

The Creative University

CREATIVE EDUCATION

Volume 1

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Scope:

The knowledge, learning and creative economies manifest the changing significance of intellectual capital and the thickening connections between economic growth, knowledge and creativity. Increasingly economic and social activity is comprised by the 'symbolic' or 'weightless' economy with its iconic, immaterial and digital goods. This new digital knowledge economy includes new international labor that rely on developments in information and communication technologies (ICTs) that are changing the format, density and nature of the exchange and flows of knowledge, research and scholarship. Delivery modes in education are being reshaped. New global cultures of knowledge and research networks are spreading rapidly. New forms of openness and networking, cross-border people movement, flows of capital, portal cities and intensive development zones all are changing the conditions of imagining and producing and the sharing of creative work in different spheres. At the centre of is the economy/ creativity nexus. But are education systems, institutions, assumptions and habits positioned and able so as to seize the opportunities and meet the challenges? This new series investigates all the aspects of education in (and as) the creative economy in order to extend the dialogue about the relationship between contemporary higher education and the changing face of contemporary economies.

The Creative University

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SENSE PUBLISHERS
ROTTERDAM/BOSTON/TAIPEI

A C.I.P. record for this book is available from the Library of Congress.

ISBN: 978-94-6209-243-3 (paperback)

ISBN: 978-94-6209-244-0 (hardback)

ISBN: 978-94-6209-245-7 (e-book)

Published by: Sense Publishers,
P.O. Box 21858,
3001 AW Rotterdam,
The Netherlands
<https://www.sensepublishers.com/>

Printed on acid-free paper

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MICHAEL A. PETERS AND TINA BESLEY

INTRODUCTION

The Creative University

Education and research have been transformed in the development of knowledge economies. The knowledge, learning and creative economies manifest the changing significance of intellectual capital and the thickening connections between on one hand economic growth, on the other hand knowledge, creativity (especially imagined new knowledge, discovery), the communication of knowledge, and the formation and spreading of creative skills in education. Increasingly economic and social activity is comprised by the 'symbolic' or 'weightless' economy with its iconic, immaterial and digital goods. This immaterial economy includes new international labour markets that demand analytic skills, global competencies and an understanding of markets in tradable knowledges. Developments in information and communication technologies (ICTs) not only define globalization they are changing the format, density and nature of the exchange and flows of knowledge, research and scholarship. Delivery modes in education are being reshaped. Global cultures are spreading in the form of knowledge and research networks. Openness and networking, cross-border people movement, flows of capital, portal cities and littoral zones, and new and audacious systems with worldwide reach; all are changing the conditions of imagining and producing and the sharing of creative work in different spheres. The economic aspect of creativity refers to the production of new ideas, aesthetic forms, scholarship, original works of art and cultural products, as well as scientific inventions and technological innovations. It embraces open source communication as well as commercial intellectual property. All of this positions education at the centre of the economy/ creativity nexus. But are education systems, institutions, assumptions and habits positioned and able so as to seize the opportunities and meet the challenges?

The chapters that form this edited book are a selection of papers given at an international conference held called The Creative University held at the University of Waikato on 15-17 August 2012. This conference investigated all the aspects of education in (and as) the creative economy. The conference objective was to extend the dialogue about the relationship between contemporary higher education and the changing face of contemporary economies. A number of terms describe the nature of the contemporary capitalism of advanced economies: 'cognitive capitalism', 'metaphysical capitalism', 'intellectual capitalism', 'designer capitalism'. The conference explored the relationship between the arts and sciences and this new

form of capitalism. It looked at the global reach and international imperatives of aesthetic and scientific modes of production, the conditions and character of acts of the imagination in the range of fields of knowledge and arts in this period, and the role of the research university in the formation of the creative knowledge that has a decisive function in contemporary advanced economies.

FREEDOM, OPENNESS AND CREATIVITY IN THE DIGITAL ECONOMY¹

Every aspect of culture and economy is transforming through a process of digitization that creates new systems of archives, representations and reproduction technologies that portend a Web 3.0 and Web 4.0, where all production - material and immaterial - will be digitally designed and coordinated through distributed information systems.

Digitization transforms all aspects of cultural production and consumption, favoring the networked peer community over the individual author and blurring the distinction between artists and their audiences. These new digital logics alter the traditional organization of knowledge, education and culture, spawning new technologies as a condition of the openness of the system. Now that the production of texts, sounds and images is open to new rounds of experimentation and development, a new grammar of digital culture is created. The processes of creativity are then transformed as they are no longer controlled by traditional knowledge institutions and organizations, but rather permitted by platforms and infrastructures that encourage large-scale participation and challenge old hierarchies.

The shift to networked media cultures based on the ethics of participation, sharing and collaboration, involve a volunteer, peer-to-peer gift economy that has its early beginnings in the right to freedom of speech, which depends upon the flow and exchange of ideas as essential to political democracy, and includes the notion of a “free press,” the market and the academy. Perhaps even more fundamentally, free speech is a significant personal, psychological and educational good that promotes self-expression and creativity, as well as the autonomy and development of the self, which is necessary for representation - in a linguistic and political sense - and for the formation of identity.

Openness has emerged as a global logic based on free and open-source software constituting a generalized response to knowledge capitalism and the attempt of the new mega-information utilities such as Google, Microsoft, and Amazon.com to control knowledge assets through the process of large-scale digitization, of information that is often in the public domain, of the deployment of digital rights management regimes and of strong government lobbying to enforce intellectual property law in the international context.

The Internet is a dynamic, open ecosystem that progressively changes its nature towards greater computing power, interactivity, inclusiveness, mobility, scale, and peer governance. In this regard, and as the overall system develops, it begins to approximate the complexity of the architectures of natural ecosystems. The more it develops, one might be led to hypothesize, the greater the likelihood that it will not merely emulate Earth as a global ecosystem, but will become an integrated organic

whole. Open cultures become the necessary condition for the systems as a whole, for the design of open progressive technological improvements and their political, epistemic and ontological foundations.

The other side of the state and corporate digital reproduction of identity is a tendency that emphasizes the relation between openness and creativity as part of a networked group. The “open self” is self-organizing and formed at the interstices of a series of membership in online communities that shape spontaneous self-concept and self-image.

Openness to experience is one of the five major traits that has shaped personality theory since its early development by L.L. Thurstone in the 1930s and is strongly correlated with both creativity and divergent thinking. Sometimes referred to as the “big five” personality traits or “the five factor model,” trait theory emerged as a descriptive, data-driven model of a personality based on openness, conscientiousness, extraversion, agreeableness, and neuroticism. Openness is associated with creativity and the appreciation of art, emotionality, curiosity, self-expression and originality. One of the limitations of personality theory is its focus on the individual: in the age of networks, this centeredness might seem somewhat misplaced. There are close links between open content, open science and open collaboration that makes collaborative creativity sustainable.

Openness to experience is probably the single most significant variable in explaining creativity and there is some evidence for the relationship between brain chemistry and creative cognition as measured with divergent thinking. Openness can also be defined in terms of the number, frequency, and quality of links within a network. Indeed, the mutual reinforcement of openness and creativity gels with Daniel Pink’s (2005) contention that right-brainers will rule the future. According to Pink, we are in the transition from an “Information Age” that valued knowledge workers to a “Conceptual Age” that values creativity and right-brain-directed aptitudes such as design, story, symphony, empathy, play, and meaning.

CREATIVITY AS THE NEW DEVELOPMENT PARADIGM

The contemporary politics of creativity rests on the intersection between art and politics tracing the influence between art and labor in the form of co-creativity and peer collaboration within the new mode of social production. This much, at least in its nascent form, has now been recognized by the United Nations (2008): that there is another reality and narrative emerging that provides an interpretation of “globalization as connectivity” rather than economic integration or free trade and that it is “reshaping the overall pattern of cultural production, consumption and trade in a world increasingly filled with images, sounds, texts and symbols” (p. iii). As the “Overview” of the UN *Creative Economy Report 2008* clarifies:

In the contemporary world, a new development paradigm is emerging that links the economy and culture, embracing economic, cultural, technological and social aspects of development at both the macro and micro levels. Central

to the new paradigm is the fact that creativity, knowledge and access to information are increasingly recognized as powerful engines driving economic growth and promoting development in a globalizing world. “Creativity” in this context refers to the formulation of new ideas and to the application of these ideas to produce original works of art and cultural products, functional creations, scientific inventions and technological innovations (p. 3).

The report documents how the concept of the “creative economy is an evolving one that is gaining ground in economic development that “entails a shift from the conventional models towards a multidisciplinary model dealing with the interface between economics, culture and technology and centred on the predominance of services and creative content”. The report adopts the UNCTAD definition of the “creative economy”, which can be summarized as follows:

- The creative economy is an evolving concept based on creative assets potentially generating economic growth and development;
- It can foster income generation, job creation and export earnings while promoting social inclusion, cultural diversity and human development;
- It embraces economic, cultural and social aspects interacting with technology, intellectual property and tourism objectives;
- It is a set of knowledge-based economic activities with a development dimension and cross-cutting linkages at macro and micro levels to the overall economy;
- It is a feasible development option calling for innovative multidisciplinary policy responses and interministerial action;
- At the heart of the creative economy are the creative industries

The notion of “creative economy” has grown out of earlier discussions of the “knowledge economy” and signals those sectors that are the most dynamic in terms of world trade with an average annual growth rate of over 8 per cent in the period 2000-05 and representing 3.4% of world trade in 2005 (or \$424.5 billion). The development dimension of the creative economy is summarized in the call for a systematic approach to national innovation: “With the increasing knowledge intensity of the contemporary economy and the need for innovation to maintain competitive advantage, it has become imperative for countries to tap into their vast reserves of creativity” (p. 5). The report sees an opportunity for developing countries to access global markets to sell products of their creative and cultural sectors thus enhancing the relationship between development and culture, and realization of the Millennium Development Goals (MDGs) including the eradication of extreme poverty. The creative economy approach is seen as being consistent with MDGs as it provides a holistic and multisectoral approach that goes beyond economics and includes cultural and social frameworks. The UNCTAD commits to the notion of creative economy in its 2010 Report² and the capacity of “creative industries” centered at the crossroads of the arts, culture, business and technology to generate creative skills, income through trade and intellectual property rights.

Creative Industries			
HERITAGE	ARTS	MEDIA	FUNCTIONAL CREATIONS
Traditional cultural expressions art crafts festivals celebrations	Visual arts painting sculpture antique photography etc	Publishing and printed media books newspapers press and other publications	Design interior graphic fashion jewellery toys
Cultural sites historical monuments museums libraries archives etc	Performing arts live music theatre dance opera puppetry circus ect	Audio-visuals film television and radio broadcasting New media digitized content software video games animations etc	Creative services architecture advertising creative R&D cultural services digital services etc

Figure 1. Creative Industries.

This mainstream neoclassical economic orientation endeavors to understand the economic aspect of creativity through its contributions to entrepreneurship, and the ways in which it fosters innovation, enhances productivity and promotes economic growth.³

For creativity studies might also follow the debates in the literature on “cognitive capitalism” to focus on the side of labor rather than capital and begin to interpret this in the light of “biopolitics” and see it signaling, “the moment that the traditional nation/State dichotomy is overtaken by a political economy of life in general,” where “power has invested life” to create “sites of the production of subjectivity” privileging, “the transformation of work in the organization of labor”(Negri, 2008: 13-14). Antonio Negri investigates the organization of labor under neoliberal globalization and the radical transformation of the production process though new processes of self-regulation and expressive creativity unleashed by information and communication technology that facilitates the rise of what Negri and others call “immaterial labor” (after Karl Marx’s “general intellect”) as the dominant productive force that takes place with the development and cultivation of new laboring subjectivities.

A manifesto for education in the age of cognitive capitalism must address the question of new laboring subjectivities and their cultivation, socialization and

education (Peters et al, 2009). In this case we can take our as our starting point the “creative energy of labor”. As Negri (2008: 20) argues:

In the Fordist era, temporality was measured according to the law of labor value: Consequently it concerned an abstract, quantitative, analytic temporality, which, because it was opposed to living labor time, arrived at the composition of the productive value of capital. As it is described by Marx, capitalist production represents the synthesis of the living creativity of labor and of the exploitive structures organized by fixed capital and its temporal laws of productivity. In the era of post-Fordism, on the contrary, temporality is no longer - nor totally - enclosed within the structures of constant capital: as we have seen, intellectual, immaterial, and affective production (which characterizes post-Fordist labor) reveals a surplus. An abstract temporality - that is to say, the temporal measure of labor - is incapable of understanding the *creative energy of labor itself* (our emphasis).

As the United Nations’ *Creative Economy Report* (2011) makes abundantly clear a new development paradigm is emerging that links the economy and culture, embracing economic, cultural, technological and social aspects of development. Creativity, knowledge and access to information are central to this new paradigm. These factors are increasingly recognized as powerful engines driving economic growth and promoting development in a globalizing world. Helen Clark, the UN Administrator writes in her Foreword to the Report: “In this era of transformation, creativity and knowledge are fast becoming powerful means of fostering development gains.”

What roles do or should universities play in this new model of development? **The age of the creative university has only just begun.** The state of Western universities—US, UK and European (Eurozone)—are in a great period of upheaval and turmoil, driven by a funding crisis, “austerity” cuts to higher education, and another round of increases in student tuition fees. In this fiscally mean environment public universities are under attack and especially vulnerable as various forms of parallel privatization begin further to dismantle national systems that took generations to build. State support for universities is steadily shrinking as governments encourage closer university-business partnerships and radical forms of outsourcing and digital, long-distance learning solutions. Against the backdrop of a continuing world recession the public mission of the university is being questioned and reframed as Western governments emphasis the responsibility of the university to contribute to and drive economic growth. Economic justifications for the existence of universities are overshadowing its traditional missions as a critical institution engaged in the process of political and social transformation, the development of disinterested scholarship, and the promotion of national and global citizenship.

By contrast, Asia’s universities are rising. As John O’Leary⁴ demonstrates already “Asian universities fill four of the top five places in a new table of young universities extracted from the 2011/12 QS World University Rankings to demonstrate their

growing power.” This is in part the global environment in which the future of the university should be situated. The survival of the university at the level of national system and individual institution will depend largely on how it interprets and responds to these trends. Increasingly, for Western universities this means nurturing the existing links, exchanges, and academic flows from American and European universities systems and institutions while developing strategic links with Asia’s leading institutions, especially China, Taiwan, and Korea, those countries that have invested strongly in expanding the university sector. In this respect the development of “export” education and the international student market is no longer sufficient. What is required is the development of strategic partnerships both at the institutional and national levels with possibilities of joint degrees, faculty and student exchanges, off-shore and outsourced learning, elearning and digital infrastructures for international study, transnational higher education centers, and leveraging of collaborative research initiatives in areas of strength and specialization. This environment conditions the mood of the “new pragmatism”. Above all, individual universities and those policy makers who design and guide antional systems need to position their institutions for the long term in relation to fundmental changes in the mode of knowledge production and in acdemic and social media that favors a flexible approach to notions of creativity and to the age of the creative university.

NOTES

- ¹ We have taken this formulation of the issues from a composite piece of writing (Peters, 2012) from past shcolarly artilces entitled “Freedom, Openness and Creativity in the Digital Economy” in *TruthOut* at <http://truth-out.org/opinion/item/9547-freedom-openness-and-creativity-in-the-digital-economy>.
- ² See the full report at <http://unctad.org/en/pages/PublicationArchive.aspx?publicationid=946>
- ³ See the UNCTAD website on creative economy at <http://unctad.org/en/Pages/DITC/CreativeEconomy/Creative-Economy-Programme.aspx>.
- ⁴ See <http://www.topuniversities.com/where-to-study/region/asia/rise-asia%E2%80%99s-young-universities>

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SIMON MARGINSON

THE CHANGING GEO-POLITICS OF CREATIVITY

Rise of the Post-Confucian University

Abstract: The paper explores the dynamic evolution of higher education and research in East Asia in China, Hong Kong SAR, Taiwan China and South Korea, and in South East Asia in Singapore. It refers also to the earlier case of Japan where higher education developed rapidly in the 1960s/1980s, and Vietnam where the take-off has yet to occur. While there are important differences between them, these systems, termed here 'Post-Confucian', share (1) a common heritage, in the comprehensive role of the Sinic state (as distinct from the limited liberal state of the English-speaking world) and Confucian educational traditions in the family and examination system; (2) an accelerated response to Western modernization. Post-Confucian higher education and research is becoming as strong or stronger than that of Western Europe, in terms of investment, participation rates and published science. High citation impact is increasing rapidly in some fields of knowledge such as Engineering, Chemistry and Computing. The Post-Confucian Model of higher education is both distinctive in its dynamics and one that other countries may try to imitate. The paper explores the drivers of the Model and the possible limits; and some implications for the comparative study of higher education, and for social theory.

INTRODUCTION

The last two decades have seen a major expansion in the worldwide role of higher education. This mega-trend, uneven by region, is associated the three other mega-trends in modernization: the relative growth of knowledge intensive work, urbanization, and the expansion of the middle class. The capitalist economy continues to absorb pre-capitalist rural sectors in Asia, Africa and Latin America. The proportion of the world population in cities has passed 50 per cent. The European Union Institute for Strategic Economic Studies estimates the size of the global middle class (persons with \$10–100 US dollars a day) will increase from 1.8 billion in 2009 to 4.9 billion in 2030, over half the world's population (Vasconcelos, 2012, pp. 28–30). The majority of growth in the middle class will be in Asia, mainly China and India, from half a billion persons in 2009 to over three billion persons in 2030. The new members of the middle class will want higher education for their children.

Michael A. Peters and Tina Besley (Eds.), The Creative University, 9–32.
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The expanding role of higher education is manifest in three principal trends. The first is the growth of participation. Between 2000 and 2010 the world Gross Tertiary Enrolment Ratio (GTER) rose from 19 to 29 per cent. In East Asia and the Pacific it rose from 16 to 29 per cent, though it was still only 17 per cent in South and West Asia (UNESCO, 2012).

The second trend is the growth of research science. All nations now need a developed capability in science and technology, though not all can afford to pay for it; just as they need clean water, stable governance and a globally viable financial system. They need universities that can ‘participate effectively in the global knowledge network on an equal basis with the top academic institutions in the world’ (Altbach, 2011, p. 11). Nations and cities that lack the capacity to interpret and understand research, a capacity that necessarily rests on trained personnel themselves capable of creating research, will find themselves in a position of continuing dependence. The common growth of research is sustained by the globalization of knowledge within the one-world English language science system, and takes the competitive form of an ‘arms race in innovation’, as nations move to secure advantages through investment in R&D. Global research rankings continually compare nations’ performances and signify their competitive positions. Between 1995 and 2009 Asia’s annual output of science papers grew rapidly, from 77,000 to almost 190,000, 147 per cent, while world output grew by 39 per cent. In quantity terms, though not quality, research in Asia is close to the United States, the world leader in science (NSF, 2009).

The third trend, associated with the second, is the global pluralization of capacity in higher education and science. Advanced provision is no longer largely confined to North America and Europe: 48 countries published over one thousand science papers in 2009, 26 per cent more than in 1995 (NSF, 2012). The science countries are distributed across North America, Europe, Asia, Latin America and Africa and the Middle East. [Table 1](#) has details. But the headline story is the rise of East Asia. China, Hong Kong SAR, Taiwan, Korea, and also Singapore in Southeast Asia, have joined Japan as high participation high science systems. As a group these systems will soon produce more published science than the whole of Europe. These systems, plus Vietnam, can be termed the ‘Post-Confucian systems’. The countries are different from each other in many ways, including language and political cultures, and there are certain tensions between them. Nevertheless, they have four common features that have facilitated the take-off: the comprehensive Sinic state, Confucian education in the home, an effective response to Western modernization, and economic growth sufficient to pay for educational infrastructure and research.

The chapter focuses on the dynamics of these Post-Confucian higher education systems. It traces the material outlines of their development, analyzes the conditions and drivers, and theorizes their dynamism and possible limits. It closes by comparing Post-Confucian higher education with the Anglo-American systems, and reflects on implications for the study of comparative higher education, and for social theory.

Table 1. Nations Publishing more than One Thousand Science Papers in 2009

ANGLO-SPHERE	EUROPEAN UNION	NON-EU EUROPE	ASIA	LATIN AMERICA	MID. EAST & AFRICA
USA 206,601	Germany 45,003	Russia 14,016	China 74,019	Brazil 12,306	Iran 6313*
UK 45,649	France 31,748	Switzerland 9469	Japan 49,627	Mexico 4123	Israel 6304
Canada 29,017	Italy 26,755	Turkey 8301	Sth. Korea 22,271	Argentina 3655	Sth. Africa 2864
Australia 18,923	Spain 21,543	Norway 4440	India 19,917	Chile 1868*	Egypt 2247
New Zealand 3188	Netherlands 14,866	Ukraine 1639	Taiwan 14,000		Tunisia 1022*
	Sweden 9478	Serbia 1173*	Singapore 4169		
	Poland 7355	Croatia 1164*	Thailand 2033*		
	Belgium 7218		Malaysia 1351*		
	Denmark 5306		Pakistan 1043*		
	Finland 4949				
	Greece 4881				
	Austria 4832				
	Portugal 4157*				
	Czech Rep. 3946				
	Ireland 2799				
	Hungary 2397				
	Romania 1367*				
	Slovenia 1234*				
	Slovakia 1000				

* = countries that have entered the one thousand papers group since 1995
Source: adapted from NSF, 2012

THE POST-CONFUCIAN HIGHER EDUCATION SYSTEMS

Student Participation and Its Financing

Typically the Post-Confucian systems progress rapidly in both the quantity and quality of schooling and higher education. All are moving towards universal participation at tertiary level. The Gross Enrolment Rate exceeds 85 per cent in South Korea and Taiwan. Macau SAR is at 65 per cent and Japan and Hong Kong SAR are both at 60 per cent (UNESCO, 2012). Hong Kong SAR and Singapore have shifted away from the non-universal systems inherited from Britain. In China, participation was less than 5 per cent in 1990. It was 26 per cent in 2010 (UNESCO, 2012) and the target for 2020 is 40 per cent, which would bring the nation close to the OECD average. In China the quality of institutions varies. Some argue that many tertiary graduates are poorly prepared for work in high technology manufacturing: one recent report refers to ‘low-skill glut and high-skill shortage’ in graduate labour markets (World Bank, 2012a, p. 194). The leading universities have been singled out for accelerated improvement to global standard in research. The challenge is to improve other institutions and lift participation in the poorer provinces.

So far the Post-Confucian systems have avoided the trade-offs between advances in educational quality and advances in quantity that seem endemic to Anglo-American systems. They also avoid trade-offs between public and private financing. Government and households share the cost of expanding participation. As Post-Confucian systems mature, the proportion of tuition paid for by the household rises; and the state focuses an increasing part of its funding on academically elite national research universities and their students, and in some cases social equity objectives. A feature of Post-Confucian systems – in marked contrast to the European world – is that many very poor families invest heavily in the costs of schooling and extra tutoring and classes outside formal school. Families can spend as much on education as American families spend on housing. In Korea 77.7 per cent of all costs of tertiary education institutions are paid by the private sector, including 52.1 per cent by households, with just 22.3 per cent by government. In Japan the private sector share is 66.7 per cent (OECD, 2011, p. 244). Government pays for about 40 per cent of costs in China. The spending on extra schooling in its different forms is remarkable. Levin (2011) estimates that in Korea it exceeds 3 per cent of GDP.

Research Science

In East, Southeast and South Asia together – Asia minus the Middle East and former Soviet Central Asia – total investment in R&D was \$402 billion in 2009, 31.5 per cent of the global total. It was not far short of the \$433 billion in North America and well ahead of the \$319 billion in Europe. South Korea invested 3.36 per cent of GDP in R&D in 2010, Japan 3.32 per cent and Taiwan 2.93 per cent, levels similar to the Scandinavian countries, the world leaders, and ahead of the US (2.88 per cent).

China invested 1.70 per cent of GDP in R&D. The national target is 2.5 per cent by 2020. If R&D spending continues to expand by 20 per cent a year (NSF, 2012) China's investment will exceed the USA in the next decade. As in Korea, a relatively low proportion of China's research budget goes to universities, one yuan in ten, but university research is expanding along with other R&D, and universities access more government-source monies by partnering state enterprises.

Increased investment in research has led to a dramatic growth in Post-Confucian scientific output. China, the world's 12th largest producer of science and quantitative social science in 1995, was second in 2009 with 74,019 papers. It passed Japan in 2007. Since the year 2000 China's annual output has grown by 17 per cent per year. When the world's largest nation expands research at unprecedented rates over a prolonged period, knowledge flows are decisively changed. In South Korea the growth of science has been almost as rapid, reaching 22,271 papers in 2009. This was larger than India's output (19,917) though India has thirty times the population of Korea. There has also been rapid growth in Taiwan and Singapore. Scientific output has plateaued in Japan, with 49,627 papers (NSF, 2012), as in the US and UK. All three established a mature research system prior to the 1990s.

World-Class Universities

National governments in East Asia and Singapore place a high priority on developing a layer of leading universities, or 'World-Class Universities' (WCUs), concentrations of status and research comparable to those of North America and UK/Western Europe. WCU policy builds on pre-given national hierarchies, like the Imperial universities established prior to World War 2 in Japan; Peking University (1898) in China; and Seoul National University (1946) which was the first national university in Korea. There are some recent foundations, such as the Hong Kong University of Science and Technology (HKUST), which opened in 1991 (Postiglione, 2011). Would-be WCUs are supported by special investment funding such as the 985 program in China and Brain 21 in Korea (Shin, 2009).

How strong are the leading Post-Confucian universities, in measured research outcomes, compared to North America and Europe? One way to answer this question is to consider the position of Asian universities in global rankings based on publication and citation counts. These counts are drawn from the two principal global data bases of bibliometric information: Thomson-ISI Web of Science (2012), and Scopus from Elsevier.

Research rankings data have limitations. They exclude the humanities and the arts, largely exclude the non-quantitative social science and professional disciplines, and mostly exclude work in languages other than English. They consider the impact of research in other science literature but not its impact in economies and societies. In addition, multi-indicator rankings are governed by arbitrary weightings between different elements, which exercise an undue influence on the *Times Higher* (2012) and QS (2012) placements. Single indicator tables based on transparent performance

data, like the Leiden (2012) and Scimago (2012) tables, based respectively on Web of Science and Scopus, are more helpful. The Leiden ranking also provides field normalization. Citation rates are adjusted to take account of different rates of citation by field. For example papers in Medicine typically has more authors and cite more comprehensively than do papers in Engineering.

The Shanghai Jiao Tong ranking, which uses Web of Science plus the winners of Nobel Prizes and Field Medals in Mathematics, is the most useful multi-indicator ranking because the elements in the index correlate closely. It is also the ranking with broadest credibility. The Shanghai top 200 list is dominated by the United States (89 universities) and the rest of the Anglo-sphere (34). Most others are from Western Europe. Asia has 14 of the top 200 universities including nine from Japan. In the top 100 are the research powerhouses of Tokyo (21st) and Kyoto (27th), strong in Physical Sciences and mathematics, plus Osaka, Nagoya and Tohoku. These are the only top 100 universities in Asia. The Shanghai top 200 includes four more Japanese universities, and the National University of Singapore, Seoul National, National Taiwan (the highest ranked Chinese university), Tsinghua in China and the Chinese University in Hong Kong. There are no top 200 Asian universities from outside the Post-Confucian group (SJTUGSE, 2012).

China is not strong in the Shanghai top 200, but between 2005 and 2011 the number of top 500 universities in mainland China increased from 8 to 23 (SJTUGSE, 2012). Hong Kong has five more. Given the surge in research in China, why are not there more universities in the world top 200? First, rankings are zero-sum. Absolute improvements in a university's performance are not enough. It must displace the established leaders, which are normally improving also, and this takes time. Second, the use of the Nobel indicators disadvantage university systems with a recent tradition of leading edge science, like most of those in Asia. Third, there are lags between investment in research capacity and scientific output, between publication and citation, and between citation and change in the rankings. Today's additional investments in R&D will show up in rankings in 10–15 years. By then there will be many more Chinese and Korean universities in the world top 200.

The Shanghai ranking also lists the top 100 institutions in five research fields. Outside Japan performance in Life Sciences and Medicine is modest, though this may be changing in Singapore and Hong Kong. But there are nine Post-Confucian universities in the top 100 in Physical Sciences and 22 in Engineering. China has ten in Engineering, including four in Hong Kong, led by HKUST at 36th in the world. There are three in Taiwan, led by National Taiwan University, a major player in computing, at 29 (SJTUGSE, 2012).

The comparative performance of Post-Confucian systems can also be monitored using the Leiden CWTS (2012) ranking. Leiden provides separate indicators of paper quantity, and the proportion of papers in the top 10 per cent most highly cited papers in their field, a quality indicator. (Here the gold standard is MIT, with 25.2 per cent of its papers in the top 10 per cent by citation rate). [Table 2](#) lists the Asian universities producing more than 6000 papers in the 2005–2009 period, all