ICT SKILLS SHORTAGE: A CLEAR AND PRESENT DANGER

As businesses across the board are becoming increasingly digitised, technology and high-tech companies alike have been bemoaning the shortage of available ICT skills. Yet the number of graduates with the requisite skills to fill ICT rolls continues to fall across A/NZ. **CLARE COULSON** *investigates whether there is a real possibility that this region is being left in the ICT dust...*

If the CEOs of some of our most successful technology companies are to be believed, then the biggest barrier to their growth right now is the lack of a local skilled workforce. And the CIOs of our largest employers are likewise reporting challenges hiring skilled staff. The problem seems to be similar on both sides of the Tasman. But not everyone agrees – ex-Commonwealth Bank CIO Michael Harte has called it "nonsense" and "a myth" but Woolworth's CIO Clive Whincup counters saying that companies are being forced offshore by the skills shortage. At first glance the statistics would appear to be on Harte's side. The Australian Department of Employment, for example, states in its June 2014 *Labour Market Research report on ICT Professions* that there is no shortage in ICT business analysts, systems analysts, analysts and developer programmers or computer network and systems engineers. It does allow that "employers recruiting for workers with appropriate government security clearances face some difficulties", a fact that is particularly evident for software engineers.

Delve deeper, however, and the report shows that because ICT professionals are employed across a broad range of industries, employers have a diverse range of skill and experience needs, which can make it harder to find the perfect candidate. The research also shows that employers are becoming more explicit in their requirements for applicants, and would rather wait for their ideal candidate than recruit someone who was 'close enough'. In addition, employers are placing a high value on soft skills (such as communication and stakeholder engagement), as many jobs require the successful applicant to liaise with clients and other stakeholders. "A large number of employers commented on the difficulty in finding people with the right mix of technical and soft skills," the report notes.

It may sound like the technology companies are trying to have their cake and eat it too, but, as technology continues to diversify and specialise, getting the right person for the job may not only become harder but also paramount to ongoing success. Indeed, the same report notes an increased demand for positions with emerging technologies (such as mobile-based applications) and suggests there may be "a potential skill gap for workers with web development, mobile applications and cloud computing experience in the future". And it's this talk of the future that is important, because any skills shortage we may be suffering now will likely be amplified in the era of the internet of things, when everything is interconnected and always online.

In New Zealand, Xero CEO Rod Drury and Orion Health CEO Ian McCrae have both been highly vocal about their inability to find the requisite skills onshore – much as they both say they wish to hire locally. Andy Jackson, manager of skills and employment policy at the New Zealand Ministry of Business, Innovation and Employment (MBIE) goes even further. He says that research and engagement with the sector undertaken by MBIE in 2013 suggests that the issues firms face in finding the ICT skills they need go beyond insufficient supply of skills, and relate to the quality of the skills available, and the ability of employers to retain and effectively use the skills that are available.

"Over the past 10 years, the employment of highly-skilled ICT professionals has been increasing in particular – specifically software engineers and ICT system test engineers – with a slight decline in the employment of lower skilled technical occupations," he explains, which echoes the Australian Labour report's comments on finding the perfect employee.

Professor Michael Myers, Head of Auckland University Business School's information systems and operations management department says there is certainly demand for his graduates and that, while 10 years ago most of them would have been hired by the corporates, today they are being hired by the technology sector whose CEOs want programmers and creators.

Brenda Aynsley, Australian Computer Society president, says that she sees there is a skills shortage and there will be one in the future when it

comes to technology. She suggests, however, that many of the more ordinary skills such as developer and coder are already being outsourced to countries which have employees with the requisite skills, and that is disguising the shortages in these areas. "That is why that Government skills list is like it is to be honest. It's the higher order of the skills that are much harder to outsource. Your ordinary coder or website developer can be anywhere." She is referring to the Federal Government's skills shortage list which includes business analysts, systems analysts, analyst programmers, developer programmers, software engineers, computer network and system engineers, telecommunications engineers and telecommunications networks engineers.

Jackson says that New Zealand firms are making extensive use of work visas, which are approximately 2.5 times more common in ICT occupations than in other occupations. Over the past five years there was an average of 1700 skilled migrant visas approved per year for people in ICT occupations. To help Immigration New Zealand is also working with ICT sector employers to attract top talent to New Zealand, as part of its wider attraction and settlement work and a new campaign is also under way in Australia to attract expatriate New Zealanders, Australians and third country nationals with technology skills to work in New Zealand, suggesting that the Government in New Zealand is well aware of the problem and that it will continue to grow without intervention.

THE MOST MISUNDERSTOOD PROFESSION?

Paul Matthews, CEO of the Institute for IT Professionals (IITP) in New Zealand is well aware of the skills shortage, which he says is huge and has already been felt for a number of years. Talking about solutions for the shortage, he says: "There have been lots of short term solutions that have tried to fix it, but it's a systemic problem." The only way to truly fix the issue, he says, is by promoting technology in schools and making a clear pathway from school to ICT as a career, as well as helping people who want to move into ICT from other professions.

Claire Douglas, deputy secretary for graduate achievement, vocation and careers at the New Zealand Ministry of Education explains that there was a "softening" in the numbers of students studying ICT from the peaks at the beginning of the decade. "That was a response to changes in the employment market in the mid-2000s, when there was some oversupply of some types of IT skills, leading to lower employment rates." Since then, she says, demand has strengthened, particularly for more specialist skills, and that has been reflected in a firming in numbers of students studying IT subjects. Prof Myers says that while his numbers of students continue to increase he had been surprised by reports of static growth from his counterparts at other universities. He suggests that the reason some universities haven't been growing their student numbers in the technology arena is down to there still being some bias from senior staff, and parents, against the importance of ICT, saying that many still don't really understand the profession.

ACS's Aynsley says it is a similar story in Australia where there has been less and less interest in studying ICT since the dotcom era 14 years ago. She puts this lack of interest partly down to the role of teachers and parents who influence children on the types of careers they should pursue and partly down to the ICT industry which has not done enough to define what ICT is

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and why people should consider it as a career. She also adds that the government doesn't have good statistics on IT and it doesn't slice the economy up to reflect IT in the services and professional areas, which makes it even harder to define and quantify the field. In addition, Aynsley says figures show that less than half of the ICT graduates end up working in their professional discipline.

Aynsley, Matthews and Prof Myers are unanimous in saying that technology still needs to shake off its 3am-pizza-and-programming image, because today it's so much more than that and can be applied in all sorts of different contexts. Indeed, technology not only includes systems architects and programmers but also business analysts, project managers, change managers and so on. There are continually new roles evolving in line with the technology changes – for example, Aynsley says the next wave of roles will likely be "intermediaries" or "interpreters" to help end users use the increasingly complex technology offered by the internet of things. And the so-called soft skills, communication and business acumen, are increasingly required to be successful in the technology-related field of work.

SCHOOLS HOOK UP TO NEW TECH

Schools broadband provider Network 4 Learning, a Crown-owned company, has also hooked up over 1000 schools to the country's ultra-fast fibre network and will soon be giving schools full access to a digital learning hub called Pond, specifically designed for New Zealand schools. In its own words, Pond offers a collaborative environment where teachers can discover a wide range of educational resources for classrooms and share them with their peers. The aim is to give schools equitable access to digital technologies that can enable new ways of learning and improve student achievement. Not that using the latest technology begets teaching how to create and implement it – but it does give children access to more engaging ways of learning and discovery.

This also goes to illustrate a point made by Prof Myers with regards the lack of women studying technology. He said we need to change the mind-set surrounding technology and promote it as people helping people. "There is still a lack of understanding of the whole industry. There are so many 'people' jobs in the industry," he said. Anecdotally universities that have re-named their degree courses and modules to themes that appeal more to women have seen their female enrolment numbers soar.

BETTER EDUCATED

The number of IT graduates might not look too bad on the surface and is even trending up, but the real question is whether the training is actually useful. And it would appear that that is not necessarily the case. A spokesperson for the Australian Department of Employment said that data from Graduate Careers Australia's *GradStats* publication shows that employment outcomes for Computer Science bachelor degree graduates were below average in 2013 and, what's worse, they have fallen by around 13 percentage points since 2008.

The ICT *Labour* Market report quoted earlier comments that a large number of employers are facing difficulties in finding people with the right mix of technical and soft skills, which suggests that many of the qualifications are not aligned with the needs of the industry. Sometimes they are simply behind the times, and sometimes they are the victims of a marketing opportunity, such as courses in cloud computing. The IITP in New Zealand has recently completed an audit of all the sub-degree qualifications – all 224 of them – and, in consultation with the industry, has reduced them down to 14 qualifications accredited by the New Zealand Qualifications Framework which cater to the needs of the industry now and five years down the track.

"The new qualifications are very aligned with industry needs, very focused and very coherent," says Matthews, who explains that while institutions can teach whatever they like, only these 14 will be funded by government. "We are now going through the whole process for degrees – aligned with the internationally recognised Soul Accord."

In June the New Zealand Government also announced a commitment to review the positioning and content of Digital Technologies within the New Zealand Curriculum. Digital Technologies, which is what ICT-related topics are called in schools these days, are currently housed in the 'technology learning area' with food technology and hard materials (previously woodwork and metalwork) etc, which are completely different types of discipline. The announcement came with the launch of the *A Nation of Curious Minds: A National Strategic Plan for Science in Society,* which outlines a series of initiatives to increase the science and technology focus of New Zealand, including within the school system.

It's not just people wishing to pursue a career in ICT who should be up with the play on ICT-related skills however, and the IITP has requested ICT be a separate learning area (subject) so children can do some of the more interesting creative or complex learning while the basics are covered off in other areas, such as word processing in English and spreadsheets in maths.

The New Zealand Government has also allocated $28.6 million over four years for the development and delivery of three ICT Graduate Schools in Auckland, Wellington and Christchurch. The schools will provide a unique opportunity to bring technology companies together with some of the country's leading tertiary education providers. It is also making a significant investment in the tertiary education system. The 2014 budget allocated $84 million over the next four years for computer science courses, alongside significant investments in software engineering and other related science and technology tuition.

The Australian Federal Government, in comparison, seems to be dragging the chain, at least according to its chief scientist Professor Ian Chubb. A paper he released in September stressed the need for the nation to more properly engage with science, technology, engineering and mathematics (STEM). "We are the only OECD country without a science or technology strategy. Other countries have realised that such an approach is essential to remaining competitive in a world reliant on science and science-trained people," Prof Chubb said. The current Government however, introduced substantial budget cuts in May targeted at research flagship CSIRO, while

NICTA will have all federal Government funding cut from 2016.

Aynsley, writing in *The Australian* at the release of the Federal budget in June this year asked why, when all the evidence points to the need for Australia to boost its capacity for innovation and drive digital enablement, was so little emphasis placed on science and technology when it is recognised by governments around the world as the means to boosting economic prosperity.

"A STEM education not only equips people with skills for research and technical roles, but it also fosters knowledge and approaches in problem solving, communication and critical thinking that are essential to a wide range of occupations, including ICT. A recent report from the Australian Council of Learned Academies claims that building capacity in the STEM fields is pivotal to Australia's competitiveness in the global economy," she wrote.

Some relief came in October in the form of the Government's innovation regime which is offering streamlined immigration processes for scarce skills, a liberalised employee share ownership regime, investment in science, technology and maths education, and a $60 million co-funding programme for start-ups.

Aynsley does not believe that it is all up to the government, however, and says that business needs to do its bit to get people skilled up too: "It's a common problem. One of the things that really worries me is that employers want people who have at least two years' experience. We produce graduates who can't get jobs to get that experience. Professional societies can only do so much. It's up to the employers to recognise that if they want the product of someone else's training why aren't they contributing as well?"

A CLEAR AND PRESENT DANGER

If we don't close the ICT skills gap we are going to lose a huge opportunity. We're seeing companies across Australia and New Zealand doing some amazing things with technology. But we are also hearing them all say that they can't get the people they need locally to do what they want to do. "They can't grow as fast as they want to grow and as a consequence of that the economy doesn't grow," says Matthews. "On the other side of the coin we've got people coming out of tertiary study with skills that we don't need."

At least on some levels progress is being made, but it's clear that we all need to do more to ensure technology is provided a firm foundation to flourish and contribute to the economy.