

# Global Assemblage: Singapore, Foreign Universities, and the Construction of a “Global Education Hub”

KRIS OLDS \*

*University of Wisconsin-Madison, USA*

**Summary.** — In the late 1990s and early 2000s, select cities in Pacific Asia formed or significantly deepened formal institutional linkages with a variety of foreign (mainly Western) universities. The objective of this paper is to examine: the policy objectives of Singapore, a Pacific Asian city-state, in opening up its territory to new forms of foreign educational knowledge, institutional structures, practices, and technologies; the specific programs and practices that have enabled the Singaporean state to implement these policy objectives; and the preliminary implications of various “modes of entry” that the foreign universities have adopted for the formation of university–industry linkages in Singapore.

© 2007 Elsevier Ltd. All rights reserved.

*Key words* — Asia, Singapore, universities, globalization, higher education, services

## 1. INTRODUCTION

Our vision, in shorthand notation, is to become the Boston of the East. Boston is not just MIT or Harvard. The greater Boston area boasts of over 200 universities, colleges, research institutes and thousands of companies. It is a focal point of creative energy; a hive of intellectual, research, commercial and social activity. We want to create an oasis of talent in Singapore: a knowledge hub, an “ideas-exchange”, a confluence of people and idea streams, an incubator for inspiration.<sup>1</sup>

Singapore, a small Southeast Asian city-state, is known worldwide for its economic development trajectory over the last three decades. The transition from neglected colonial outpost to post-colonial “air-conditioned nation” (George, 2000) has provided ample fodder for triumphalist sagas (e.g., Lee, 2000), relatively even-handed and incisive analyses (e.g., Chua, 1997; Kong & Yeoh, 2002; Rodan, 1989), and caustic critiques (e.g., Lingle, 1996; Tremewan, 1994).

Regardless of one’s views on the forceful forms of modernist planning and social engineering undertaken by the Singaporean state (as guided by the continually ruling People’s Action Party, PAP), a structural change is underway in Singapore’s economy. The 1997–

98 Asian economic crisis, and the rise of China as a manufacturing powerhouse, has unsettled Singapore and forced the country’s politicians and officials to think more creatively about ensuring Singapore adapts to and benefits from an evolving global knowledge-based economy (KBE). In this context a shift from low value added manufacturing-based export platform status to high value added manufacturing/global city status is occurring. Statecraft is being used to shape this restructuring process, in part through the targeting of select industrial sectors

\* Sincere thanks to the representatives of both local (Singaporean) and foreign universities, as well as representatives of the Singapore Economic Development Board, for their incisive insights into the development process; to Claudia Hanson Thiem for her exemplary assistance on many aspects of this project; to the University of Wisconsin-Madison and the Social Science Research Council/World Bank program on *Universities as Drivers of Urban Economies* for research support; to Nigel Thrift and Henry Yeung for related collaborations over the last five years, and; to the *Constructing Knowledge Spaces* group for intellectual inspiration and guidance. Final revision accepted: May 18, 2006.

such as the life sciences, chemicals, engineering and environmental services, professional services, and, most recently, education services. A discursive reframing is also underway as Singapore seeks to become credibly known, in selective academic, industry, and media circles as a cosmopolitan and creative space, a vibrant and diverse global city integrating into the lattice under girding the global network economy. This reframing is even more important at this stage of time, I would argue, than the formation of more tangible university–industry linkages at an intra-urban scale, for it lays the foundation required to reduce the sense of risk that many foreign universities grapple with when implementing internationalization strategies that involve risky forms of institutional mobility. In the context of an awareness of Singapore's evolving developmental objectives, this paper focuses on one increasingly high profile aspect of the planned structural transformation—the 1998 to present creation of opportunities for the provision of new foreign-led or foreign-linked education services, especially higher education services, within Singapore. The Singaporean state has sought to achieve this goal by opening up its territory, and therefore its society, to the presence of foreign institutions of higher education and has sought to target “world class” institutions, when at all possible.

Singapore's attempts to become the “Boston of the East,” a global knowledge-based hub associated with innovation, creativity, informed debate, and significant university–industry linkages, has triggered a response from over a dozen universities including Duke, Johns Hopkins, Chicago, Cornell, and Carnegie Mellon. They have established campuses, centers, research laboratories, joint ventures with Singaporean universities, and joint degrees, all since the “World Class University” (WCU) program was launched by the government in 1998.

With its Global Schoolhouse program, the Singaporean state is pushing the envelope in a relative sense with respect to the opening up of its territory to the global trade in education services, including Mode 3/commercial presence (using GATS parlance):

- *Mode 1*: Cross-border supply (e.g., on-line distance education);
- *Mode 2*: Consumption abroad of education services (e.g., students traveling to another country to study);
- *Mode 3*: Commercial presence (e.g., establishing a foreign campus);

- *Mode 4*: Presence of natural persons (e.g., faculty teaching in another country).

The remainder of this paper provides an analysis of the planned role of foreign universities in spurring on the global city formation process in Singapore. Section 2 outlines the importance of addressing the global city formation process from a geographically and historically specific perspective. This line of argument is pursued because the developmental city-state character of Singapore is relatively unique, and there are few direct lessons about university–industry linkages that can be derived from a place the same geographic size of the Island of Montreal yet governed by a powerful and well-resourced nation state. This said, the Singapore experiment provides fresh insights on assumptions and expectations associated with the formation of university–industry linkages in other cities and countries. Following this context-oriented introduction, Section 3 outlines the Global Schoolhouse development policy. I pay particular attention to the origins and evolution of the policy, and to the articulation of the agendas of the Singaporean state and the many Western universities that have deepened their presence in Singapore since 1997. Section 4 then outlines some of the preliminary impacts of the Global Schoolhouse development policy. It is important to note, however, that the Singapore Global Schoolhouse development policy has only been implemented in a concerted way since 1998, and that many of the foreign universities with Singaporean linkages are in the process of enhancing or reframing them for a variety of reasons. This point is expanded on in Section 5 where the formation of Singapore–foreign university linkages, and university–industry linkages, is viewed through the frame of four “globalization of higher education” models (the Import model, the Export model, the Partnership model, the Network model).

## 2. ASSEMBLING SINGAPORE: A DEVELOPMENTAL CITY-STATE

As noted above, Singapore, a Southeast Asian city-state with a 2004 population of 4.24 million (of whom approximately 800,000 are foreigner employment or employee-dependent visa holders), is often viewed as a model with respect to the economic development. Independent from Great Britain since 1959, and Malaysia since 1965, the city-state has seen

Table 1. *Key economic indicators on Singapore, 1985–2003*

Item	1985	1990	1995	1999	2000	2001	2002	2003
Population (million)	2.74	3.05	3.53	3.95	4.02	4.13	4.17	4.19
Labor force (thousand)	1,288	1,563	1,749	1,976	2,192	2,120	2,129	2,150
Employed	1,235	1,537	1,702	1,886	2,095	2,047	2,017	2,034
Agriculture	9	4	3	4	4	5	5	4
Manufacturing	314	445	404	396	435	384	368	365
Mining	3	1	1	1	1	1	1	1
Other	909	1,087	1,295	1,485	1,655	1,657	1,644	1,664
Unemployment rate (%)	4.1	2.0	2.0	3.5	3.1	3.3	4.4	4.7
Structure of output (% of GDP at current prices)								
Agriculture	1.0	0.4	0.2	0.1	0.1	0.1	0.1	0.1
Industry	34.5	33.0	33.3	32.9	34.1	31.8	33.1	32.7
Services	68.8	67.8	65.3	67.8	64.3	68.3	67.5	66.4
Growth of output (annual change, %)								
GDP	14.6	9.0	8.0	6.9	9.7	−1.9	2.2	1.1
Agriculture	−8.1	−7.6	−3.1	−1.8	−4.9	−5.9	−5.8	−0.4
Industry	−0.2	9.4	9.8	6.6	11.1	−9.1	3.5	0.2
Services	14.5	10.3	7.4	6.3	7.9	2.5	1.4	1.1
Trade (as a % of GDP)	n/a	49.5	63.9	n/a	n/a	77.1	78.0	n/a
Per capita GDP (at current prices in US\$)	6,872	12,110	23,806	20,891	23,043	20,775	21,206	22,070

Source: <http://www.adb.org>; accessed on March 20, 2005; <http://www.worldbank.org>, accessed on March 20, 2005; <http://www.singstat.gov.sg/keystats/hist/gdp.html>, accessed on March 22, 2005.

considerable growth in virtually all of the typical indicators associated with economic development. Table 1 provides highlights of but a few of these indicators over the last two decades.

The city-state is also the fourth largest foreign exchange trading center in the world after London, New York, and Tokyo (Bank for International Settlements, 1998), and it usually ranks as the first or second most “globalized” nation in the world (according to the annual surveys of AT Kearney and *Foreign Policy Magazine*). Singapore receives regular accolades for its container ports (it is the busiest port in the world in terms of shipping tonnage), Changi airport (annual passenger flow through equalling Tokyo’s Narita Airport), and telecommunications infrastructure. UNCTAD’s annual *World Investment Report* regularly identifies Singapore as one of the most significant recipients and of annual FDI inflows FDI stocks and FDI outflows in Asia and the Pacific (e.g., UNCTAD, 2004). In addition, as Dicken (2003, p. 61) points out, Singapore has the highest percentage share of inward FDI as a share of GDP of any other country (or indeed city) in the world.

These global flows both support and maintain the “twin engines” of services and manu-

facturing. Approximately 6,000 foreign MNCs and 10,000 foreign SMEs have formal presences in Singapore according to International Enterprise Singapore, a Government of Singapore statutory board (also see Yeung, Poon, & Perry, 2001, p. 170). Thus the Singaporean economy is dominated by foreign (mainly American, European, and Japanese) multinationals, as well as a small number of government-linked corporations (GLCs). These firms, especially the multinationals, draw in and now support Singapore-linked foreign universities (either directly or via partnership arrangements with Singaporean institutions), especially those with strong engineering, science, and business programs. Firm representatives convey essences of this structural pressure by lobbying the Government of Singapore (especially the Ministry of Trade and Industry (MTI) and its statutory board, the Singapore Economic Development Board (EDB)) to enhance the quality of the education system so as to (a) provide better quality local labor supply, while also (b) offering opportunities for life-long learning in Singapore for the 100,000 or so expatriate staff who call Singapore home at any one time. The impulse is thus generated at a local (Singaporean) scale, though in reality educational upgrading

(especially executive education and graduate education, including the MBA) both depends upon, and affects, expatriate staff based throughout the Southeast Asian, South Asian, and East Asian regions.

Obviously, the university–industry linkages discussed above are framed and mediated by the territorial state. The state, in its various institutional and spatial forms, exerts a critical influence on the processes and governance of global city formation. There are two aspects of the state that need to be addressed to make sense of the Global Schoolhouse/university–industry linkage phenomena in Singapore: the unique nature of both the “developmental” state, and the global city-state.

First, the development process in Singapore has been guided by an authoritarian (sometimes deemed “soft-authoritarian”) government; one controlled by the PAP continually since 1959. The PAP, under the leadership of Lee Kuan Yew (Prime Minister, 1959–90), Goh Chok Tong (Prime Minister, 1990–2004), and Lee Kuan Yew’s son Lee Hsien Loong (Prime Minister, 2004 to present), has developed and used the state apparatus to achieve a wide range of social, cultural, political, and economic objectives (Chua, 1997; Kong & Yeoh, 2002; Yeung, 2005). The state form is typically characterized as a “developmental state,” one guided by an elite bureaucracy, focused on medium- to long-term economic objectives, and frequently prone to eclectic and effective forms of social control in the stated interests of national development (Wade, 1990; Weiss, 1998; Woo-Cumings, 1999).

Second, Singapore is a global city-state. Global city-states have the political capacity and legitimacy to mobilize strategic resources to achieve (national) objectives that are otherwise unimaginable in non-city-state global cities (Olds & Yeung, 2004). Amongst the most important roles *vis a vis* the Global Schoolhouse/university–linkage development process are

- management of territorial boundaries (e.g., immigration laws *vis a vis* foreign faculty and students);
- production and reproduction of labor (e.g., education–labor market planning);
- provision of basic infrastructure (e.g., funding for new campuses, campus expansions, or linking mass transit systems to new sites of higher education);
- legal frameworks to maximize economic cooperation (e.g., intellectual property rights).

The politics of city/nation-building tends to be focused on the strengths and weaknesses of policy options rather than which intra-national territorial unit or institution is deserving of attention and resources.<sup>2</sup>

### 3. TOWARD THE GLOBAL SCHOOLHOUSE

The above discussion sets the context for the articulation process whereby:

- The Singaporean state introduces structural economic change, in part through its higher education policy.
- Western universities adjust to emerging fashions in higher education, including the establishment and implementation of “internationalization” programs, including those with a strong Pacific Asian focus.

The articulation process is the outcome of the most recent historical phase of the evolution of science and technology policy in post-colonial Singapore, and the role of the university in the implementation of this policy. Kong (nd), drawing upon Saravanan Gopinathan’s work, frames the historical development of such policy as such:

- 1965–86: building technological know-how;
- 1985–95: expanding science and technology education;
- 1995–2005: fostering creativity and innovation.

While space limitations prevent a discussion of the 1965–95 era, it is important to note that Singapore has single mindedly sought to fashion education as a tool for economic development over all other objectives (e.g., individual self-realization) (Kong, nd). In addition, given the relatively small population, and lack of natural resources, economic crises always trigger changes in policies. The mid-1980s crisis, for example, led to the emergence of the twin-engine strategy of higher valued-added manufacturing and exportable services, as well as a regionalization drive (ERC, 2002a). It was during this time that education was identified, for the first time, as a service sector worthy of being nurtured for its “revenue growth potential, net worth to the economy, as well as its export earning potential” (ERC, 2002b, p. 1).

Much of the mid-1980s to mid-1990s was spent devising and implementing a series of manufacturing and service sector-oriented development policies and programs (these are

outlined in Chui, Ho, & Lui, 1997). It was during this period that the Singaporean higher education system experienced the massification drive that continues to the present. For example, student participation rates in Singaporean universities rose from 5% in 1980 to 21% in 2001 (Lee & Gopinathan, 2003, p. 117). Singaporean universities also initiated the launch of endowment funds, though university governance and financing was still firmly controlled by the Ministry of Education. The era of “academic capitalism” (Slaughter & Rhoades, 2004) had yet to seriously emerge.

Concurrently, Singapore became a significant net importer of educational services, with rising proportions of Singapore-based graduate and undergraduate students enrolling in external (i.e., non-residential) degree programs (Singapore Department of Statistics, 2000). This trend provided some of the impetus to open up Singaporean territory to the provision of *in situ* higher education degrees via foreign providers.

It was really the Asian economic crisis of 1997/98, and concern about China’s fast growing manufacturing capacity, that spurred on a deep rethink of Singapore’s socio-economic development strategy. In the midst of the crisis a series of rapid adjustments were made (including wage cuts, benefit cuts, tax cuts, reductions in rentals on industrial properties). These adjustments merged with the service-oriented agenda, and the slogan of the “KBE” that acquired currency globally and regionally in the 1990s (Coe & Kelly, 2000, p. 418; also see Coe & Kelly, 2002).

It is in this context that the strategy to further develop Singapore’s KBE via hitherto unexplored regulatory shifts emerged. A particular conception of the KBE was developed, one that elevated principles of life-long learning, creativity, innovation, competition, entrepreneurialism, critical thinking, and talent (see the paper by Wong, Ho and Singh in this special issue). In other words the need for

- enhanced and diversified services and high valued added manufacturing sectors, as well as;
- better educated and more skilled citizen-subjects; creative “souls” that would contribute to contemporary and especially future development.

Practically, this socio-economic transformation had to be implemented. The MTI is the most important formal institutional mechanism for governance, with the Ministries of Education (MOE) and Manpower (MOM) following

its lead though in an integrated fashion. While the MTI has only one functional department—the Singapore Department of Statistics—nine statutory boards (semi-independent and well-resourced agencies) under the MTI jurisdiction carry out policy and program work. The most significant MTI statutory boards are

- EDB,
- Standards, Productivity and Innovation Board,
- International Enterprise Singapore.

The Singapore EDB was founded in 1961 to formulate and implement economic development strategy for Singapore (Chan, 2002; Low, 1999; Schien, 1996). While relatively well resourced and staffed by Singaporeans, the EDB is the front line with respect to Government of Singapore-business relations, including relations with foreign universities seeking approval to establish an institutional (commercial) presence in Singapore. It was the EDB that launched the “WCU” program in 1998. This program was designed to attract “at least 10 WCU to Singapore within 10 years” via a variety of linkage mechanisms (from joint ventures to autonomous campuses). A series of linked higher education reforms were then extended or initiated (Kong, nd; Lee & Gopinathan, 2003) including

- comprehensive and integrated reviews of university governance and funding systems, including via the establishment of an International Academic Advisory Panel (IAAP) that meets biannually;
- greater autonomy for universities, though linked to a need for greater “accountability;”
- The diversification of financial resources for universities, including private endowments designed to draw in corporate and private (alumni) monies.

The implications of these reforms for the main Singaporean university, NUS, are clearly evident in the paper by Wong, Ho, and Singh in this special issue.

While the EDB is the shaper and mediator of most economic change within Singaporean territory, select committees play a powerful guidance role on a one-off basis or *ad-hoc* basis. An example of the former is the Committee on Singapore’s Economic Competitiveness that reported on Asian crisis related matters in 1998. An example of the latter is the Economic Review Committee (ERC), a Singapore-based network of state and private sector representatives responsible for making recommendations to



generate structural shifts in economy and society.

The most recent ERC was set up by Prime Minister Goh Chok Tong in October 2001 with a mandate “to fundamentally review our development strategy and formulate a blueprint to restructure the economy, even as we work to ride out the current recession.” The Committee’s composition is revealing: nine members of the government or government functionaries (including the President of the National University of Singapore), two union representatives, and nine private sector representatives (including Arnoud De Meyer, the first dean of INSEAD’s Asia campus). Arnoud De Meyer also served on the Sub-Committee on Service Industries in the ERC.

While the ERC (which issued its final report in February 2003) was given a relatively new mandate in 2001, it is building upon initiatives first established in the mid-1980s, as noted above, to promote the services sector as actively as manufacturing, thereby firing up “twin engines” in a city-state drive for more diversified economic growth (ERC, 2002a). In line with the goal of transforming Singapore into “a vibrant and robust global hub for knowledge-driven industries,” the EDB accordingly announced its detailed *Industry 21* strategy, a strategy whose product would be a Singapore capable of developing:

[M]anufacturing and service industries with a strong emphasis on technology, innovation and capabilities. We also want to leverage on other hubs for ideas, talents, resources, capital and markets.

The KBE will rely more on technology, innovation and capabilities to create wealth and raise the standard of living. For our KBE to flourish, we will need a culture which encourages creativity and entrepreneurship, as well as an appetite for change and risk-taking. (<http://www.sedb.com>, accessed May 18, 2005).

Such comments illuminate the connection between structural reform (in a sectoral sense) and the need to construct new citizen-subjects. Hence, the shift from “I21” to “E21”—from industrial development to educational reform. The development of E21 led the state to enhance support for the WCU program, and focus on the development of a “world-class” education sector more generally.

It is in this variegated policy context that the “Global Schoolhouse” concept was developed, with education services (at all levels—from primary to postsecondary) being perceived as a vehicle to diversify the economy, spur on

restructuring in indigenous institutions of higher education, while also re-branding Singapore as a hub of the global KBE.

The education market was segmented, with demand perceived to come from both consumers (i.e., students) and corporations (recalling that Singapore is a major regional headquarters base for multinationals). Four broad supplier categories were delineated, with acknowledgment that the supporting services sub-sector (e.g., testing and assessment services) could also be attracted to locate in Singaporean territory. Figure 1, from the ERC (2002b) report, conveys this segmented conceptualization.

In the context of the emergence and then implementation of the 1998 WCU program, and the issuance of the final report of the Economic Review Committee (ERC, 2003; see especially the education section in Chapter 11), a relatively liberal and well-crafted regulatory framework for foreign providers of higher education (also deemed tertiary education) emerged. Practically, this new framework suggested territorialized forms of foreign university involvement via recognition of the value of Mode 3 (commercial presence) forms of service provision.

There is a clear differentiation component, however, to the higher education component of the Global Schoolhouse development policy (see Figure 2). The National University of Singapore, Nanyang Technological University, and the newly established (in 2000) Singapore Management University (SMU) are targeted as the bedrock (or filling?) of a three-tier university system, though NUS clearly feels, and deserves to feel, that it is the preeminent “local” institution of higher education.

#### 4. SINGAPORE, FOREIGN UNIVERSITIES, AND THE IMPLEMENTATION PROCESS

After the WCU program was initiated in 1998, a large number of Singapore-foreign university initiatives have been established (see Table 2):<sup>3</sup>

The foreign universities have been attracted by the nature of development processes in Pacific Asia, including the rapid extension of global production and R&D networks into the region (Coe, Hess, Yeung, Dicken, & Henderson, 2004; UNCTAD, 2005), and an expectation that providers of higher education can both benefit from and contribute to the Pacific Asian

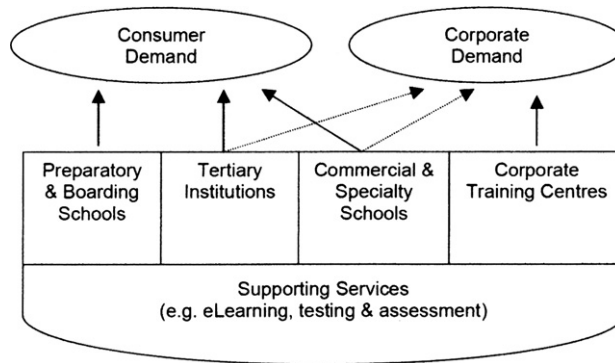


Figure 1. The market segments for educational services in Singapore. Source: ERC (2002b, p. 4).

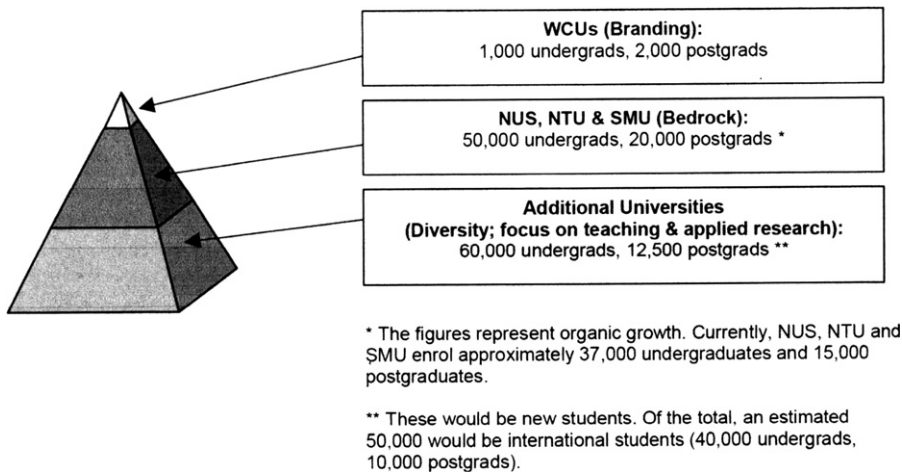


Figure 2. Idealized three-tier university system in Singapore. Source: ERC (2002b).

development process. Singapore has been viewed as an attractive location to be linked to, or based in, because of

- the city-state's strategic geographical position within Southeast Asia (boosted by Changi Airport), with close proximity to South Asia, and the southern parts of East Asia;
- the quality of life for visiting and permanent faculty and students;
- a significant and often well placed alumni base in Singapore;
- the large number of transnational corporations with presences in Singapore;
- Singapore's political stability;

- the presence of relatively high quality local universities;
- the presence of other foreign universities;
- Singapore's well-known commitment to education;
- previous linkages with Singaporean academics and universities that were forged during the 1980s and early 1990s.

The grounding of the foreign universities, including elite Western business schools such as INSEAD and Chicago Graduate School of Business (GSB), was and is far from guaranteed. Policies do not beget the stabilization, even if only temporarily, of the heterogeneous elements which make up the Global

Table 2. *Substantial Singapore-foreign university initiatives (1998-2006)*

Year	Foreign university and discipline(s)	Type of linkage
1998	Johns Hopkins University—Medicine (JHU)	Offices established at NUS to facilitate joint research and teaching
1998	Centre National de la Recherche Scientifique (CNRS)—Engineering	Laboratories established at NUS to facilitate joint research
1998	Massachusetts Institute of Technology (MIT)—Engineering and Computer Science	Joint graduate programs with NUS and NTU via video-conference, exchanges, conferences
1999	Georgia Institute of Technology (GIT)—Logistics	Joint graduate programs with NUS via in situ teaching and exchanges
2000	University of Pennsylvania (Penn)—Business	Consultancy to establish Singapore Management University (SMU), and subsequent joint research
2000	INSEAD—Business	Second campus established in Singapore. Graduate degrees, executive education, corporate courses, research
2000	University of Chicago Graduate School of Business (GSB)—Business	Third campus established in Singapore. Executive MBA offered. Offers, with SMU, joint conferences, business and customized programs for Singapore-based corporations
2001	US Naval Postgraduate School (NPS)—Military	Joint graduate programs with NUS via in situ teaching and exchanges
2002	Technische Universität München (TUM)—Industrial Chemistry and Ecology	Joint graduate programs with NUS via in situ teaching and exchanges. Independent research via the German Institute of Science and Technology (GIST), a private university affiliated with TUM
2002	Technische Universiteit Eindhoven (TU/e)—Engineering	Joint graduate programs with NUS via in situ teaching and exchanges. Joint research via the Singapore-based Design Technology Institute (DTI)
2002	University of Illinois, Urbana-Champaign (UIUC)—Engineering	Joint graduate programs with NUS via in situ teaching and exchanges
2002	Shanghai Jiao Tong University (SJTU)—Business	Joint graduate programs with NTU via in situ teaching and exchanges
2003	Carnegie Mellon University (CMU)—Information Systems	Consultancy to establish School of Information Systems in SMU, and subsequent joint research
2003	Stanford University—Environmental Science and Engineering	Joint graduate programs with NTU via in situ teaching, video conference teaching and exchanges
2003	Cornell University—Hospitality Management	Joint graduate programs with NTU via in situ teaching, exchanges, and research
2003	Duke University—Medicine	Joint graduate medical school with NUS
2003	Johns Hopkins University—Music	JHU's Peabody Institute collaborated with the National University of Singapore to create the Yong Siew Toh Conservatory of Music (YSTCM)
2003	Karolinska Institutet (KI)—Bio-engineering	Joint graduate programs and research in stem cells, tissue engineering and bio-engineering
2004	Australian National University (ANU)—Actuarial Sciences, Economics, Mathematics, Chemistry, Physics	Joint graduate programs with NUS
2004	Waseda University—Business and Technology Management	Joint graduate programs with NTU
2004	University of New South Wales—Comprehensive	Full breadth campus being established for up to 15,000 students
2004	Ecole Supérieure D'Electricite (Supelec)—Engineering	Joint graduate programs with NUS
2005	Ecole Supérieure des Sciences Economiques et Sociales (ESSEC)—Business	Private campus currently being established



Table 2—continued

Year	Foreign university and discipline(s)	Type of linkage
2005	University of Nevada at Las Vegas (UNLV)— Hospitality Management	Private campus currently being established
2005	SP Jain Center of Management (SPJCM)— Business	Private campus currently being established

Schoolhouse assemblage. What also matters is statecraft via the powers and capacities of a Pacific Asian developmental state (e.g., large scale targeted financial subsidies), along with doses of bureaucratic persistence and persuasion. For example, the EDB played an important role in courting select universities in R&D rich contexts (e.g., Boston). In order to tempt the universities, the EDB played up Singapore's cosmopolitan nature, and then used tangible material resources in the form of financial and other incentives. In another case INSEAD received \$10 million in research funding over the first four years of its Memorandum of Understanding (MOU), plus soft loans, reduced land values (about one-third of the commercial price), easier-to-get work permits, housing access, and so on. The University of Chicago GSB, for example, received several million dollars worth of subsidy via the renovation of the historic House of Tan Yeok Nee building they now use as their campus. The University of New South Wales is receiving upwards of \$80 million of direct and indirect subsidy from the EDB. Finally, the Government of Singapore effectively funds the Wharton-SMU Research Center at SMU, providing monetary and in-kind support for research projects, seminars, scholarships and the like. While the exact scale of the subsidies is confidential, and tied to 4–5 year Memorandums of Understanding (MOUs) and other contractual forms, suffice it to say the typical foreign university in the first five years of the WCU received several million dollars of direct and indirect subsidy.

It is also important to note the foreign universities are being attracted by the substantial sums being allocated into R&D by the Government of Singapore via its Science and Technology plan. For example, on February 17, 2006, the Government announced that more than USD\$8.3 billion will be allocated for R&D expenditures during 2006–10 (Chang & Choong, 2006). A large proportion of this will find its way into research programs focused on biotechnology, water technology, and software engineering.

## 5. MODELS OF GLOBALIZATION AND THE EMERGENCE OF UNIVERSITY-INDUSTRY LINKAGES

One of the most important mediating factors that shapes both the nature of the decision-making process and the impacts of the development process in Asian cities, including the preliminary formation of university–industry linkages, is the model that the foreign universities adopt when implementing their internationalization/globalization strategy, which in turn determines their mode of entry into Singaporean territory. One way of conceptualizing of this process is graphically represented in Figure 3, a model developed and operationalized by the business school INSEAD in relation to the development of their Asian campus.

The *Import model* is the classic approach to internationalization in Western universities. University campuses establish formal and informal policies, programs, and projects to draw in foreign degree students, as well as foreign faculty. The level of internationalization is typically associated with measures of relative proportions of non-citizens on campuses at any one time, or trends over time.

In the Singaporean case, the *Import model* is built on the assumption that Singaporeans, and Singapore-based students (e.g., employees of multinational firms with offices in Singapore), would acquire their knowledge at a non-Singaporean (i.e., foreign) university. This is the traditional and still important model that trains up Singaporeans (e.g., the Singapore life sciences development agency A\*Star sends most of its scholarship holders to American and European universities) for Singapore-based industrial employment. Risk levels *vis a vis* investments and potential negative effect upon the foreign university brand name is relatively low.

The capacity of the *Import model* to generate direct university–industry linkages within Singaporean territory is clearly limited, for students and faculty are geographically located outside of Singapore. Research, in particular,

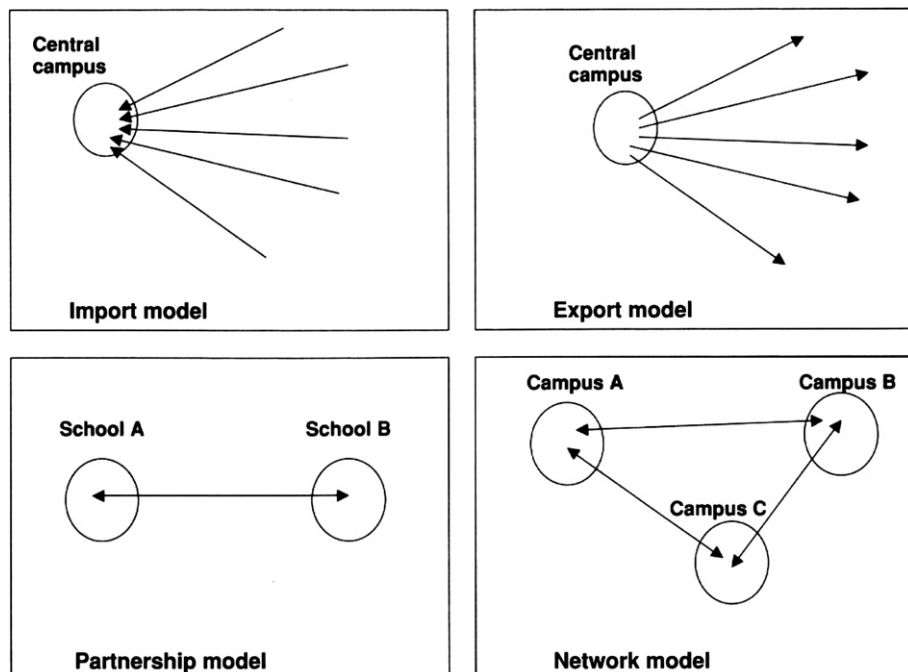


Figure 3. Models for the globalization of higher education. Source: De Meyer et al. (2004, p. 108).

is highly unlikely to be designed to benefit Singapore-based firms or workers. This said, the geographical inhibitor is mediated by the fact that many GLCs in Singapore offer prestigious overseas scholarships. Upon completion of their studies, the students return and are often “bonded” to work for the GLC for a specific time period (approximately 3–5 years).

The *Export model* is built on the assumption that core faculty of a foreign university will be based at a central campus so as to retain critical mass, and enable the faculty to generate and disseminate knowledge via research and teaching practices. Knowledge is globalized via the export of courses that are taught by core faculty in home locations. The Export model can also be implemented via flying core faculty overseas to teach (a resource intensive obligation). The problems associated with the Export model, with respect to teaching, can also be mediated via the use of distance-learning technologies (video conferencing and the Internet). This model is often combined with the bringing in of local or foreign lecturers to teach a significant proportion of course materials, often with uneven learning results. This is the model adopted, for example, by the SIM, which coordinates approximately 50 academic programs

that are offered by “foreign” universities. However, none of the foreign universities that have formed linkages with Singapore as part of the EDB-coordinated Global Schoolhouse development program (as outlined in Table 2) have adopted this model. This situation reflects the desire of the Singaporean state to focus their resources on facilitating deeper forms of linkages between Singapore and select foreign universities for the reasons outlined earlier in this paper. More generally, there is an emerging tendency in Pacific Asia for the state to implement development policies that support *in situ* capacity building, reflective in part of the desire of the state to lessen dependencies on Western universities for higher education service provision, and the desire to reinforce the grounding of global production networks as well as global R&D networks that are rapidly becoming territorialized within Pacific Asian territory (OECD, 2004; UNCTAD, 2005).

The *Partnership model* is the most common mechanism to further the internationalization objective of the foreign universities that are active in Singapore. The model is typically pursued via the exchange of students and faculty, via the joint operation of teaching and research programs, and via the provision of intellectual

leadership or consultancy in the establishment or restructuring of research and teaching programs, departments, schools, and indeed entire universities (in the case of SMU). The Partnership model is relatively low risk in nature from the perspective of the foreign university as well as the local sponsor. Partnerships are established following negotiations between local and foreign universities, or else between foreign universities and the state. They tend to be institutionalized in the form of time-specific Memorandums of Understandings (MOUs) or Agreements.<sup>4</sup>

In the Singaporean case, the Partnership model has been heavily utilized, in part because it supports the diverse and sometimes contradictory objectives of both local and foreign universities. From the Singaporean perspective, partnerships enable local universities to acquire links with brand name institutions, one of their key objectives. Assuming the brand name exists because of the quality of the research and teaching conducted by the foreign university, the brand effect enables local universities to differentiate themselves from other universities in the Pacific Asian region, as well as from universities in Australasia. Differentiation is sought so as to enable local universities to compete for faculty and students (especially postgraduate students) at a regional and increasingly global scale.

Equally important, partnerships with foreign universities enable local faculty to engage in a learning process with respect to program development, curriculum development, pedagogical practice, and research practice; all in a manner that can facilitate the formation of university–industry linkages in the broadest of senses. For example, the University of Pennsylvania and Carnegie Mellon University (CMU) have provided critically important guidance in the establishment of SMU, Singapore's first private not-for-profit university. The Wharton School from Penn, in particular, provided critically important intellectual leadership in the formation of SMU's organizational structure and curriculum, and will formally continue to do so until 2007. The Penn link was extended in December 2003 when the School of Arts and Sciences of the University of Pennsylvania signed an MOU to help SMU establish industry-oriented social science research and teaching. CMU signed an MOU with SMU in January 2003 to collaborate on the development of a School of Information Systems (SIS). The five-year partnership includes the design of undergraduate and graduate/profes-

sional programs, delivery of research and graduate training, and faculty development. The focus is on IT architecture, information management skills for enterprise contexts, and business and technology analysis. SMU enrollment has grown from 306 students in 2000, 3,000 in 2004, to 3,800 in 2006, with a planned capacity of 9,500 (6,500 undergraduates and 3,000 graduates). A new US\$650 million 4.5 ha campus opened in Singapore's downtown in August 2005. The Wharton–SMU Research Center was initially established at SMU with emphasis on “technopreneurship,” knowledge transfer, technology-based industries, and e-commerce in the Asian context. SMU continues to develop centers (e.g., the UOB–SMU Entrepreneurship Alliance Centre; the IBM Solution Centre; Asia's first Centre for Social Innovation), executive education programs, and customized training programs for Singapore-based corporations to further the formation of university–industry linkages in Singapore and the broader Asia-Pacific region. Thus, the long experience of Wharton and Carnegie Mellon in strategically facilitating the formation of university–industry linkages in the United States was transferred to Singapore, and has created an important formative legacy.

The capacity to enhance university–industry linkages is strong in the Partnership model for several additional reasons. First, the Partnership model builds upon the existing and potential linkages that local universities (NUS, NTU, and now SMU) already have with Singapore-based firms and institutions, be they local or multinational. Indeed foreign universities such as MIT, TUM, TU/e, UIUC, Cornell, Karolinska Institutet, Georgia Tech, and MIT effectively used the partnership to extend their networks into both Singapore and the broader Asian region. The logic behind this is to create networks that can be used in the enhancement of the research and teaching process (e.g., via the acquisition of research funding, industry feedback, joint research, and guest speakers in classes). For example, the advisory board of Georgia Institute of Technology–NUS Logistics Institute–Asia-Pacific is made up of seven people, five of whom are Singapore-based industry representatives.

Second, internships are also incorporated into almost all of the partnership programs, further enhancing the formation of foreign university/local university–industry linkages. For example, in 2003/04 and 2004/05 students

enrolled in the five full-time graduate programs that the Singapore–MIT Alliance offers had internships with firms including:

- Accenture Pte Ltd.
- Accord Express Holdings Pte Ltd.
- Advanced Materials Technologies Pte Ltd.
- Agilent Technologies Singapore Pte Ltd.
- Apple Computer Limited, Singapore Branch
- Centre for Advanced Computations in Engineering Science
- Chartered Semiconductor Manufacturing Ltd.
- Centre for Advanced Numerical Engineering Simulations
- Data Storage Institute Delphi Automotive Systems (S) Pte Ltd.
- ExxonMobil Asia Pacific Pte Ltd.
- Hewlett-Packard Singapore (Pte) Ltd.
- IBM Singapore Pte Ltd.
- Institute of High Performance Computing
- Institute of Materials Research and Engineering
- Institute of Microelectronics
- International Semiconductor Products Pte Ltd.
- Keppel FELS Limited
- Merck Sharp and Dohme (Singapore) Ltd.
- Ministry of Defense
- Motorola Electronics Pte Ltd.
- National Semiconductor Corporation
- Phillips Electronics Singapore Pte Ltd.
- PSA Corporation Limited
- Shell Eastern Petroleum (Pte) Ltd.
- Silicon Graphics Pte Ltd.
- Sun Microsystems Pte Ltd.
- Wigetworks Pte Ltd.

Graduates of partnership programs are also able to acquire career placements with both local and foreign firms in a relatively easy fashion because they are perceived to have a greater capacity for critical thinking, and agility and openness of thought.

Third, the medium- to long-term logic of the Partnership model is also to enhance and/or broaden alumni networks, such that certificate and degree graduates eventually donate to alumni-dependent fund raising foundations that are associated with both local and foreign universities. Again, this is a very obtuse and indirect form of university–industry linkage, but my research has determined that both foreign and local universities are intensely strategizing *vis a vis* the creation of the foundations

for long-term university–industry linkages in both Singapore and the broader Pacific Asian region. The Partnership model enables them to do this in a relatively low cost and low risk way, especially since the Government of Singapore (esp., the EDB and A\*Star), as well as local universities, are bankrolling most of the partnership schemes.

#### Partnership model—Research and teaching

- Australian National University (Economics, Southeast Asian Studies, Mathematics, Chemistry, Physics) and NUS
- Carnegie Mellon University (Computer Science, Business, Information Systems, Engineering) and SMU
- Centre National de la Recherche Scientifique (Engineering) and NUS
- Cornell University (Hospitality Management) and NTU
- Duke University (Medicine) and NUS
- Georgia Institute of Technology (Industrial Systems and Engineering) and NUS
- Johns Hopkins University (Medicine) and NUS
- Johns Hopkins University (Music) and NUS
- Karolinska Institutet (Medicine) and NUS
- Massachusetts Institute of Technology (Engineering) with the NUS and NTU
- Shanghai Jiao Tong University (Business) and NTU
- Stanford University (Engineering) and NTU
- Technische Universität München (Chemistry, Engineering, Ecology) with NUS and NTU
- Technische Universiteit Eindhoven (Engineering) and NUS
- University of Illinois, Urbana-Champaign (Engineering) and NUS
- University of Pennsylvania (Business) and SMU
- US Naval Postgraduate School (Military) and NUS
- Waseda University (Business) and NTU

The *Network model* is the least utilized of all of the globalization of higher education models in general, though it is increasingly evident in the Singaporean Global Schoolhouse case. In this model, global networks are created via the merger of geographically separate institutions, or else the establishment of new campuses in other countries. One of the key principles underlying the establishment of a genuine network of campuses is their functional integration with a relatively intense sharing of material and non-material resources, and a relatively flat hierarchy with respect to the quality of the multiple campuses and their respective roles in knowledge production. The Network model requires an undeniably significant commitment of up-front resources, and it is the most risky of all of the models outlined in this paper. Once commitment is made to implement the Network model, flows of what might have been viewed as “proprietary knowledge” occur across space between the campuses (De Meyer, Harker, & Hawawini, 2004), and presumably between the campuses and the firms based in campus city regions.

In the Singapore case, six universities have or are beginning to adopt the Network model. The two universities that have adopted the Network model and established a tangible presence in Singapore are the University of Chicago (in 2000) and INSEAD (in 2000). This said each campus is operated differently, and this generates differential opportunities and constraints *vis a vis* the formation of university–industry linkages in Singapore and the Southeast Asian region.

The University of Chicago GSB established a dedicated Singapore campus in July 2000 to offer its Executive MBA to a maximum of 84 students per program. On average, not more than 20% of the student base is Singaporean. The curriculum is identical to that of the Executive MBA program in Chicago, and is taught by Chicago-based faculty who travel to Singapore to deliver one-week modules. Graduates are offered a Chicago GSB MBA degree. Given this development approach, the campus is less integrated into Singapore’s political economy than the INSEAD campus. The absence of resident faculty in Singapore ensures there are fewer opportunities to engage with local and foreign firms that are based in Singapore and the broader region. Partly due to this constraint, the GSB entered into an agreement in 2004 with SMU to offer joint conferences, business and customized programs for Singapore-based

corporations. To date, five Singapore-based custom programs have been offered at the SMU campus via this joint scheme. In an overall sense, then, the GSB campus has few linkages with the local economy. This said the reputation of the Chicago GSB is such that students throughout the Pacific Asian region register to take Singapore-based courses. This draws future and current industry leaders into Singaporean territory. Assuming the experience is a positive one, the theory is that Singapore will be on their “radar screen” when allocative decisions are made with respect to the implementation of regional and global development strategy. This is a rather nebulous dynamic to account for, but it is one that was raised with me during numerous interviews.

INSEAD, the prominent global business school, established its “Asia campus” in Singapore in January 2000. A US\$40 million 12,000 m<sup>2</sup> building was built to enable Singapore-based faculty, and European campus visiting faculty, to offer full- and part-time courses, as well as executive seminars and an EMBA program. European and Asian campuses are fully integrated (a “global learning network”), with student exchanges a common component of the MBA program. The Singapore campus enrolls approximately 373 students and employs 34 permanent faculty. On average, not more than 10% of the student base is Singaporean. Numerous executive education courses are offered on campus. INSEAD announced its Singapore campus broke even in 2003, and expanded in 2005 with an additional 6,000 m<sup>2</sup> of floor space, which will enable up to 450 MBA students to be based in Singapore at any one time. In addition, it launched a commercial research institute (InnovAsia) to monitor and disseminate regional emergent technologies.

The decision to pursue a relatively embedded campus model sprang out of a relatively long history of research on Asian business systems,<sup>5</sup> and INSEAD’s commitment to “a non-dogmatic learning environment that brings together people, cultures and ideas from around the world, changing lives, and helping transform organizations through management education.” The institutional paradigm that shapes the curriculum also logically led INSEAD to establish a site in the center of Asia. The capacity of this version of the Network model to enhance university–industry linkages is relatively strong given that it requires a significant commitment to being embedded in space, and therefore

Table 3. *Select INSEAD activities (2000–04)*

	2000	2001	2002	2003	2004
Case studies published	61	67	89	123	110
MBA programme participants	681	773	836	829	870
Of whom started on Asia campus	53	114	244	244	281
Number of weeks of executive education	365	378	364	374	426
Of which were given in Asia	60	72	74	73	94

Source: Derived from INSEAD (2005, p. 3).

geographically specific institutions and networks are generated over time (assuming the campus is well managed).

The Network model functions particularly well in global cities; a socio-economic formation that is built upon global flows of people, ideas, and technologies (Abu-Lughod, 1999; Olds, 2001; Sassen, 2001). Students and faculty regularly travel between campuses; indeed programs tend to be designed such that components are held in multiple locations. The nodal location also enables the university to leverage off of these flows. For example, while I was conducting research at INSEAD's Asia campus the Germany-based chairman of the Bayer Group was speaking at a large executive function for Bayer staff from the entire Asia-Pacific region. INSEAD's presence in Singapore, in conjunction with the Bayer regional HQ (Bayer (South East Asia) Pte Ltd.), helped to elevate Singapore's status and capacity as a place to dialogue about corporate strategy. On a more systematic basis, INSEAD's MBA and Executive Education offerings have increased significantly once the Asia campus was established in 2000, as has its capacity to produce cases (an increasing number of which are focused on Pacific Asian themes) (see Table 3).

Finally, the Network model enables an important symbolic statement to be made given the commitment of significant resources, and a public recognition that geography matters, that regional difference exists despite the forces of globalization. Commitment to an Asian city (either through the Network model, or some variants of the Partner model) also generates the desired branding effect. For example, the presence of INSEAD and University of Chicago campuses in Singapore enables the city-state to register on globally circulated and highly influential ranking schemes in business newspapers such as the *Financial Times* for now two of the top 10 leading business schools

list "Singapore" as one of their countries (a key sorting column).

While the impact of this form of textual presence is difficult to assess, it is clear that Singapore's image as a place for particular forms of life-long learning is being enhanced.

#### Network model—Research and teaching

- Ecole Supérieure des Sciences Economiques et Sociales (Business)
- INSEAD (Business)
- SP Jain Center of Management (Business)
- University of Chicago Graduate School of Business
- University of Nevada at Las Vegas (Hospitality Management)
- University of New South Wales (Comprehensive)

## 6. CONCLUDING COMMENTS

The emergence of a complex of Western university campuses, programs, and joint ventures in Singaporean space, and substantial local university reforms (Lee & Gopinathan, 2003) is obviously designed to further the developmental objectives of the Singaporean state and the long-ruling PAP. As noted above these objectives include those of both a material and non-material nature:

- the diversification of Singapore's labor market;
- the generation of opportunities for competition and synergy between foreign providers of education services, and indigenous institutions of higher education including the National University of Singapore, Nanyang Technological University, and SMU;



- the emergence of Singapore as a “global knowledge hub,” associated with knowledge production, innovation, R&D activities, and significant university–industry linkages;
- the creation of a conducive base for professional expatriate residence; a base affording opportunities to attend lectures, seminars, workshops, short-term courses, etc.;
- the registering of Singapore in benchmarking venues, especially the *Financial Times*, the *Times Higher Education Supplement*, and disciplinary-specific discursive fields.

In summary, foreign institutions of higher education are recognized by the Singaporean state as playing a fundamental role in restructuring the economy via the refashioning of the local citizenry, while simultaneously providing retooling opportunities for the 100,000 or so professional migrants who use Singapore as a temporary base. The key idea is the creation of a virtuous circle: draw in the “best universities” with global talent; this talent then creates knowledge and knowledgeable subjects; these knowledgeable subjects, through their actions and networks, then create the professional jobs that drive a vibrant local KBE with profitable regional links.

While the structural pressures to create a “Boston of the East” are immense, and the Government of Singapore has sunk enormous resources into generating complex of active universities and affiliated institutions, it is clear that foreign universities themselves play a critical role in shaping the development process. The specific modes of entry that universities use in the globalization process—the Import model, the Export model, the Partnership model, the Network model, and any number of hybrids—bring with them a range of opportunities and constraints with respect to the formation of university–industry linkages.

Regardless of which model is adopted, much also depends upon institutional histories, dominant disciplinary paradigms, and “faculty champions” regarding the unfolding of the university–industry linkage development process. Moreover, the vast majority of the Singapore–foreign university linkages that have been created, to date, have been focused at the

undergraduate and masters levels and in a very targeted (in disciplinary terms) sense. This is particularly the case with respect to the many joint and double degree programs that bind together local and foreign universities. Given that foreign universities have been, to date, unable or very hesitant about transplanting or extending advanced research and development operations to Singaporean territory, we are unlikely to witness deep and multitudinous forms of university–industry linkages being formed in Singapore territory. Indeed this weakness is reflected in the substantial Government of Singapore resources that are currently available for supporting the establishment of two or three new full breadth foreign university campuses. The current development of the University of New South Wales campus in Singapore (to be opened in 2007) might change this situation, though the failure of the EDB to convince globally recognized research universities (e.g., MIT, Stanford, Imperial College), as well other research active universities (e.g., the University of Warwick, LSE), to establish overseas campuses in Singapore highlights a disconnect between Government of Singapore policy goals and the reality of institutional globalization in higher education at this point of history.

These are early days in the most recent higher education reform era of Singapore’s history, and in the globalization of higher education (especially the variants involving the establishment of commercial presence in foreign territories). Moreover, there are a variety of submerged yet important factors that underlie the entire development process; factors such as the nature of academic freedom in Singapore for foreign faculty (Olds & Thrift, 2005), and the outcome of the withdrawal of Government of Singapore subsidies over time. The global assemblage known as Singapore Global Schoolhouse is clearly the outcome of a variety of actor-networks; actor-networks that are being shaped by broader structural transformations, as well as actor-networks shaping these broader structural transformations. Regardless of one’s views on this approach to development, the experiment is certainly worthy of greater attention and illumination.

## NOTES

1. *Source:* Extracts from an address by RADM (NS) Teo Chee Hean, Minister for Education and Second Minister for Defense at the Alumni International Singapore (AIS)

Lecture on January 7, 2000 at the NUSS Guild Hall @ 6.35 pm, available at <http://www.moe.gov.sg/speeches/2000/sp10012000.htm>, accessed on March 19, 2005.

2. It is also worth noting that the most prominent global city-states—Singapore and Hong Kong (until 1997)—are the products of colonialism, and then post-colonial political dynamics. Colonial origins helped to shaped urban destinies that were (and still are) tightly intertwined with the evolving global economy. This colonial history has helped to engender openness to constant change, and an outward-oriented and relatively cosmopolitan sensibility. Colonialism also helped to lay the legal, linguistic, and technological (esp., transport) foundations for integration into the contemporary global economy.

3. While beyond the scope of this paper, it is also important to note that foreign universities have been reaching into Singapore for several decades via a series of locally registered institutions. For example, the Singapore Institute of Management (SIM) currently works with 10 international universities to coordinate a variety of undergraduate and postgraduate programs. In addition, Singapore is also the base for *Universitas 21 Global*, the on-line graduate business school that is jointly operated by the Thomson Learning Corporation.

Numerous corporate and business media organizations such as the Center for Creative Leadership (which was ranked as the number 10 Executive Education school in the Financial Times in their May 2005 survey), the Singapore Financial Learning Centre, Lucasfilm Animation, DigiPen (the digital media school) and Boeing (their pilot and flight attendant training unit) have set up training programs in Singapore over the five years.

4. The main differences between these two inter-party documents is that an Agreement is “legally binding if there is the intention to create legal relations,” while an MOU is “usually a document which records the understanding of the parties on a proposed project and is therefore not legally binding” (Ministry of Education, memo, no date, available at: <http://www.moe.gov.sg/corporate/pdf/MOE-Educational-18dft.pdf>, accessed on March 15, 2005).

5. INSEAD was founded in 1957, an Asian business program was established in 1974, and the Euro-Asia Centre at its Fountainebleau campus in France was opened in 1980.

## REFERENCES

- Abu-Lughod, J. (1999). *New York, Chicago, Los Angeles: America's global cities*. Minnesota: University of Minnesota Press.
- Chang, A.-L., & Choong, M. Y. (2006). Govt pumps US\$8.3 b into boosting R&D. *Straits Times*, February 17.
- Chua, B. H. (1997). *Political legitimacy and housing: Stakeholding in Singapore*. New York: Routledge.
- Chui, S., Ho, K. C., & Lui, T.-L. (1997). *City-states in the global economy*. Boulder: Westview Press.
- Coe, N., Hess, M., Yeung, H., Dicken, P., & Henderson, J. (2004). “Globalizing” regional development: A global production networks perspective. *Transactions of the Institute of British Geographers*, 29(4), 468–484, New Series.
- Coe, N., & Kelly, P. (2000). Distance and discourse in the local labour market: the case of Singapore. *Area*, 32(4), 413–422.
- Coe, N., & Kelly, P. (2002). Languages of labour: Representational strategies in Singapore's labour control regime. *Political Geography*, 21, 341–371.
- De Meyer, A., Harker, P., & Hawawini, G. (2004). The globalization of business education. In H. Gatignon, & J. Kimberly (Eds.), *The INSEAD-Wharton alliance on globalizing: Strategies for building successful global businesses*. Cambridge: Cambridge University Press.
- Dicken, P. (2003). *Global shift: Reshaping the global economic map in the 21st century* (4th ed.). London: Sage.
- ERC. (2002a). Report of the ERC Subcommittee on Services Industries: Part I, Singapore: ERC. <[http://www.mti.gov.sg/public/ERC/frm\\_ERC\\_default.asp?sid=99](http://www.mti.gov.sg/public/ERC/frm_ERC_default.asp?sid=99)> Accessed 20-05-05.
- ERC. (2002b). Developing Singapore's Education Industry, Singapore: ERC. <[http://www.mti.gov.sg/public/ERC/frm\\_ERC\\_default.asp?sid=99](http://www.mti.gov.sg/public/ERC/frm_ERC_default.asp?sid=99)> Accessed 20-05-05.
- ERC. (2003). New challenges, fresh goals—Towards a dynamic global city, Singapore. <[http://www.mti.gov.sg/public/ERC/frm\\_ERC\\_default.asp?sid=99](http://www.mti.gov.sg/public/ERC/frm_ERC_default.asp?sid=99)> Accessed 20-05-05.
- George, C. (2000). *Singapore: The air-conditioned nation. Essays on the politics of comfort and control, 1990–2000*. Singapore: Landmark Books.
- INSEAD (2003). *INSEAD: One school, two campuses: Going to Asia, Case 303-041-1*. Singapore: INSEAD.
- INSEAD (2005). *INSEAD 2005: In profile*. Singapore and Fountainebleau: INSEAD.
- Kong, L. (nd). Science and education in an Asian tiger. <[www.brightminds.uq.edu.au/TRC/downloads/ScienceEducationAT.pdf](http://www.brightminds.uq.edu.au/TRC/downloads/ScienceEducationAT.pdf)>.
- Kong, L., & Yeoh, B. (2002). *The politics of landscape in Singapore: Constructions of 'Nation'*. Syracuse: Syracuse University Press.
- Lee, K. Y. (2000). From third world to first: The Singapore story, 1965–2000, Singapore, Times Editions.
- Lee, M., & Gopinathan, S. (2003). Reforming university education in Hong Kong and Singapore. *Higher Education Research & Development*, 22(2), 167–182.
- Lingle, C. (1996). *Singapore's authoritarian capitalism: Asian values, free market illusions and political dependency*. Fairfax, VA: The Locke Institute.

- Low, L. (Ed.) (1999). *Singapore: Towards a developed status*. Singapore: Oxford University Press.
- OECD (2004). *Internationalisation and trade in higher education: Opportunities and challenges*. Paris: OECD.
- Olds, K. (2001). *Globalization and urban change. Capital, culture and Pacific rim mega-projects*. Oxford: Oxford University Press.
- Olds, K., & Thrift, N. (2005). Cultures on the brink: Reengineering the soul of capitalism—on a global scale. In A. Ong, & S. Collier (Eds.), *Global assemblages: Technology, politics and ethics as anthropological problems* (pp. 270–290). Oxford: Blackwell.
- Olds, K., & Yeung, H. (2004). Pathways to global city formation: A view from the developmental city-state of Singapore. *Review of International Political Economy*, 11(3), 489–521.
- Rodan, G. (1989). *The political economy of Singapore's industrialization: National state and international capital*. London: Macmillan.
- Sassen, S. (2001). *The global city* (2nd ed.). Princeton: Princeton University Press.
- Schien, E. (1996). *Strategic pragmatism: The culture of Singapore's Economic Development Board*. Cambridge, MA: MIT Press.
- Singapore Department of Statistics (2000). Educational upgrading through external degree programmes. Singapore Statistics Newsletter.
- Slaughter, S., & Rhoades, G. (2004). *Academic capitalism and the new economy*. Baltimore: Johns Hopkins University Press.
- Teo, C. H. (2000). Speech by Teo Chee Hean, Minister for Education and Second Minister for Defense at the Alumni International Singapore (AIS). Lecture on January 7, 2000 at the NUSS Guild Hall @ 6.35 pm. <<http://www.moe.gov.sg/speeches/2000/sp10012000.htm>>.
- Tremewan, C. (1994). *The political economy of social control in Singapore*. London: St. Martin's Press.
- UNCTAD (2004). World Investment Report 2004: The shift towards services. UNCTAD, Geneva.
- UNCTAD (2005). World Investment Report 2005: TNCs and the internationalization of R&D. UNCTAD, Geneva.
- Wade, R. (1990). *Governing the market: Economic theory and the role of government in East Asian industrialization*. Princeton: Princeton University Press.
- Weiss, L. (1998). *The myth of the powerless state: Governing the economy in a global era*. Cambridge: Polity Press.
- Woo-Cumings, M. (Ed.) (1999). *The developmental state*. Ithaca, NY: Cornell University Press.
- Yeung, H. (2005). Institutional capacity and Singapore's developmental state. In H. Neadurai (Ed.), *Globalisation and economic security in East Asia: Governance and institutions* (pp. 85–106). London: Routledge.
- Yeung, H., Poon, J., & Perry, M. (2001). Towards a regional strategy: the role of regional headquarters of foreign forms in Singapore. *Urban Studies*, 38(1), 157–183.

