better educated knowledge workers is where the workforce is headed.

Table 1.
Changing Workforce Demographics (000's)

	2015	2000	% Growth
Part Time	3,672	2,371	55%
Females	5,436	3,941	38%
Males	6,366	4,981	28%
65+ years	426	138	208%
15-19 years	635	634	0%
Total Workforce	11,802	8,922	32%

Source: ABS survey data

“Jobs of the future will continue to derive from the rapidly expanding health, education and professional services sectors.”

The rise of the knowledge worker

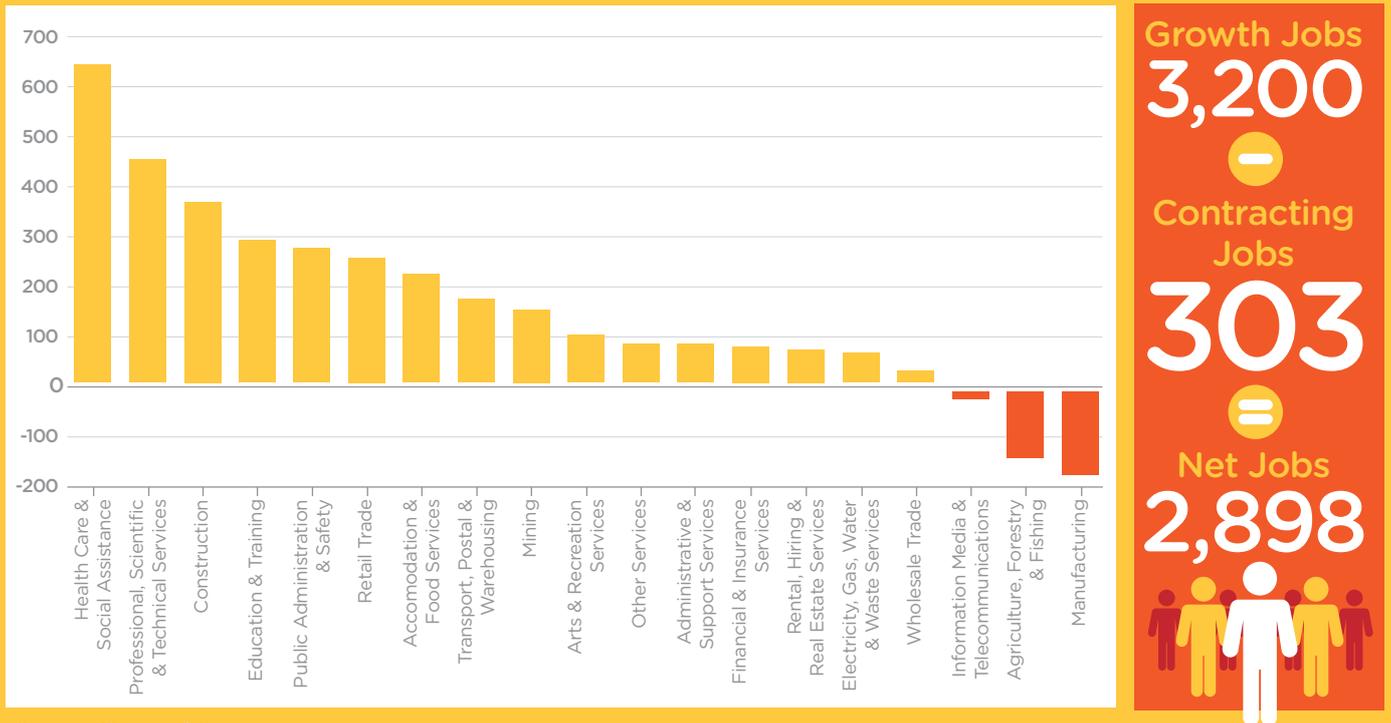
As the Australian economy shifts from a manufacturing and agricultural base to a services base, there is an increased requirement for professional knowledge workers. GPs send and receive diagnostic material online. Lawyers exchange briefs and documentation online. Some are outsourcing the discovery process to cheaper labour markets in India and the Philippines; all these tasks were previously not possible without the advent of modern digital technology.

What is a knowledge worker?

The term knowledge worker applies to workers that complete university training. This includes professionals, managers, accountants, engineers, computer programmers, law graduates, scientists, earth science specialists and others. There is some gradation in knowledge work where computer programmer sits at one end of a spectrum and drama teacher might sit at the other end.



Figure 1.
Workforce Sector Change 000s employees 2000-2015



Source: ABS survey data

The demand for engineers and especially earth science professionals has emerged in Australia with the rise of the mining boom. But even in this sector, large mining companies are shifting to an automation process where mines are operated remotely by trained technicians based in capital cities.

Jobs of the future will continue to derive from the rapidly expanding health, education and professional services sectors. The rise of the knowledge economy is part of this shift in the workforce but so too are demographic trends like the ageing population base and strong levels of immigration. Australia will need more primary school teachers, secondary school teachers and more GPs and nurses in the future because of the prevailing rate of population growth.

Artificial intelligence and entrepreneurialism

Over the longer term there may be some diminution in the demand for white-collar jobs as automation and artificial intelligence change that way health and education services are delivered. But in the short to medium term, say over the next decade, these are the sectors that will yield the bulk of Australia's jobs of the future.

The rise of new technology and digital disruption is likely to have an added effect on the workforce.

“Uncommitted to marriage, mortgage or children in their 20s, knowledge worker Generation Ys will be looking for ways to disrupt, to improve and to create value.”

These developments will facilitate a level of entrepreneurialism that was not previously possible. This is an especially appealing prospect for Generation Y, today's 20-somethings looking for alternative models of employment. Uncommitted to marriage, mortgage or children in their 20s, knowledge worker Generation Ys will be looking for ways to disrupt, to improve and to create value.

It's not just the jobs of the future that will sustain and expand the future workforce, it is a culture of entrepreneurialism that will influence the structure of the economy. More and more small and agile businesses operated by young entrepreneurs will be a feature of the future Australian economy. Big business dominated in the second half of the 20th Century; the first-half of the 21st Century will see the rise of small technology based businesses.



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What are the jobs of the future?

This of course raises the issue of how the Australian workforce might change in the future and especially in the decade following the full roll out of the nbn (the ten years to 2030).

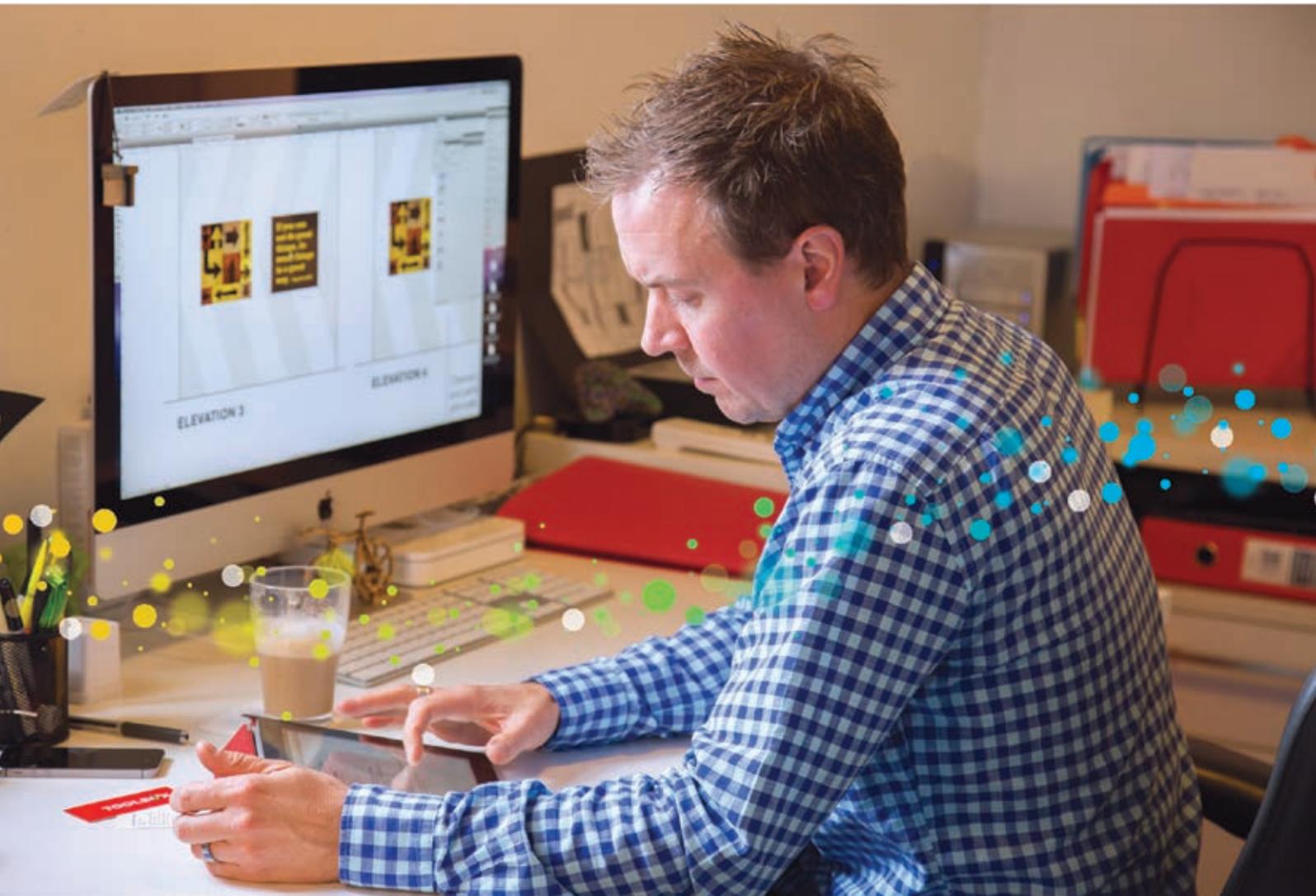
What will be the jobs of the short to medium term future? There is a tendency when discussing 'jobs of the future' to focus on the extreme, the niche and the exotic.

One recent study cited the new job of 'robot polisher' in much the same way as the invention of the motorcar created jobs in car cleaning. (Although why won't there be a robot polishing robot?) There may well be robot polishing jobs in the future but this will not be a source of job growth.

The issue is not what new jobs will be created in the future but rather what jobs will be most in demand. And how will these most demanded jobs be shaped and reshaped by access to ubiquitous fast broadband via the **nbn™** network?

Jobs rising faster than the workforce average during the 21st Century cluster into five distinct skill sets that represent typical jobs of the future. The example jobs cited are those that have, or are aligned to, the jobs that have gained market share in the workforce.

“There may as well be robot polishing jobs in the future, but this will not be a source of job growth.”



01. The Care Givers

The Australian population is ageing giving rise to demand for more care givers.

The Australian population is ageing giving rise to demand for more care-givers. But Australian values are also shifting. With greater prosperity as a nation Australians are choosing to share that prosperity through greater allocations to welfare. And the composition of the workforce is changing. More and more women are working which means there is a rising market for household services. The care giver jobs of the future include social worker, aged-care worker, child-care worker and youth worker.

But there is also a rising demand for support jobs in meal replacement (eg take-away food), household maintenance work like gardening and lawn mowing, as well as personal services like massage therapist, manicurist, beauty therapist, fitness instructor and nanny; all of which are accounting for an increased share of the workforce.

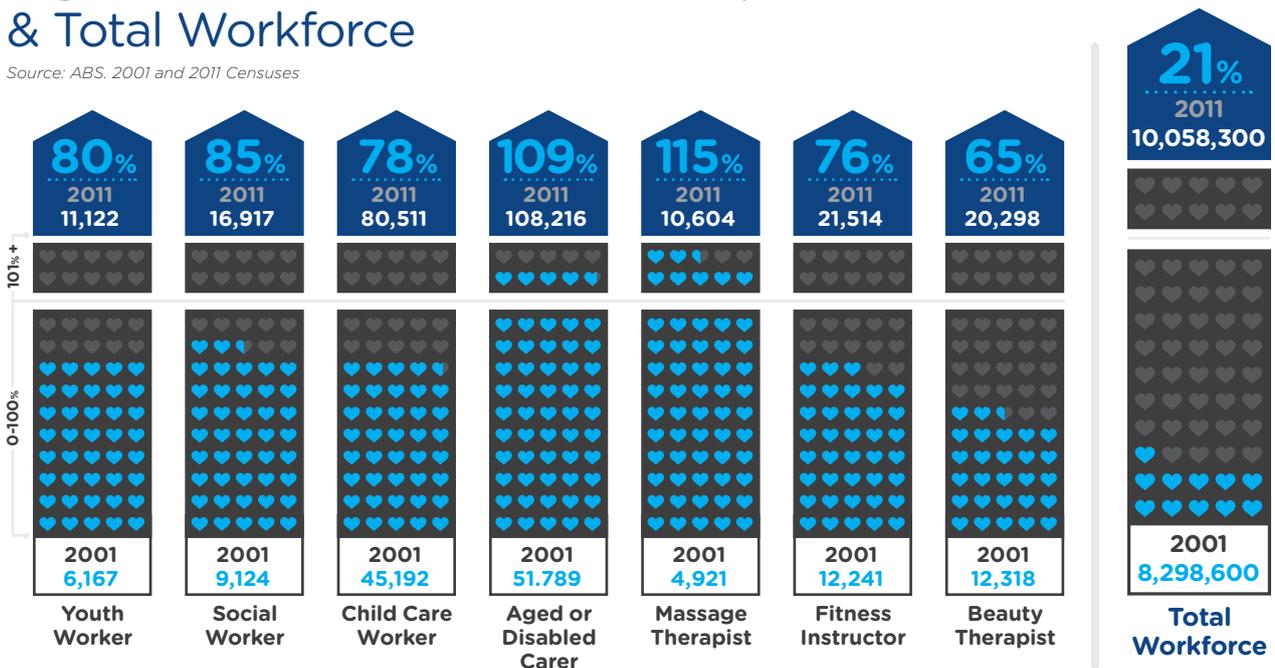


Care Giver job of the future.

A personal trainer pitches for work using an uber-like app. The trainer sets up group workout sessions where participants join in from the lounge rooms and workplaces via HD video conferencing. The trainer follows up with participants for a one-one-one Skype call to talk through exercise regime and diet plans. Billing is completed in real time with the client and personal trainer using a special Trip Advisor type app. Both client and personal trainer marvel at how they managed to get anything done 'the old way'.

Figure 2. Selected Growth Occupations & Total Workforce

Source: ABS. 2001 and 2011 Censuses





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02. The Technocrats

Technocrats sit at the core of what might be termed the knowledge worker segment. There are other knowledge workers but they are less central to the operational design and management skills needed to run the businesses of the future.

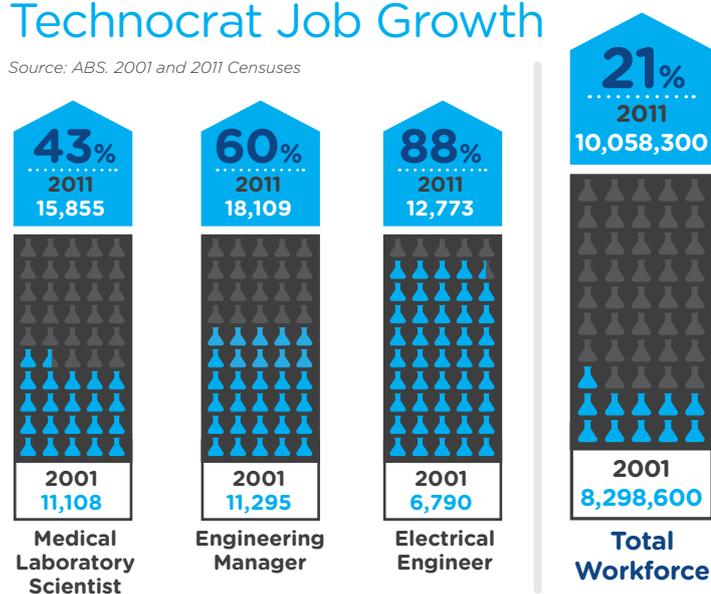
The technocrats are highly skilled, highly trained and are well remunerated. In another world technocrats might have been called geeks or nerds; today references are more diplomatic. Technocrats control the know-how that drives the methods of production. Without the technocrats the robots and the automatons subside and business ceases to evolve. The technocrats have highly developed skill sets in science, technology, engineering and mathematics.

Business entrepreneurs fall within the core STEM (science, technology, engineering, mathematics) skill set of the Technocrat class through the addition of entrepreneurialism. There is no real difference between creating an app and creating a business. And so Technocrats have STEEM skills where the extra E is for entrepreneurship.

Jobs in this space that appear to be expanding based on census analysis include electrical engineer, civil engineer, engineering manager, industrial engineer and mining engineer. But it would also include computer programmer, data scientist, medical researcher and even web-page designer. The Technocrats use their skill sets to create, analyse, manage and improve consumer products and services.

Figure 3. Selected Technocrat Job Growth

Source: ABS. 2001 and 2011 Censuses



Technocrat job of the future.

The Technocrat job of the future might involve a collaboration between health scientists based in say Melbourne's Parkville medical research precinct and their counterparts based in Stamford University in the US. A research project in say nanotechnology might then be commercialised, a company created, and venture capital sourced, all using real time communications and social networking. Start-ups will drive the growth of 'Silicon Cities and Silicon Beaches' outside of the bigger metropolitan areas because such businesses can be operated and run from wherever an entrepreneur chooses. These high-tech businesses will move from the city to regional and perhaps lifestyle Australia creating hotbeds of innovation and perhaps reviving or stimulating local economies.



03. The Specialist Professionals

Also in the knowledge worker category are the professions and the regulators because these jobs require a university education or some other technical qualification.

However these are not jobs at the creative edge of knowledge work; these are specialist jobs that are required to maintain systems (including compliance) and to deliver outcomes. A medical researcher Technocrat might discover and commercialise a new health application but that application must be administered by health care professionals like doctors and monitored and regulated by other professionals.

The Australian population will increase by close to six million by 2030; this will create demand for jobs that are a function of increased population levels including health, teaching, accounting and public administration professionals. Specialist profession jobs of the future include jobs in finance accounting, general medical practice, dentistry, pharmacy, oncology, gerontology, urban planning, policy advice, occupational health & safety, primary school teaching, secondary school teaching, university lecturing and vocational trade teachers.

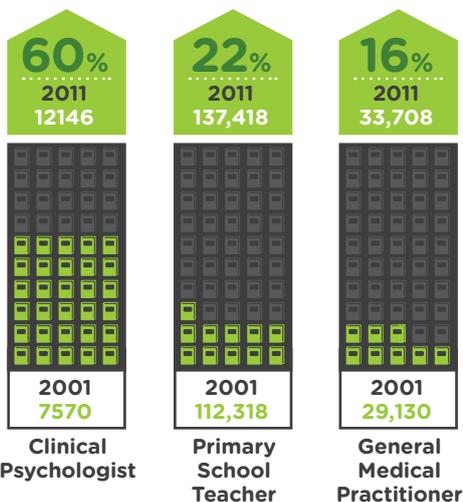
These are the specialist profession jobs that have expanded most rapidly so far this century and that will expand further in the future.

“The Australian population will increase by close to six million by 2030; this will create demand for jobs that are a function of increased population levels...”



Figure 4. Selected Specialist Job Growth

Source: ABS, 2001 and 2011 Censuses



Specialist Profession job of the future.

The Specialist Profession job of the future might include for example the GP or the solicitor who will increasingly utilise new technology to assist in diagnosis. IBM Watson for example is advising medical practitioners with regard to suggested diagnoses. Solicitors might access artificial intelligence machines to scan documents for the discovery process looking for key words or phrases. The role of the teacher may - change as they become facilitators of learning rather than merely sticking to a set lesson plan. Learning will be ‘flipped’ as students research ‘how to’ lessons on Google and Youtube and then come to class to discuss and to workshop ideas. Learning in the future will be more about research and collaboration than about absorption and instruction.

04. The Doers

It is likely the number of people working in the Australian workforce will expand from 12 million to 15 million over the period to 2030 regardless of the level of automation in other parts of the workforce.

Many jobs of the future will have some connection into a technology base but many will not. There will still be a requirement for waiters in 2030. Many of the jobs of the future will be existing jobs scaled up to service a bigger population base but perhaps with newer technology these jobs will deliver better efficiency.

Job losses on a large scale takes decades; there were at last census, after all, still 300 working blacksmiths in the Australian workforce. There will be demand in the future for skills to build houses to accommodate a bigger population; this demand will result in jobs for plumbers, electricians and carpenters which have been some of the fastest growing jobs in Australia since the 2006 Census.

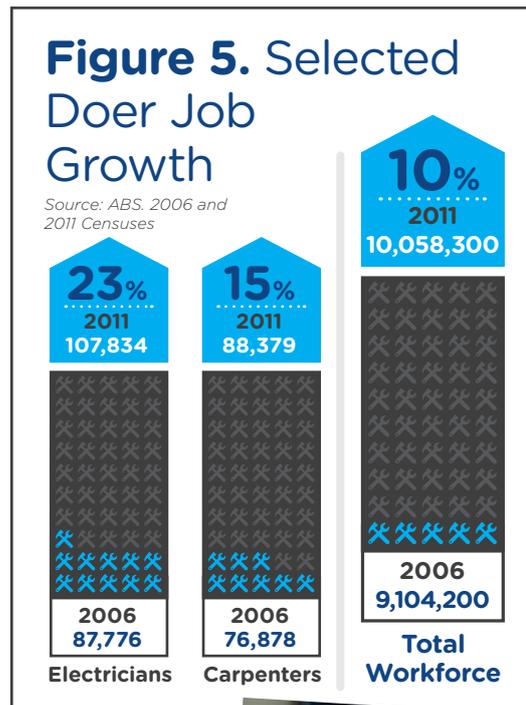
It's more the way plumbers, electricians and carpenters work in the future that will change. New tools, new methods of billing, new ways of communicating with clients, new ways of ordering materials will all be part of the tradie toolkit in the 2020s and beyond.

There is also the possibility that the way building work is commissioned might change. In the future work may be allocated via an Uber-like app; billing could be immediate and completed on site with payment required by the end of the day.

But the Doers are far more than builders; the Doer skill set also covers jobs like personal assistant (replaced the secretary), sales representatives (face-to-face selling/pitching will still be required), check-out operators (small retailers are being replaced by big-box retailers who still employ check-out staff) and catch-alls like 'general clerk'

and 'office manager.' These jobs are not necessarily disappearing as much as they are morphing into different roles over time.

In addition, time-series occupational data from the censuses show, large-scale job growth in Australia has often occurred in people related activities. More office workers, more management, more houses, more consumption, will drive demand for Doers to deliver and to complete billable and/or receipt based transactions.



Doer job of the future.

The Doer job of the future will still involve doing and delivering. A bi-box retail assistant in the future might carry iPads linked to product range and store inventory across the network. Queries, sales orders and item delivery can be tracked and billed in real-time without involvement from a cashier. A Bunnings worker of the future will have more than a red t-shirt and a leather apron; they will be the interface between the customer and the product. Tradies will be able to run more of their businesses from home, giving back time to spend with their families and on their hobbies and/or interests.



05. The Creatives

Not all workers in today's or tomorrow's workforce are driven by commercial considerations. Some workers work in jobs for lifestyle and/or creative reasons. There are more workers over the age of 65 in today's workforce than ever before and there will be even more by 2030.

Some of the fastest growing jobs in the future will be jobs that accommodate the lifestyle aspirations of older baby boomer workers. Lifestyle and creative jobs will blossom as a larger section of the workforce is motivated by what pleases as opposed to what delivers the best return on effort. One of the fastest growing jobs in the first decade of the 21st Century is the job of photographer and this was at a time when photography was democratised through the smartphone.

But in fact that same smartphone technology has created new demand for webpage photography and the visualisation of products and services. New technology has in fact delivered job growth in an occupation that was once threatened by technology.

Creative and lifestyle jobs are on the rise and include the likes of dance instructor, life coach, stylist, social media engineer, photographer, sportsperson, yoga instructor and Pilates



Creatives job of the future.

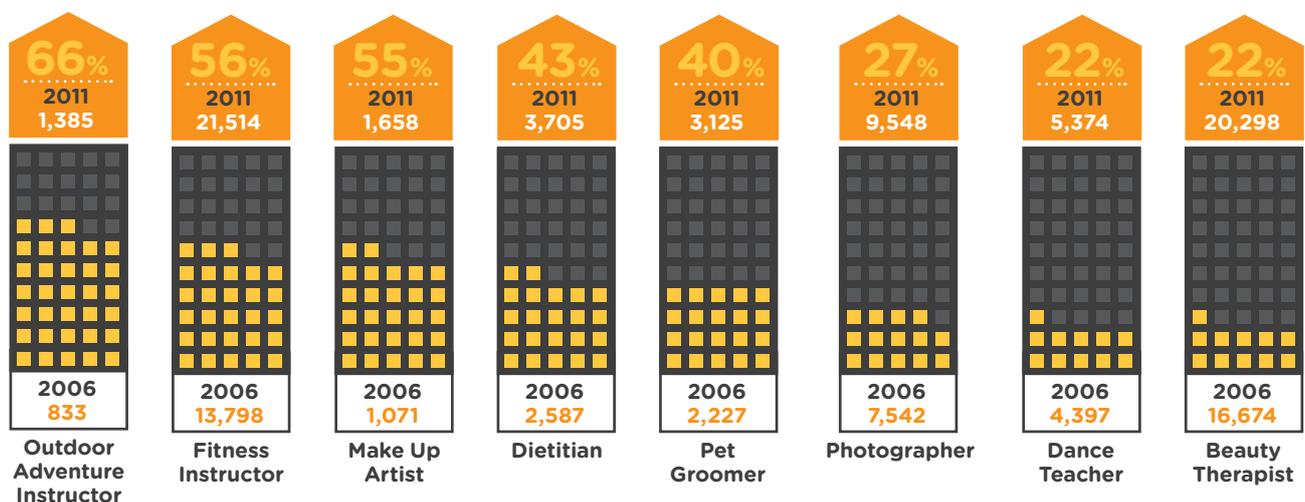
The Creatives job of the future will involve pursuing a passion or an interest and in an entrepreneurial way developing a business. It may well be an accountant setting up a photography business or a one-person consulting practice. Clients will be provided with photo selects instantly after a shoot as there is no longer the long delays associated with upload times. In either case the business operation and marketing will be conducted online and via technology.

instructor. All these creative jobs of the future can draw on technology for inspiration as well as client engagement, inspiration and peer communication.

The lifestyle aspect of the Creatives occupation may involve a directional shift but it might also, for example, be expressed in shifting from full time to part time, high-end to local and face-to-face to online. An accountant might pursue a passion for photography later in life but another equally valid pathway is for the corporate accountant to augment their retirement lifestyle by setting up a small business that is operated and marketed entirely online.

Figure 6. Lifestyle Jobs Growth

Source: ABS.
2006 and 2011 Censuses



Connectivity the common denominator in future jobs

There are two ways of looking at jobs of the future. There's the exciting speculation approach that conjures a futuristic world of automation and artificial intelligence, where everything and everyone is interconnected. And then there's the practical evolution approach where consideration is given to how work has actually changed thus far and how the broader economic and demographic context might change over the coming decade.

What kinds of jobs will deliver most employment growth over the next 15 years? What can be said is that whatever jobs are created in the future a common denominator will be, access to the universal connectivity designed to be delivered by the **nbn**[™] network.

Digital disruption combined with universal connectivity will indeed create new business models and new jobs. But for the majority of the Australian workforce, job growth will occur in categories that are tied to population and housing growth and to an expansion of existing commercial contracts in mining, agriculture and even manufacturing.

Access to fast broadband no matter where one lives is more likely to refine and improve current jobs rather than replace them entirely. Although it is true that some jobs might indeed evaporate, (it's hard to see a market for photographic film production or development) these impacts are specific rather than general.

What is changing is the need for investment by the Australian workforce in STEM and STEEM skill sets that include entrepreneurship. What's also required by the workforce is an attitudinal shift that comes with digital disruption, and that is to remain open to and accepting of change in order to identify new business and work opportunities.

The fusion of the smartphone with the camera might have led some photographers to consider their skills obsolete. But as social media draws more and more online there is a now a market to curate professional imagery.

Technology and super connectivity will augment and perhaps even alter how and where work is undertaken and even what kind of work is done in the future.

And when you think about it, the jobs of today are generally better, generally more interesting and certainly more productive than the jobs of yesterday. There is always some reticence about the future and especially where it appears demand for skill sets is on the move. But with the right attitude and the right inspiration, as well as the right super connected technology, there is every reason to believe the jobs of the future will lead the Australian people to an even better quality of life.

“Technology and super connectivity will augment and perhaps even alter how and where work is undertaken and even what kind of work is done in the future.”

Methodology



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The methodology for the Jobs of the Future study has involved an analysis of time series job data for Australia sourced from the Australian Bureau of Statistics.

Two data sources have been accessed: Labour Force Survey data and Census data. Labour Force Survey data accessed between 2000 and 2015 shows structural change in the composition of the workforce in the 21st century. Similar data dissected by sector shows which workforce sectors have expanded and which have contracted in the 21st Century. The Census data set relates to censuses conducted in 2001, 2006 and 2011. A new census will be conducted in August 2016 with results being made available in mid 2017. The 2016 census results are expected to confirm the structural shifts observed between 2001 and 2011.

The Australian census provides a five-yearly snapshot of the jobs that comprise the Australia workforce. There are around 1,300 different

occupations that comprise the workforce. These occupations shift over time; jobs like blacksmith recede while jobs like call centre operator and web page designer expand.

KPMG Demographics has correlated and aligned job descriptions between the 2001 and 2011 Censuses in order to expose the granularity of actual job growth in 21st Century Australia. Which jobs specifically have experienced most growth over the first decade of this century? And can this perspective be used to determine what jobs will be in most demand in the future? Over the decade to 2011 the Australian workforce expanded by 20 per cent which means any occupation that increased by more than 20 per cent is by definition rising in market share.





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