



VOCATIONAL EDUCATION AND TRAINING (VET) AS AN ECONOMIC DRIVER

2016 Australian TAFE Study Tour to Asia

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About this report

This report is intended to synthesise observations from a study tour to Singapore and South Korea in 2016. The tour was attended by 10 Australian TAFEs from Victoria, Queensland, South Australia and the Australian Capital Territory. The format was:

- Two days in Singapore, including visits to Singapore Polytechnic and Temasek Polytechnic.
- One day in Songdo to examine smart city initiatives and South Korea's approach to start-up incubation and acceleration.
- One day in Seoul, South Korea, including perspectives on the role of education in meeting the needs of the economy.

Methodology

Brad Davies from dandolopartners was commissioned by Cisco and Optus to design and facilitate a study tour focused on the impact of digital disruption and emerging trends in vocational education and training in Singapore and South Korea. The tour built on a similar program delivered in 2015, and drew on some of the themes identified in dandolo's VET in Asia report, which was launched at the TAFE Directors Australia annual conference. This report is intended to capture:

- The rising importance of the policy context for VET in Singapore and South Korea.
- Change that is occurring at a VET institutional level (i.e. how policy is being translated into action).
- Industry perspectives from Optus and Cisco about the digital disruption being caused by technology in VET and the growing importance of VET in meeting the skills demands for the digital economy.

1. VET context in Singapore/South Korea

Growing importance of VET in the Asian economy

A shift in global economic power towards Asia has forced developed countries in particular to re-evaluate their own economic futures. A premium is now placed on the speed of innovation and the ability of countries to transition away from traditional manufacturing of more products, or mining of more resources. The impact of digital technology on business models, supply chains and customer expectations is well publicised, but perhaps the most profound aspect for VET institutions relates to changing requirements for skills. In Australia, we know that up to 44% of jobs – 5.1 million – are at risk from digital disruption.¹ Singapore and South Korea are two countries that have understood the profound challenges this creates for their economies, which is reflected in both policy responses and activity at an institution level (see Table 1).

Table 1: Snapshot of VET markets in Singapore and South Korea, and comparison with Australia

	Singapore	South Korea	Australia
Fast facts	<ul style="list-style-type: none"> 6 tertiary-level institutions Public institutions only 100,000+ students 	<ul style="list-style-type: none"> 180+ tertiary-level institutions Mix of public/private 1.1m+ students 	<ul style="list-style-type: none"> 5000+ tertiary-level institutions Mix of public/private 1.8m+ students
Major policy drivers	<ol style="list-style-type: none"> Help individuals make well-informed choices in education, training and careers. Develop an integrated high-quality system of education and training that responds to constantly evolving needs. Promote employer recognition and career development based on skills and mastery. Foster a culture that supports and celebrates lifelong learning. 	<ol style="list-style-type: none"> Meet demand for skilled workers in scientific and technological fields by increasing focus on STEM skills. Increase focus on competencies that are required by employers such as problem-solving, communication and teamwork. Promote VET as a pathway to employment. 	<ol style="list-style-type: none"> Student choice. Contestability in the VET market. Quality assurance. Addressing capability gaps to help meet the needs of a changing economy. Attracting international students.
Response to digital disruption	<ul style="list-style-type: none"> Focus on skills of the future (cyber security, big data analytics, STEM). Immersion in industry (e.g. mentoring and industry placements). 	<ul style="list-style-type: none"> Increased focus on innovation and entrepreneurship in VET system (as part of diversifying economy). Future-proofing cities and campuses through smart and connected infrastructure. 	<ul style="list-style-type: none"> Pockets of excellence in terms of digital uptake but not at scale.
Strengths of the system	<ul style="list-style-type: none"> STEM focus. Industry partnerships. Government leadership. Fostering entrepreneurship. 	<ul style="list-style-type: none"> Focus on VET in secondary schools. Use of big data to send clearer signals to VET institutions. 	<ul style="list-style-type: none"> Capability frameworks. Proven history in partnering with industry.
Weaknesses of the system	<ul style="list-style-type: none"> Lack of scale (a function of population size). 	<ul style="list-style-type: none"> Historic under-investment in VET. Negative perceptions of VET. 	<ul style="list-style-type: none"> Not geared strongly enough to demands of digital economy. Not connected to Science and Innovation agenda.

1 PwC, *A smart move* (2015), p. 1.

Case study: Effective use of big data and analytics

Data collected through the National Education Information System (NEIS) via surveys and transactions is being harnessed to improve VET in South Korea. For example, the National Skills Needs Outlook (managed by KRIVET – Korea Research Institute for Vocational Education and Training), is a 10-year project aimed at defining current skills shortages and future skills needs. Deeper insights are being derived as datasets expand and tools mature. For example, it is now possible to identify shortages of technical skills as well as ‘soft skills’ in specific industries.

The rise of innovation and skills-driven economies is being driven by digital disruption

Innovation and skills are becoming the currency of the global economy and the key to being competitive. Both Singapore and South Korea have prioritised industries that favour high-value goods and high-end technologies.² The value placed on innovation has different contexts in both countries:

- **Singapore:** The focus on innovation recognises that Singapore has few natural advantages (e.g. natural resources and population size). Singapore acknowledges that maintaining its place as a commercial hub in the South-East Asia region will be achieved only by focusing its investment in human capital.
- **South Korea:** The focus on innovation stems from recognition that its previous ‘fast follower’ economic strategy is no longer sustainable. Compounding this fact is South Korea’s exposure to its two largest companies: Hyundai and Samsung represent 35% of the country’s economy, making economic diversification critical. One of the reasons for prioritising VET is that South Korea doesn’t necessarily believe it has the time to wait five years for critical skills to be provided through universities.

² Austrade, *Advanced Manufacturing: Trade opportunities in the Asian century* (2013).

2. Themes from Singapore/South Korea

The program for the study tour included macro and micro issues. Delegates were particularly focused on what could be learned from vocational education institutions in relation to Smart Digital Campus initiatives specifically, and their approach to innovation more broadly. Seven major themes were identified by participants:

1. VET is treated as a major economic lever.
2. There is a sense of urgency about digital disruption at an institution level.
3. Institutions recognise the importance of discipline and focus on being 'smart'.
4. Formalised processes are essential for managing innovation and change.
5. Industry (including start-ups) needs to be part of the institution ecosystem.
6. Investment in 'smart, digital campuses' is treated as an investment to build and sustain a competitive advantage.
7. Learning institutions maintain an eye on the future, with more frequent review cycles.

1. VET is treated as a major economic lever

One of the most striking observations of the Singapore and South Korean education systems is the clarity and long-term nature of government policy. Each country's government publishes five-year policy statements that provide genuine direction and predictability to institutes and other stakeholders such as industry.

What quickly becomes apparent in discussions with Singapore polytechnics is that government policy drives investment decisions and behaviours. For example, government advice on areas of looming skills shortage is valued highly by institutions that are looking to ensure their curriculum prepares young people for the jobs of the future, as well as today.

It is also instructive to look at how government policy is interpreted at an institution level. For example, Skills Future in Singapore places significant emphasis on the need for training institutions to prepare young people for life as global citizens, not just work. This includes a focus on skills such as problem-solving, entrepreneurship, creativity and communication, as well as global awareness. This sentiment was reflected in the corporate statements of both polytechnics visited in Singapore:

“Life Ready. Work Ready. World Ready”

– Corporate statement at Singapore Polytechnic

“Spirit of enterprise. Global Mindset. Socially responsible”

– Corporate statement at Temasek Polytechnic

One of the common themes running through policy statements in both Singapore and South Korea was the need to elevate the position and reputation of vocational education and training. Both countries have historically valued a university education much more highly than a vocational one. However, as both economies have become more dependent on vocational skills, this is changing and government is playing an active role in changing community and industry perceptions of the value of VET.

Case study: Changing perceptions of training for the benefit of the economy

South Korea's focus on vocational education as an economic lever is relatively new. South Korea has traditionally placed an extremely high value on K-12 education (it is consistently at or near the top of OECD rankings for education performance) and higher education. Until recently South Koreans spoke of VET as representing jobs that were '3D': dirty, dangerous and demeaning. Recently South Korea has also changed the nomenclature from VET to career and education training, recognising that the sector needs to prepare young people for their working lives, not just a specific vocation. The establishment of Meister high schools (Meister is German for master craftsman) was part of the government's move to de-stigmatise vocational education. Similarly, the creation of the ITE in Singapore paved the way for a new perception of VET institutions with a focus on state-of-the-art technology and close ties to international institutions. Today, 65% of the entire post-secondary cohort sits in a vocational institution. Singapore has also taken an innovative approach in tackling poor perception of VET, through campaigns such as the "Top of the Trade" television competitions and "Apprenticeship of the Year" awards. Now, the ITE and a handful of institutions like it are considered world-class education institutions (even when considered against universities) and excel particularly in STEM areas, including promoting specialisations such as robotics as well as creativity.

2. There is a sense of urgency about digital disruption at an institution level

There is a growing recognition that VET institutions must embrace technology across their operations if they are to remain valued and relevant. Technology offers efficiencies and productivity improvements on one hand, but it also requires substantial investment. Institutions in Singapore and South Korea are recognising that embracing digital is about much more than procuring technology. A true embrace of digital disruption means critically assessing the impact of technology on all training functions, as demonstrated in Figure 1.

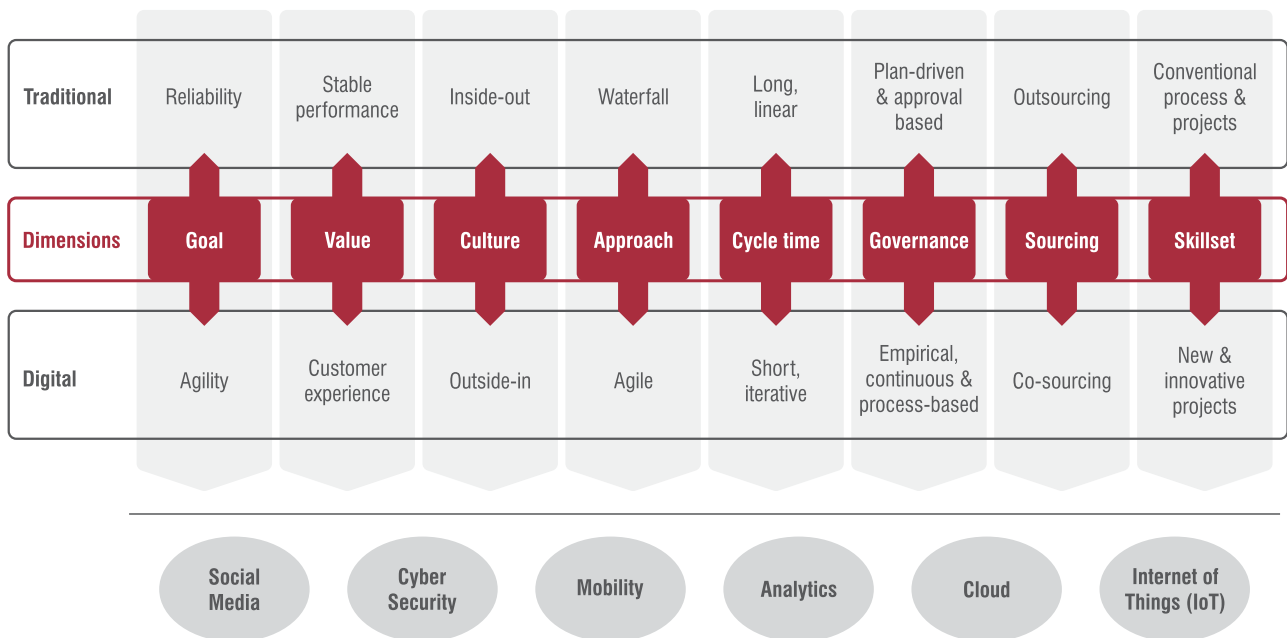


Figure 1: How digital is impacting on different aspects of training and education

To summarise Figure 1, digital is having profound impacts on training institutions. From a curriculum perspective, technology is influencing decisions about courses being offered and the design of learning materials, as well as how teaching and learning is being provided (e.g. via video). From a student experience perspective, technology is influencing the way students ‘consume’ services from their training institutions, as well as the nature of the services themselves. At Singapore Polytechnic, for example, students initiated (using data provided by their institution) a ride-sharing application – an example of how the training institution is embracing digital to deliver value beyond learning itself.

3. Institutions realise the importance of discipline and focus in being ‘smart’

Singapore and South Korea both demonstrate the power of focus and discipline, including in education policy, industry policy and resource allocation. One of the most compelling examples of focus is in relation to course choice in Singapore. Both polytechnics visited indicated they had between 60 and 70 courses active at any one time. That number in Australia was as high as 400. Temasek Polytechnic spoke openly of its process for ensuring the institution did not spread resources too thinly. For every new course that was added, Temasek asked itself a simple question: what should it replace? In many cases the decision to replace a course with a new – and more highly demanded – course meant difficult discussions with staff. The institution had worked hard to convince staff that a discussion about ‘re-profiling’ a role should be treated as a development opportunity, rather than being threatening.

<p>School of Informatics & IT (IIT)</p> <ul style="list-style-type: none"> ▪ Approximately 1500 students ▪ 100 full-time staff 	
<p>Eight full-time courses</p> <ul style="list-style-type: none"> ▪ Information technology ▪ Game design & development ▪ Big data management & governance ▪ Business intelligence & analytics ▪ Financial business informatics ▪ Cyber & digital security ▪ Digital forensics ▪ Mobile & network services 	<p>Five part-time courses</p> <ul style="list-style-type: none"> ▪ Specialist diploma in big data management ▪ Specialist diploma in business analytics ▪ Specialist diploma in Internet of Things ▪ Specialist diploma in cloud data centre technology & management ▪ Specialist diploma in information security & forensics

4. Formalised processes are essential for managing innovation and change

An experimental culture does not imply the absence of process, rules or policies. At both Singapore and Temasek, digital campus implementations were being pursued in a measured way. The ‘portfolio’ approach by Singapore Polytechnic was particularly insightful. As part of its quest to innovate from the ‘inside out’, it divided its digital campus projects into three categories: pilots (experimental proof of concepts), production (concepts that have been proven and can be scaled) and future (longer-term watching briefs). Singapore Polytechnic is focused on ensuring a reasonable spread of projects across all three categories. Figure 2 depicts the 20-plus projects currently in its Smart Campus portfolio.

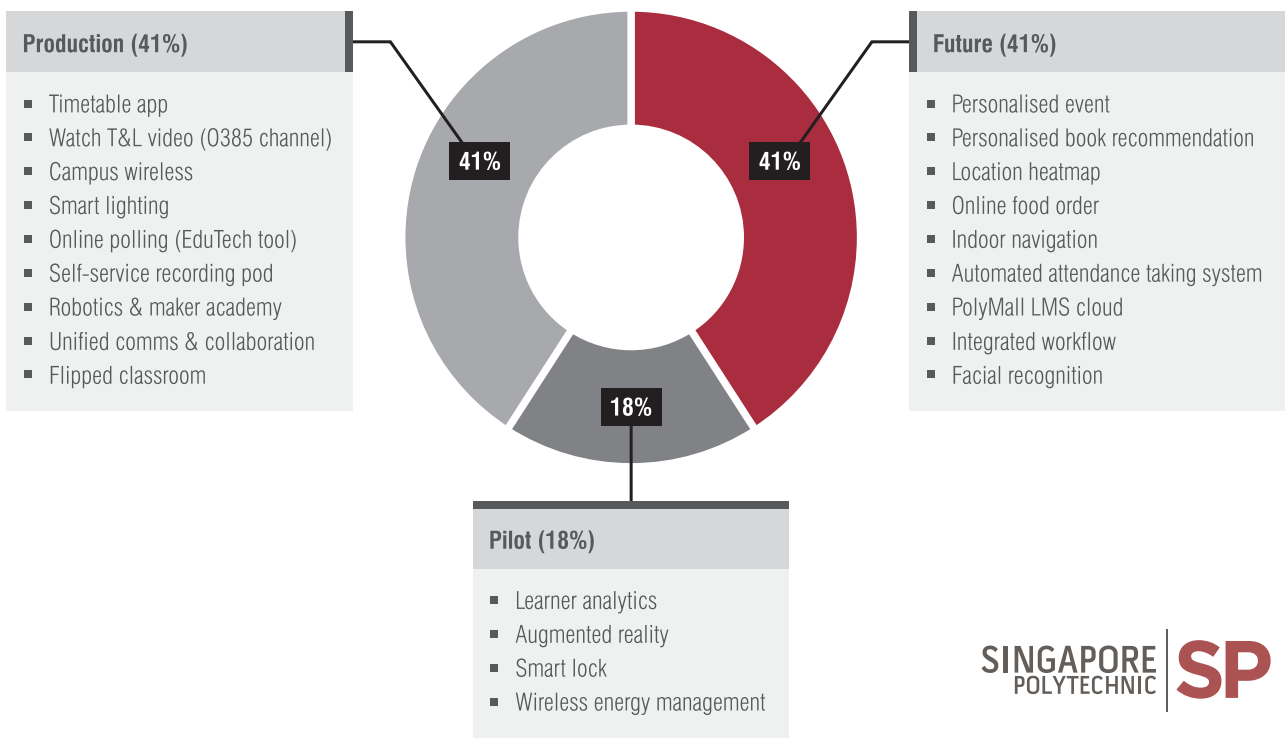


Figure 2: Current Smart Campus projects in the Singapore Polytechnic portfolio

The situation was similar at Temasek, though its view of the portfolio was much more focused on the type of application rather than its state of maturity, with in-flight projects listed in Figure 3.

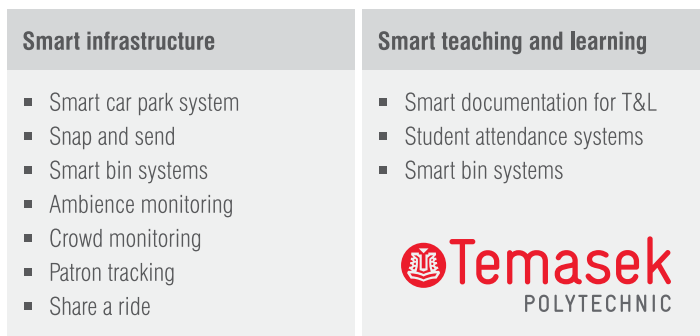


Figure 3: Current digital campus projects at Temasek Polytechnic

5. Industry (including start-ups) needs to be part of the institution ecosystem

Industry is a cornerstone of the Singapore and South Korean VET systems. Industry tends to be regarded as a strategic rather than transactional partner, with the primary motivation for both parties being the transfer of knowledge and skills. This manifests in industry playing an active role in influencing decisions as varied as curriculum, course selection and assessment, as well as policies relating to industry placements. The prominence of industry is represented by Figure 4.

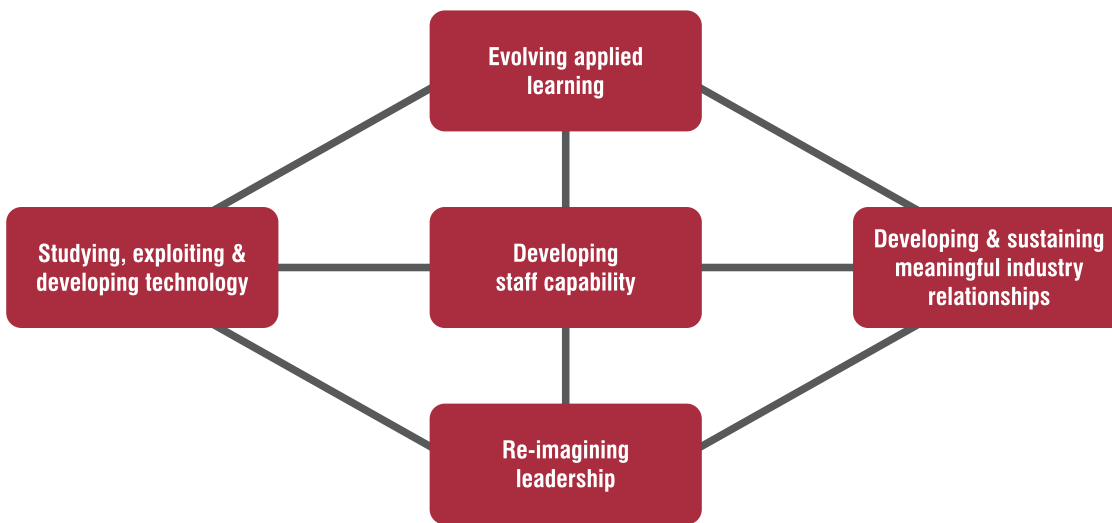


Figure 4: Singapore Polytechnic’s major focus areas to build a contemporary training institution

The selection and treatment of industry partners has also evolved. In South Korea it was recognised that restricting partnerships to industry leaders was potentially risky, particularly when you consider that up to 60% of the top 10 companies in each vertical are likely to be significantly disrupted by technology. Institutions were increasingly focused on forging relationships with potential disrupters (e.g. new entrants) and with a broader variety of ecosystem partners.

Industry partnerships were also the focus of discussions at the Incheon Centre for Creative Economy in South Korea. The centre was developed to help transition the economy from manufacturing-centric to more balanced. The focus on creative industries was seen as critical to this diversification. While the Centre for Creative Economy valued highly its partnerships with Hyundai, Samsung and others, the centre was located with the Spark Incubator, which provided support to start-ups.

“Korea’s strategy has been built on being a very effective fast follower. We are realising that we have reached the limits of that business model and need to be innovation leaders. This means a much stronger focus on entrepreneurship and looking beyond Korea as a market to the global economy.”

– Korean industry expert

Case study: Earn and learn program at Temasek

Temasek Polytechnic offers a 12-month ‘Earn and Learn’ program to students after they complete a 3-year IT or IT-related diploma course. These students are provided with an industry mentor and are given a funded industry placement (involving 40 to 60 hours of project work). The experience is tied to one of the subjects the student is enrolled in, and represents a true collaboration between industry and the institution. The program includes one week of basic training, a two-week orientation and 23-week internship. The program is strongly supported by government: industry partners receive \$15,000 per student they hire under this program and each student receives \$5,000 (half upfront upon signing up and the other half after completing the program). The Earn and Learn Program is a Singapore-wide SkillsFuture initiative.

6. Smart Digital Campus is treated as a strategic investment

Investments in Smart Digital Campus initiatives are considered part of the DNA of training institutions in Singapore in particular. Institutions are recognising they have significant sunk investment in digital infrastructure that they are not exploiting. This has obvious resonance for Australian TAFEs, many of which had much more robust and scalable technology infrastructure than their RTO competitors. Beyond the range of Smart Campus projects described earlier, institutes are continuing to invest in the underlying infrastructure required to deliver digital services. This includes investment in/optimisation of a range of sensor technologies and supporting analytics. For example:

- **Wireless access points** which can be used as 'authenticated sensors'. These are increasingly used to underpin services ranging from attendance tracking to monitoring traffic flows in common areas.
- **Video end points as sensors.** Video is now being used for a range of purposes. For example, a camera that is being used to capture and record lectures can also be applied to facial recognition and even 'emotion tracking'
- **Environmental sensors** (light, water, air) are being used to underpin energy-saving applications and generate savings that can be redirected towards innovation projects.

7. Learning institutions maintain an eye on the future

Part of the success of Singapore and South Korea's approach is their focus on continuous improvement and change. The progress reported by Temasek Polytechnic between the 2015 and 2016 visits was stunning, and demonstrated not just a commitment to implementation but a desire to refresh its thinking and approach.

Singapore Polytechnic reported that the items on its 'future agenda' included augmented reality, online polling in class, auto attendance capture and the introduction of automated alerts relating to functions as diverse as payment for food through to progress with a student's learning. Similar future-oriented thinking was also applied to institutions' infrastructure, particularly in areas such as cyber security where meeting today's requirements was not sufficient.

A visit to 'U-Solutions' in Songdo, South Korea, provided a window into future services enabled by technology. U-Solutions is a collaboration focused on trialling new consumer-oriented applications in the Songdo Smart City. As part of the Masterbell project, 2500 high-end video points (TelePresence) were installed in apartments and a range of new services trialled. Some of these applications had an education orientation and served as operational examples of how tutoring, study groups, career mentoring, cultural lectures and language learning could be delivered via video.

3. Implications and recommendations

The study tour was intended to provoke discussion and encourage TAFE representatives to reflect on what could be learned and adapted in their own institutions. While Singapore and South Korea have different contexts and institutional arrangements, both jurisdictions are grappling with how to exploit and build on their VET capability to succeed in the digital economy.

Implications for government

TAFEs need to be treated as genuine contributors to Australia's Innovation and Science Agenda

Vocational education and training is seen as an incubator for innovation in Singapore and, increasingly, South Korea. It recognises the inherent agility of institutions and their capacity to respond quickly to changing industry demands. VET is also treated as an integrated component of the wider education policy framework in both countries, rather than treated as a silo.

In Australia, the absence of TAFE institutions from the National Innovation and Science Agenda (NISA) report indicates that VET is not yet considered a genuine and mainstream lever to increase the scale and impact of innovation, future skills demand (i.e. cyber) and applied research. As an example, TAFE institutions' capacity to act as effective vehicles for applied research is regularly overlooked by governments focused only on TAFE's training role. Another focus area is cyber skills, which were identified as a priority in the NISA report. TAFEs are potentially a significant part of the solution if Australia is to rapidly develop a sustainable pipeline of cyber skills.

Government needs to acknowledge that digital infrastructure and capability can be a significant differentiator for TAFEs over private providers

The TAFE sector in Australia competes with both universities and private RTOs for student enrolments, government funding and industry attention. While this sense of competition is less acute in Singapore and South Korea, it is still present. In considering the long-term role of TAFE, state and Commonwealth governments need to consider what TAFE really stands for. One of the overlooked differentiators of TAFE (particularly over RTOs) is the quality of technology infrastructure that is already in place and its industry-quality training reputation. This infrastructure is a pre-requisite for a broad range of Smart Digital Campus applications that can make TAFE more engaging, efficient and attractive for the international student market. With the right encouragement from government, TAFE can enshrine itself as the sector that effectively exploits digital opportunities.

Implications for institutes

Institutions need to get started with digital innovation

The overwhelming message TAFEs took away from the Asian immersion was the importance of getting started. Institutes visited as part of the tour indicated that they didn't wait for perfect information, or ideal implementation conditions. One of the most challenging aspects of embracing innovation, institutes reported, was grappling with ambiguity. Australian institutes are under intense pressure (funding, mounting 'performance pressure' and rising expectations) and embracing risk and uncertainty can be challenging. However, getting started on Digital Campus projects need not be overly risky, resource-intensive or complex. Some of the projects that were deemed sensible places to start included:

- **Attendance tracking** – using WiFi infrastructure and smartphone sensors to automatically record class attendance. This type of project was straightforward to implement, relied on infrastructure likely to be in place at most TAFEs, and fulfilled a current need (i.e. the requirement to report on attendance).
- **Video surveillance and analytics** – physical and virtual security is a significant management challenge for institutes. On-campus security, in particular, is attracting greater interest as students and staff demand a safe study/work environment and breaches attract significant media attention. While the benefits of video surveillance are compelling in their own right, another reason for its appeal is that the video end points can also be used for other applications (e.g. parking, traffic monitoring and even emotion tracking).
- **Location awareness/people monitoring** – by using WiFi and video feeds, institutes can now easily track the movement of people using anonymised data. This data has a range of applications, from helping students find quiet spaces in cafeterias and libraries to influencing the decisions about capital spending on buildings and technology (e.g. WiFi density). Human traffic monitoring is also useful in helping triangulate video security applications, and can provide vital real-time data in an emergency.
- **Smart digital classrooms** – at the core of TAFE institutes is teaching and learning. More institutes are recognising the value of augmenting traditional face-to-face instruction with video, chat, real-time polling, recording and sharing to offer a more engaging experience. South West TAFE from Victoria is leading Australian institutes in the deployment of Smart Digital Classroom technologies, having started more than a year ago. The reason South West started with classroom-based application is simple: it wanted to make an impact quickly on the area most critical to its success.

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