

Building the world-class research universities: a case study of China

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Abstract The purpose of this study is to analyze how China has strived to develop its world-class research universities and what are distinguishing characteristics of China's efforts to form these universities for the last decades. This study begins with a review of literature and research questions. It then touches on the background and rationale of creating China's world-class university. In the third section, it examines national policies and strategies of building China's world-class research university since the mid-1990s. In the fourth section, based on national documentation and institutional strategies as well as major findings from the international survey of the Changing Academic Profession which was exercised in China in 2007, the study presents what has been achieved in the effort launched to create Chinese world-class research university and challenges facing China in this regard. The study concludes by arguing the following aspects: firstly, China has made an impressive progress of forming its world-class research university and national policies and strategies are effective; secondly, differing from the world-class research universities in the USA and the UK, the Chinese path to building a world-class research university is characterized with a top-down policy, accompanied by the growth in intensive funding from both national government and especially local authorities on few selected elite universities; and finally, the Chinese way is still receptive to Western influence and external international ranking systems or organizations; therefore, there is still a long way for China to become an internationally influential part of the higher education landscape.

Keywords China · Research university · World-class university · University ranking systems

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Introduction

Since the mid-1990s, there has seen not only a rapid expansion of higher education enrollment in China, but also a steady rise of several Chinese universities at major global world university ranking systems, such as the Shanghai Jiao Tong ARWU (Academic Ranking of World-Class University), the Times Higher Education and QS. For the last decades, while China's higher education has transformed from the stage of elite higher education to that of mass higher education with nearly 35 % of its gross higher education enrollment at the 18-year-old group by 2013 (MOE 2013), there has also emerged a number of research universities, among which some of them are making efforts to become world-class research universities. The purpose of this study is to analyze how China has strived to develop its world-class research universities and what are distinguishing characteristics of China's efforts to form these universities for the last decades. This study begins with a review of literature and research questions. It then touches on the background and rationale of creating China's world-class university. In the third section, it examines national policies and strategies of building China's world-class research university since the mid-1990s. In the fourth section, based on national documentation and institutional strategies as well as major findings from the international survey of the Changing Academic Profession which was exercised in China in 2007, the study presents what has been achieved in the effort launched to create Chinese world-class research university and challenges facing China in this regard. The study concludes by arguing the following aspects: firstly, China has made an impressive progress of forming its world-class research university and national policies and strategies are effective; secondly, differing from the world-class research universities in the USA and the UK, the Chinese path to building a world-class research university is characterized with a top-down policy, accompanied by the growth in intensive funding from national government and especially local authorities on few selected elite universities; and finally, the Chinese way is still receptive to Western influence and external international ranking systems or organizations; therefore, there is still a long way for China to become an internationally influential part of the higher education landscape.

Literature review and research questions

Although more and more countries have developed both national and local policies to stimulate the emergence of world-class universities and particularly building world-class research universities has become a high on the agenda of various in non-English speaking countries in Asia and Europe in recent years (Leon et al. 2014), the research into this theme is still rare. Among notable literature, some studies are concerned with the discussion of various roads to the world-class universities, challenges and issues of building a world-class university in different systems from the global perspective (Altbach and Balan 2007; Salmi 2009; Sadlak and Liu 2009; Altbach and Salmi 2011; Altbach 2013; Shin and Kehm 2013), while more focus on case studies of individual countries in non-English-speaking countries. For example, the literature review shows that a majority of these studies deal with issues concerning China's world-class universities based on one or several case studies of Chinese Projects of 211 and 985 universities, among which Wang's research is about the case study of Shanghai Jiaotong University, one of the Project 985 universities which are making tremendous efforts to become a world-class research university (Wang et al. 2011). Yang and Welch, and Luo discussed the rationales and strategies of building

world-class universities in China by analyzing the same case study of Tsinghua University (Yang and Welch 2012; Luo 2013). As the newest study on this topic, Rhoads' book focuses on four universities—Tsinghua University, Peking University, Renmin University and Minzu University, and discusses how the Chinese government began a concerted effort to create world-class universities by pumping funding into a select group of universities, through Project 211 and Project 985 based on extensive faculty interviews (Rhoads et al. 2014). Besides, Byun and his group introduced Korean' policies and outcomes of building world-class universities (Byun et al. 2013).

The brief review of earlier studies suggests that, firstly, although as early as the 1990s the Chinese government has implemented two Projects of 211 and 985 with an intention of building China's world-class universities or world-class research universities, only in recent years could few studies be found on this topic. Secondly, a majority of existing literature are concerned with case studies of Chinese universities, and little research has been conducted to provide an overall portrait of the rise of China's world-class research university at both policy and institutional levels. In order to address the theme mentioned earlier—building China's world-class research universities—the present study employs two focus questions.

How China has made efforts to build its world-class research universities?

What are the outcomes of these efforts and more importantly, challenges facing China's path to forming its world-class research universities?

Terminology

Even among the existing literature, there is no accurate definition of the phrase world-class university or world-class research university. This is partly because these terms can be interpreted from diverse perspectives and different dimension. For example, Altbach argued that world-class universities by nature are research universities in general and based on the American model in particular (Altbach and Balan 2007). Samil mentioned that world-class higher education institutions could also include those that are neither research-focused nor operating as universities in the strict sense (Samil 2009). With respect to characteristics of world-class university, Samil emphasized that they include three key aspects: concentration of top talent, abundant resource and favorable governance. From the perspective of East Asian countries, Shin pointed out that a world-class university is characterized by its global competitiveness, value orientation for humanity and primary goal of teaching and research (Shin and Kehm 2013).

Background and rationale

Like many other Asian countries such as Japan and Thailand, the modern university and higher education systems in China were established, modeled on the West (Altbach and Selvaratnam 1989). However, differing from Japan in which the modern university was basically influenced by the Humboldtian Ideal and German research university style, there were more models that shaped China's modern university in the late nineteenth century, including Germany, Britain, the USA and even Japan, but the impact from French patterns is particularly significant and evident. In the era of the Republic of China, which was founded by the National Party from 1911 to 1949, the structure and basic function of the

university and higher education systems were essentially developed by learning from the American patterns. After the founding of the People's Republic of China in 1949, the national higher education systems were entirely restructured based on the model of the Soviet patterns. Although during the Culture Revolution period from 1966 to 1976, China attempted to search for a so-called Chinese way, the Soviet Union model still maintained a prominent influence on the academic and higher educational systems in China (Pepper 1996).

Prior to the early 1990s, similar to the former Soviet Union, at a system level, except for a very few comprehensive universities, the vast majority of higher educational institutions were practically categorized according to the social professional or vocational fields. All those types of specialties were further divided into numbers of educational programs. Each higher education institution established and reorganized their undergraduate curriculum in accordance with the national criteria for the establishment of fields or disciplines. Most of them were concerned with utilitarian and practical subjects. Also, based on the nationwide syllabus for each specialty, individual higher education institutions formulated an even more detailed syllabus for each subject in consideration of the standards and number of people required for training by the education departments and ministries holding jurisdiction over them (Huang 2006). As the primary mission of individual universities and higher education institutions was to foster professional and vocational graduates, except for very few universities that were administered by the Ministry of Education and other ministries and departments, university faculty members devoted a huge amount of their time and efforts to teaching activities, especially at an undergraduate level. Research activities were basically undertaken in research institutes outside of universities and especially in Chinese Academy of Sciences or Social Sciences. In a major sense, there was a clear division of labor between university and research institute in the Chinese academic systems. In most cases, there was no any linkage or collaboration between the two sectors, namely China's universities and higher education institutions were typical representatives of teaching-centered style and university academics were not encouraged to engage in any research activities.

In general, driving forces for forming world-class research universities in China since the mid-1990s are concerned with those related to higher education reforms, challenges from globalization and in particular necessity to improve the quality and international competitiveness of China's higher education at a global level. Rationale for building China's world-class research universities can be practically identified into different factors in various phases. In the early phase from the later 1980s to the early 1990s, major reforms focused on redeveloping or restructuring China's higher education systems and academic systems by expanding comprehensive universities and producing graduates that were able to meet with various needs from society. This is quite different from what it used to be prior to the 1980s when higher education was rigidly administered by the Ministry of Education and particularly by other ministries or departments at a central level. After 1992, when China facilitated the pace of the transition to a market economy with Chinese characteristics, market mechanisms and a conception of competition with an international perspective were rapidly introduced into the development of China's higher education. Since then, reforms on China's higher education have come to be affected increasingly by challenges from globalization and worldwide competition in various fields. Improvement of academic standards and enhancement of the quality of education and research in light of those of advanced Western countries and international standards have become another strong driving force to promote comprehensive and research universities in China. As to be discussed in the following section, the former President Jiang's speech at the 100 anniversary of the Peking University in May 2008 has officially and explicitly expressed China's national goal to build several world-class universities in near future.

The significance of the emergence of global university ranking systems on the formation of China's world-class university, especially the publication of ARWU which was created by Shanghai Jiaotong University in 2003, cannot be overestimated, for it is the first time for both central government and individual universities to be aware of the position of Chinese universities at those university ranking systems, what are key dispositions or elements of world-class universities, and how far China's universities are standing away from top world-class universities.

In short, the effort to be made to establish China's world-class research university since the mid-1990s has been influenced by diverse forces, and they include both academic and political factors at domestic and international dimensions. Especially since the latter part of the 1990s, policies and strategies for building China's world-class research university have become more impacted by national government and involved in searching for a response to challenges from internationalization of higher education and academic competitiveness at a global level.

Strategies and practice

From the international and comparative perspectives, important strategies of forming the world-class research university in China can be identified as follows.

Firstly, there are clear national and institutional strategic plans. At a national level, as early as 1994, the central government issued the 211 Project. Although one of its primary objectives is to establish 100 key universities in China by the twenty-first century, it has also planned to finance Peking University and Tsinghua University intensively with the purpose of enabling the two universities to reach or approach a higher level in the world and become world-class institutions. Furthermore, after May 2008 when the former President Jiang declared that "in order to realize modernization, China ought to have a number of world-class universities" (Jiang 1998), China's Ministry of Education launched the 985 Project in 1999 and developed the national policy of building world-class research universities (Yang 2009). From July 1999 to November 1999, nine universities were selected to be included in the 985 Project as the first group. They are Peking University, Tsinghua University, Zhejiang University, Fudan University, Shanghai Jiaotong University, Nanjing University, University of Science and Technology of China, Harbin Institute of Technology and Xi'An Jiaotong University. In October 2009, these nine universities agreed to create a Chinese counterpart to the ivies and formed the C9. Modelling on the ivies and Russel Group universities, the C9 are committed to the highest levels of academic excellence in teaching and research. Through their outstanding teaching and research, the C9 aim at becoming world-class research universities (Wang 2009).

For the past decades, the 985 Project has roughly experienced two phases. In the first phase from 1999 to 2003, the number of universities that were included in the 985 Project was 34. In the second phase commencing in 2006, another five universities were added to the list of the 985 Project. By the end of 2013, the total number of the 985 Project universities has expanded to 39. At an institutional level, each 985 Project university has been required to develop and implement its strategy of fostering world-class research university. For instance, as early as the late 1990s, both Peking University and Tsinghua University have issued almost similar three-phase strategies to become world-class research universities. In the case of Shanghai Jiaotong University, there is also a three-step strategy: The first step is to become a comprehensive, research-oriented, internationalized

higher education institution by 2010; the second step is to stand in the top 100 universities in the world university rankings by 2020; and the third step is to achieve its overall world-class status by the middle of the twenty-first century. In order to realize these goals, particularly the following key strategies have been developed (Wang et al. 2009)

- to improve faculty quality,
- to strengthen fundamental sciences,
- to encourage interdisciplinary research,
- to promote internationalization and
- to serve the national needs.

Secondly, both central government and local authorities have collaborated closely with each other to supply financial support for building world-class research universities. Normally, when a university is selected to be included in the 985 Project, the Ministry of Education signs a collaborative agreement with the local government which promises to allocate a matching sum of funding to the university. For example, in the first phase of the 985 Project (1999–2003), nearly 4 billion US dollars was allocated on the 34 universities, among which 54.9 % of the budget was provided by the central government, while the reminding funding came from local authorities. In the second phase commencing in 2004, it is reported that nearly 6 billion US dollars was allocated for the 39 universities. However, the share of the funding from the central government declined to approximately 46 % of the total, while the proportion from local authorities increased to nearly 54 %. This indicates that the local authorities have played a more important role in building China's world-class universities in terms of financial support (Wang and Zhang 2011). Further, in the first phase much more funding was allocated in infrastructure and “hardware” of the designated universities, while a vast amount of budget was used to attract talent from abroad, to train high-level postgraduates and faculty members or researchers at home, to establish key laboratory and national bases of key disciplines and to improve the quality of teaching and research activities, etc. (MOE 2004).

Thirdly, as mentioned earlier, prior to the early 1990s, Chinese higher educational institutions devoted a special emphasis on training professional manpower through specialized education for industry and socialist construction. Science- and engineering-related institutions as well as other single-department colleges dominated the higher education system. With a transfer from the planned economy system to a market-driven economy system since 1992, China's government has merged hundreds of these specialized colleges with a purpose of establishing comprehensive universities with a wide variety of disciplines. The data of the Ministry of Education revealed that from 1992 to the late 1990s, 637 institutions were merged into 270 universities, among which the number of comprehensive universities had increased from 50 to 83 from 1990 to 2000, while the number of colleges of science and engineering decreased from 286 to 239 (MOE 1991/2001). Although the merge of higher education institutions was part of higher education reforms on administration and management, since the latter part of the 1990s, it was also considered as one of important ways to create research-focused universities because major global ranking systems show that a huge majority of world-class universities are comprehensive and research-intensive universities. For example, in 1999 Central Academy of Craft Art was merged into Tsinghua University and became one of its colleges. In 2000 Beijing Medical University was integrated into Peking University and became Peking University Health Science Center. Other typical examples include the merge of Shanghai Medical University with Fudan University in 2000 and the emergence of new Zhejiang University based on the merger of old Zhejiang University with other four universities in 1998 (Zhang 2009).

As a result, several huge universities have been established with an intent to become world-class universities. With other institutions, mostly famous higher professional institutions, being consolidated into these huge universities, they have become more research-oriented: Many national key research units and experiment centers are to be found in these huge universities. Besides, in 1998 the documentation of the Ministry of Education indicates that the merge of Zhejiang University is meaningful and important for China to establish several large, high-level and comprehensive universities with all disciplines by the twenty-first century (MOE 2009).

Fourthly, internationalization is also employed as one of important ways to build China's world-class research university. It is concerned with not only encouraging local faculty members to publish more in internationally referred journals, especially those SSCI and SCI journals, but also attracting world-renowned scholars and promoting joint research in collaboration with internationally renowned universities, laboratories and professors. For instance, both government and individual institutions have launched various programs to attract internationally renowned overseas Chinese scholars to come to Chinese local universities such as national *Cheung Kong Scholar Program* and *the attraction of hundred-Scholar Program*. Meanwhile, since 2005, Chinese government has increased the number of dispatching Chinese young scholars and graduate students to world-famous universities, especially in the USA and UK for further study and joint research with national funding. Over the past decades, China has attracted and trained many internationally renowned scholars and experts and also trained thousands of students with an international perspective and advanced knowledge as well as high capacities urgently required by China's efforts to build world-class research universities. Another enormous impact resulted from internationalization of higher education is that new educational ideas, curricula and mediums of instruction, as well as governance arrangements in many Western leading universities, including curriculum management, have been introduced into Chinese universities and they have facilitated substantially the improvement of academic quality and standards of Chinese higher education institutions. In a major sense, these activities play a significant role in making Chinese universities more competitive at an international level.

Outcomes and issues

With respect to outcomes and effect, firstly, as indicated in Fig. 1, there has been a quick rise of Chinese universities at the ARWC since 2004. The total number of Chinese universities which were listed among top 500 in 2004 was only eight and it had increased to 28 by 2013, of which one of the most noticeable change is that after 2006 when all the list of the 985 Project universities had been finalized, there had been a surprisingly quick rise of Chinese universities among 500.

Figure 2 shows that there was not only an increase of numbers of Chinese universities among top 500, but also a growth in numbers of Chinese universities which were listed among top 301–400, 201–300 and especially top 151–200 in recent years. With the largest number of Chinese universities among top 500, progress was also made by several Chinese universities to be ranked among top 200 in recent years. For example, there was not a Chinese university standing at top 200 by 2004; however, by 2013 its number had been expanded to five.

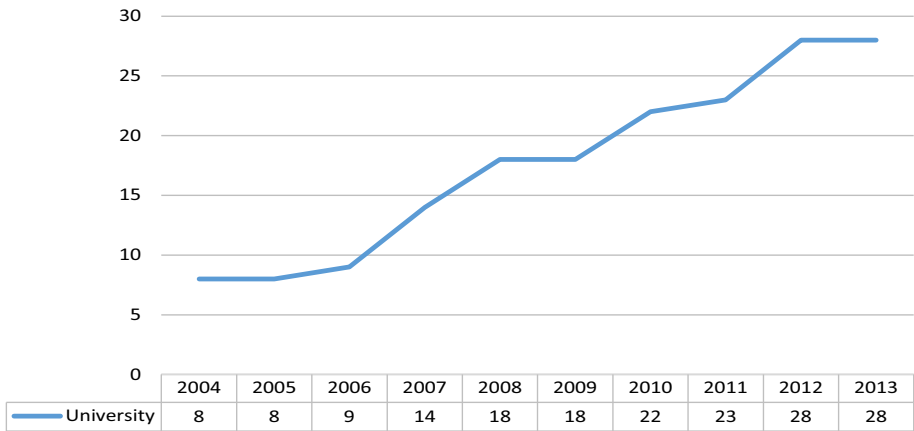


Fig. 1 Changing ranking of Chinese Universities among Top 500. Source ARWC at www.shanghairanking.com

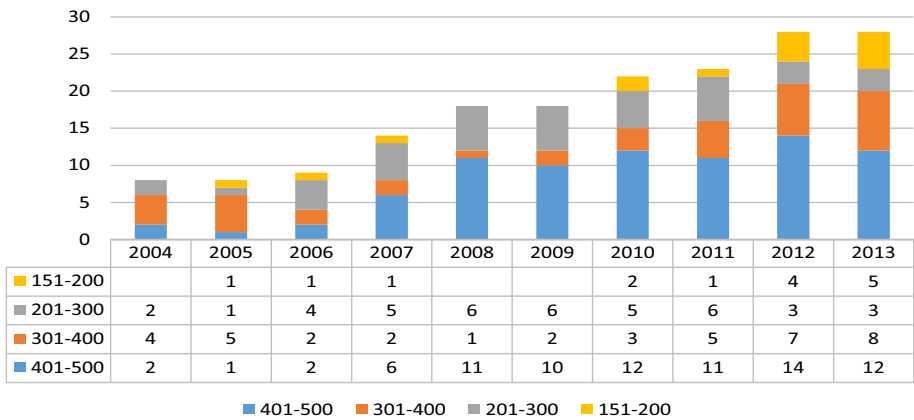


Fig. 2 Chinese universities among top 151–500. Source ARWC at www.shanghairanking.com

As mentioned earlier, due to the fact that the C9 is most likely to become world-class research universities, they are certainly expected to launch more effort to show their presence at major global ranking systems. According to Table 1, among all the 985 Project universities, the C9 had made a prominent contribution to the rise of Chinese universities at the ARWC ranking. Compared with other 30 universities, all the Chinese universities ranked among top 200 were part of the C9. In addition, among three Chinese universities listed at top 300, two of them belong to the C9.

Secondly, there have emerged a number of research universities in China, while the effort to create Chinese world-class universities was made. Compared with the early 1990s, when a vast majority of Chinese higher education institutions were highly professional and vocational colleges with a single discipline or only very few specifications, with an increasingly diversifying of higher education systems and especially the implementation of national policies and strategies of building world-class universities, a clear division of

Table 1 Mainland Chinese universities among top 500

	Universities supported by “985 Project”		All in ARWU 2013
	Top 9	Other 30	
Top 100	0	0	0
151–200	5	0	5
201–300	2	1	3
301–400	2	6	8
401–500	0	11	12
Total	9	19	28

Source: ARWC at www.shanghairanking.com

labor between research-intensive university and other types of universities has been gradually made. Table 2 shows hours spent on teaching and research activities by university faculty members in a typical week in session. Apparently, by institution the faculty in national public university spent the largest percentage of their time on research, while the faculty in local public colleges spent the largest time on teaching.

Another data on faculty members’ interest in teaching or research reveal almost the similar result. According to Table 3, by institution, more percentage of faculty in national public university believed that their interest primarily lies in research, while that of more percentage of the faculty from local public college lies in teaching.

Thirdly, Table 4 indicates that by institution, there is also a clear division in the character of academic work between the national public universities, local public universities and the local public colleges. The faculty in the national public universities spent the largest proportion of their time on teaching graduate programs and especially doctoral programs (3.9 %), followed by these local public universities. In contrast, the local public colleges spent the largest proportion of their time on undergraduate programs (90.5 %) but the least proportion of their time on either master programs (1.4 %) or doctoral programs (0.1 %), showing that they are basically involved in teaching activities and conducting the least research activities.

Finally, changes have happened to internal governance and management arrangements, especially in research activities while these universities are making efforts to become world-class universities. Some evidence shows that the 985 Project has provided those participating institutions with governance autonomy to improve their national and international competitiveness and to narrow the gap in academic achievement, research performance and science innovation with other leading research universities in the world (Wang et al. 2011). Reform has been carried out to develop the universities’ governance, in terms of administration, management and staff capacity. Teaching and research have been improved. As a result, the university has changed its management style, from traditional administration to strategic management. This enables each university to envision the most

Table 2 Hours spent on teaching and research in a typical week in session

Institution	Teaching Mean	Research Mean	N
National Public University	16.0	21.5	397
Local Public University	20.1	13.1	2187
Local Public College	21.4	9.2	452

Source: CAP database (September 2011)

Table 3 Faculty members' interests in teaching or research

	Teaching + learning toward teaching	Research + learning toward research
Institution		
National Public University	32.4 %	67.6 %
Local Public University	53.5 %	46.5 %
Local Public College	69.3 %	30.7 %
Total	53.1 %	46.9 %
<i>N</i>	1720	1517

Source: CAP database (September 2011)

Table 4 Faculty members' teaching activities by educational level and institution

Institution	Undergraduate programs (%)	Master programs (%)	Doctoral programs (%)	Continuing professional education programs (%)	Other programs (%)
National Public University	62.8	30.0	3.9	1.7	1.4
Local public University	82.2	12.9	0.9	2.3	1.5
Local Public College	90.5	1.4	0.1	3.2	4.8

Source: CAP database (September 2011)

desirable future, create a bold vision of mission and goals and accordingly design a series of procedures as blueprints for daily activities.

There are many problems facing Chinese universities to become world-class research universities, though a great deal of achievement has been accomplished and several of them have already raised their level at global ranking systems in a speedy and steady way. To illustrate, firstly, even at present, there seems to be no any accurate description of what is a world-class university with Chinese characteristics and what elements or dispositions should be made up of these universities. As discussed above, in 1995 when the Project 211 was initiated, despite one of its primary objectives was to develop about 100 universities and key disciplines that would be able to take a leading position in the country's economic and social development, and in international competition, yet no detailed account of world-class was made since then. While the 985 Project sets up the goal of building China's world-class universities, neither was any full consideration taken into the definition of world-class university in the Chinese context. Since Shanghai Jiaotong University created the ARWU in 2003, followed by other major global ranking systems such as the Times Higher Education and the QS, it appears that no generally accepted interpretation or terminology, let alone official definition, of world-class university at a policy can be found in China nowadays.

Truly, the idea of establishing China's world-class research university was initially promulgated by the central government, and then, its strategies have been developed and implemented by the central government in collaboration with local authorities. However, it is worthy of mentioning that the effort to build China's world-class research university has

been launched by concentrating public resources on the most excellent universities. More importantly, it has been and will continue to be essentially shaped by external ranking systems and especially by the top USA and UK universities which are listed at international ranking organizations. Inevitably, the Chinese way of building world-class research university will be confronted with major issues as follows:

- Whether the policy and practice of building world-class research university can improve the overall quality of a higher education system?
- Whether there will be a wider gap between those 985 Project universities and other universities which are not expected to become world-class research universities such as teaching-centered universities or universities which are more responsive and relevant to local community and regional economic development?
- Whether there will give rise to academic capitalism and imbalanced development between hard sciences and soft sciences in Chinese campus? And
- Whether an overemphasis on the evaluation of academics' research outputs will exert a negative effect on their responsibilities for teaching, service or other academic work?

Although the number of Chinese mainland universities which are ranked in top 500 universities has been increased, still no any Chinese universities had been listed among top 100 in major global ranking systems by 2013. As pointed out by Lamon, if China's universities are to fully join the ranks of world-class institutions, they must embrace a culture of academic peer review. Moreover, it is also crucial for China to diversify sources of financing for academic excellence in teaching and research and to strengthen faculty's ties with local and regional peers instead of using more universal criteria of evaluation and engaging in more national or international activities (Lamon 2014)

Concluding remarks

This study suggests that developing China's world-class research university since the early 1990s could be considered as one of the most significant policies of restructuring the old higher education systems modeled on the former Soviet pattern. Further, it also indicates that China has strived to enhance its educational quality and to be involved in international competition. Much evidence shows that China has accomplished an impressive progress in this regard. Therefore, national policies and strategies seem to be effective.

China's path has experienced transformations from an ambiguous interpretation of a world-class university in an earlier stage to a much clearer understanding its criteria and features in recent years; from an emphasis on a vast investment on infrastructure and facilities in relation to teaching and research to more efforts to attract internationally renowned academics; and from the creation of national-level research-focused universities to the building of world-class universities.

Differing from the world-class universities in the USA and the UK which either can trace their roots to private founders or have achieved their international reputation by obtaining top talent (both faculty members and students), abundant sources, maintain their favorable governance and management style, and undertaking a high level of international teaching and research activities without any concentrated financial support from either state or government, the Chinese path to building a world-class university is characterized with a top-down policy, accompanied by the growth in the amount of funding from both national government and especially from local authorities on few selected elite universities.

However, because its progress has been largely impacted by global university ranking systems or Western evaluation organizations, it is receptive to Western influence. In a major sense, China is still in a stage of striving to catch up with top universities in the USA and the UK. Arguably, although full of potentials and possibilities, there is still a long way for China to become an internationally influential part of the higher education landscape.

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