Asia Pacific Educ. Rev. (2013) 14:11–22
DOI 10.1007/s12564-013-9249-x

The quest for an entrepreneurial university in East Asia: impact on academics and administrators in higher education

Ka Ho Mok

Published online: 16 February 2013

Abstract In the last decade, universities in East Asia have taken knowledge transfer more seriously, especially when the state funding for higher education was reduced while other private funding sources were diversified. Universities in East Asia collaborate with the industrial and business sectors on projects related to research, development, and knowledge transfer to enhance their global competitiveness. This article examines how the quest for an entrepreneurial university in East Asia has affected academics and administrators in higher education, with particular reference to the perceived impact of an entrepreneurial university on academic life.

Keywords Entrepreneurial university · Academic freedom · Managerialism and university governance · Global competitiveness

Introduction

The rise of knowledge economy has generated new global infrastructures, with information technology playing an increasingly important role in the global economy. Therefore, significant implications arise for different stakeholders in a national innovation system. For the government, how to make the country thrive in a competitive knowledge economy has become an important national development agenda. The government is often hard pressed to orchestrate the strategic development of R&D activities, with higher education as one key component of the national innovation system (Edquist and Hommen 2008; Etzkowitz 2008; Lundvall et al. 2006; Nelson 1993). For entrepreneurs, an era of "open innovation" is argued to have emerged, where firms, instead of conducting in-house R&D, have been increasingly outsourcing their research activities to diverse external units including universities so that innovation can be achieved in a more efficient manner (Chesbrough 2003; Perkmann and Walsh 2007).

As for universities, apart from performing their traditional mission of teaching and conducting academic research, they are now experiencing tremendous pressure to acquire the third mission of working toward economic and social development. The new mission provides many opportunities for universities to establish linkages to the industry sector, namely, by setting up university spin-off companies, conducting licensing activities and contract research, providing consulting services, exploring graduate and researcher mobility between the two sectors, and so on. As higher education has become further associated with the social and especially economic developments, the R&D activities in universities can no longer be regarded as purely academic pursuits in the ivory tower. Therefore, structurally, universities are required to build a "university-based entrepreneurship ecosystem" (Fetters et al. 2010) where "academic entrepreneurship" flourishes (Wong 2011). In sum, many policy-makers in different countries believe that a closer and more interactive cooperation among the government, the industry, and the academia will lead to sustainable economic growth and competitiveness in the knowledge economy where innovation is important.

This article sets out in the context briefly outlined above to examine the major strategies that governments/economies in East Asia have adopted in promoting innovation advancement and R&D to foster knowledge transfer as

K. H. Mok (✉)
The Hong Kong Institute of Education, Tai Po, Hong Kong
e-mail: kahomok@ied.edu.hk

well as enhance the national higher education systems to become more internationally competitive in terms of global ranking. This article is based on the recent research projects of the author with major focus on how universities have attempted to work closely with the industry and business sectors to promote innovation and knowledge transfer in East Asia. The article is divided into three major parts. The first part focuses on major strategies adopted by selected East Asian countries/economies in fostering university–industry –business cooperation to become more entrepreneurial. The second part discusses how East Asian universities perform in global league tables. The third part examines the major impacts on academics and administrators when higher education institutions (HEIs) are engaged to become entrepreneurial universities.

Enhancing global competition: responses of governments and universities

Changing university governance and the rise of private universities

Higher education plays an important role in fostering innovation in various ways. First, higher education is the key to "competence building" of an economy that desires to excel in innovation, cultivating a capable workforce equipped with essential skills and knowledge, the so-called human capital. Infrastructure such as research institutes, factories, and machines are called hardware and physical capital, whereas human capital is non-tangible capital, the software component of national technological capability. Research institutes and private firms are capable of hiring local or foreign talents to conduct indigenous research only with the help of universities. Second, HEIs can contribute to innovation by conducting entrepreneurial activities in the form of research, knowledge transfer, technology licensing, and commercial spin-offs. These entrepreneurial activities are conducted by universities either alone or in cooperation with the industry sector.

Historically, education has been essential to East Asia, where education is crucial to nation building and is an instrument that creates a sense of belonging and nationhood and that builds up the government's political legitimacy by enhancing economic growth through its improvement (Bray and Lee 2001; Gopinathan 2001). In recent decades, responding to the growing pressure generated by the globalization forces, many governments have attempted to reinvent themselves by moving beyond the welfare state to become the competition state. Facing fiscal pressure, governments are hard pressed to execute neoliberal reforms, such as deregulation, privatization, or corporatization of state-owned industries or publicly owned organizations. More private providers are introduced into the market. The creation of a competition state does not necessarily result in a retreat of the state but rather an assertion of new and different roles of the state (Gill 1995; Jordana and Levi-Faur 2005; Moran 2002; Drahos and Jospeh 1995; Scott 2004). In the arena of higher education, many East Asian governments have on one hand enhanced the autonomy and flexibility of the universities to run their own businesses and on the other hand devised strategic planning, aligning the development of universities with the national development agenda. For example, the governments have devoted more financial resources as incentives to the higher education sector as a whole and set the benchmarks for universities to compete for funding. Another approach is the "concentration and selection" strategy through which governments allocate resources for certain special projects that involve only the best and most suitable universities to improve their R&D capacities and international recognition (Table 1).

Parallel to the call for more financial commitment to higher education from the government, higher education funding sources have been diversified in the Four Little Dragons in East Asia, giving rise to private higher education, as in many countries in the world (see Altbach and Levy 2005). In the Four Little Dragons, with the rise of private HEIs, the division of labor between private higher education and public higher education has become clearer. The former will shoulder the responsibility of the massification of higher education by offering more higher education seats to aspiring students, whereas the latter, with the aid of government subsidy and the favor of public policy facilitation, will engage in more R&D and entrepreneurial activities. Majority of universities or HEIs in Hong Kong and Singapore are either run by the government or heavily state financed, whereas a clearer private–public mix is observed in South Korea and Taiwan, where the proportions of private HEIs are higher. However, in recent years, the Hong Kong and Singapore governments have exerted effort to increase the number and share of private education to use the market to fulfill the policy goals of higher education massification. The presence of the public–private mix is caused not only by the rise of private higher education but also by the transformation of public HEIs into entrepreneurial universities, which receive more financial contributions and fee-paying practices. Therefore, the conventional conception of the public–private distinction is no longer appropriate in understanding the nature of higher education, as it has become a "hot product" for both public and private pursuits, that is, for both the government to advance national development agenda and the private sector to sustain business growth (Hussin and Ismail 2009).

Table 1 Asia's private and public higher education shares, 2001–2008 (selected countries)

	Private % of total HE enrollment	Years	Private % of total HEIs	Years	Private % of total university enrollment	Years	Private % of total university	Years
China	19.9	2008	28.3	2008	0	2008	0	2008
Hong Kong	59.0	2007/08	54.5	2007/08	59.4	2007/08	22.2	2007/08
Japan	77.4	2007	89.6	2007	73.2	2007	76.7	2007
Malaysia	50.9	2004	97.0	2004	7.5	2000	39.3	2004
Philippines	65.1	2005/06	89.4	2005	–	–	–	–
South Korea	80.0	2006	87.0	2002	78.4	2004	84.8	2004
Taiwan	71.9	2004	65.8	2004	66.8	2004	64.1	2004
Thailand	9.9	2007	46.9	2007	16.8	2001	28.3	2003

Source The program for research on private higher education, http://www.albany.edu/dept/eaps/prophe/international_databases.html

Promotion of science and technology and emphasizing R&D

Before the 1990s, many countries or societies in East Asia lagged behind the developed West in terms of innovation. East Asian economies invest more in R&D to promote innovation and expand higher education, enhancing the global competitiveness of their citizens to catch up with the developed economies in the West. In the past decade or so, some international organizations have emphasized the importance of higher education in the technological innovation and economic development of both developed and developing countries. For instance, the Organization for Economic Cooperation and Development (OECD) values the importance of innovation in the long-term prosperity of developed and high-income economies such as Japan and South Korea (OECD 1998, 1999). In its recent report in 2010, *The OECD Innovation Strategy: Getting a Head Start on Tomorrow*, OECD declares that searching for new sources of growth is important in the face of the 2008–2009 global financial crisis, which led to declining output growth; innovation will play a crucial role in the searching process. Therefore, OECD warns that, for countries and firms to recover from the crisis and achieve sustainable economic growth, they cannot ignore the importance of investments in education, infrastructure, and research. Therefore, even in the face of a budget crisis, a stronger calling has ensued for an increase in the effort of governments in OECD countries to promote R&D, especially in advancing the demand-side factors "such as smart regulations, standards, pricing, consumer education, taxation, and public procurement that can affect innovation" (OECD, 2010: 2). Apart from OECD, the World Bank, which is more concerned about developing countries than OECD, also released a number of publications on the relationships between higher education, innovation, and economic growth in the past decade, such as *Constructing Knowledge Economies: New Challenges for Tertiary Education* (World Bank 2002a), *Building Knowledge Societies: Opportunities and Challenges for EU Accession Countries* (World Bank 2002b), *How Universities Promote Economic Growth* (Yusuf and Nabeshima 2007), *Accelerating Catch-Up: Tertiary Education for Growth in Sub-Saharan Africa* (World Bank 2009), and *Putting Higher Education to Work: Skills and Research for Growth in East Asia* (World Bank 2012). Moreover, the Asian Development Bank also highlighted in its 2008 report entitled *Education and Skills: Strategies for Accelerated Development in Asia and the Pacific* that the advancement of working skills of the populace has become imperative for developing Asian countries to achieve economic growth (Asian Development Bank 2008).

Realizing the importance of increasing investment in R&D for future economic and social development, many Asian governments have increased their investment in higher education, particularly in the fields of sciences and technologies (S&T). East Asian students have expressed preference for S&T disciplines, as they account for a significant proportion of the science and engineering (S&E) student world population. In 2008, a total of 1.7 million students earned their first university degrees in natural sciences. Overall, 28 % of them were from the United States and the European Union (EU), and 45 % of them were from East Asia (with Japan accounting for 2 %, China for 17 %, and the other eight Asian countries for 26 %). East Asian students also dominated the field of engineering, accounting for 56 % of the 2.0 million students earning their first university degrees in engineering. Combined, students from the United States and EU accounted for only 21 %. By comparison, in the field of social sciences or other non-S&E fields, a higher proportion of students came from the United States and EU than from East Asia. In fact, over the last decade, the number of S&E students in East Asia has been soaring. For instance, in China, the number of students earning their first university degrees in natural sciences increased from 68,400 in 2000 to 297,300 in 2008.

In the same period, the number of students earning their first university degrees in engineering also increased from 213,000 in 2000 to 704,600 in 2008 (Tables 2, 3, 4).

Table 2 First university degrees by selected region/country, 2008

Country	Natural sciences	Engineering	Social sciences	Non-S&E Fields
World number	1.7 million	2.0 million	1.3 million	9.9 million
United States	10 %	4 %	19 %	11 %
European Union	18 %	17 %	23 %	18 %
Japan	2 %	5 %	16 %	2 %
China	17 %	34 %	11 %	11 %
Asia-8	26 %	17 %	3 %	23 %
Russia	6 %	7 %	6 %	11 %
Brazil	3 %	2 %	2 %	7 %
All others	18 %	14 %	20 %	18 %

Source National Science Board (2012) Science and Engineering Indicators 2012

Asia-8 = India, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand; *EU* European Union

Table 3 First university degrees in Natural Sciences and Engineering by selected country/economy: 1998–2008 (thousands)

	China	France	Germany	Japan	South Korea	Taiwan	United States
	Natural Sciences						
2000	68.4	50.8	22.4	33.8	28.6	14.8	151.0
2004	168.2	45.4	45.4	28.0	33.3	28.2	173.6
2008	297.3	36.0	36.0	35.2	37.7	29.9	177.6
	Engineering						
2000	213.0	34.3	36.3	103.2	56.5	19.6	59.5
2004	442.5	43.9	34.1	98.4	70.4	44.1	64.7
2008	704.6	41.0	41.0	95.2	77.2	58.8	69.9

Source National Science Board (2012) Science and Engineering Indicators 2012

Comparatively, East Asia is not short of students trained in the S&T fields, and many of them have the intellectual ability required to excel. Their knowledge and skills in R&D can be unleashed if they can receive good innovation and entrepreneurship education in higher education.

The quest for "world-class" status and university ranking

With strong intentions to enhance their global competitiveness, governments and universities in Asia have taken global university ranking exercises very seriously. Recent studies have repeatedly indicated that universities in East Asia are increasingly under pressure to compete internationally, and research has obviously become one of the major yardsticks in measuring university performance. University league tables are popular not only in the UK and Canada, but various university ranking exercises have also been launched by academic institutions in Taiwan and Mainland China (Liu and Cheng 2005; Research Center of Chinese Scientific Evaluation of Wuhan University 2005; Zhejiang University 2006).

Positioning itself as a regional hub for higher education, Hong Kong has emphasized research performance to be reflected in the research performance–led funding formula adopted by the government. Since the 1990s, Hong Kong higher education has undergone several Research Assessment Exercises, modeling the UK approach to monitor research performance. Universities in Hong Kong have undergone major review exercises, and they have been asked to differentiate themselves in terms of roles and missions, identifying their major strengths and developing their centers of excellence. Academics currently working in Hong Kong are confronted with increasing pressure from the government to engage in international research, commanding a high quality of teaching and contributing to professional and community services. As Hong Kong universities attempt to match the top universities in the world, they struggle to compete for limited resources, similar to universities in central Europe (Kwiek 2004).

Table 4 Natural sciences and engineering doctoral degrees by selected country, 2000–2008 (thousands)

Years	United States	Germany	Russia	China	UK	Japan	South Korea	India
2000	17.2	10.2	11.4	7.3	6.2	6.5	2.8	5.4
2001	17.0	9.5	8.2	7.5	7.4	6.8	2.8	5.4
2002	16.3	9.0	9.8	8.7	7.3	6.8	3.0	5.5
2003	17.3	8.7	9.6	11.0	6.8	6.8	3.0	6.3
2004	18.3	8.6	10.1	13.6	7.2	7.1	3.3	7.5
2005	20.0	9.5	11.5	16.0	7.3	6.7	3.4	7.4
2006	21.9	8.9	11.4	20.9	7.7	7.2	3.5	7.8
2007	23.7	9.2	11.7	24.4	8.0	7.0	3.3	–
2008	24.5	9.9	8.1	26.2	7.2	–	3.4	–

Source National Science Board (2012) Science and Engineering Indicators 2012

Under a "publish or perish" context, academics in Hong Kong are becoming increasingly "instrumental" when choosing publication venues; International Social Science (SSCI) and Science Citation–indexed journals are the major targets for publication. In addition, university presidents/vice chancellors in the city are concerned about the ranking of their institutions in the global university league (Mok 2005a; Chan 2007).

In Taiwan, the government has realized that globalization has accelerated competition among HEIs globally. The Executive Yuan formulated a policy target to develop at least one university in Taiwan as one of the top 100 universities in the world and to ensure that at least 15 key departments or cross-university research centers will become the best in Asia within the next 5 years to improve the global competitiveness of Taiwan institutions (Lu 2004). Guided by these policy objectives, the Ministry of Education and the National Science Council have jointly launched the "Program for Promoting Academic Excellence of Universities," aiming primarily to improve the infrastructure and research of universities (MOE, Taiwan 2000). Well aware of the importance of its international position, HEIs in Taiwan have attached far more weight to university ranking exercises. For instance, the Research Institute of Higher Education at Tamkang University has conducted university assessment studies in the last few years. University league tables have been produced, and subsequent reports have triggered heated debates in Taiwan (Lo and Weng 2005; Research Institute of Higher Education and University Evaluation 2005; Lo and Chan 2006). Similar to Hong Kong, research assessment has dominated academic life in Taiwan. Despite the fact that the university sector in Taiwan has established the Taiwan Social Science Citation Index to counterbalance the pressure to publish only in SSCI journals, academics confront the reality that special weight is still attached to international publication venues in terms of promotion and research evaluations (Chen and Lo 2007).

The Chinese government has implemented a few major projects such as the "211 Project" and the "985 Scheme" to enable some HEIs to become "world-class universities," enhancing the international competitiveness of Chinese universities in the globalizing world. For the "211 Project," the government attempts to develop 100 key universities and key disciplines in the 21st century, with additional funding allocated to institutions of higher education to improve their teaching and research facilities. The "985 Scheme" aims to transform Beijing University (Peking University) and Tsinghua University into world-class universities by 2015 and 2011, respectively. Realizing the intensified global competition among leading universities and feeling the pressure for better ranking in the global university league, the Chinese government has strategically identified key national bases for research in the humanities and social sciences, and major national laboratories have been established to promote scientific research (Huang 2006). Recently, a research institute of higher education based in Shanghai published a report on *The Academic Ranking of World Universities* (ARWU), which has drawn significant attention and sparked considerable debate among academics in China (Liu and Cheng 2005). In the quest for developing world-class universities in China, other research institutions in China, such as the Research Center of Chinese Scientific Evaluation of Wuhan University and the College of Education, Zhejiang University, also conducted similar research to promote university assessment and performance (Research Center of Chinese Scientific Evaluation of Wuhan University 2005; Zhejiang University 2006). Recently, Ngok and Guo critically reviewed the quest for world-class universities in China, pointing out the gap between the government policy goals and the reality. They also reported some malpractices and even corruption among academics resulting from the strong drive for obtaining world-class status (Ngok and Guo 2007).

In Japan, academics are becoming increasingly aware of the ranking exercises. Therefore, they launched a "Flagship Universities" project to identify some major Japanese universities and develop them as "world-class universities." According to Yonezawa (2006), the consistent and protracted development of the higher education system in Japan has long been driven by strong national initiatives since the late 19th century. Heavily invested in its university systems, Japanese universities long dominated the top echelons in *Asia* Week's annual "Asian University Ranking." Nonetheless, Japanese universities have recently found that their positions are declining in both the regional and global university league tables. After benchmarking with the world university rankings, the Japanese government has become highly concerned on how to reposition Japanese universities in the rapidly changing global environment. Therefore, the government has allocated additional resources to promote internationalization, and students and academics are strongly encouraged by the government to engage in international collaborations and exchanges (Yonezawa 2006).

Similarly, universities in Singapore are becoming increasingly aware of their international standing. The government strategically identified the major top universities internationally and invited them to set up branch campuses in the capital to strengthen Singapore as a regional hub for higher education. The government has also attempted to attract leading academics to collaborate with local scholars (Mok and Tan 2004). Similar situations can be found in other Southeast Asian societies such as Malaysia, especially because their university system has been restructured along the lines of "neo-liberalism." The present government is keen on transforming Malaysia into a regional hub for higher education. More overseas academics will be appointed to the

system, and international collaborations with overseas institutions on research and teaching have received strong support from the state (Interviews by Mok with Professor S. Morshidi & Mr. Abdul Razak, April 2006, Malaysia; Mok 2007).

How universities in East Asia perform: moving up the global leagues

After consistently working hard in the last three decades, many universities in East Asia have obtained a good reputation, as indicated by several international university benchmarking exercises. According to the Times Higher Education University Rankings, 9 out the top 10 universities in Asia ranked among the top 100 universities in the world. Four of them, namely, University of Tokyo (30), University of Hong Kong (34), National University of Singapore (40), and Peking University (49), were even among the top 50 in the world. Similarly, universities in Japan and the Four Little Dragons also performed well in the QS's Asian University Rankings, consistently placing in the top 10. For instance, in the 2012 ranking, the top 10 universities included two from Japan, three from Hong Kong, three from South Korea, and one from Singapore. According to the Shanghai Jiao Tong University's ARWU, an international benchmark that places greater emphasis on research performance (especially in terms of science and technology) of universities than other criteria, the Asia–Pacific region lags behind Europe and Americas. The top 20 universities were all from the latter two regions. Only 7 universities from Asia ranked among the top 100, and only 22 universities in the region ranked among the top 200. As for the Four Little Dragons, each of them had only one university ranking among the top 200, whereas the United States had 109, the United Kingdom had 30, Germany had 24, and Japan had 9. In brief, although universities in East Asia are still lagging behind their counterparts in America and Europe, those from Japan and the Four Little Dragons are already among the highest in Asia (Tables 5, 6, 7, 8).

With regard to student performance, East Asian students have long been the "champions" of international standard tests in mathematics and sciences as well as in literacy. International standard tests such as the Third International Mathematics and Science Study (TIMSS) and OECD's Program for International Student Assessment (PISA) have ranked students of Taiwan, Hong Kong, South Korea, and Singapore highest among their international and Asian counterparts. In the 2007 TIMSS, Taiwan, Korea, Singapore, and Hong Kong were the top four countries in 8th grade student achievement in mathematics. In the Science test, Singaporean students were number one in the world, Taiwan students placed second, South Korean students fourth, and Hong Kong students ninth. East Asian students also performed well in the OECD's PISA in mathematics, science, and reading (Tables 9, 10).

Table 5 Times higher education university rankings, 2010–2012

		Regional rank	International rank	
School	Economy	2011–12	2011–12	2010–11
University of Tokyo	Japan	1	30	26
University of Hong Kong	Hong Kong	2	34	21
National University of Singapore	Singapore	3	40	34
Peking University	China	4	49	37
Kyoto University	Japan	5	52	57
Pohang University of Science and Technology	South Korea	6	53	28
Hong Kong University of Science and Technology	Hong Kong	7	62	41
Tsinghua University	China	8	71	58
Korean Advanced Institute of Science and Technology	South Korea	9	94	79
Tokyo Institute of Technology	Japan	10	108	112
Seoul National University	South Korea	14	124	109
Chinese University of Hong Kong	Hong Kong	15	151	–
National Taiwan University	Taiwan	16	154	115
Nanyang Technological University	Singapore	18	169	174
City University of Hong Kong	Hong Kong	20	193	–
National Tsing Hua University	Taiwan	23	201–225	107
Korea University	South Korea	26	226–250	–
National Chiao Tung University	Taiwan	27	226–250	181

Source Times higher education university rankings

The quest for entrepreneurial university: impact on academics and administrators

Growing inequalities in higher education

Our earlier discussion already highlighted how universities in Asia have attempted to concentrate their funding on

Table 6 QS's Asian University rankings 2010–2012

	2012	2011	2010
Hong Kong University of Science and Technology	1	1	2
National University of Singapore	2	3	3
University of Hong Kong	3	2	1
Seoul National University	4	6	6
Chinese University of Hong Kong	5	5	4
Peking University	6	13	12
Korea Advanced Institute of Science and Technology	7	11	13
University of Tokyo	8	4	5
Pohang University of Science and Technology	9	12	14
Kyoto University	10	7	8

Source QS, http://www.topuniversities.com/university-rankings/asian-university-rankings/2012 accessed on September 24, 2012

Table 7 Shanghai Jiao Tong University's academic ranking of world universities by country (selected)

	Top 20	Top 100	Top 200	Top 300	Top 400	Top 500
United States	17	53	85	109	137	150
United Kingdom	2	9	19	30	33	38
Germany	0	4	14	24	30	37
Japan	1	4	9	9	16	21
China	0	0	7	15	24	42
Singapore	0	0	1	2	2	2
South Korea	0	0	1	4	7	10

Source Academic ranking of world universities, http://www.shanghairanking.com/ARWU-Statistics-2011.html

Table 8 Shanghai Jiao Tong University's academic ranking of world universities 2012 by region

	Top 20	Top 100	Top 200	Top 300	Top 400	Top 500
Americas	17	57	95	130	162	182
Europe	2	31	75	123	158	202
Asia	1	7	22	35	60	88
Oceania	0	5	8	11	18	24
Africa	0	0	0	1	2	4
Total	20	101	200	300	400	500

Source Academic ranking of world universities, http://www.shanghairanking.com/ARWU-Statistics-2012.html

selected areas to transform them into research-intensive and globally competitive institutions to position their university systems favorably in different global university ranking exercises. Not surprisingly, we have heard complaints from academics in Asia regarding the widening gap between well-established and newly created universities. Government funding is increasingly linked to the performance and ranking of individual universities, while HEIs are under pressure to move beyond the first and second missions (i.e., teaching and research) to the third mission (i.e., serving economic and social developments through engagement in various entrepreneurial activities) (Mok 2005b).

Preferential treatment and funding based on selectivity is clearly observed in South Korea. Kim offers a critical analysis of how universities in South Korea are incorporated, identifying the key issues confronting these universities. However, one point that deserves attention is that, contrary to other Asian university systems that have experienced reductions in state funding (except Singapore), the South Korea government has increased its financial support to the university sector to aid a few universities in climbing up the world university ranking league tables. For example, aspiring to move up the global university league table, Kansei University issued a new personnel policy to recruit international faculty instead of appointing the local Korean scholars. This new staffing policy has raised deep concerns in South Korea (Kim 2006). Other Asian societies undergo similar experiences, such as the "211 Project" in Mainland China, "Flagship Project" in Japan, "Brain 21 Project" in South Korea, "Academic Excellence Project" in Taiwan, "Areas of Excellence" in Hong Kong, and so on.

Critically reflecting the world of globalized higher education, Altbach openly notes that globalization has reinforced existing inequalities and erected new barriers in many ways. Economists Stiglitz and Rodrik, among others, argue that globalization has damaged the interests of developing countries in many aspects as the powerful university systems in the developed economies, such as those in the United States and the United Kingdom, have always dominated the production and distribution of knowledge (Stiglitz 2002; Rodrik 1997, 1999; Altbach 2004). The growing popularity of the quest for world-class universities has further widened the gap between the developed and the developing economies. Although a few Asian universities have successfully climbed up the ladder in these global university league tables, "the major international academic centers—namely the leading research-oriented universities in the North, especially those that use one of the key world languages (particularly English)—occupy the top tier…. Even within countries at the center of the world academic system in the early 21st century—the United States, Britain, Germany, France, and to some extent Australia and Canada—there are many peripheral institutions" (Altbach 2004: 5).

Globalization has intensified the disparities between universities in well-established countries and those in less-developed economies. Therefore, universities in less-

Table 9 Average mathematics and science achievement of 8th grade students

	Mathematics				Science			
	1995	1999	2003	2007	1995	1999	2003	2007
China	–	–	–	–	–	–	–	–
Hong Kong	569	582 (4)	586 (3)	572 (4)	510	530 (15)	556 (4)	530 (9)
Taiwan	–	585 (3)	585 (4)	598 (1)	–	569 (1)	571 (2)	561 (2)
Korea	581	587 (2)	589 (2)	597 (2)	546	549 (5)	558 (3)	553 (4)
Singapore	609	604 (1)	605 (1)	593 (3)	580	568 (2)	578 (1)	567 (1)
Malaysia	–	519 (16)	508 (10)	474 (20)	–	492 (22)	510 (20)	471 (21)
Philippines	–	345 (36)	378 (41)	–	–	345 (36)	377 (42)	–
Indonesia	–	403 (34)	411 (34)	397 (36)	–	435 (32)	420 (36)	427 (35)
Thailand	–	467 (27)	–	441 (29)	–	482 (24)	–	471 (21)
International average	513	487	467	500	516	488	474	300

Source Third International Mathematics and Science Study Report, 1995, 1999, 2003, and 2007

Figures in brackets indicate rank among the countries included in the test

Table 10 OECD's program for International Student Assessment

	Math		Science		Reading	
	2006	2009	2006	2009	2006	2009
Shanghai, China	–	600 (1)	–	575 (1)	–	556 (1)
Hong Kong	547 (3)	555 (3)	542 (2)	549 (3)	536 (3)	533 (4)
Taiwan	549 (1)	543 (5)	532 (4)	520 (12)	496 (16)	495 (23)
Korea	547 (3)	546 (4)	522 (11)	538 (6)	556 (1)	539 (2)
Singapore	–	562 (2)	–	542 (4)	–	526 (5)
Malaysia	–	–	–	–	–	–
Philippines	–	–	–	–	–	–
Indonesia	391	371	393	383	393	402
Thailand	417	419	421	425	417	421

Source OECD program for International Student Assessment

Figures in brackets indicate rank among the countries included in the test

developed economies will encounter difficulties in performing well in these global university league tables, not to mention the academic institutions at the periphery with insufficient resources to transform into world-renowned universities (Altbach 2009). Our discussion on how the Asian governments have attempted to enhance their institutions to become world-class and research-led universities has clearly suggested deepening inequalities and disparities in higher education not only within the national system but also regionally and globally. Welch, for instance, points out the dilemmas that many HEIs in Southeast Asia have confronted amid the quest for world-class university status. Without sufficient funds, HEIs in Indonesia, Malaysia, the Philippines, Thailand, and Vietnam experience difficulties in competing with other well-established universities concentrated in the West and the other wealthier areas of East Asia. Therefore, the university systems of these Asian countries are disadvantaged because they fail to assert their academic standing in the global university ranking exercises, patents granted, and papers and citations (Welch 2007). Thus, several debates on globalization revolve around the ideas of social integration and social justice (Held 2004), and the acceleration of globalization has indeed retarded social development and deepened divisions between the North and the South (Welch and Mok 2003). Michael Polanyi even regards the freedom of neo-liberalism as a poisoned chalice, liberating us from everything, "even from obligations toward truth and justice" (Polanyi 1975: 14).

Undervaluing teaching amid greater emphasis on research

Our earlier discussions indicate that educational reforms in Asia have been significantly influenced by Western new managerial-oriented doctrines. Responding to the growing impact of globalization, all Asian states have reviewed their education systems and launched reforms to pursue technology commercialization as a source of economic growth (Wong et al. 2011). Correspondingly, the demand for research and knowledge, as well as R&D investment

has steadily increased in Asian universities. However, the quantity and quality of research staff did not meet such demand in the Asian universities at the initial phase. The result is that Asian universities are expected to experience the magnification of academic staff and the enhancement of research productivity (Meek and Suwanwela 2006). Teachers are required to conduct more research, and thus, they tend to focus on research and neglect teaching.

Two additional reasons account for the growing tension between teaching and research in these Asian universities. First, the quest for university ranking has inevitably changed the academic lifestyle in Asia. As mentioned earlier, an increasing number of Asian universities are eagerly engaging in world-class university competition, especially attempting to deploy resources to improve their "international university ranking." The criteria for university performance in general and research assessment in particular are unquestionably determined by the Anglo-Saxon traditions and practices with significant emphasis on research (Mok 2007). When comparing the ranking index systems among US News World Report, The Time Higher Education Supplement, and Shanghai Jiao Tong University, respectively, that of Shanghai Jiao Tong University places more weight on research, with HiCi, Publication in Natural & Science, and Citations occupying 60 %; this proportion in the US system is 20 % (Hou 2006). Against this context, overemphasis on the index of research achievements has triggered a publishing boom of internationally refereed papers among Asian universities. According to the figure below, from 1990 to 2003, Asia's share of the world total of S&E articles increased from 11.5 to 19 %, whereas the shares of the EU and the United States declined slightly to 30 % in 2003 (National Science Foundation 2007). Among the total output of Asia from 1990 to 2003, the shares of China and Taiwan more than doubled, reaching 22 and 7 %, respectively, in 2003, and South Korea's share increased dramatically from 2 to 11 %. Thus, intense pressure has been generated for research and publication. The phenomenon of "publish or perish" has emerged, significantly affecting the performance of universities and professional evaluation of academics. Against this context, teaching and learning have received relatively less attention in universities (Fig. 1).

Second, state funding policies and mechanisms also shape the way universities are governed and managed. In keeping with the creation of research universities, many Asian countries have prioritized this longstanding aim by implementing more targeted funding for research. Many Asian universities nowadays introduce internal and external competition to enhance research productivity. Individual departments or groups of departments/programs jointly apply for funds to obtain additional funding. Against this context, universities need to identify their own strengths by

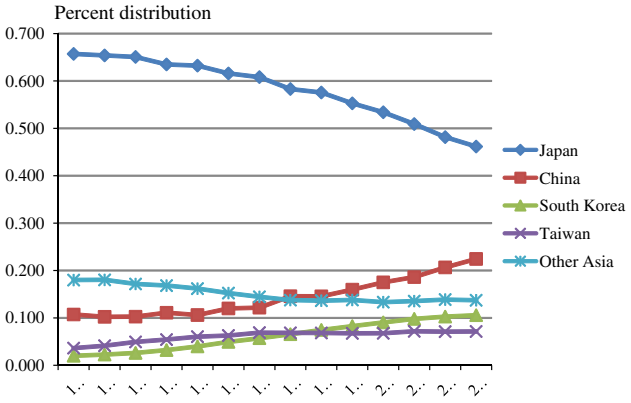

Fig. 1 Share of Asian Science and Engineering Articles by Country/Economy: 1990–2003. *Source* National Science Foundation 2007. Asia's Rising Science and Technology Strength: Comparative Indicators for Asia, the European Union, and the United States, p. 22

developing centers of excellence for research by pulling their expertise together for bidding on external/internal funds. The idea of the establishment of centers of excellence is viable because it can gather a critical mass of academic faculty for research collaboration. However, the same process has also resulted in the polarization of funding support between the identified centers of excellence and the other institutions that would receive less funding and support. What worsens the research disparity situation is that universities have attached greater weight to hard sciences and medicine but less attention to humanities and social sciences. For example, China approved a national Natural Science Foundation of China in 1986 and built research universities as part of its "985 project" (Liu 2007). Similar programs were created elsewhere in Asia as follows: the 1999 Brain Korea 21 (BK 21) program in South Korea (Shin 2009), the 2002 Center of Excellence program in Japan (Yonezawa 2007), and the National Higher Education Strategic Plan beyond 2020 and the National Higher Education Action Plan 2007–2010 in Malaysia (Ahmad et al. 2012). Although these research enhancement strategies adopted by these Asian countries have been extremely successful in "jump-starting" the research productivity of scholars at the targeted universities, such strategies have inevitably led to internal inequalities between disciplines identified as key strategic areas of development and those without such privilege. Worse still, many universities in Asia nowadays place far greater emphasis on research than on teaching and learning, particularly when a significant proportion of full professors and associate professors do not teach any undergraduate courses (Yu 2006).

As more universities attempt to attain better positions in global university leagues, they have also changed their pay structure to attract, retain, and promote faculty members with high-quality international publications. In recent

years, many Asian universities have implemented different schemes to reward high flyers and great performers in research. There is nothing wrong with rewarding and recognizing good performance in research. However, such incentive and reward systems can create tension between research and teaching, as institutions prize research performance over teaching and learning. Against this incentive structure with greater emphasis, even overemphasis, on research, teaching has been undervalued (Shin and Harman 2009). Moreover, higher education is no longer considered elite education because of the increasing demand to equip students with the industrial skills to enable economic development within a short cycle. Consequently, Asian universities reform themselves by aiming for a more industry-friendly and work-based curriculum, which may undervalue disciplines that are not found immediately "useful" or "sensitive" to the emerging labor market or economic development needs. Therefore, several studies related to academic profession in Asia have revealed that many academics serving in the fields of humanities and social sciences complain about their academic status being undervalued, while the academic freedom of universities is shaken because university administration is under tremendous pressure to run universities as corporations that should be sensitive to the market needs (Currie et al. 2005).

Rectifying the imbalanced tension between research and teaching, some countries have sought to improve teaching quality. In China, the Ministry of Education issued a directive in 2003, stating that full professors are required to teach undergraduate courses. This proposal is now adopted as a major indicator for national evaluation of Chinese universities (Yu 2006). In 2004, the Ministry of Education in Taiwan launched the Teaching Excellence Project, which granted subsidies ranging from NT$15 million to NT$85 million to reinstate the teaching evaluation in the academic profession. The Taiwan government is keen on articulating teacher quality, curriculum design, teaching resource, and student performance into the national evaluation system (MOE of Taiwan 2011). Similarly, the University Grants Committee in Hong Kong has begun teaching and learning quality reviews and quality assurance audits since the mid-1990s to ensure student-learning experiences in publicly funded universities in Hong Kong (Mok 2013). The strategies being executed by different Asian university systems to ensure student learning are exceptional, but how far such measures would truly "protect" teaching in the context of increasing the pressure on the quest for global university ranking with a strong link to research performance instead of teaching and learning is still in doubt. Piecing together these observations, the lifestyle of academics in Asia is inevitably affected by the growing tide of research weighing heavier than teaching and learning. For survival and career promotion, academics invest more energy in and attention to research than teaching and learning in Asian campuses.

Conclusion

This article is set in the context of increased pressure for universities to attain outstanding positions in global university ranking as discussed above. This paper examines the major strategies that governments/economies in East Asia have adopted in promoting innovation advancement and R&D to foster knowledge transfer and enhance the national higher education systems to become more internationally competitive in terms of global ranking. This article is based on the author's recent research projects with a major focus on how universities have attempted to work closely with the industry and business sectors to promote innovation and knowledge transfer in East Asia. This article first discussed the major policies and strategies adopted by different Asian university systems to promote research and innovation by fostering university–industry–business cooperation to become more entrepreneurial. The second part discussed how East Asian universities perform in global league tables. The third part examined the major impact on academics and administrators when HEIs are engaged in aiming to become entrepreneurial universities, examining in particular how the emphasis on research performance, which is closely linked to the quest for success in global ranking exercises, has affected administrators and academics.

Acknowledgments The author would like to thank the Research Grant Committee (RGC) of the Hong Kong Special Administrative Region Government for offering research grant support to the project entitled "Fostering Entrepreneurship and Innovation: A Comparative Study of Changing Roles of Universities in East Asia." The GRF grant was funded by RGC (GRF750210).

References

Ahmad, A.R., Farley, A., & Naidoo, M. (2012). An examination of the implementation of federal government strategic plans in Malaysian public universities. *International Journal of Business and Social Science*. Retrieved from http://www.ijbssnet.com/update/index.php/current.html?id=1460.

Altbach, P. (2004). Globalization and the university: Myths and realities in an unequal world. *Tertiary Education and Management, 1*, 1–20.

Altbach, P. (2009). Peripheries and centers: Research universities in developing countries. *Asia Pacific Education Review, 10*(1), 15–27.

Altbach, P., & Levy, D. C. (2005). *Private higher education: A global revolution*. Rotterdam: Sense Publishers.

Asian Development Bank. (2008). *Education and skills: Strategies for accelerated development in Asia and the Pacific*. Bangkok: Asian Development Bank.

Bray, M., & Lee, W. O. (Eds.). (2001). *Education and political transition: Themes and experiences in East Asia*. Hong Kong: The University of Hong Kong Comparative Education Research Centre.

Chan, David. (2007). Global agenda, local response: Changing education governance in Hong Kong's higher education. *Globalization, Societies & Education, 5*(1), 109–124.

Chen, I. R., & Lo, Y. W. (2007). Critical reflections of the approaches to quality in Taiwan's higher education. *The Journal of Comparative Asian Development, 6*(1), 165–185.

Chesbrough, H. W. (2003). The era of open innovation. *MIT Sloan Management Review, Spring*, 35–41.

Currie, J., Peterson, C. J., & Mok, K. H. (2005). *Academic freedom in Hong Kong*. Lanham: Lexington Books.

Drahos, P., & Jospeh, R. A. (1995). The telecommunications and investment in the great supranational regulatory game. *Telecommunications Policy, 19*(8), 619–635.

Edquist, C., & Hommen, L. (Eds.). (2008). *Small country innovation systems*. Cheltenham: Edward Elgar.

Etzkowitz, H. (2008). *The triple helix: University-industry-government innovation in Action*. New York: Routledge.

Fetters, M. L., et al. (Eds.). (2010). *The development of university-based entrepreneurship ecosystems: Global practices*. Cheltenham: Edward Elgar.

Gill, S. (1995). Globalization, market civilization and disciplinary neoliberalism. *Millennium, 24*(3), 399–423.

Gopinathan, S. (2001). Globalization, the state and education policy in Singapore. In M. Bray & W. O. Lee (Eds.), *Education and political transition: Implications of Hong Kong's change of sovereignty*. Hong Kong: The University of Hong Kong Comparative Education Research Centre.

Held, D. (2004). *Global covenant*. Cambridge: Polity Press.

Hou, Y.Q. (2006). Research on international ranking system of universities: Comparison among Shanghai Jiaotong University. *The Times and U.S. News World Report*. Presented at the 2nd Forum of *Higher Education.* Guangzhou, China.

Huang, F. T. (2006). Difference in the context of internationalization by region: China. In N. Furushiro (Ed.), *Final report of developing evaluation criteria to assess the internationalization of universities* (pp. 41–50). Kwansei: Osaka University.

Hussin, S., & Ismail, A. (2009). Goals, components, and factors considered in university development. *Asia Pacific Education Review, 10*(1), 83–91.

Jordana, J., & Levi-Faur, D. C. (2005). Preface: The making of a new regulatory order. *The Annuals of the American Academy of Political and Social Science, 598*(March), 1–6.

Kim, T. (2006). The academic profession in East Asian private higher education. Paper presented at the International Workshop Frontier of Private Higher Education Research in East Asia, Tokyo, Japan

Kwiek, M. (2004). The emergent educational policies under scrutiny: The bologna process from a central European perspective. *European Educational Research Journal, 3*(4), 759–776.

Liu, N. C. (2007). Research universities in china: Differentiation, classification, and future world-class status. In P. G. Altbach & J. Balan (Eds.), *Transforming research universities in Asia and Latin America* (pp. 54–69). USA: Johns Hopkins University Press.

Liu, N. C., & Cheng, Ying. (2005). Academic ranking of world universities. *Higher Education in Europe, 30*(2), 127–136.

Lo, Y.W., & Chan, D. (2006). The impact of globalization on higher education in Taiwan and Mainland China. Paper presented at the International Conference on GDPism and risk: Challenges for social development and governance in East Asia, Bristol, UK.

Lo, Y. W., & Weng, F. Y. (2005). Taiwan's responses to globalization: Decentralization and internationalization of higher Education. In K. H. Mok & R. James (Eds.), *Globalization and higher education in East Asia* (pp. 137–156). Singapore: Marshall Cavendish Academic.

Lu, M.L. (2004). The blueprint and competitiveness of Taiwan's higher education. Paper presented to cross strait seminar on review and prospect of the policy of university excellence, Taipei, Taiwan.

Lundvall, B., et al. (Eds.). (2006). *Asia's innovation systems in transition*. Cheltenham: Edward Elgar.

Meek, V. L., & Suwanwela, C. (2006). Introduction. In V. L. Meek & C. Suwanwela (Eds.), *Higher education, research, and knowledge in the Asia Pacific region*. New York: Palgrave Macmillan.

Ministry of Education [MOE], Taiwan. (2000). *List of projects for the first round of the program for promoting academic excellence of universities* (p. 2000). Taipei: MOE.

Mok, K. H. (2005a). The quest for world class university: Quality assurance and international benchmarking in Hong Kong. *Journal of Quality Assurance in Education, 13*(4), 277–304.

Mok, K. H. (2005b). Fostering entrepreneurship: Changing role of government and higher education governance in Hong Kong. *Research Policy, 34*(4), 537–554.

Mok, K. H. (2007). Questing for internationalization of universities in Asia: Critical reflections. *Journal of Studies in International Education, 11*(3&4), 433–454.

Mok, K. H. (2013). Enhancing quality of higher education for world-class status: Approaches, strategies and challenges for Hong Kong. Paper accepted for publication in Chinese Education & Societies (forthcoming).

Mok, K. H., & Tan, J. (2004). *Globalization and marketization in education: A comparative analysis of Hong Kong and Singapore*. Cheltenham: Edward Elgar.

Moran, M. (2002). Review article: Understanding the regulatory state. *British Journal of Political Science, 32*(2), 391–413.

National Science Foundation (2007). Asia's rising science and technology strength: Comparative indicators for Asia, the European Union, and the United State (pp. 22).

Nelson, R. (Ed.). (1993). *National innovation systems: A comparative analysis*. New York: Oxford University Press.

Ngok, K. L., & Guo, W. Q. (2007). The quest for world-class universities in China: Critical reflections. *The Journal of Comparative Asian Development, 6*(1), 21–44.

OECD (1999). Managing national innovation systems. Available on: www.oecd.org/innovation/strategy.

OECD (2010). Ministerial report on the OECD innovation strategy. Available on: www.oecd.org/innovation/strategy.

Organization for Economic Cooperation and Development [OECD] (1998). Technology, productivity and job creation: Best policy practices. Available on: www.oecd.org/innovation/strategy.

Perkmann, M., & Walsh, K. (2007). University-industry relationships and open innovation: Towards a research agenda. *International Journal of Management Reviews, 9*(4), 259–280.

Polanyi, M. (1975). *Personal knowledge towards a post-critical philosophy*. Chicago: University of Chicago Press.

Research Center of Chinese Scientific Evaluation of Wuhan University. (2005). *How do we rank the scientific research competition of the world universities?*. Wuhan: Research Center of Chinese Scientific Evaluation of Wuhan University.

Research Institute of Higher Education and University Evaluation. (2005). *University rankings in Taiwan*. Taipei: Tamkang University.

Rodrik, D. (1997). *Has globalization gone too far?*. Washington, D.C.: Institute for International Economics.

Rodrik, D. (1999). *The new global economy and developing countries: Making openness work*. Washington, D.C.: John Hopkins for Overseas Development Council.

Scott, C. (2004). Regulation in the age of governance: The rise of the post-regulatory state. In J. Jordana & D. Levi-Faur (Eds.), *The politics of regulation: Institutions and regulatory reforms for the age of governance* (pp. 145–174). Cheltenham: Edward Elgar.

Shin, J. C. (2009). Building world-class research university: The Brain Korea 21 project. *Higher Education, 58*(5), 669–688.

Shin, J. C., & Harman, G. (2009). New challenges for higher education: global and Asia-Pacific perspectives. *Asia Pacific Education Review, 10*(1), 1–13.

Stiglitz, J. (2002). *Globalization and its discontents*. New York: W. W. Norton.

MOE, Taiwan. (2011). Evaluation of teaching excellence project. Available on line: http://www.rdec.gov.tw/public/PlanAttach/201108301540564071480.pdf.

Welch, A. (2007). Governance issues in South East Asian higher education: Finance, devolution and transparency in the global era. *Asia Pacific Journal of Education, 27*(3), 237–254.

Welch, A., & Mok, K. H. (2003). Conclusion: Deep development or deep division? In K. H. Mok & A. Welch (Eds.), *Globalization and educational restructuring in the Asia Pacific Region* (pp. 333–356). Basingstoke: Palgrave Macmillan.

Wong, P. K. (Ed.). (2011). *Academic entrepreneurship in Asia: The role and impact of universities in national innovation systems*. Cheltenham: Edward Elgar.

Wong, P. K., Ho, Y. P., & Singh, A. (2011). Contribution of universities to national innovation systems in Asia: Technology commercialization and academic entrepreneurship. In P. K. Wong (Ed.), *Academic entrepreneurship in Asia: The role and impact of universities in national innovation systems* (pp. 1–18). UK: Edward Elgar.

World Bank. (2002a). *Constructing knowledge economies: New challenges for tertiary education*. Washington, D.C.: World Bank.

World Bank. (2002b). *Building knowledge societies: Opportunities and challenges for EU accession countries*. Washington, D.C.: World Bank.

World Bank. (2009). *Accelerating catch-up: Tertiary education for growth in sub-Saharan Africa*. Washington, D.C.: World Bank.

World Bank. (2012). *Putting higher education to work: Skills and research for growth in East Asia*. Washington, D.C.: World Bank.

Yonezawa, A. (2006). Japanese flagship universities at a crossroads. In N. Furushiro (Ed.), *Final report of developing evaluation criteria to assess the internationalization of universities* (pp. 85–102). Kwansei: Osaka University.

Yonezawa, A. (2007). Japanese flagship universities at a crossroads. *Higher Education, 54*, 483–499.

Yu, W. (2006). Policy debate on research in universities. In V. L. Meek & C. Suwanwela (Eds.), *Higher education, research, and knowledge in the Asia Pacific region*. New York: Palgrave Macmillan.

Yusuf, S., & Nabeshima, K. (Eds.). (2007). *How universities promote economic growth*. Washington, D.C.: World Bank.

Zhejiang University. (2006). *A report on the first session of the international academic advisory committee for university evaluation*. Hangzhou: Zhejiang University.