CHAPTER 11

Building Singapore's University Education System in a Globalized World: Issues, Policies and Challenges

Tony Tan Keng Yam

Singapore is a small young nation with a relatively short history, becoming independent only in 1965. Over the last 42 years, Singapore has moved from third world to first world and built a modern economy with a per-capita income second in Asia only to that of Japan.

This paper will chart the role that education particularly university education has played in powering Singapore's economic growth.

1960s AND 1970s: ECONOMIC LEAP-FROGGING THROUGH EXPORT-ORIENTED INDUSTRIALIZATION

In the 1960s, Singapore faced the challenge of weak economic fundamentals. Labour participation was low, unemployment high and the labour force was poorly educated. In the region, political changes limited Singapore's access to the regional market.

The international environment, on the other hand, presented opportunities. The combination of threats and opportunities prompted a shift in Singapore's economic development strategy towards export-led industrialization. Going against conventional wisdom at that time, Singapore opened its economy to foreign investments and leveraged on Multi-National Companies (MNCs) to gain access to technologies, markets and management expertise.

To improve the investment climate, the Singapore Government laid down employment standards and built institutions to help manage labour-management relations. The Government also invested heavily in both physical infrastructure like transport and communications and soft infrastructure, particularly the necessary business and legal systems.

Together with monetary stability and fiscal prudence, Singapore's pro-business environment made it attractive for MNCs to invest in Singapore. The successive inflows of foreign capital enabled Singapore to quickly build up its manufacturing base, which doubled between 1965 and 1980. Over the same period, GDP growth averaged 10% per annum. Robust growth and sound economic fundamentals enabled the country to weather the oil crisis-induced slowdown in 1974, and transit into the next stage of economic development in relatively good shape.

In those early years, the Singapore Education Ministry focused on building a national education system which would provide mass education for all. Singapore increased the number of school places by building schools and recruiting teachers on a large scale. In its efforts to build social cohesion, Singapore also amalgamated different language stream schools, introduced bilingualism and instituted the singing of the Singapore National Anthem and the recitation of the National Pledge as daily rituals in schools. These remain key features of Singapore's education system today.

With the emphasis on primary and secondary school education and upgrading vocational and technical training institutes, Singapore had only one public university, the University of Singapore, and a Chinese Language university, Nanyang University, set up by the community, both of which merged to become the National University of Singapore (NUS) which celebrated its 100th anniversary in 2005. The emphasis at the university level in the 1960s and 70s was to rapidly expand enrolment in order to produce the professional manpower needed to staff a growing economy and to meet social needs. What was very important was to ensure that the rapid expansion of university enrolment did not result in lower educational standards.

1980s AND 1990s: INDUSTRIAL RESTRUCTURING AND UPGRADING

By the late 1970s, industrial restructuring had become necessary. Rapid economic growth created problems of labour shortage. Employers had little incentive to invest in worker upgrading as wages were kept cautiously low. Externally, Singapore faced increased competition from low-cost countries in the region.

In response, Singapore pursued the strategy of shifting from labour-intensive activities to more capital-driven and higher value-added industries. Fiscal

incentives were introduced to encourage automation and mechanization, while efficient labour utilization and productivity enhancements were encouraged. Singapore's investment efforts also targeted manufacturing industries that were technology-intensive, such as computer parts, machinery, aerospace, petrochemicals, pharmaceuticals and biotechnology.

With Singapore's evolving economic structure, more skilled workers, technicians and university graduates were needed to fill the jobs available. Singapore therefore expanded its post-secondary and tertiary education sector to raise the standard of education and upgrade the skills of the people.

In 1981, the Nanyang Technological Institute (NTI) was set up with three engineering schools. NTI sought to train practice-oriented engineers for the burgeoning Singapore economy. Ten years later, NTI became Singapore's second public university, Nanyang Technological University (NTU), with the absorption of the National Institute of Education, which is Singapore's teacher training institute. Today, NTU has established an international reputation and nurtures tech-savvy, entrepreneurial leaders through a broad education in diverse disciplines.

The sharp pace of "catch-up" growth in the 70s and 80s meant that resource constraints and diminishing returns to investments were beginning to set in in the 90s. As a result, the cost-productivity advantage Singapore enjoyed over other countries began to narrow.

On the other hand, Singapore's indigenous technological capabilities were still relatively shallow compared with many developed economies and some newly industrialized economies. Government spending on R&D as a percentage of GDP was also below that of many developed countries.

The strategic focus during this phase of economic development was therefore to upgrade Singapore's capabilities and diversify the economy. Taking advantage of the regional boom in the early 90s, Singapore moved to develop an "external wing" for its economy. The rationale was that regionalization allowed Singapore to tap on the rapid growth of the regional economies and complement its linkages with the developed nations. It also provided an opportunity to strengthen MNC-linkages through co-investment in the region.

On the education front, Singapore sought to identify and develop the full spectrum of talents and abilities in its students, encouraging them to be responsive to globalization and technological change. To this end, the Government decided to introduce a diverse mix of institutions in Singapore offering an assortment of pedagogy, curricula as well as learning cultures.

In 1997, the Government mooted the idea of setting up a third university, the Singapore Management University (SMU), to provide more choices for Singapore parents and students. Located in the city, SMU was envisioned to be different from the two established institutions, NUS and NTU, as it would adopt an American-style broad-based education in contrast to NUS and

NTU's British-style system. Modelled after the Wharton School of the University of Pennsylvania, SMU would enjoy wide autonomy in its operations.

SMU was an experiment in diversity which worked out well. SMU provided healthy competition to the more established business schools in NUS and NTU and also enhanced the diversity and quality of educational offerings for students in Singapore.

Since its inception, SMU has produced three graduating classes of students, all of whom were employed within six months after graduation. SMU graduates have been hired in a wide spectrum of professions, including finance, accounting, consulting and services sectors, and are well-regarded by industry. This is a testament to the quality of the new university.

SINGAPORE UNIVERSITIES — KEY CENTRES OF EXCELLENCE TO FOSTER AND ATTRACT TALENT

In Singapore, universities are viewed as key centres of excellence to foster local talent and to attract foreign talent to the country. Singapore's three universities have achieved much in a relatively short period of time. They are among the best universities in the region and have done well in providing quality education for undergraduates, producing the required graduate manpower to meet the needs of Singapore's economy, carrying out rigorous research and creating knowledge. In 1980, Singapore had only one university — the National University of Singapore (NUS) which educated 8,600 students every year. Today, Singapore has three publicly-funded universities — NUS, the Nanyang Technological University (NTU) and the Singapore Management University (SMU), with a combined student enrolment of over 40,000 students. The universities are well-regarded globally, and their graduates have contributed significantly to the growth and development of Singapore.

To ensure that Singapore's universities continue to improve and enhance their quality, especially in a fast-changing and increasingly competitive university landscape, the universities need to build up their own institutional characters and distinguish themselves from other universities. They need greater flexibility in order to chart their own strategic directions. SMU's successful experience demonstrated that NUS and NTU would similarly benefit from greater autonomy to differentiate themselves. Hence, to empower the universities to chart their own directions and build on their areas of strength, the Singapore Government decided to corporatize NUS and NTU, making them autonomous universities, similar to SMU, in 2006.

As autonomous universities, the three universities operate with greater autonomy, whereby their respective Boards of Trustees and university management are entrusted with the responsibility of managing the universities, under the general guidance of the Ministry of Education. Quality audits,

conducted three-yearly by international panels of senior academics and experienced university administrators, ensure that the universities maintain high standards in their research and educational missions. By making the universities autonomous, Singapore hopes to foster a greater sense of ownership among the Boards of Trustees, senior management, faculty, students and alumni, who would now play a more active role in helping the universities achieve their missions.

In a fast-changing global university landscape, Singapore's publicly-funded universities need to respond to a dynamic environment. Competition for the best people — faculty, management and students — is becoming very intense, as people become more mobile and move to countries that offer them better opportunities. Singapore's universities need to attract the best in order to stay ahead of their competitors, and provide Singaporeans with a quality university education. The establishment of the International Academic Advisory Panel (IAAP) in 1997 was a major step in helping Singapore to upgrade its universities. The IAAP, which includes senior businessmen and eminent academics from top universities in the world, meets biennially to review Singapore's university sector and provides advice and guidance to the Government on what measures are needed to assist Singapore universities in their quest for excellence.

BRINGING THE WORLD TO SINGAPORE

The progress that Singapore has made in its university sector is a result of the strategy of keeping Singapore's society and economy open, flexible and adaptable. Singapore's success hinges on developing and attracting able and talented people. The Government thus continues to invest heavily in education to ensure that every Singaporean is equipped with the necessary skills and know-how for the future. Singapore has also welcomed global talent to augment its indigenous talent pool. Singapore's openness to global talent is its key competitive advantage. In this sense, the Government seeks to bring the world to Singapore.

CREATING A DIVERSE UNIVERSITY SECTOR

To be at the forefront of the latest developments, Singapore needs to create a diverse, differentiated and competitive university sector that will support its economic growth and social development. A vibrant university sector will not only attract and retain top talent, it will also help to create jobs and wealth.

Singapore's university sector has therefore evolved into a tiered system. The three Autonomous Universities form the bedrock of the sector, and meet key national objectives. Forming another tier in the system are world-class private educational institutions. Bringing the best institutions that the world has to

offer to Singapore would enhance the educational opportunities for our students and provide opportunities for Singaporeans to establish valuable networks.

One of the first players to set up a campus in Singapore was INSEAD. In 1997, INSEAD considered venturing into Asia, and explored 12 locations around the Asia Pacific, before deciding to set up a branch campus in Singapore. Today, INSEAD's branch campus in Singapore has done very well, attracting close to 400 MBA students from over 70 countries. Many students from Europe consciously chose to study in the Singapore campus, rather than INSEAD's main Paris campus, as they want to develop the Asian perspective provided at the Singapore campus.

Speciality institutions such as the DigiPen Institute of Technology, Culinary Institute of America and New Zealand's Southseas Film and Television School have also been established in Singapore. These speciality institutions allow students with a keen interest in niche disciplines to learn about the latest developments from the best people in these fields.

The response from Singaporean local and foreign students to these new players has been enthusiastic. In fact, Singapore's foreign student intake has seen a sharp increase over three years, from less than 50,000 international students in 2002 to 80,000 international students this year. With a diverse mix of institutions in Singapore offering an assortment of pedagogy, curricula as well as university culture, Singapore is confident that the country can distinguish itself as a premier education hub.

DEVELOPING CITIZENS WITH A GLOBAL OUTLOOK

The corporatization of Singapore's universities was intended to allow them more flexibility to respond to the challenges of the global economy. It is, however, just as important for Singapore to develop its students to become global citizens, with a global outlook and equipped with the skills, knowledge and motivation needed to operate in an increasingly interconnected world.

Today, students in the three autonomous universities already have the chance to interact with over 9,000 foreign students on-campus. The enrolment of foreign students in Singapore universities comprises 20% at the undergraduate level and higher at the postgraduate level. These foreign students hail from our close neighbours such as Malaysia and Indonesia, China, India and other parts of Asia, as well as Europe and US. The presence of foreign students in Singapore's universities enriches the learning experience for our own students, and gives them a taste of different cultures all in the same classroom. This adds an important element of global orientation to their university experience.

In this aspect, Singapore's universities are doing more. Students can now look forward to a wide range of educational opportunities overseas through

student semester exchange programmes and joint programmes with top overseas universities. To date, our universities have student exchange agreements with over 200 overseas partners ranging from Asia to Europe to the US. These overseas stints expose our students to different education systems, ways of life and cultures. Currently, up to 40% of each cohort of students in the universities experience some form of overseas exposure during their studies. Going forward, the universities are targeting to send half of each cohort overseas.

At the institution level, Singapore's universities have also forged global partnerships with overseas universities in research and teaching, as well as participating in global university networks. Such global networking aims to expand educational and other forms of cooperation among the member countries, promoting dialogue among members on the latest education issues so that Singapore can become an effective player in the global knowledge economy. It is through these meetings that universities come together and agree to collaborate on joint/dual degree arrangements, as well as student and faculty exchanges.

NUS has been very active on this front, and is part of global university alliances such as the International Alliance of Research Universities and the Association of the Pacific Rim Universities. In fact, NUS was elected to lead the 36-member Association of the Pacific Rim Universities for two terms, an endorsement of NUS's international standing and capabilities.

2000 AND BEYOND: BUILDING A KNOWLEDGE-BASED ECONOMY

In the 21st century, the global economic landscape is changing dramatically with the rise of China and India. China has a population of 1.3 billion and its economy is growing strongly at 8 to 10% a year. India has a population of 1.1 billion and is the second fastest growing Asian economy, at 6 to 8% a year. As the investment environment and workforce quality in these countries improve, China and India will offer tremendous business opportunities for global investors.

However, with internationalization and the opening up of our neighbouring economies, there will be increased competition for jobs and investments. As Singapore's economy matures, rapidly rising costs will further erode Singapore's attractiveness as an industrial and business centre. Singapore must find sustainable ways to differentiate itself, not just based on cost and efficiency.

In a globalized knowledge economy, talent will be the key to economic success. Talent will provide the intellectual and innovation capacity to sustain the technological edge and competitive advantage of a country. Indeed, investments and economic growth will follow talent. This will be the economic paradigm of the 21st century.

PUSHING THE BOUNDARIES

To bring Singapore universities to the next level, the Government has committed to provide more resources for Research and Development at the universities. Singapore universities will be able to leverage on the additional resources to enhance their research endeavours, as well as boost the overall quality of educational experience for their students.

A recent initiative by the Ministry of Education and the National Research Foundation (NRF) is to establish a small number of world-class Research Centres of Excellence (RCE) at the universities. The RCEs will be headed by eminent scientific leaders and will conduct investigator-led research with a global impact. NUS has been selected to set up the first RCE on Quantum Information and Science Technology later this year.

To succeed in the knowledge economy, Singapore needs to be creative and entrepreneurial, ready to take risks and seize opportunities. Singapore can no longer fall back on tried and tested strategies. Singapore needs to fundamentally rethink its strategies to tackle the challenges ahead. This would involve venturing into uncharted territory. Breaking new ground, the NRF is undertaking a bold initiative to work with selected top research universities around the world to develop a campus which will house world-class research centres in Singapore. This will be known as the Campus for Research Excellence and Technological Enterprise or CREATE.

CREATE is envisioned to be an unprecedented multinational, multidisciplinary research enterprise, strategically located in Singapore, the nexus of East and West. It will be a complex of several research centres from world-class research universities, pursuing research programmes in areas that are aligned to Singapore's strategic interests.

CREATE will be a talent magnet and innovation hub, and will serve as the Asia research campus of institutions that until now have focused their research in their home countries. Many US and European universities are eager to establish a presence in Asia because of the keen awareness of the rise of Asia and the increasing shift of global dominance towards Asia. CREATE presents them with a unique opportunity to start in Singapore.

The Massachusetts Institute of Technology (MIT) will be establishing the first research centre within CREATE to be called the Singapore-MIT Alliance for Research and Technology (SMART) Centre. When fully established, it is anticipated that the centre will house 5-6 research groups. Over 400 faculty, post-docs, students and other technical staff from Singapore, MIT and other overseas institutions are expected to be involved in the centre. The first research group within the centre, which will focus on Infectious Diseases, will start operations in temporary premises in NUS on 1 July 2007.

NRF is also in discussion with the Swiss Federal Institute of Technology (ETH) and the Technion — Israel Institute of Technology for them to establish similar research presence in CREATE.

Other than research centres, CREATE will also house corporate labs, which would contribute their knowledge-creation capability and create more research career opportunities in Singapore. Corporate labs generate cutting-edge knowledge for products and services which do not even exist today. The presence of corporate labs in CREATE would allow them to interact with the research centres, and their industry-oriented research would add to the vibrancy of research activities in CREATE.

For CREATE to succeed, there should be intensive collaborations between CREATE and the Singapore-based universities, polytechnics, laboratories and research institutes. CREATE could work with NUS and NTU to jointly recruit graduate students who would be enrolled in the universities' PhD courses, but do their research at CREATE. These students will be given the rare opportunity of being under the supervision of senior faculty of world-class research universities linked to CREATE.

Panels and networks comprising visiting committees and entrepreneurs could also interact with the researchers in CREATE to encourage innovative technology applications and promote entrepreneurship and services to the business community and wider society. Such interactions would drive all parties to strive for higher standards of research performance, and the synergies created from these collaborations would allow CREATE and our universities to reach greater heights of excellence.

NURTURING THE SPIRIT OF ENTREPRENEURSHIP AND SOCIAL RESPONSIBILITY

Apart from technical knowledge and exposure to different cultures, Singaporeans also need the right mindset to thrive in an environment of rapid and unpredictable change. In particular, Singapore needs to nurture the spirit of entrepreneurship and creativity and a sense of social responsibility in our young.

Today, Singapore's universities organize entrepreneurship programmes, workshops and seminars on a regular basis to educate aspiring entrepreneurs. Such events bring together working professionals and members of the university community, as well as the public, for networking opportunities, and sharing of knowledge and experience. Seed funding and venture support are also available to help budding entrepreneurs among the university community to realize their aspirations.

NUS has also established five Overseas Colleges in global entrepreneurial hubs such as Silicon Valley, Shanghai and Bangalore, where students are

immersed in a dynamic environment, engaging in full-time internships with start-ups and taking entrepreneurship courses part-time at the partner universities. The Overseas College initiative is bearing fruit, and we have seen that students are increasingly active in establishing their own start-ups.

In addition, our universities have partnered industry and the wider community on collaborations which seek to achieve strategic national and social objectives. For example, NUS is collaborating with the Public Utilities Board and Delft Hydraulics to establish a Centre of Excellence for water knowledge. This Centre will focus on multi-institutional and interdisciplinary research, information exchange and technology transfer related to water management, hydraulic engineering and urban water cycles. The outcomes of the Centre's research would be of strategic importance to Singapore.

BALANCING THE ROLES OF TEACHING AND RESEARCH

As Singapore's national universities evolve into research-intensive universities, their research activities will increasingly be given higher priority as this would generate additional funding for the universities. Unlike teaching, research is also more measurable and is increasingly used in university rankings.

When the IAAP met in Singapore early this year, it was noteworthy that the Panel stressed repeatedly that it was imperative for universities to continue to maintain excellence in teaching, even as they aspire towards research excellence. The IAAP strongly affirmed teaching and research excellence to be the twin pillars for the success of universities. That said, all research-intensive universities face the struggle to maintain undergraduate teaching excellence. The universities need to tackle issues like how faculty allocate time between teaching and research, and how to create an environment where undergraduate education continues to be highly valued.

CONCLUSION

In summary, Singapore's university sector has made tremendous progress in the past 25 years. Singapore universities today are no longer ivory towers of pure academic pursuits. They exist in a complex societal and economic ecosystem, and interact with many parties — research institutes, businesses, government agencies and the wider community. These interactions are multi-faceted, spanning education, economic, social and cultural dimensions. The new knowledge that they create has practical implications on the economic and social development of Singapore.

As Singapore moves forward, the country needs to continue to nurture its own talent as well as attract the top brains from overseas to locate, work, live and contribute to the country. International talent will add diversity and

intellectual capacity to our learning environment, and at the same time spur Singapore's own home-grown talent on to greater heights. The intellectual interactions among the various stakeholders would be of mutual benefit to all involved. These efforts will help push Singapore towards the next level of international competitiveness.

Throughout Singapore's short history, the nation's university education system has evolved to meet societal needs and to support the country's economic progress. Singapore is a small country and people are its only resource. Continued investment in people is the only way Singapore can succeed in a globalized world. In the next phase of development towards building a knowledge-based economy, Singapore needs to develop a workforce that can respond dynamically to the rapidly changing needs of the economy. Learning will become a lifelong process. Singaporeans will engage in skills and knowledge upgrading not only through full-time courses but also through other means, including short courses and part-time education programmes which may lead to formal qualifications.

With the rising aspirations of parents and students, demand for access to university level education will increase. There will also be a need for more graduates to staff an increasingly complex economy. It is therefore timely for Singapore to consider increasing the number of university places. One possibility, as recommended by the IAAP at its meeting earlier this year, is to establish a high quality liberal arts college which would complement, but provide a different education from NUS, NTU and SMU.

Building Singapore's university education system is an ongoing work-in-progress. Only by constantly re-examining and re-inventing the university education system can Singapore's universities not only achieve higher peaks of excellence in teaching and research, but also address the larger, fundamental role that universities play in today's society.