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**Role of Higher Education Partnerships in
Creating a Knowledge-based Economy**

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Ladies and Gentlemen

I would first like to thank President Robert Brown and the organizers for inviting me to speak at this US-China-India Innovation Partnerships Conference. The topic of my speech today is : Role of Higher Education Partnerships in Creating a Knowledge-based Economy.

I will begin by summarising briefly Singapore's development and how universities have played a vital role in transforming Singapore's economy.

Singapore's Development

Singapore is a small young nation with a relatively short history, becoming independent only in 1965. Over the last forty-three years, Singapore

has moved from third world to first world and built a modern economy with a per capita income second only to that of Japan in Asia.

2 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.

3 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 industrialisation. 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.

4 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.

5 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.

6 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.

7 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 mechanisation, while efficient labour utilisation 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.

8 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.

9 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.

10 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.

11 To maintain Singapore's economic progress, the Singapore Government launched a determined and broad-base programme to upgrade Singapore's capabilities to transit to a diversified knowledge-base economy with high value-

added industries and services. The key to success in this programme was the vital role played by Singapore universities as agents of change.

12 Singapore's three universities - National University of Singapore (NUS), Nanyang Technological University (NTU) and Singapore Management University (SMU) - 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.

The 21st Century University

13 In today's highly competitive and technologically driven economy, universities have emerged as increasingly key players in contributing to sustainable economic growth. The role of higher education has evolved beyond its traditional function of knowledge dissemination, training and education.

Universities have to serve as the powerhouses of knowledge creation as well as facilitate the efficient diffusion of the created knowledge for the benefit of the economy and society.

Only when these new discoveries and technologies leave the realm of academia and into the society and economy, in the form of products and services, will

their impact be felt. This is especially important in a knowledge-based economy where ideas and innovations generate wealth.

14 Universities in the 21st century have to be resourceful and versatile.

They need to attract not only top quality international faculty, researchers and students, but also institutional and industry partners. They are expected to have the agility to anticipate and respond quickly to new trends and changing needs, not only in their home country, but also around the world.

Universities recognize that to compete successfully in the global arena, they must be prepared to take risks and tread new paths. Therefore, it is even more important than before that education institutions, the government and industry foster close and mutually beneficial ties, in order to effectively address the challenges of the global economy.

Collaboration Among Universities

15 One key mechanism for universities to fulfill their role is the establishment of strategic collaborations and symbiotic relationships with premier institutions of international standing.

The Singapore-MIT Alliance (SMA), a collaboration in advanced engineering education and research, is a good example. Established in 1998 by MIT, the

National University of Singapore (NUS) and the Nanyang Technological University (NTU), the SMA is a successful pioneering higher education initiative. The SMA has tapped the benefits of technology and successfully overcome the barriers of time and distance between Cambridge and Singapore. The distance between Cambridge and Singapore is about as far as any 2 points on earth can be. Over 720 students have graduated from SMA proving that distance is no obstacle for collaborative education programmes, exchange of research ideas and close ties between partner institutions.

16 The SMA gives students the opportunity to experience an academic environment spanning Asia and the US. The close ties cultivated through SMA have also led to further R&D partnership between Singapore and MIT, most notably, the Singapore – MIT Alliance for Research and Technology (SMART for short) Centre, established in 2007.

17 The SMART Centre is MIT's largest international endeavour. It will undertake cutting-edge research in areas of interest to both Singapore and MIT. Besides serving as an intellectual hub for research interactions between MIT and Singapore, the SMART Centre will also provide MIT an opportunity to perform interdisciplinary experimental, computational and translational research that presently cannot be conducted at its home campus in Cambridge, Massachusetts. The Centre will be a magnet for attracting research talent from

all over the world to Singapore. The SMART Centre is the first entity in an initiative launched by the Singapore National Research Foundation to build a Campus for Research Excellence And Technological Enterprise (CREATE).

CREATE aims to have several research centres set up in Singapore by world-class research universities and corporations working collaboratively with Singapore's research community.

18 Besides MIT, Singapore's universities have partnered with many other top universities from all over the world. These include for example, a joint PhD programme in Genetic and Molecular Epidemiology between the National University of Singapore (NUS) and the Swedish Karolinska Institute; and the joint Masters of Science programme between Nanyang Technological University and the Technische Universitat Munchen (TUM) of Germany. International student exchange programmes have also given our students many opportunities to develop global perspectives in the disciplines they pursue.

19 Global university networks, such as the International Alliance of Research Universities, will enable member universities to tap the expertise of the broader international community, and be in tune with the latest developments which impact teaching and research while building closer relationships in the process.

Internationalising the Student Experience

20 Other programmes such as the NUS' Overseas Colleges or the NTU's Global Immersion Programme have considerably broadened the outlook of students. These immersion programmes provide students the opportunity to operate in new and unfamiliar environments, effectively preparing them for the increasingly globalised economy that they would be part of, upon graduation. For example, NTU students going to China have the chance to be attached to multinational companies, leading Chinese companies and start-ups in Chinese hi-tech parks.

The NUS Overseas Colleges in Silicon Valley, Philadelphia, Shanghai, Stockholm and Bangalore, provide opportunities for students to immerse themselves in the dynamic environment of these global entrepreneurial hubs. Students in the programme engage in fulltime internships at start-ups and take entrepreneurship courses at partner universities, such as Stanford in Silicon Valley and Fudan University in Shanghai.

21 In addition to sending our students out, Singapore has also received students from overseas institutions for work immersion or research attachments.

One such programme started recently is the East Asia Pacific Summer Institute programme, a collaboration between US National Science Foundation and the Singapore National Research Foundation.

Engagement with Industry

22 Universities are also increasing their engagement with industry, helping companies primarily in R&D, but also test-bedding and commercialising new technologies. For example, the GE Water & Process Technologies Global R&D Centre located at the National University of Singapore involved joint R&D between leading industry scientists and the university's faculty and students.

Another example would be Rolls-Royce scholarship programme in conjunction with Nanyang Technological University's aerospace engineering degree programme which enhances the linkage between academia and industry.

Increasing Diversity in Singapore's University Sector

23 Student enrolment in higher education has increased sharply in Singapore, both because of a growing population as well as the higher aspirations of the population. While increasing intake, Singapore also endeavours to make its university landscape more diverse, providing its students with more educational pathways that encourage more peaks of excellence to emerge.

The Singapore Government has recently decided to set up a fourth university to complement the present three universities, NUS, NTU and SMU.

The fourth University will add new options and diversity to Singapore's overall higher education landscape. It could also be the institution to facilitate a unique partnership between Singapore, the United States and China in higher education.

Fourth University

24 Let me say a few words about the proposed fourth university. The fourth university will aspire to be a world-class University with a distinctive character, which will position it to attract the top students and produce graduates who are well prepared for the challenges of the future. In the planning for the fourth university, three interesting and path-breaking ideas are being explored.

25 The first idea is that the new university can consider adopting an integrated, interdisciplinary approach to learning. Many universities currently have interdisciplinary programmes that aim to bridge the divide between the traditional disciplines or departments. But for many of them, the legacy of organisational structure and culture, budgeting and manpower allocation practices, often limit the potential and impact of such programmes. Instead of the traditional rigid boundaries around disciplines, the fourth university can

formulate programmes to have a strong inter-disciplinary flavour from the onset, in combinations such as architecture and design or engineering and business.

The interplay of Engineering, Design, Architecture and Business, which would be the focus areas of the new university, is truly exciting and would show that top universities can be innovative in their curriculum and need not be bounded by the traditional disciplines.

26 The second idea is to promote, encourage and facilitate strong use-directed research in the fourth university that aims to provide practical and effective solutions to major societal challenges. The curriculum of the fourth university can also provide opportunities for students to apply their learning within a real-world environment, and nurture a spirit of innovation and entrepreneurship. The possibility of starting off with both undergraduate and post-graduate programmes concurrently, together with a major research centre, will boost the research capability and capacity of the new university from the onset.

27 Finally, pursuing the third idea of a unique international partnership in university education, the Singapore Ministry of Education is presently in discussion with a number of US universities about one of them being a possible

partner with whom to set-up and run the new university. The Ministry is also considering the involvement of a Chinese university which, if it happens, will form a unique tripartite partnership in higher education between US, China and Singapore, offering students a truly enriching learning experience that will equip them well to meet the complex demands of a globalised knowledge-based economy.

28 To encourage and strengthen the research component of the new university, the Singapore National Research Foundation will be happy to consider supporting the research programmes to be undertaken at the new university, if these programmes are of high standard and aligned to Singapore's aspirations and interests.

Conclusion

26 Global cities which are able to produce many skilled, well trained and motivated graduates are very attractive to companies who tend to locate and invest in places with a high concentration of talent. These companies attract other talent which would bring in yet more investments thereby building up a cycle of economic growth.

27 Boston, with its many excellent universities, is a good example of a city which has become renowned throughout the world as a centre for learning and scholarship and consequently a centre for specialised high value-added industries and services.

28 The global economy has evolved from one driven by agriculture, to manufacturing and now to one based on knowledge. Higher education is intricately tied to the economy of a nation. In the complex economic system of today that is strongly characterised by knowledge, universities have a truly important role to play. They must be creative, innovative, resourceful and versatile. They must be willing to step out of their boundaries and comfort zones to venture beyond the conventional to be successful.

29 As a small nation, Singapore is well aware of the significant challenges it faces to maintain its economic competitiveness in a globalised world.

We therefore seek to elevate higher education to the next level that will position it well to serve both the needs of our economy and the aspirations of our young people in the years to come.
