Chapter 10
Building World-Class Universities in China

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10.1 World-Class University: A Century's Dream of China

China has a long history as a great nation. In the first millennium to 1,000 CE, China accounted for about 25% of the world economy. It maintained roughly 23% in the following 500 years. In fact, within this 1,500 year period, the Chinese economy had doubled that of Western Europe, which had been ranked as the second largest economy in the world. However, the early eighteenth century witnessed a reversal. In the missing of the first revolution of technology and science and later becoming a victim of the colonialism of the Western countries, China declined rapidly in the following two centuries. The Chinese national economic gross dropped to 17% of the global total in 1897, 8.9% in 1913, and 4.5% in 1950 (Maddison 2001).

Along with the declining national economy was the disorganization of Chinese social institutions. The year 1911 witnessed the collapse of the political institutions of the empire together with the imperial education and examination systems. Chinese contribution to world knowledge system largely discontinued. Chinese intellectual elites, suffering from self-doubt, started to look to the West. The modern education system, including universities, in China was imported from the West in the nineteenth century. By 1912, China had only 18 universities, 13 of which were church-based universities. Of the remaining five Chinese universities, three were actually under the control of missionaries (Ye 2009). However, the number of Chinese universities grew very fast and outnumbered the church universities in the 1930s.

Despite their growth, Chinese universities were not able to train qualified faculty for their own universities. All PhD holders in China were trained in the West, obtaining their degrees mainly from the United States, Germany, and France.

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Recognizing this as a kind of dependence, Chinese intellectual elites advocated the independence of the Chinese academy should be one of the primary goals of national modernization. Among the prestigious figures, Shi Hu (胡适, 1891–1962) was one of the few who had proposed that China needed a world-class university and what such a world-class university should be like. Hu's formula of four conditions provides the Chinese definition of a WCU if Mohrman's argument is right that the goal of world-class status is clear, though the definition of world-class status is not (Morhman et al. 2008):

1. Chinese universities should be able to provide training on modern (academic) disciplines so that Chinese students do not need to study abroad.
2. Those who are trained in modern disciplines should be able to find a place (in China) so they can research further in the fields they are interested (to generate new knowledge).
3. National needs in health, industry, security, etc., should be addressed by domestic talent and research institutions in China.
4. Chinese domestic talent and research institutions, as part of the global academic community, should collaborate with the research talent and institutions worldwide, contributing to human knowledge and welfare.

Hu named his plan A Ten-Year Plan to Resume (Chinese) Academic Independence (Hu 1998). Because the plan was formulated by Hu in 1940s, it was not implemented because of the Sino-Japanese war and then the civil war between the Communist Party and the Kuomintang (KMT).

However, Hu's idea of seeking national academic independence as a leader of the new culture movement in China was well accepted by Chinese intellectuals including the communists.

10.2 The Initiatives of WCU as a National Policy

The end of the 1940s witnessed the establishment of Communist China. The Chinese communists rejected the Kuomintang (KMT) learning model of the Western approach. They adopted the Soviet model instead. They believed a planned and centralized social system would fit China better because the country was still in the early stages of industrialization.

Therefore, they established a centralized and specialized system in the field of science and higher education. This system was effective in particular of the fields related to national defense. In view of the party reformers in 1980s, however, this system had one great weakness – namely, knowledge production was largely disengaged from the national economy. This was because of, on the one hand, the separation of knowledge production from common production and, on the other, the separation of knowledge production from the training of top talent. By building world-class universities based on research universities, the party reformers believed that they would reconnect knowledge with production and the training of top talent.

10.2.1 Yuasa Law and Zhao's Strategy of "Red Light Effect"

The idea of a world-class university is globally important in the field of higher education, and the research on it in China can be traced back to a well-known study named Yuasa Law in the field of science studies in the mid-twentieth century. Based on the theoretical framing of Bernal (1954), Mintomo Yuasa, a Japanese historian of science, used statistics to illustrate Bernal's theory of the shifting of world science activities center (Yuasa 1962). According to Bernal and Yuasa, world science activities experienced a series of shifts from Italy to the United Kingdom (the first shift), from the United Kingdom to France (the second shift), from France to Germany (the third shift), and from Germany to the United States (the fourth shift). Each stage lasted on average for 80 years.

Hongzhou Zhao (赵红州), a renowned Chinese scholar, using a copy of Great Events in Science, independently uncovered a similar trend in 1974 when he was sent to Henan province during the Cultural Revolution. Unlike Bernal and Yuasa who believed that the Soviet Union would become the next science center of the world, Zhao believed that China would have a chance to lead global knowledge production under the "effect of red light." In other words, that China would eventually surpass developed countries while they waited for a "green light" (Yuan 2005).

Although both Yuasa and Zhao failed in their prediction (since there is no evidence that United States will cease to be the center of global science activities in the near future), the efforts of Zhao and his colleagues provided Chinese policy-makers with the ambition of improving the contribution of Chinese science and technology in the world. Zhao was later recruited by the China Academy of Science, on the strong recommendation of Xuesen Qian, the father of Chinese nuclear and space technology. With great efforts, Zhao established a new research field scientometrics in China and became a leading figure in it.

In 1987, China published its first university ranking in the Daily of Science and Technology, an authoritative publication in the field of science and technology. It was a national ranking (of universities) based on scientometric indicators. This was a bold innovation by Zhao and his team. Examining the 1987 ranking, we find that it was different from most of the rankings appearing later. Zhao's was an effort to capture the essence of the competitiveness of knowledge production at an institutional level, rather than functioning mainly as a "consumer guide" for higher education as most rankings do (Luo 2006).

The Academic Ranking of World Universities (ARWU) published by Shanghai Jiaotong University in 2003 and now known worldwide followed the same path. As Niancai Liu, the founder of ARWU, remarked often, "ARWU is an unexpected outcome when we focused on uncovering the distance between us (Chinese elite universities) and the world-renowned universities (according to the scientometric scale of knowledge production competitiveness)."

10.2.2 WCU Legitimized as National Policy

Although it was mainly an ideation of academic elites in the beginning, WCU later became a national policy in China. Inspired by the successful experiences in developing nuclear weapons and space technology in the 1950s–1970s, the party elites believed that science was the field that relied more on the talents and resource projection rather than national gross GDP.

The Party Central jointly together with the State Council promoted an important document entitled *China Education Reform and Development Outline* in 1993 (http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe_177/200407/2484.html). It argued that

> We are living in the world where international politics change rapidly, science and technology develop quickly and the global competitions are fierce. ... the nation that leads education in the 21st century will ultimately obtain a strategic position in the coming global competition.

Therefore,

> Focused resources at both the national and provincial level should be projected to a group of key universities (around 100) and key disciplines and programs, so that a certain number of universities and programs will be upgraded to the world-class level of quality in the sense of teaching, research and governance.

This is the first time when WCU was incorporated into an important document released by the Chinese government. Being a policy cornerstone in the era of party reformers, the outline signaled the new rationality that favors higher education had emerged. This new rationality was continued in the 985 Project and was again consolidated in the *Medium and Long-Term Program for Education Reform and Development 2010–2020*, released in 2010 (Yang and Welch 2011).

As the government's ambition becomes more pronounced, WCU becomes an important theme in the Chinese academy. Figure 10.1 illustrates the number of papers on WCUs published in China during the period 1993–2010, which, in the viewpoints of the authors, indicated the shift in WCU from a vision shared by a handful of elites to the Chinese academic community at large.

This is of great significance. According to the theory of neo-institutionalism, a new rationality (cultural-cognitive meaning system) should be established before new institutions can be set up (Scott 2001).

10.3 Implementing WCU Policy: National Strategies

Apart from the new cultural-cognitive meaning system, strategies are important instruments to accommodate the existed structure of system with a new vision in institutionalization.

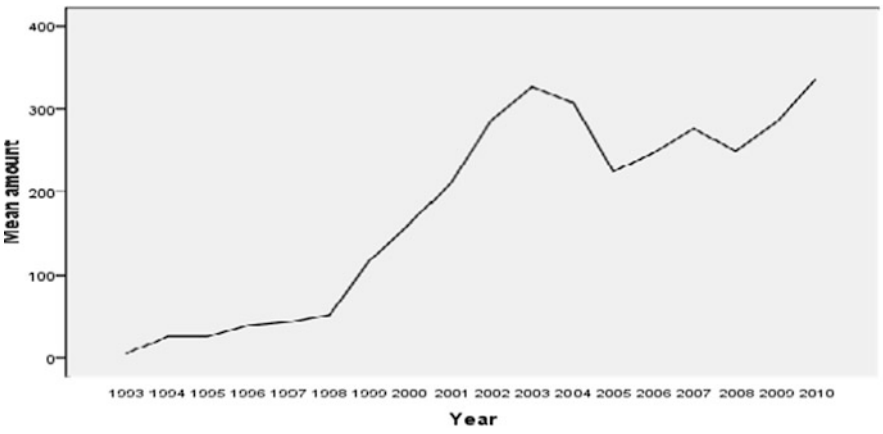

Fig. 10.1 The number of published papers in China containing the keyword "WCU" (1993–2010) (Notes: the numbers come from a search of papers with the keywords of "world-class university" in the database of China National Knowledge Index)

In this case study, two main strategies adopted by the Chinese government are identified: structurally reclassifying the higher education institutions and financially reframing the funding system.

10.3.1 Reclassifying Universities

As previously mentioned, China adopted the Soviet model in the 1950s and thereafter built a redistributive social system. Polanyi (1944) defined the redistributive social system as a structure of social organizations in which goods and services are distributed by central direction from lower-level production units to the center and then back again. This is quite different from a market where buyers and sellers directly engage in exchange.

In order to improve the effectiveness of the redistribution in the field of higher education, the Chinese restructured their comprehensive universities into specialized institutions in the 1950s. Tsinghua University, for instance, which had been a comprehensive university with five colleges (Art, Law, Sciences, Engineering, and Agriculture) and 26 departments, had been transformed into a polytechnic institute mainly producing "red engineers" in 1950s.

At the same time, a hierarchy of higher education institutions was established, in which some of the institutions were affiliated to the functional departments of the state, for instance, the Ministry of Education, Ministry of Machine Building, and Ministry of Metallurgical Industry, while the others were affiliated to provincial government where the institutions were geographically located, thus forming a "strip-block" isolation system (Zha 2009). The ministry-sponsored ("strip")

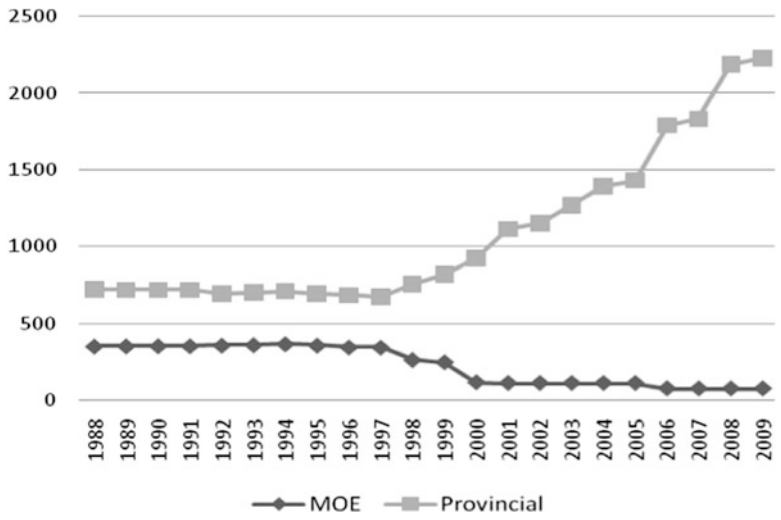

Fig. 10.2 Number of HEIs by affiliation (Ministry of Education vs. provincial government) (Source: China Statistical Yearbook for Education (1989–2010))

institutions were usually of higher status and quality compared to the provincial-supported ("block") ones, as the redistributive system favored the agents at the upper level of power.

In the 1980s, the party reformed the redistributive system. The concept of market was introduced which in turn reorganized the social system (Luo 2007). Consequently, some central ministries that were tied to a planned economy, such as the Ministry of Machine Building and the Ministry of Metallurgical Industry, were dismantled. This made the status of the universities affiliated to them problematic. In 1998, a decision was made jointly by the Party Central and the State Council, stating that ministries other than MOE were not allowed to run higher education institutions. As a result, the number of universities affiliated to provincial government increased rapidly.

Some prestigious universities that were formerly run by ministries, however, would rather choose to be merged into a national elite universities rather than assume a lower status while remain as an independent unit. They knew that higher status in the hierarchy of Chinese higher education meant higher student selectivity, the trademark of an institution of excellence. For instance, the Central Academy of Arts and Design which used to be affiliated with the Ministry of Culture chose to be integrated into Tsinghua University in 1999, and the Beijing Medical University which had been affiliated with the Ministry of Health chose to be merged with Peking University in 2000. As a result, the national elite universities greatly benefited from this reclassification (Fig. 10.2).

Inspired by the benefits from the merger, the primary universities also mobilized resources (in most cases, through their influential alumni) to target desired

institutions rather than merely passively accepting those institutions who wanted to merge with them. The merging of Tsinghua University with the Graduate School of the People's Bank of China is a good example. The Graduate School used to be affiliated with the Central Bank of China, (known as the People's Bank of China) and had functioned as the college for training the cadre for the Chinese national financial system. It was revealed in August of 2011 that it had been merged into Tsinghua. Even this was undertaken quietly, it is reported that Tsinghua alumni had played an important role in making it. However, sometimes even despite lobbying, the efforts to merge other institutions were futile. The effort of Tsinghua University to merge Peking Union Medical College (PUMC) in the early twenty-first century is an example. Established in 1906 and developed by various Western missionary organizations, PUMC represented the initial efforts to establish modern medicine in China. In fact, PUMC has a lot of influential alumni both domestically and internationally. They had exerted significant influence in maintaining PUMC as an independent institution. Now, PUMC does not merge with Tsinghua but jointly holds its PhD program with Tsinghua University. The strategy to reclassify universities adopted by Chinese government resulted in a megamerger, which effectively enhanced the competitiveness of Chinese WCU candidate universities.

10.3.2 Reframing the Finance System

Another strategy adopted by the Chinese central government was to reframe the funding system, thus reducing a university's recurrent expenditures while increasingly supporting earmarked grant programs. Examples of such projects are 211 Project (1993), 985 Project (1998), and the Thousand Persons Plan (2008).

The 211 Project is the initial action plan of WCU policy. During the period 1995–2005, known as the period of national 9th five-year plan and 10th five-year plan, the central government, jointly by provincial governments and institutions themselves, invested 36.8 billion RMB in 107 higher education institutions (Inter-Ministry Coordinating Office of "211 Project" 2007).

Unlike the wide range of support from the 211 Project, the 985 Project was very focused in the beginning. The central government provided 1.8 billion RMB for Peking University and Tsinghua University over a period of 3 years. This made it clear that Peking University and Tsinghua University were the only two institutions intentionally selected by the Chinese government to participate in the global competition for the status of WCU. Those universities in the first tier other than Peking University and Tsinghua University became anxious because the 1.8 billion additional funds meant more than money. It also indicated the advantaged status of the concerned universities! After negotiating with the Ministry of Education and involving other significant players such as the provincial/municipal governments, seven other universities were added to the list by 1999, and by 2011, the number of institutions on the list had increased to 39.

Table 10.1 Additional fund received by C9 universities in the 985 Project

Universities	985 Project phaseI (1999–2003)	985 Project phaseII (2004–2010)	985 Project phaseIII (2010–2015)
Peking University	1.8	0.9	4.0
Tsinghua University	1.8	0.9	4.0
Zhejiang University	1.4	0.7	2.64
Nanjing University	1.2	0.6	2.6
Fudan University	1.2	0.6	2.6
Shanghai Jiao Tong University	1.2	0.6	2.6
University of Science and Technology of China	0.9	0.6	1.8
Xi'an Jiao Tong University	0.9	0.6	1.5
Harbin Institute of Technology	1.0	/	/

Unit: billion RMB

The amount of additional funding received through the 985 Project varied among different candidate institutions, due to the variation in the amount that the central government provided for each institution and the variation in the funding capability of the provincial/municipal governments that the institutions belonged to.

Table 10.1 shows the additional funds received by the first nine candidates (also known as C9League) through the 985 Project. A recent Thomson Reuters analysis found that Chinese C9 universities by receiving about 10% of China's R&D expenditures have consistently generated more than 20% of the nation's output of journal articles, and these papers have attracted around 30% of China's total citations (http://www.timeshighereducation.co.uk/story.asp?storyCode=415193&sectioncode=26).

In fact, the 985 Project was launched rather hurriedly. The inside story, as revealed by Xuefei Chen, verified this (Chen 2006), and the changes of the candidate institutions on the list also shed light on it. After the uncertainty of phase II, the 985 Project is now part of the national five-year plans and has become more and more undimmed.

Apart from the project funding coming from higher education, Chinese elite universities have also benefited from the government's increasing investment in R&D. The OECD reported in 2008 that the ratio of GERD (gross expenditure on research and development) to gross domestic product (GDP) in China had increased considerably, from 0.6% in 1995 up to 1.43% in 2006. China's GERD was the third largest worldwide, immediately after the United States and Japan in 2006.

The R&D funds from the government are relatively "easy" to use compared with the subsidy of the 985 Project whose use is limited to hardware. Unlike other types of production, knowledge production relies more on talent than on equipment. The increasing investment by the Chinese government in the field of science and technology has greatly improved the research productivity of Chinese universities. Taking Tsinghua University for instance, 3.6 billion of the total 8 billion RMB in

fiscal year 2010 was from research funds. With this "easy" money, professors find it easier to use research assistants, postdoctoral fellows, and elite visiting international scholars as participants in their research.

How did the reframed funding system affect the academic activities in universities? This was illustrated in an interview with a dean of Tsinghua University:

> When the slogan of building WCU came out in 1990s, I laughed at it. We knew our distance (with the world-renowned universities). Becoming one of them? No way. It's another "Great Leap" (doomed to fail) fancied by (someone in) the top. (But) after the 985 Project (was enacted), things changed. First of all, money came in. We are able to recruit new faculty members from the genuine world-class universities, and with the new faculty members joining, we produce papers for international journals. Some (of the papers) are of very good quality . . . (laugh). Especially after X (a prestigious scholar in the world) started to work with us last year. He brought a team of young scholars from (the universities of) USA. They (the young scholars) all work on cutting-edge studies. Our PhD (students) have real things to do now. (laugh) (The goal of building) a World-class university now? We are more confident.
>
> (Interview conducted on Aug. 16, 2011)

When a policy is accepted and acted upon by deans, the academic life in universities generally undergoes a reformation.

10.4 Implementing WCU Policy: Institutional Strategies

In the following pages, Tsinghua University will be used as a case to be analyzed at the institutional level. This study adopted the perspective of neo-institutionalism to look into how the idea of a WCU was accepted and what strategies were applied in Tsinghua.

Tsinghua University was not selected as the case for analysis because it had produced 280 ministers and nine standing committees at the Politburo for the Republic, including the in-serviced China president and possibly his successor. This was impressive, but not the reason for choosing Tsinghua. The reason why Tsinghua is a valuable case for study is that it is a miniature of the Chinese higher education system.

Established in 1911 and on the site of a former royal garden belonging to a prince, Tsinghua was first a preparatory school for students later sent by the government to study in the United States. It was funded by the Boxer Rebellion indemnity returned by the United States to the Qing Dynasty, on the condition that the fund be used to provide scholarships for the selected Chinese students studying in the United States. This history accounts for the main contradiction in the history of Tsinghua University – on the one hand, it is dependent on the American universities and the dominant Western higher education tradition; on the other hand, it is the place where the Chinese elites had been trained. Many scholars would still argue that this contradiction has not changed much today – more than one-third of the Tsinghua graduates annually choose to pursue graduate studies in Western countries, mainly

in the United States. Tsinghua was reported by *Science* (July 11, 2008:185) as the undergraduate alma mater that produces the most PhD's in US universities.

This tension has made Tsinghua the place for the Chinese intellectual elites to reflect on the relationship between modern academic disciplines and Chinese traditional knowledge. In order to incorporate the two, Tsinghua built a Western-like undergraduate college and an Institute of Chinese Study (ICS) in 1925. Three years later, it upgraded to become the National Tsinghua University.

The 1920s started to witness the returning of Tsinghua graduates from the United States. They were young, ambitious, and had the personal experience of studying in the best universities in the West. They felt it was their obligation to upgrade their alma mater Tsinghua into a world-renowned university. Many of them joined the faculty team, and Yiqi Mei, one of those returning, served as the president of university in 1931.

Mei and his cohort adopted strategies to change Tsinghua into a world-class higher education institution. The main strategies included (1) establishing the department autonomy and professor governance; (2) recruiting faculty through international peer review; (3) standardizing the textbooks, library, and labs according to world-class standards; (4) fostering the new function of research by setting up a number of research institutes (in the 1930s, there were only around 20 research institutes in China, while 10 of them were affiliated to Tsinghua University); and (5) actively exchanging faculties with world-renowned universities. Mei's reform focused on three institutional elements that he believed to be crucial for a WCU, namely, academic autonomy, research-intensive, and internationalization. After Mei's presidency in Tsinghua, the university soon entered its "golden age." There is much evidence that "Tsinghua had already been a very international institution in the 1930s" (Wei 2011).

The academic boom came to an end however. The years 1937–1945 witnessed the Sino-Japanese war, which was immediately followed by the Civil War (1946–1949). Mei fled to Taiwan after the Kuomintang (KMT) retreated to Taiwan. The "old" Tsinghua he left behind was restructured in 1950s into a polytechnic university – the "new" Tsinghua.

10.4.1 Rejuvenating the Vision of WCU

After the party reformers came to power in the 1980s and the "open" policy became an established national policy, however, the dream of the "old" Tsinghua was reawakened. Tsinghuaers missed the departments and institutes they lost in the 1950s. A number of beautifully written prose about "old" Tsinghua and "old" Tsinghua professors were published. Even the motto of the "old" Tsinghua which comes from an obscure Chinese classic, "Yi Jing" (易经), was reaccepted by the "new" Tsinghua without causing any major ideological inquiry.

> As heaven maintains vigor through movements, a gentle man should constantly strive for self-perfection. As earth's condition is receptive devotion, a gentle man should hold the outer world with great merits.

Once the dream of "old" Tsinghua was awakened, the vision of upgrading Tsinghua into a world-class university became distinct. For Tsinghuaers, it is a desire to rejuvenate their "old" Tsinghua – a comprehensive, research-intensive, and international university. The reason why world-class universities are usually comprehensive was interpreted in one debate at Tsinghua University, which the author witnessed, as indicating the scope of knowledge production of an institution and therefore the opportunity to influence the human knowledge construction.

Although this vision of WCU was met with resistance by the engineering faculties who had emerged in the "new" Tsinghua, the desire to fulfill the vision was very strong, especially that of the former president Dazhong Wang (王大中). A strategy of three steps was formulated by Wang and his vice-presidents: (1) from 1994 to 2002, to upgrade Tsinghua to a comprehensive and research-intensive university; (2) from 2003 to 2011, to rank several disciplines above in the top 10 worldwide; and (3) from 2012 to 2020 (and thereafter), to rank Tsinghua in the top 100 institutions in the world.

10.4.2 Benchmarking Tsinghua with MIT and the Association of American Universities

Organization studies, particularly from the perspective of neo-institutionalism, have argued that an organizational field (a group of organizations) may be highly diverse in the beginning, but they may become similar to one another due to the pressures of obtaining legitimacy. Sociologists DiMaggio and Powell (1983) named these phenomena as isomorphism. They further argued that institutional isomorphism results from three mechanisms: coercive, normative, and mimetic. Coercive isomorphism is driven by two forces: pressure from other organizations on a focal organization to be dependent and pressure on an organization to conform to the cultural expectations of the larger society. Normative isomorphism is a result of professionalization, which involves two processes: (1) members of professions receive similar training (such as that received by physicians, attorneys, and university professors), which socializes them into similar worldviews, and (2) members of professions interact through professional and trade associations, which further diffuses ideas among them. Mimetic isomorphism viewed by DiMaggio and Powell is a response to uncertainty: in the situation that a clear course of action is unavailable, organizational leaders may mimic the peer that they consider successful as they think it is the best response they can make (DiMaggio and Powell 1983).

It is not merely an action of policy borrowing that Tsinghua decided to benchmark AAU in general and MIT in particular. It is rather an effort to obtain legitimacy, by satisfying the cultural expectations held by Western society and

following the norms held by the global professional association. To a certain degree, it is mimicry, too. Since the public in China has no idea what a world-class university is and how it should be built, who could deny Tsinghua is a great university if Tsinghua reached or surpassed MIT?

10.4.3 Planning

Planning is a heritage that the Chinese obtained from their experience of the redistributive system in Mao's China. The party reformers, Deng Xiaoping, for instance, believed that planning, like the market, is but one form of governing structures. None is superior to the other. The same idea was held by the Tsinghua leaders.

Planning in Tsinghua is mainly focused on two areas – academic disciplines and faculty recruitment. Tsinghua leaders have rather clear strategies about its disciplines: (1) to resume the liberal arts and social sciences which had been deprived and in fact merged into other institutions in the 1950s. As a result, the School of Humanities and Social Science was established in 1993 after some disciplines had been resumed as research institutes in the 1980s; (2) to build professional schools that have a profound influence on social life, including the School of Economy and Business (1984), the School of Architecture (1988), the School of Law (1995), the School of Public Policy and Management (2000), the School of Medicine (2001), and the School of Journalism and Communication (2002); (3) to set up new disciplines which might have strategic influence on the future of human life. After examining the reference group of AAU, Tsinghua observed that health would become the most important field in human life, after national defense, especially in a time of peace. Therefore, the School of Life Science was established (2008), as were the School of Aerospace (2004) and the School of Environment (2011); (4) to rejuvenate the three pillar disciplines – mathematics, physics, and chemistry; and (5), last but not least, to maintain the strength of engineering that Tsinghua had been celebrated for.

Although the university leaders have a clear plan for the university's development, it is not without faculty resistance, especially from engineering. Since so many new schools had been established in the last few decades, the departments of engineering felt marginalized. The morale of the faculty dropped, and the deans or department heads complained regularly. The great challenges confronting the leaders of Tsinghua University were how to develop the new disciplines while at the same time, retain the strength of the engineering.

Another important field of planning in Tsinghua is faculty recruitment. Under the impact of Mao's radical higher education policy, the faculty recruited by Tsinghua in the 1960s and 1970s were basically from workers-peasants class(工兵学员). Most of them had minimal training in academic disciplines, and they seldom had a masters or higher degree. In the 1990s, Tsinghua started to recruit new faculty members basing on contracts, which greatly enhanced the university's control of

Table 10.2 The number of full professors recruited from outside, 2006–2010

	2006	2007	2008	2009	2010
Full professors recruited from other universities in China	9	7	12	23	9
Full professors recruited from oversea universities (not Chinese nationality)	1	1	5	7	20
Full professors recruited from oversea universities (Chinese nationality)	7	9	13	8	20
Number in total	17	17	30	38	49

faculty recruitment. All faculty recruitment must now be agreed on by the University Committee. As a result, the quality of faculty in Tsinghua has greatly improved. As of August 2011, approximately 75% of the faculty hold doctorate degrees, and 62% are under the age of 45 years. Full professors account for approximately 41% of the faculty.

Although the quality of Tsinghua faculty has been greatly improved, university leaders believe that there still exists a vast gap between Tsinghua and the top world-class universities, especially in terms of the number of great masters, top scholars, and innovative research teams. In order to improve the quality of the first tier faculty, Tsinghua has taken control of the recruitment of full professors. The university reported that since 2005, 55% of the full-professor recruitment quota has come from scholars outside Tsinghua (mainly abroad), while only 45% are university faculty. In fact, the quota from university faculty of 2011 was much lower (Table 10.2).

This strategy, very effectively, renewed the top faculty tier. Most of the faculty recruited in 1960s and 1970s had either retired or been moved to other functional departments, mostly university party organs.

Although this strategy effectively renewed the top faculty tier, it exerted considerable negative effects on the middle-tier faculty. Due to the limited chances for promotion to full professor, young faculty with great potential chose to work in other national universities that could provide them with better opportunities including the title of full professor, research funds, and managerial responsibilities. As a result, the faculty team was weakened, and the so-called innovative research "teams" hardly exist. This has already aroused the attention from the university.

10.4.4 Reforming the Governance

In order to implement the planning, the university reformed the governance framework. As mentioned earlier, contracts had been introduced to recruit new faculty and staff, which greatly enhanced the university's autonomy. Another significant reform concerned the university financing.

When Tsinghua was affiliated to MOE in the redistributive period, it received funding from the allocation of MOE. After market was introduced into higher education system, Tsinghua diversified its funding sources – for example, tuition

fees, profits from enterprises affiliated with the university, and donations. This reduced, to a large degree, Tsinghua's dependence on MOE. But the reform of greater significance was the establishment of Tsinghua Holdings Corporation Ltd. Established with a registered capital of $240 million RMB in 2003, Tsinghua Holdings Corporation Ltd, in fact, functions as the management platform for Tsinghua assets. In 2005, Tsinghua Holdings Capital was established as the sole legally qualified investment banking unit under Tsinghua Holdings, managing Tsinghua University's first securities-based fund – Tsinghua Holdings Industry Investment Fund. This fund plays the same role as a university fund does for any private university in the United States, though Tsinghua is a public institution.

With greater control on its personnel and finances, Tsinghua now possesses the organizational autonomy that a WCU experiences.

10.4.5 Outcome

Thanks to its clear vision, good planning, and reformed governance, Tsinghua made good progress in relation to the selected indicators (Yang and Welch 2011).

10.4.5.1 Knowledge Production

Table 10.3 illustrates Tsinghua's publications in the field of science and technology during the period 1996–2009. Tsinghua made remarkable progress, and the publications in 2009 increased more than six times over that of the 1996.

Although the social sciences had been reestablished in Tsinghua for less than two decades, publications in the field ranked above the top 1% globally by June 2011, and its citation has been rapidly grown. Figure 10.3 shows the rate of growth of citations.

The number of Tsinghua's patents has also had significant grown. In 1995, Tsinghua had only 48 patents, but in 2005, it registered 521, which is three times that of MIT in the same year (Gu 2008).

It is reported by the university that Tsinghua holds 11,000 patents, including 9,684 inventions, 6,500 authorized patents (among them 5,069 authorized inventions), 1,800 patent applications, 400 authorized patents abroad, and 828 computer software copyright registration (http://www.tsinghua.edu.cn/publish/then/5993/index.html).

10.4.5.2 Educational Experience for College Students

After introducing the NSSE (National Survey of Student Engagement) instrument into China, Luo and her colleagues compared Tsinghua with its American counterparts (American Universities with Very High Research Activities) in 2009

Table 10.3 The increase of Tsinghua in SCI, EI, and ISTP articles, 1996–2009

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
SCI	273	407	424	598	1,054	1,427	1,899	2,212	2,321	2,915	2,866	2,591	2,589	2,758
EI	511	829	576	1,324	1,418	1,449	2,094	2,584	2,299	3,242	3,317	3,393	3,381	3,431
ISTP	238	393	263	372	410	765	1,144	1,303	1,288	1,768	1,579	1,752	1,905	1,377

Source: (Yang and Welch 2012); Brief Statistics of Tsinghua 2010, http://xxbg.cic.tsinghua.edu.cn/oath/detail.jsp?seq=91196&boardid=22
Notes: *SCI* is an abbreviation of Science Citation Index, *EI* is an abbreviation of the Engineering Information Index, *ISTP* is an abbreviation of Index to Scientific & Technological Proceedings

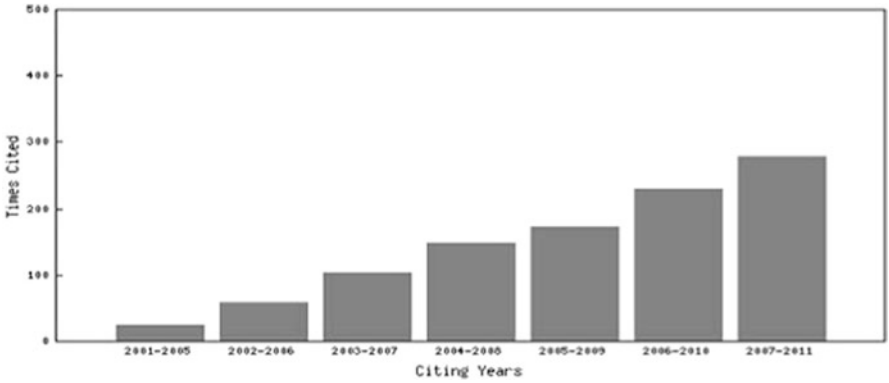

Fig. 10.3 The growth of citations of Tsinghua University in social sciences in general (2001–2011) (Source: Essential Science Indicator (2011) http://news.lib.tsinghua.edu.cn/page.user.article.asp?articleid=904. Notes: SSCI is an abbreviation of Social Science Citation Index)

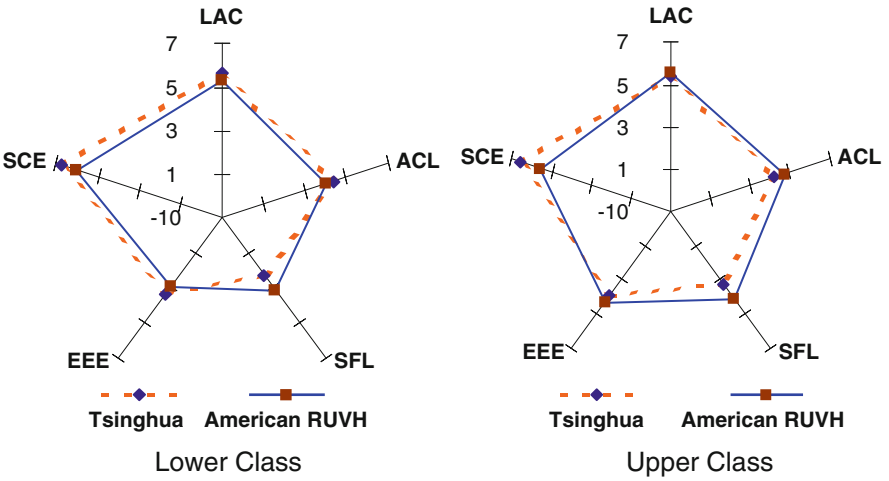

Fig. 10.4 Comparing Tsinghua with American RUVH on five Benchmarks, 2009 (Note: this figure is adapted from the data released in Luo's study (2009))

against five benchmarks: the level of academic challenge, the level of active and collaborative learning, the level of enriching educational experience, the level of student-faculty interaction, and the level of supportive campus environment. Luo's study showed that there were no significant statistical differences on the first three benchmarks between Tsinghua and its American counterparts. For the latter two, Tsinghua's performance was inferior on student-faculty interaction but more supportive on quality of campus environment (Luo et al. 2009). Figure 10.4 indicates the differences.

Because of the clear vision, good planning and sound strategies at both the national and institutional level, Tsinghua University successfully upgraded its faculty quality and academic productivity in only two decades. But is Tsinghua a world-class university now? Reflections are needed in order to answer this question.

10.5 Reflections

Institutions change. The changes occur in quantity and quality. Positive quantitative changes are referred to as institutional improvement; positive qualitative changes are considered institutional innovation. Is a WCU an institutional improvement or an innovation? This is a key question when examining the Chinese experience and trying to interpret it.

The concept of WCU is underdeveloped in terms of theoretical framing. The term "world-class universities" generally refers to a small group of renowned universities which are ranked at the top of the international league tables. This leads to the thinking as if "world-class university" is not a newly emerging form of institution driven by geographic-political restructuring (i.e., "globalization") and the restructuring of human economic production (i.e., "knowledge economy") but a group of existing well-known higher education institutions who bear at the same time the two main properties of high quality and internationalization.

Philip G. Altbach stated in many of his books and lectures that WCUs by nature are research universities in general and based on the American model in particular (Altbach and Balan 2007). Unlike Altbach, who believed the WCU has only one model to follow, Jamil Salmi has argued that world-class higher education institutions could also include those that are neither research-focused nor operating as universities in the strict sense (Salmi 2009). Although they disagree somewhat on how to become a WCU, both Altbach and Salmi have interpreted WCUs in the framework of nation-states, viewing WCU mainly instruments of nation-states to cope with the intense global competition.

Although this is a way to conceptualize WCUs, it is incomplete. Looking at the history of humanity, we may find that while agricultures and industrialization emancipated humans from a dependence on nature for food, the popularization of education (in particular higher education) emancipated humanity from its dependence on social constructions by turning every individual into a potential knowledge producer. Therefore, what the knowledge economy has changed is not only the economy but also the whole of human life. Analyzing world-class universities merely through the technical lens of benchmarks or the lens of nation-state strategy to cope with global competition actually underestimates the importance of WCUs in restructuring our human life. Thus far, the Chinese experience provides at least two points for reflection. The first is about the limitation of the instrumentality of Chinese WCU policy. There is no doubt that the strategies and efforts taken by the party and by state and higher education institutions in China greatly enhanced the

global competitiveness of Chinese higher education institutions. But all of these happened when the WCU was deconstructed into observable technical indicators. Without a sense of contributing to an improved human value system, China's efforts to build a WCU would be merely a mimic of other systems, rather than embodying the institutional innovation they desire.

The second point is about the relationship between states and universities. Many scholars have pointed out that the state played a decisive role in China's bid for world-class universities (e.g., Marginson 2011). Yang and Welch believed this, in fact, paralleled the international tide which harnessed universities to economic programs serving national interests rather than preserving the autonomy of universities (Yang and Welch 2011). In paying close attention to Tsinghua's case, however, we detect the opposite. The logic of knowledge production, rather than "serving the country," has dominated the university life of Tsinghua since the WCU policy carried out in Tsinghua. On the one hand, more than two-thirds of the graduates each year choose to either pursue their graduate study in Western countries or work in large global companies, which indicate a weakening of students' faith in constructing their own country. On the other hand, the faculty spend more and more time on getting published in English, anticipating to become "world-class scholars," and thus, quite a number of them have the values and beliefs diverge from those of the state. The Chinese government was trying to ensure that local universities enhance China's competitiveness, but when the knowledge production housed in these universities becomes more and more world class, the elites who used to be defined as national elite might get freed from the framework of nation-states. They produce knowledge that takes part in global circulation. This will in certain ways influence the way of global governance, especially when the knowledge they produce is concerning value system. It seems the relationship between a WCU and the state is much more complicated than what has been previously thought.

Getting back to the question – is Tsinghua a world-class university now? The answer is that it depends. If a world-class university is a university that wins a global competition according to performance indicators, Tsinghua certainly is a runner with full speed surpassing many of his rivals. But if a world-class university is a place where scholars from worldwide gather and produce the knowledge and values to the excellence that our human kind by far can reach, Tsinghua does not fall into the category. In fact, few of the universities ranked above in the world rankings are of the category.

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