

The Role of University in Fostering International Cooperation in S&T Human Resources: The Case of National University of Singapore (NUS)

Poh-Kam Wong

Assoc. Prof., Business School & LKY School of Public Policy

Director, Entrepreneurship Centre

National University of Singapore



The Context: Singapore's Transition towards a Knowledge Economy

Between 1960 and 2000, Singapore achieved GDP growth rate of 8% p.a., driven by the manufacturing sector and sustained by her development as a major regional business and communications hub

Distinctly new phase of development emerging in the new millenium: **Shift towards Knowledge Based Economy incorporating:**

High tech innovation and manufacturing

Knowledge intensive business services

Creative content production and distribution

Mirrored by a shift in the primary focus of the national innovation system:

Creation of IP-based knowledge and commercialization of innovation

Development of entrepreneurial mindsets and capabilities

Becoming an integral node in the global innovation network

Changing Role of NUS in Singapore's Economy

Until the late 1990s, NUS, as the oldest and leading university in Singapore, has emphasized the traditional twin academic missions of providing excellent education to the nation's population, and contributing to the creation of new knowledge through engagement in R&D activities geared primarily towards scientific publications

NUS has continued to pursue these twin academic missions and has indeed made significant achievements by the mid-2000s, as evidenced by various international ranking...

But the university's role in the 21st century has taken on additional dimensions in response to the changing need of the Singaporean economy...

Recent International Ranking of NUS

Ranked 5th in Asiaweek's list of Asia's Best Universities 2000

Ranked 18th, 22nd and 19th in the 2004-2006 Times Higher Education Supplement Ranking of top 2000 universities in the World

	2004 ranking	2005 ranking	2006 ranking
Overall	18	22	19
Biomedicine	25	15	9
Science	35	34	22
Engineering and IT	9	9	8
Social Sciences	10	13	11
Arts and Humanities	17	56	22

• NUS is ranked 31st in the world by Newsweek in 2006, top 3 in Asia

Source: Knowledge Enterprise Online, various issues, downloaded from <http://newshub.nus.edu.sg/>; The Times Higher Education Supplement (various years)

New Roles of NUS in the Context of Singapore

Contribute to the Creation of New Knowledge-based Industries

To support knowledge-based economic growth through the creation of industrially-relevant knowledge/innovation and their commercialization, and to attract global MNCs in new emerging industries

Attraction of Foreign Talents

Go beyond Education for the small local population to compete for global talents by attracting top students and faculty from overseas, as done by top universities in USA

Fostering Entrepreneurial Mindset

In the past, high economic growth has provided NUS graduates with good career prospects as salaried employees, particularly in MNC subsidiaries and government

In the future knowledge economy, stable job opportunities no longer guaranteed, need to inculcate spirit of enterprise

New Vision of NUS: Becoming a Global Knowledge Enterprise

To become a globally-oriented university, open to and competing for students and faculty globally, and benchmarking practice and performance against global leaders

To make NUS a knowledge hub for Industry and Enterprise

To inject an entrepreneurial dimension to NUS education and research

To be a key node in the global innovation network

Towards an Entrepreneurial University



"NUS aspires to stand among the entrepreneurial universities. This is in line with our vision to become a global knowledge enterprise. We have taken steps to inject an entrepreneurial dimension. We have established NUS Enterprise: A *FREE ENTERPRISE ZONE*, where innovation and entrepreneurship are freed from traditional rules..."

**-- Prof Shih Choon Fong,
State of University Address 2002, 13 August 2002**

Summary Profile of Changes in NUS, Before and After Shift to Entrepreneurial University Model

Indicator	AY1996/7	AY 2005/6
Teaching staff	1414	1,820
of which % foreign	39.0%	52%
Research staff	843	1,218
of which % foreign	70.1%	80%
Undergraduate students enrolled	17,960	22,031
Graduate students enrolled	4,478	6,308
Graduate students as % of total student enrolment	20.0%	28.6%
Percentage of foreign students studying at NUS	13% ¹	33.3%
Total research funding ²	na	> S\$185 mil
of which % industrial sponsored research ³	na	12%
Publications in SCI/SSCI	1307 ⁴	2831 ⁵
Patents filed	13 ⁴	152 ⁵
Cumulative Patents granted by USPTO	21 ⁴	187 ⁵
Licensing agreements signed	8 ⁶	26 ⁷
No. of spin-offs	<2 ⁶	7 ⁷

1 Percentage of total student intake for 1997/8

2 Figure for FY2004/05

3 Includes foundations and individuals

4 CY1997

5 CY2005 6 Average 1994-1997

7 Average 2004-05

Source: NUS Annual Research Report (various years), National University of Singapore; NUS Enterprise Database

Examples of New NUS Initiatives in International Cooperation in S&T Human Resource Development

The NUS Overseas College (NOC) Program

The Singapore-MIT Alliance Program

The CREATE program

The RCE Program

Infusing Entrepreneurial & Global Mindset: The NUS Overseas College initiative

Aim is to send 200 NUS undergraduate students per year to five high tech entrepreneurial hubs in the world

Experiential Education: “Learning by immersion” Model

Work as interns in high-tech start-ups for one year

Take entrepreneurship-related courses in leading universities in the host region

Return to NUS to complete their final semester/year

Infuse entrepreneurial, global mindset

Influence future career choices towards entrepreneurial and innovative pursuits

Establish social networks with overseas entrepreneurial communities

Serve as catalyst for mindset change among their peers in NUS when they return

NUS Overseas Colleges

*NUS College in Silicon Valley, USA
(2002)*

Study at Stanford & work in the innovation “habitat”

≈

*NUS College in Bio Valley, USA
(2003)*

Study at UPenn & work in the US’ pharma hotbed

≈

*NUS College in Shanghai, China
(2004)*

Study at Fudan & work in China’s commercial hub

≈

*NUS College in Stockholm, Europe
(2005)*

Study at KTH/SSE & work in
Europe’s No.1 IT hub

≈

*NUS College in Bangalore, India
(2006)*

Study at IISc & work in India’s high-tech hub



Raising Innovative Capacity through International Cooperation: The Singapore-MIT Alliance Program

Established in 1998, the Singapore-MIT Alliance (SMA) is an innovative engineering and life science educational and research collaboration involving the National University of Singapore (NUS), the Nanyang Technological University (NTU), and MIT, with students recruited globally

The program is intended to combine a focus on creativity and entrepreneurship with an intense, hands-on approach to research, leveraging on MIT's experience in developing industrial collaboration and fostering innovation and entrepreneurship among its students. All students will reside a minimum of one semester at MIT. In Singapore, they will attend "live" MIT classes and take part in research meetings with MIT faculty, staff and students through video-conferencing

The success of the first phase of the program, where the degree is granted by NUS solely, to the establishment of a second phase, where the degree is granted jointly by NUS and MIT

Building Global R&D Links: The International Campus for Research Excellence and Technological Enterprise (CREATE) Initiative

Recognizing the importance of building strong linkages with global institutions to enhance Singapore's connectivity to other centres of research in US and Europe, and accelerate Singapore's thrusts towards an innovative and entrepreneurial economy, the Research, Innovation and Enterprise Council (RIEC) (chaired by the Prime Minister) initiated in 2006 the International Campus for Research Excellence and Technological Enterprise (CREATE) Program

The Singapore MIT Alliance for Research and Technology (SMART) Centre was established in NUS as the first CREATE program. SMART will house joint, inter-disciplinary research between NUS and MIT professors. The first project will focus on infectious diseases.

A second CREATE with European partners being explored with ETH (Switzerland)

Building Nodes of Global Excellence: The Research Centre of Excellence (RCE) Initiative

Recognizing the need for Singapore to build “peaks of global excellence” in selected fields of knowledge in order for Singapore to become a truly integral node in the global innovation network, the National Research Foundation (NRF) has committed to fund a number of new Research Centre of Excellence (RCE) in Singapore.

NUS has made a successful bid to establish the first RCE in Singapore, the Quantum Information Science and Technology (QIST) Centre, with S\$150 million funding from NRF to attract up to 200 scientists from around the world

Conclusion: NUS' role in making Singapore an integral node in the Global Innovation Ecosystem

Singapore has been a major hub in the global business, trading and communications/transportation system in the 20th Century

Singapore is aiming to become a major hub in the global innovation ecosystem in the 21st century

Attracting global innovators to Singapore

Nurturing globally competitive indigenous innovators

Building connectivity to other global innovation hubs

NUS can play a significant role in this vision of Singapore through its “Open Innovation, Entrepreneurial University” model