Business urged to STEM the tide

TIMOTHY BOREHAM



Cultural attitudes must change if Australia is to find its way amid the global skills shortage, business leaders have been told

Australian businesses have been urged to shift their cultural attitudes to address the global skills shortage, including addressing ways to foster a more diverse workforce and rethinking the nature of formal and on-the-job training.

Fostering a more flexible workplace approach went hand-in-hand with overhauling science technology, engineering and mathematics (STEM) education, according to panellists on The Australian's Future Australia Round Table.

An academy of independent technology experts, the Australian Academy of Technology and Engineering (ATSE), cites the need for 100,000 more "digitally skilled" workers by 2023.

Digital technologies are estimated to contribute $65bn to Australia's economy.

By 2025, 40,000 more engineers will be required.

"An immediate need that is not being met by support for teachers, students and the higher education sector," the academy said.

However, existing sources of talent also remain untapped.

ATSE chief executive Kylie Walker said "hundreds, if not thousands" of international STEM graduates from Australian universities had been unable to find work, despite having an Australian qualification and a working visa.

"I think the industry would be absolutely bonkers if they didn't access that highly skilled, highly motivated workforce as soon as possible," she said.

KPMG Australia associate director of People and Change Nick Ghamgosar said studies show the total cost of a new hire can be up to $79,800 (including direct costs, training costs, time to proficiency and productivity).

Put another way, the process equated to an average nine months of salary.

In contrast, the World Economic Forum has estimated the cost to re-skill an employee to adapt to a new digital role at $35,000 – an average 57 per cent less than finding a new one.

"So, there's the human side (of staff attrition), but definitely the economic cost side of things as well," Mr Ghamgosar said.

The panel heard that the skills problem was linked to the overall red-hot jobs market, which has resulted in job vacancies more than doubling over the past decade.

The skills shortage is evident especially in the resources sector, where a slate of new projects will stretch the talent pool even further.

The federal Department of Industry lists 352 prospective new resource projects worth $420bn.

If all of these projects were to go ahead, this would create 165,000 new jobs across both construction and production phases by 2027.

Australian Petroleum Production and Exploration Association acting chief executive Damian Dwyer said the oil and gas sector's quest for talent was unlikely to abate, given major projects in the development stage including Woodside's Scarborough and Chevron's Gorgon stage two LNG projects (both in Western Australia). "Oil and gas at its heart is a STEM-based industry," he said.

"So how do we position ourselves as that natural home for those professionals who are either working in the industry right now or working in other industries, or coming out of the various education pathways that we've got available to us?"

Ms Walker said Australia fought above its weight in terms of contributing to advanced research in STEM disciplines, but "what we're not doing so well is filling the skills gap".

As well as tapping skilled migrants, other solutions lay in tapping "ready to activate" cohorts of dormant talent.

These included workers who had left STEM professions mid career. Ms Walker said women in particular had done so because they didn't feel welcome, or because working conditions were "completely at odds with their other life challenges and requirements and responsibilities".

She said smart employers would address these obstacles at a cultural and systemic level, with genuine mechanisms in place to support that inclusive workforce.

Measures could be as simple as ensuring designated, lockable female toilets in male-dominated workplaces. Other steps included ensuring childcare and encouraging men to take parental leave.

Ms Walker said paid internships were an excellent way of "try before you buy" talent retention.

"They're a genuine opportunity for graduates, they're pretty low risk for the employer," she said.

"You get to have a look at whether there's a good cultural fit, as well as good skills fit."

Mr Ghamgosar said a fundamental power shift meant that workers were in a stronger position to enunciate how their work could be made more meaningful.

He said it wasn't just a case of fostering technical skills, but "softer" attributes such as leadership skills or those pertinent to emerging green economy applications.

"The most important skills of the 21st century will be learning new skills," he said.

"There's .... an opportunity for employers and employees to change their attitude around how we think about radical brand new skills."

Employers fostering "new collar" talent include IT multinational IBM with its P-Tech initiative, a public education partnership that offers high school diplomas and an associate degree, along with real-world experience and mentoring.

In Britain, vacuum cleaner maker Dyson has invested £31.5m ($55m) in the Dyson Institute of Engineering and Technology, enabling undergraduate engineers to earn a full salary with no tuition fees.

"It will be interesting to see what learning pathways are used, given 80 per cent of learning is on the job rather than in a training course," Mr Ghamgosar said.

The shift to micro-credentialling and online learning was an opportunity for companies to think differently about talent – offering the potential to identify and re-skill existing staff.

An important tool to help that process was for firms to conduct thorough strategic human capital management, Mr Ghamgosar said.

"The ability to have an understanding of your existing workforce, the skills that they have, and then being able to plan for the future in terms of roles and skills required and being able to map the pathways that are required," he said.

"A really structured approach to that is one of the answers on the operational side."

Mr Dwyer said that while it was important to ensure the education system produced the right graduates, STEM-based industries needed to take responsibility in ensuring an adequate supply of talent.

"It's not all about what you can do for me, often it's about what I'm going to do to help myself," he said.

Key to success is making subjects attractive to students

RIA PANDEY

Australia is in the midst of a severe STEM skills shortage. For the third year in a row, the country has experienced a decline in rankings in the IMD World Digital Competitiveness Ranking, dropping five places and placing 20th in 2021.

PISA – the OECD's Program for International Student Assessment that examines 15-year-old students from each country – also showed Australia ranked 29th in the OECD for mathematics, and 17th for science in 2018.

Comparatively, students from China, Singapore and Japan ranked consistently within the top five slots, in the top band, for each subject.

It leaves the nation facing a long-term competitive disadvantage, both in the completion of major projects like infrastructure and the transition to digital economies, if a solution for the low rates of STEM engagement among young people is not found.

Panellists on The Australian's Future Australia Roundtable said more needs to be done to inspire young people to take up STEM-based careers, and also identified shortcomings in the way secondary schools delivered STEM education.

Taj Pabari, chief executive of The ASE Group and 2017 Queensland Young Australian of the Year, who has run nationwide programs to empower young people to enter the workforce, said better storytelling and continuous learning were essential to foster the newest generation of digital natives.

Changing the perception, particularly for young women, that STEM careers were only for "boys in dark rooms" was a critical need. Access to role-models and highlighting the variety, creativity and excitement that comes with working in STEM, as opposed to "this is your career in coding", was also identified as a pathway to address the skill shortage.

"What we need to say is: think about having a career in problem solving," Mr Pabari siad.

"Think about having a career in energy transformations. Think about having a career in supporting coastal communities to be resilient, or working on the next suite of vaccines. The application is what we're looking at. That's the stuff we need to sell.

"And then we have to very clearly communicate that to have those problem-solving, real-world, exciting careers that align with your passion, you need to acquire this particular set of [STEM] skills."

Kylie Walker, chief executive at Australian Academy of Technology and Engineering, lamented the high dropout rates in engagement of STEM skills at primary school, and then for engineering concepts during secondary schooling.

"Those dropout points from the pipeline have been well documented," Ms Walker said.

"One of the key reasons is that we have a teaching workforce out there who are obviously exhausted, even before the pandemic. Most of the people teaching science, maths and coding at secondary school have acknowledged their lack of competency to teach [STEM] skills."

Ms Walker also suggested that paying a premium to teachers who have completed an undergraduate STEM degree could be one way to close the skills gap at the educational level, while Mr Pabari suggested that changing the composition of STEM education would also be useful.

Mr Pabari's view is that the STEM industry, and the jobs that it facilitates, should be taught through the lens of entrepreneurship.

By contextualising the "human life skills" that are gained through entrepreneurship – such as critical thinking and creativity – real-world applications of STEM would become more engaging for students.

The stakes are high, with Damien Dwyer, acting chief executive at APPEA, saying there could be energy projects worth hundreds of billions to the Australian economy going forward, if critical components, such as a skilled workforce were available.

Mr Dwyer said that if the industry offered high-paying STEM careers, that would be a building block for "jobs for the future," because of the transferable nature of the skills acquired.

"They're gas-based jobs, they're hydrogen-based jobs, they're renewable jobs, they're jobs in biofuels, they're jobs in future energy," he said.

Workers at the heart of oil and gas revolution



DAMIAN DWYER

People often think about the amazing technology and infrastructure in the oil and gas industry – helping overcome geological and technical challenges, connecting massive multibillion-dollar offshore projects to customers, and reducing emissions and protecting the environment.

But what must not be forgotten is the workforce that creates and runs that amazing kit – among the most innovative and future-focused on the planet.

It is also at the centre of one of the most exciting challenges in history: the energy transition to continue reducing emissions on the path to net zero while continuing to deliver energy security.

With a new generation of STEM skills needed to address skills shortages, there has never been a more important time to collaborate because it will require business, the community and government to revitalise local training efforts and build a pipeline of skilled workers.

With 80,000 highly rewarded jobs supported directly and indirectly by the upstream sector, the Australian oil and gas industry is at the forefront of utilising our existing skills and experience to inform and drive the new skills needed for the future.

We will need all types of energy and all types of technology in future. Our industry is ready for change, with portability of our skillsets within and outside the energy sector a key positive for oil and gas workers.

For example, many of the Australian Petroleum Production & Exploration Association's members are already integrated energy companies working with renewables, and many of their workforce skillsets are transferable to new industries as they emerge.

For example, natural gas is a key pathway to a commercial scale hydrogen industry, meaning gas jobs can become hydrogen jobs.

We are already using robotics and automation on projects, allowing greater safety for our workforce, more environmental protection including lower emissions, and better operational efficiency as businesses.

APPEA member Woodside Energy recently launched a world-first project with uncrewed vessels to complete inspections of subsea and pipeline assets in its North West Shelf operations. This used an underwater robot and vessel that was operated fully remotely via satellite communications technology.

Similar work was previously performed with more than 50 people on board a vessel, consuming fuel and creating emissions.

Working in remote and challenging locations has always been a feature of our industry – but that will not necessarily always be the case in the future.

Woodside has a remote-control centre in Perth allowing staff to control production of gas 1500km away when it is piped from the Scarborough gas field to an onshore LNG facility near Karratha.

Meanwhile, workers at another APPEA member, Chevron Australia, operate a quarantine-management program on Barrow Island, a class A nature reserve and home to its Gorgon LNG Project.

Potential non-indigenous species are detected using acoustic sensor devices that analyse animal calls and identify them using isothermal amplification of tissue and scat samples. A mobile app, meanwhile, is enabling the workforce to participate in citizen science programs.

The future environmental challenges will need similar but different skills as we continue to lower emissions.

Projects such as Santos's Moomba Carbon Capture and Storage Project will help development of new skills in abatement technology.

But the emissions will be injected into the same underground reservoirs the gas was drawn from in the first place, so experience and existing skills will form a vital part of the mix.

It is difficult to imagine a more diverse and unique industry on the planet than the Australian oil and gas industry when it comes to employment and skills pathways.

We are at the cutting edge of the highly competitive global skills workforce market, providing a home for workers, with expertise in geology, science and technology to take on the future.

But we are also reliant on attracting skilled workers in some of the most isolated regional towns in the world.

It is difficult to imagine a more diverse and unique industry on the planet than the Australian oil and gas industry when it comes to employment and skills pathways

A great example of these two strands working together is the extraordinary economic opportunity of the Northern Territory's Beetaloo Basin, where it has been estimated that, under a high-growth scenario, about 6000 jobs may be created over the next two decades.

While gas companies are conducting drilling tests to examine geology in the basin, we are already working with remote businesses and workers, many of them Indigenous, in the Beetaloo's exploration phase.

We believe work is critical to people building their own future while also developing their community, contributing to the greater good economically, socially and environmentally.

Creating secure local jobs is the best way to ensure shared economic prosperity.

The industry supports government initiatives that make it easier for Australians to find jobs and be trained for future work in the oil and gas sector, particularly for Indigenous Australians and those living in the regions close to our operations.

Workers have always been the lifeblood of our sector.

Damian Dwyer is the acting chief executive of the Australian Petroleum Production & Exploration Association (APPEA)



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