

Linking TVET with economic expansion

Lessons from Singapore

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Governments the world over often pronounce the importance of Technical and Vocational Education and Training (TVET) in the social and economic development of people and nations. Much research and numerous studies have been undertaken. However, TVET continues to remain a 'weakest' link in the total education system in many countries. Unlike the university or polytechnic, the image, quality, standards and outcomes remain elusive. In contrast, parents continue to cherish the hope and aspiration that their children will go to university. This intense desire to pursue an academic education generates unrealistic expectations among parents and undue pressure on students in schools. The consequence is a prejudice against and less-than-positive image of TVET and all its negative associations with those who are less academic. In reality, the greatest gaps in human resource development are in technical and vocational skills.

What will it take to develop graduates who not only have the technical knowledge and skills but also values for lifelong learning? From the economic and institutional perspectives, the graduates must not only be well trained, entrepreneurial and confident, but also ready to contribute to the economy and serve society. Beyond these more immediate educational goals are the questions of how educational institutions should respond to the increasing expectations of stakeholders and customers in terms of organisational excellence, systems, processes and best practices.

Governments and educational institutions in the Commonwealth would have reflected on some of these unique challenges and opportunities. Many will be looking for possible solutions in education and personnel development. From a strategic systems perspective, what makes an effective and responsive TVET? What are the optional models available to accommodate the needs of different social, economic, educational and cultural conditions? Is the TVET system aligned with and responding to the different levels and types of skills required for continuing economic growth? How is it positioned within the national education and training system? Is it meeting the training needs of school leavers who are less academically inclined? How well is TVET accepted by school leavers, parents, industry and society? What are the governance, funding and educational policies and issues? How do we measure the results?

The fact is that there is no one 'universal' education and training system to suit the needs of all countries. In my view, the so-called 'best' system is one often shaped by the history, social motivation and economic needs of the local community. There should be a clear mission and vision in articulating the role of TVET within the national education and training system. A key challenge today is

remaining true to its mission in staying focused on vocational and technical skills. The real tests of success are the employability of the graduates, career development, upgrading in the educational system, public acceptance and image. Ultimately, the effectiveness and responsiveness of a TVET system would be measured by its impact on the social and economic development of the nation.

In this respect, the Singapore Government believes in and has invested continuously and heavily in education and training, not only in the universities and polytechnics but especially so in Vocational and Technical Education (VTE) under the Institute of Technical Education (ITE).

A history of Singapore's economic development

There was little attention paid to TVET before Singapore's independence in 1965. Soon after, it became clear that the traditional trading, commerce and service sectors alone could not generate sufficient jobs for the number of school leavers in a growing population. The overall strategic plan of the Singapore Government then was to diversify and accelerate economic growth through industrialisation. During this early phase of economic development, from the 1960s to the 1970s, the educational priority was to expand primary and secondary education, including technical education and training, so as to lay the necessary foundation for the acquisition of basic vocational skills. It was only from the 1980s that an increasing emphasis was placed on improving the level of skills and quality of the education and training system, including the schools, universities, polytechnics and TVET.

The first vocational institute, the Singapore Vocational Institute (SVI), was established within the school system in 1964. With the increasing pace of industrialisation, there was growing concern on how best to expedite and expand TVET to meet the technical and skilled personnel needs of new emerging industries. The mainstream of education remained largely academic. In 1968, 84 per cent of students in schools were enrolled in the 'academic' stream.

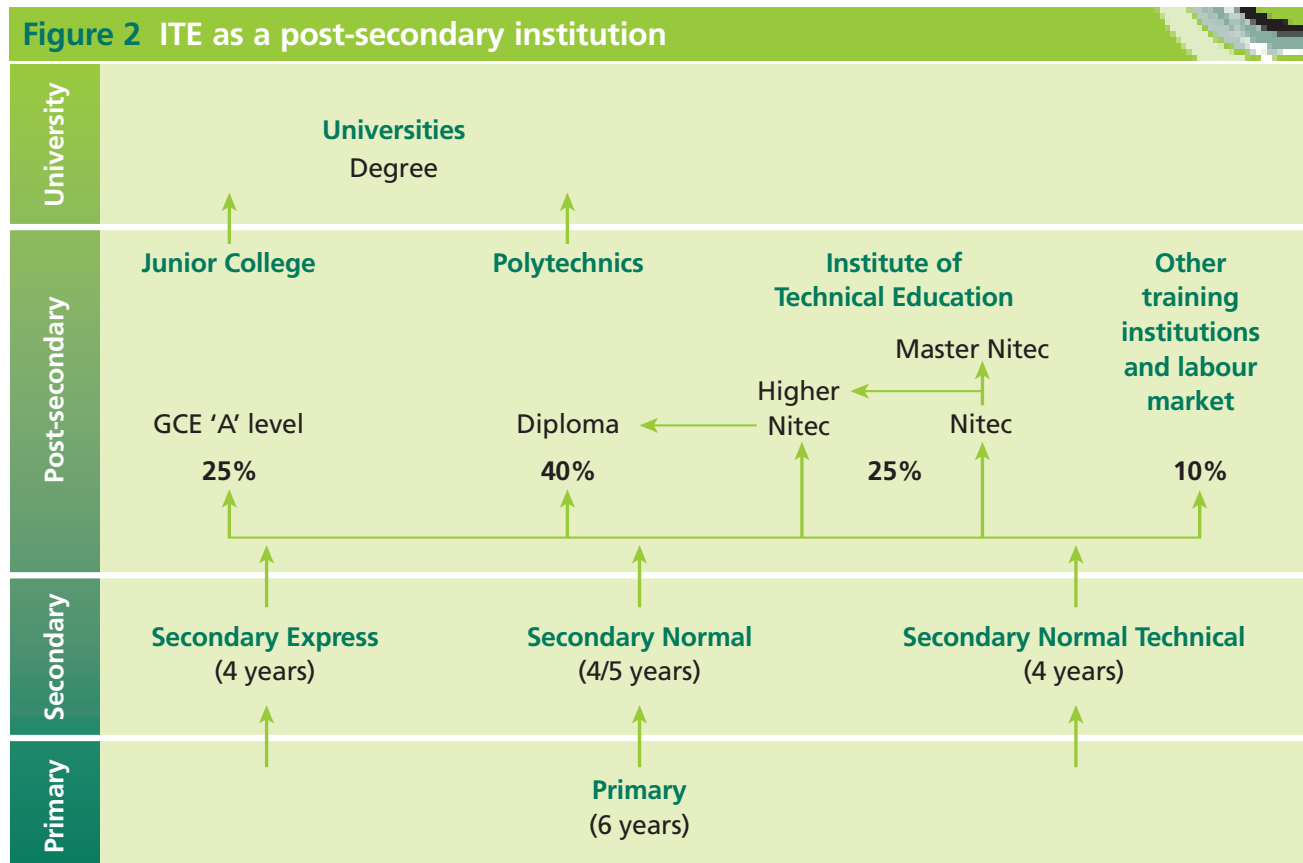
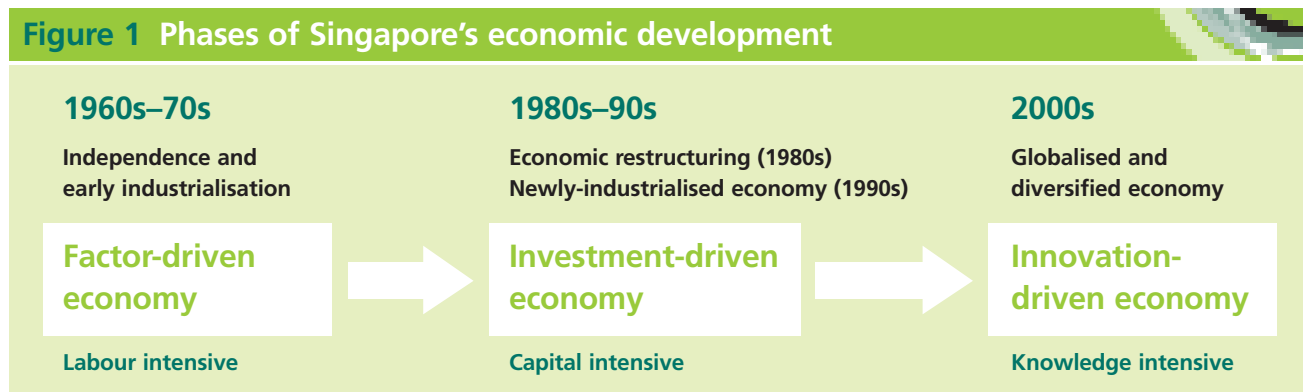
As a result, in 1968, a Technical Education Department (TED) was established within the Ministry of Education to spearhead the development of secondary vocational education, industrial training and technical teacher training. By 1972, there were nine vocational institutes under TED and the number of graduates greatly increased from 320 in 1968 to over 4,000. With this expansion in

infrastructure and student enrolment, this model of vocational training, which was a part of the school system, was set for the next major phase of development. Thus, was created, the first Industrial Training Board (ITB) in 1973 to centralise, co-ordinate and intensify industrial training. This was a significant step marking the formalisation of the system of vocational training outside the school system. As a statutory board, ITB was empowered with greater autonomy and flexibility to respond to the challenges of technical personnel needs in a rapidly growing economy.

In line with the changing needs of the economy, the National Trade Certificate (NTC) was introduced to meet the different levels of skills and quality standards required by industry. A wide range of courses was introduced in areas such as electronics, mechanical engineering and motor vehicle mechanics, starting with the NTC-3 or semi-skilled level of certification. The unique feature of this system is that the same competency standards were used for the

full-time vocational training courses and the public trade testing system for working adults.

In the early 1970s, another government agency, the Economic Development Board (EDB) whose mission is to promote direct foreign investment into Singapore, also played a significant role in strengthening the industrial training system. By partnering multinational corporations (MNCs) such as Tata of India, Rollei of Germany and Philips of the Netherlands, it established so-called 'Joint Government Training Centres', which helped to enlarge the pool of trained technical personnel. This concept was later extended to the setting up of joint 'government-to-government' technical institutes with the assistance of Japan, Germany and France. Throughout this process, Singapore was able to meet the more specialised skills needs of the MNCs that the local training system was not quite ready to provide.



Creating a capital-intensive economy (1980s–1990s)

In 1979, the government embarked on a major restructuring of the economy towards higher value-added, high technology and more capital-intensive industries.

The response was a restructuring of the TVET system and establishment of the Vocational and Industrial Training Board (VITB) in 1979. The VITB replaced the former ITB. With a broader mission, efforts were directed towards expanding the training system, developing new programmes, and improving the quality of vocational training. In particular, the higher NTC-2 level of certification was extended to include electrical, electronics, precision engineering and automotive technology. For the first time, a Centre of Vocational Training was set up to develop professional capabilities in areas such as curriculum development, training of trainers and instructional media development. These were some of the core areas of expertise necessary to develop and support a quality system of training.

Economic restructuring had a direct impact on the capabilities expected of the existing workforce. National efforts were intensified in developing a comprehensive Continuing Education

and Training (CET) system to facilitate upgrading and ‘re-skilling’ of the workforce, especially those with lower education and skills. So, between 1983 and 1987, three national CET programmes were launched – the Basic Education for Skills Training (BEST), Work Improvement Through Secondary Education (WISE) and Modular Skills Training (MOST). Focusing on English language and mathematics, BEST and WISE had helped a quarter of a million working adults to acquire a primary or secondary level education respectively. For ease of access, the classes were conducted through an extensive network of vocational institutes, schools, companies, union centres and even Ministry of Defence centres. MOST, on the other hand, provided a system of training for working adults to upgrade and acquire a technical skills qualification on a part-time modular basis.

In 1991, the government published a new economic plan in charting the next phase of Singapore’s development. The goal was to turn Singapore into a first league developed nation within the next 30 to 40 years. The new direction was focused on building the manufacturing and service sectors as the twin engines of economic growth. Companies were encouraged to diversify, upgrade and develop into strong, export-oriented businesses and

Key features of the ITE system

- i. **Having a clear mission:** With a clear focus on its ‘Mission, Vision and Values’, ITE has developed an inner spirit of commitment and teamwork in always asking how it can better serve, add value, and meet the needs and expectations of students and stakeholders. As an educational institution built upon organisational excellence and best practices, it has nurtured a pervasive culture of care, especially the care and concerns of the staff for the students.
- ii. **Addressing the needs of the less academic:** ITE has systematically restructured and transformed a former system of smaller traditional vocational institutes and regrouped them into a system of three modern and mega campuses called ITE colleges. Operating under a ‘One ITE, Three Colleges’ system of governance, the colleges, each with a full-time student enrolment of 7,200 and headed by a Principal, enjoy greater autonomy, economy of scale and flexibility in responding to changing needs. ITE has created alternative pathways, choices and diversity to the robustness of the Singapore education system.
- iii. **A unique brand of education:** Called ‘Hands-on, Minds-on and Hearts-on’, this is a holistic college education that provides the motivation, assists student learning and nurtures all-rounded graduates. Known for its quality, relevance and values, it produces highly employable and adaptable graduates who are ready to take on the challenges of a modern global economy.
- iv. **Modern campus infrastructure:** ITE’s campuses are modern and well equipped with extensive workshops, an IT-rich, web-based environment, student support services, and other sports and arts facilities. Purposefully built, they provide a conducive and experiential learning environment for the total development and experience of students. These modern campuses have been an important factor in changing the public perception of ITE.
- v. **A rigorous curriculum development process:** Called ‘Developing a Curriculum’ (DACUM) process, the skills standards and competencies to be acquired by students are derived directly in consultation with the major sectors of business and industry. To ensure relevance and a strong foundation in technical skills, typically 70 per cent of curriculum time is allocated to practical and 30 per cent to theory.
- vi. **A process-oriented pedagogic model:** Called the ‘Plan, Explore, Practise and Perform’ (PEPP) model, the aim is to develop ‘thinking doers’ – i.e. graduates who can apply what they have learned and put this into practice. The focus is on acquiring the technical, methodological and social competencies in an experiential learning environment.
- vii. **Close partnership with industry:** Built on the mutual needs and benefits since the early days of Singapore’s efforts in industrialisation, this partnership has further strengthened in terms of levels and quality of engagements. Leveraging on the knowledge, expertise and skills of industry leaders, established linkages with private industry include industry-based training (IBT) schemes, ITE board representation, curriculum development committees, college advisory committees and joint centres of technologies.
- viii. **Branding:** The effort to communicate and rebrand the ITE image was an integral part of its journey of transformation. Supported by a comprehensive marketing and rebranding programme, there was gradual turnaround in its public perception and image. Over a period of nine years, from 1997 to 2006, the image of ITE had significantly improved by 76 per cent.

invest in the regional economies. From the educational perspective, the stage was set for a critical review of the post-secondary education system to ensure the availability of well-trained and qualified personnel in the high-technology, knowledge-intensive sectors.

So, in the same year, a review of school education and vocational training resulted in a crucial decision by the Ministry of Education in adopting a new policy of a minimum of ten years of basic general education for all pupils in the school system. It became clear that to meet the skilled personnel needs of Singapore's future economic development, a primary school education was no longer sufficient for those who wished to pursue vocational and technical training. Employers needed vocational graduates who had a secondary education and higher-level NTC-2 skills in order to respond to the dynamic changes in an increasingly global economy.

This review was a turning point for the establishment of the Institute of Technical Education (ITE) as a post-secondary educational institution in 1992.

Creating a knowledge-intensive economy (2000s)

Moving forward into the 2000s, Singapore saw the need to increasingly develop into a globalised, entrepreneurial and diversified economy. While continuing to strengthen the higher-end manufacturing activities, there was a clearer recognition of the importance of the service sector as another engine of economic growth. Concerted plans were formulated to attract and nurture new growth sectors such as the biomedical sciences, IT, creativity technology, integrated resorts and high-value engineering. The response in the educational sphere was to position Singapore as an education hub by attracting foreign students and internationally renowned institutions.

The transformation of the Institute of Technical Education is a Singapore success story. It was the first educational institution to win the prestigious Singapore Quality Award (SQA) in 2005 and Harvard-IBM Innovations in Transforming Government Award in 2007 for its achievements and innovations in vocational and technical education (VTE). Over a period of 15 years (1992–2007), it has effectively rebuilt and transformed the former system of traditional vocational institutes into top-line modern regional colleges. Described by the Education Minister as 'the shining jewel'

in the education system, ITE has successfully created an educational pathway for school leavers who are less academically inclined. These are students who would otherwise leave the formal education system prematurely.

This government-funded, post-secondary institution focuses on career-based VTE. Its mission is: 'To create opportunities for school leavers and adult learners to acquire skills, knowledge and values for employability and lifelong learning.' Its goal is to train technicians and skilled personnel for jobs and careers in the major sectors of the economy.

ITE today is well positioned among the post-secondary education institutions in Singapore, as shown in Figure 2. There are clear demarcations with respect to the missions of the university, polytechnic and ITE. All students in Singapore receive at least ten years of general education in schools, comprising six years primary and four or five years secondary. Depending on their academic achievements, aptitude and interests, about 90 per cent progress to post-secondary education and beyond. The junior colleges provide an academic high school education for the top 25 per cent who go on to a university. The next 40 per cent might enter the polytechnics for a wide range of practical-oriented three-year diploma courses in preparation for middle-level professions and management.

Catering to the needs of the lower 25 per cent of a school cohort who are less academically inclined, ITE provides full-time, institutional-based courses under its 'One ITE, Three Colleges' system of governance. With a wide range of 80 different courses, full-time student enrolment is 25,000. There are two basic levels of qualifications under the National ITE Certificate (Nitec) system. Depending on their achievements in schools, aptitudes and interests, students may enroll at the Nitec or Higher Nitec mainly two-year courses in Schools of Engineering, Business and Services, Electronics and ICT, Applied and Health Sciences, Hospitality, and Design and Media. There is formal articulation for progression from ITE to a polytechnic and from a polytechnic to a university, based on merit performance. There are 'ladders and bridges' linking the alternative pathways to cater to the different needs, talents and potential.

ITE has transformed itself into a model of excellence in vocational and technical education. It was certainly not a journey without its

Journey towards organisational excellence

ITE is not a university or a polytechnic but it has achieved international recognition for its achievements and innovations in vocational and technical education. It has created a unique brand of an ITE college education for those who are less academically inclined. Its journey of transformation towards organisational excellence was a response to upgrade the system and change the image of VTE in Singapore. So, what are some of the factors of ITE's success?

- Constancy of purpose in pursuing its mission, vision and goals.
- Consistent use of five-year strategic plans has helped to provide a clear focus and platform for implementing many of its initiatives and programmes.

- Strong team of leaders and staff who are professionally qualified and dedicated to the cause of VTE. Their commitment and enthusiasm to achieve the mission and goals are reflected in the 'ITE care' culture, especially the care and concerns of the staff for the students.
- Relentless pursuit of organisational excellence and pro-active approach in always seeking better ways to serve, add value and meet the needs of students and stakeholders.
- Willingness to learn from and adopt the best relevant practices from other educational systems.

With a new vision and five-year strategic plan (2010–14) called 'ITE Innovate', the journey of transformation in ITE continues.

share of challenges. In this respect, it takes a government that not only believes in but continues to invest heavily in education and training, including VTE, to make real a difference. In particular, the special efforts in addressing the needs of the lower 25 per cent of a school cohort who are less academically inclined through the ITE model have added choices, diversity and robustness to the Singapore education system.

Conclusion

Each country will ultimately need to carefully assess and decide on the 'TVET system' that it considers most relevant in meeting its national strategic goals. But, underlying a successful model are also some fundamental policies and principles. One fundamental principle is the need to ensure that the TVET system is closely linked to the national economic development agenda. Another would be the question as to whether sufficient attention has been paid to those who are less academically-inclined in the school system. There are policy decisions and choices to be made.

Given all the constraints, it is even more important that governments in the poorer developing countries take direct responsibility for the leadership in TVET. There should be priority at the highest level in setting the direction and championing the cause for building and funding a 'sustainable' TVET system, taking into consideration the local factors and conditions. Not to do so would only serve to weaken the total national education system. The goals should be strategic but not overly ambitious. They should be set with the support of the relevant governmental ministries within the total political, social and economic environment. It is better to begin a journey that is relevant, realistic and sustainable in line with social and economic progress of the nation. While it would not be feasible or realistic to duplicate every aspect of a model from another country, the policies, experience and best practices that have been proven successful should be of interest and may be of value to others.

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Endnote

These are personal perspectives based on first-hand experience as administrator and practitioner in the transformation of the vocational and technical education system in Singapore.

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Dr Law Song Seng was formerly Director and CEO of the Institute of Technical Education (ITE) in Singapore. He was ITE's CEO for 25 years, until retiring in 2007.