View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by UB ScholarWorks

How Tsinghua Became a World Class Research University

A Case Study on the Impact of Rankings on a Chinese Higher Education Institution

Lu Pang

BA, Beijing Normal University, 1995

MS, University of Bridgeport, 2013

Chair

Chunjuan Nancy Wei, Ph.D.

Co-Chair

Thomas J. Ward, D.Ed.

Reader

Christine Hempowicz, Ed.D

Reader

Nelson Ngoh, Ph.D.

Director, School of Education

Allen Cook, Ph.D.

DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF EDUCATION IN

THE SCHOOL OF EDUCATION

UNIVERSITY OF BRIDGEPORT

BRIDGEPORT CONNECTICUT

2018

© Copyright by Lu Pang 2018

University of Bridgeport
Committee Approval of a Dissertation

Dissertation Title:

How Tsinghua Became a World Class Research University: A Case Study on the Impact of Rankings on a Chinese Higher Education Institution

Submitted by:

I have read this dissertation and have found it to be of satisfactory quality for a doctoral degree.

Nov. 27, 2018
Date

Chunjuan Nancy Wei
Chunjuan Nancy Wei, Ph.D.
Chair, Dissertation Committee

I have read this dissertation and have found it to be of satisfactory quality for a doctoral degree.

Nov. 27, 2018
Date

Thomas Ward, D.Ed.
Co-Chair, Dissertation Committee

I have read this dissertation and have found it to be of satisfactory quality for a doctoral degree.

Nov. 27, 2018
Date

Christine Hempowicz, Ed.D.
Member, Dissertation Committee

I have read this dissertation and have found it to be of satisfactory quality for a doctoral degree.

Nov. 27, 2018
Date

Nelson Ngoh, Ph.D.
Member, Dissertation Committee

I have read this dissertation and have found it to be of satisfactory quality for a doctoral degree.

Nov 27, 2018
Date

Allen Cook, Ph.D.
Director, School of Education

ABSTRACT

Today's global knowledge economy has highlighted the need for the comparison of higher education quality. This need has been largely met by international university rankings. Although it is widely recognized that no one ranking system is completely objective, higher education stakeholders across the world still take rankings' results seriously. Rankings, thereby, exert a great deal of influence on higher education institutions.

Ranking affects higher education through various approaches. In a variety of practical manifestations, the idea of building a "world-class" university has been widely adopted by national governments that urgently want to improve competitiveness in the globalized knowledge economy.

Chinese universities (in this thesis, China, or Chinese, refers to mainland China) have been steadily climbing up international rankings over the last decade. The extraordinary achievement has its roots in the initiative of establishing "world-class" universities. This study explored the actual course of events through which a Chinese university raises its statures in global rankings. By using an exploratory case study research design, the study attempted to answer the question about how a Chinese university became a world-class research university according to the global ranking systems. The findings revealed that an antiquated university has the potential to update to a high-quality modern research institution within a short period of time if talents, resources, and governance mechanism are adequately aligned.

Keywords: Higher Education Management, Global University Rankings, Quality of Higher Education

ACKNOWLEDGEMENTS

This work would not have been possible without the support of my dissertation committee. I am tremendously fortunate to have committee member Dr. Thomas J. Ward, Dean of the College of Public and International Affairs (CPIA) and Vice President for Internationalization at the University of Bridgeport (UB), Dr. Chunjuan Nancy Wei, Chair of East Asian and Pacific Rim Studies at the CPIA, Dr. Christine Hempowicz, Director of the Office of Sponsored Research and Programs (OSRP) of the University, and Dr. Nelson Ngoh, Director of Graduate Studies in Science Education in the School of Education at UB.

My deep gratitude goes first to Dr. Thomas J. Ward. His vision, expertise, generous guidance and support launched a great part of this dissertation. Dr. Ward is a distinguished scholar and administrator for more than two decades. He has contributed to pioneer writing and academic research in the field of politics and diplomacy. He established the College of Public and International Affairs at UB. He is a member of the Board of Directors of the Committee on Teaching in the United Nations. He also participated in the first International Education Administrator (IEA) program in France in 2013 as a Fulbright scholar. As a master of teaching, he knows how to develop and lead students. When I was struggling to choose a dissertation topic, his insight inspired me to pursue this investigation. In conducting the research, he offered me great direction. His suggestion demonstrates his foresight and sagacity, without which I could not have even started the project.

This same appreciation also extends to my committee chair, Dr. Chunjuan Nancy Wei, who is also an excellent scholar in the field of political economy and the recipient of Fulbright

Fellowship. Her expertise in Chinese culture has helped me to a great extent to accomplish this work. In addition, her ongoing encouragement has been accompanying with me throughout the time of this study. When I was in the most stressful time, she was there with me. Her integrity and courage make her the most beautiful teacher in my eyes.

I would also express my sincere gratitude to Dr. Christine Hempowicz for her timely and scholarly suggestions on my thesis. Dr. Hempowicz has been serving as a key administrator in the academic institute for years. Her insightful advice greatly improved my work. Moreover, she was so supportive in helping me apply for an IRB (Institutional Research Board) exemption in spite of her busy schedule.

I am extremely thankful to Dr. Nelson Ngoh, a dedicated education researcher, for his meticulous scrutiny on my work. His demanding requirements with kindness and enthusiasm have urged me to improve my writing.

In addition to my committee members, I would also like to thank UB's Assistant Provost Michael J. Giampaoli for his ongoing encouragement, and the School of Education for affording me the unimaginable opportunity to complete my doctoral program here at UB. I will not forget to thank all the teachers who have taught me during the past four years.

Lastly, special thanks to my church, Calvary Evangelical Free Church at Trumbull in Connecticut, and all those friends who have helped me. Their faith brought me light and strength when I faced the challenges. Without their support, I would not have come this far.

TABLE OF CONTENTS

LIST OF TABLES ……..……..……..x

LIST OF FIGURES……..……...xi

ABBREVIATIONS AND ACRONYMS…….……xii

CHAPTER I: INTRODUCTION TO THE STUDY……. ……...1

Background of the Study……..2

Statement of the Problem……. 8

Purpose of the Study……11

Research Questions……..11

Theoretical Foundation……12

Conceptual Framework……13

Definitions……15

Significance of the Study…….17

Summary …….19

CHAPTER II: LITERATURE REVIEW…….. 21

Literature Search Strategy……21

History of Tsinghua University……22

Ranking and its Proliferations …….23

Major International University Rankings…….25

What do these Rankings Measure and How do they Measure…….29

Rankings' Impact……..……..……..33

Major Governmental Initiatives to improve HEIs' Performance in China……..40

Summary……..……....42

CHAPTER III: RESEARCH METHOD……...43

Research Design and Rationale……...43

Methodology……...44

Data Collection ……..44

Data Analysis……..49

Role of the Researcher……....51

Research Validity and Reliability……...54

Limitations of Research Method……....55

Summary…… ……....57

CHAPTER IV: RESULTS……...58

Findings……..59

Study Results……..68

Summary……75

CHAPTER V: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS……78

Interpretation of Findings……....78

Discussion.……...……...87

Recommendations……...93

Conclusions.…… …….. 95

REFERENCES…….99

Appendix A: Interview Questions…….....……107

Appendix B: IRB Exemption Approval……..……109

Appendix C: Tsinghua University Campus Map……110

LIST OF TABLES

Table 1 Number of Chinese Higher Education Institutions…… 3

Table 2 Number of Students Enrolled in China's HEIs in 2016…….3

Table 3 Standings of Top Chinese Universities in ARWU, 2003-2017.... ……9

Table 4 Standings of Top Chinese Universities in THE, 2011-2018…..……..... .10

Table 5 Standing of Top Chinese Universities in QS, 2015-2018…….10

Table 6 Standings of Top Chinese University in USNWR in 2015…….. 10

Table 7 Profile of Tsinghua University …… 16

Table 8 Major International University Rankings in the World ……..29

Table 9 Indicators and Weights of ARWU, THE, and USNWR……32

Table 10 Major Documents Reviewed… …… ……..47

Table 11 Relevant Laws and Regulations Reviewed……...…… ..47

Table 12 Major Locations Observed on Tsinghua Campus……49

Table 13 Restructuring of Tsinghua University, 1994-2002…… 70

Table 14 Number of Published Articles of Tsinghua, 2001-2006……...71

Table 15 Number of New Enrolled International Students in Tsinghua, 2016-2017…....74

Table 16 Number of International Students Enrolled in Tsinghua by 2017……...75

LIST OF FIGURES

Figure 1 Hazelkorn's (2009) Framework Regarding Rankings' Impacts on Higher Education……..15

Figure 2 Graphic Research Matrix…….53

Figure 3 Steps of Tsinghua's Reform toward a "World-class" University……....64

ABBREVIATIONS AND ACRONYMS

AHCI	Arts and Humanities Citation Index
AEARU	Association of East Asian Research Universities
APRU	Association of Pacific Rim Universities
ARWU	Academic Ranking of World Universities [Shanghai Jiao Tong University, China]
AUA	Asian Universities Alliance
BRICS	The acronym of five Nations: Brazil, Russia, India, China and South Africa
CALIS	China Academic Library and Information System
CERNET	China Education and Research Network
CPC	Communist Party of China
EI	Engineering Index [Publication]
EU	European Union
GER	Gross Enrollment Rate
GIX	Program of Global Innovation Exchange [Tsinghua University, China]
HEI	Higher Education Institution
IAU	International Association of Universities
IHEP	Institution for Higher Education Policy
IMHE	Program of Institutional Management in Higher Education
IRB	Institutional Research Board
MCDM	Multiple Criteria Decision Making
MEFSS	Modern Equipment and Facilities Sharing System [China]
MIT	Massachusetts Institute of Technology

MOE	Ministry of Education [China]
MOF	Ministry of Finance [China]
NCEDR	National Center for Education Development Research [China]
NUS	National University of Singapore
PRC	People's Republic of China
QS	Top University Rankings [Quacquarelli Symonds, United Kingdom]
SCI	Science Citation Index [Publication]
SSCI	Social Science Citation Index [Publication]
SIST	School of Information, Science and Technology [Tsinghua University, China]
SJTU	Shanghai Jiao Tong University [China]
THE	Times Higher Education World University Rankings [United Kingdom]
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USNWR	US News & World Report [United States]
UW	University of Washington [United States]
WTO	World Trade Organization

CHAPTER I

INTRODUCTION TO THE STUDY

In today's knowledge economy, tertiary education is increasingly recognized as a key factor in national competitiveness. The availability of qualified professionals and the application of advanced knowledge and technology are important factors for accelerating and sustaining economic growth (Altbach & Salmi, 2011). As the place where knowledge and scholars are developed, universities in various countries, including developed and developing countries, are striving to enhance productivity. Despite a huge difference in practices and social contexts, the improvement of research capability has been highlighted. Building a "world-class" research university has become a common goal, as well as a prevalent approach throughout all of the endeavors for the nations and higher education institutions (HEIs) that want to effectively participate in the global knowledge network.

Meanwhile, as mass higher education has become the norm worldwide, the performance of individual higher education institution has also been increasingly compared. All kinds of stakeholders of higher education, especially the students and parents, pay more and more attention to the quality of higher education that these HEIs provide.

Global university rankings have exerted a great deal of influence in the practices of measuring the quality of higher education. Many governments have used rankings to systematically examine their HEIs. Many HEIs have also set specific goals to gain their desired positions in a variety of rankings. This is partly because these rankings to some extent provide the most precise definition in terms of "world-class university" through those measurements

embedded in the ranking systems, though it is widely recognized that "there is no such thing as an objective ranking" (Hazelkorn, 2013. p.84.). These exercises allow rankings to exert enormous influence on the trajectory of higher education.

As one of the fast-growing economies in the world, China has also attempted to improve the quality of higher education and develop a tertiary education system within which a number of universities have gained international stature. Moreover, the country has made a significant improvement in the global ranking race over the recent years. A few Chinese universities have been steadily climbing up international rankings during the past decade. The performances of these institutions have attracted wide attention worldwide (Marginson & Van Der Wende, 2006; Salmi, 2009; Hazelkorn, 2009; Sonnez, 2015; Paulk, 2017). Yet fewer details regarding the process of the transformation have been explored. This study, therefore, attempts to examine the course of events that a Chinese elite university went through on the road to academic distinction. By using Tsinghua University as a case, this paper focuses on exploring how an antiquated university builds its international stature of a world-class research university in China, and what roles the global university rankings play in the transformation. The purpose of the study is to highlight a new reference to higher education leaders worldwide and provide an in-depth understanding on the rankings' impact on the Chinese higher education system.

Background of the Study

China has a large higher education system, offering bachelor, master, and doctoral degree programs. By 2016, the total number of Chinese higher education institutions had reached 3,910, including 217 post-graduate research institutes; 2,596 regular higher education institutions that

award degrees; 284 adults HEIs that award vocational certificates; and 813 non-governmental HEIs. In the academic year 2015-2016, the total enrolment was over 40 million full-time students. More than 4 million degrees were awarded (Ministry of Education of PRC, 2016) (Tables 1and 2).

Table 1: Number of Chinese Higher Education Institutions Unit: Institution

	Total	HEIs under Central Ministries & Agencies	HEIs under Local Authority	Non-Governmental HEIs
Research Institutes	**217**	**176**	**40**	**1**
Public HEIs Offering Degree Programs:	**1237**	**113**	**700**	**424**
• **Those Providing Postgraduate Programs**	**576**	**100**	**461**	**5**
Public Higher Vocational Colleges	**1359**	**5**	**1037**	**317**
Adult HEIs	**284**	**13**	**270**	**1**
Non-Governmental HEIs	**813**			**813**

***Source*:** Ministry of Education of PRC, 2016, http://en.moe.gov.cn/Resources/Statistics/edu_stat_2016/2016_en01/201708/t20170822_311604.html (accessed March 18, 2018).

Table 2: Number of Students Enrolled in Chinese Higher Education Institutions in 2016
Unit: Student

	No. of Graduates	No. of Degrees Awarded	No. of Entrants	No. of Enrollment
Doctoral Degree	**55,011**	**53,360**	**77,252**	**342,037**
Master's Degree	**508,927**	**505,421**	**589,812**	**1,639,024**
Undergraduate Degree	**7,041,800**	**3,659,686**	**7,486,110**	**26,958,433**
Vocational Graduates	**3,298,120**		**3,432,103**	**10,828,898**
International students	**109,894**	**20,876**	**138,362**	**243,735**
Total	**11,013,752**	**4,239,343**	**11,723,639**	**40,012,127**

***Source*:** Ministry of Education of PRC, 2016, http://en.moe.gov.cn/Resources/Statistics/edu_stat_2016/2016_en01/201708/t20170822_311603.html (accessed March 18, 2018).

Most of these Chinese higher education institutions are public. The governance of the HEIs is conducted under the authority of either central or local government. By 2016, of the 813 public four-year undergraduate degree-granting universities, 113 institutions are under the central government, including 76 that are supervised directly by the Ministry of Education (MOE), and 37 that are under other central agencies. Another 700 are subordinate to provincial or municipal governments. Similar to those under the central government, these institutions are under either the provincial ministries of education or the county level education bureaus. Overall, Chinese higher education system is predominantly state-run, with little involvement of private providers in the sector.

Accordingly, colleges and universities in China are mainly financed by governments through the appropriation system. In general, the budget-based investment from different level governments makes up 60 percent of total education expenditure. The other 40 percent expenditure is derived from tuition which normally accounted for 20-25 percent; government investment for special projects; and university-run enterprises or donations. Since 2008, the MOE and the Ministry of Finance (MOF) have jointly reformed the appropriation system, increasing government investment to those special projects that aim to improve research productivity and bring universities to "world-class" standards (Shen, Hua, & Bruce, 2017).

China's modern higher education system emerged in the late 1890s. It was marked by the establishment of "The Imperial University of Peking" (*Jingshi Da Xue Tang*), the predecessor of

Peking University. Beginning with the Opium War (1839-1842), China suffered from Western invasions along with internal fragmentation for over one hundred years. The period is referred to in China as the *Century of Humiliation.* In order to escape the fate of colonialism, the Qing government implemented the reform of a "Self-Strengthening Movement" since the mid-nineteenth century. In an attempt to establish a modern naval force by learning advanced technology from the West, the Qing government founded the first foreign language school in Beijing in 1862. In the following year, the central government sent the first group of Chinese young students to study abroad, particularly to the United States. After the defeat in the 1895 Sino-Japanese War, China conducted a new reform aimed at changing the country's moribund political system. Among the numerous proposals issued in the reform, one was to build the Imperial University of Peking with intent to change the traditional civil service system that had lasted in imperial China for one thousand years.

After China's 1895 defeat in the hands of Japan, the Western powers, typically Great Britain, the United States, France, Germany, Russia and Japan carved up the country and took the commercial rights and privileges from Qing. These actions aroused greater resistance from the Chinese people. An anti-foreign religious society, known as the Boxers, emerged in China at that time. The Qing government initially supported but later turned against the rebellion in collusion with the Western invaders. The Qing government's change of heart resulted in the defeat of the Boxers and evoked the conquest of the Eight-Nation Alliance (Austria-Hungary, France, Germany, Italy, Japan, Russia, the United Kingdom, and the United States), which led China to a more severe economic and political crisis.

Accompanying the crisis and the larger scale of political reform, Chinese modern education also became more westernized during the period. In 1901, girls were admitted, along with boys, to schools. In place of Confucianism, the subjects of science, mathematics, and geography were taught at schools. The Western subjects such as classical economics, liberalism, socialism, and social Darwinism were also introduced to China. In 1905, the Civil Service Examination (*Keju*) was abolished. Henceforth, officials were to be recruited from the graduates of the new schools and those who had studied abroad.

After the 1912 establishment of the Republic of China, the country remained in the yoke of imperialism and, add insult to injury, it had new problems of warlordism and communist insurgency. From the late 1920s, ongoing wars were waged between the nationalists and the Communist governments, and between their combined forces and the Japanese. Then, upon the end of World War II, a four-year civil war (1945-1949) ensued. It was against this background that modern Chinese higher education survived and slowly expanded over the decades.

When the People's Republic of China (PRC) was founded in 1949, there were only 211 higher education institutions in the country (Zhu & Ma, 2014). For the purpose of national economic recovery and regime consolidation, the Communist Party rebuilt the higher education sector by restructuring the universities into state-owned institutions. For better governance, the Soviet educational model was introduced into the Chinese higher education system that replaced the initial western model. Under the new model, HEIs in China must follow central authority on all education matters. A small committee of the Chinese Communist Party was established into every university governance. College students were now trained in specialized fields of study

using common syllabi and textbooks. Assignments upon graduation were also arranged by the government quota plans. This model was in place until the late 1990s (Li, 2004; Wan, 2006).

From 1967 to 1976, China's higher education was devastated by the Cultural Revolution. According to the data retrieved from the national bureau of statistics (2005), the gross enrollment rate (GER) of Chinese higher education was 2.7 percent in 1978. The number of graduating students could not meet the needs of national development, particularly after the implementation of economic reform and opening policies in 1978. To address the deficit, China embarked on higher education reform beginning in the early 1990s. In 1993, the State issued the "*Outline of Educational Reform and Development"*. In 1998, the Ministry of Education promulgated the "*Action Plan for Invigorating Education towards the 21st Century*", outlining major objectives of China's education reform.

Started in the late 1990s, the Chinese higher education sector went through an unprecedented enrollment expansion. Between 1998 and 2004, college enrollment grew on average by 26.9 percent annually. New regular undergraduate students increased from 1.08 million in 1998 to 4.47 million in 2004 (the National Statistics Bureau of China, 2005). In 2016, the total attendance of higher education reached 40 million. The GER increased to 37.5 percent (Ministry of Education, 2016).

The massive increase of the Chinese higher education enrollment brought about the desire to improve the higher education quality. Meanwhile, the complex challenges of competing in the global economy, especially after China joined the World Trade Organization (WTO) in 2001, further spurred the demand for quality improvement. In 1998, Chinese President Jiang Zemin announced at the centennial celebration of Peking University that China would like to

build "world-class" universities in the 21st century. To promote actions, the "Project 985" was initiated right after Jiang's speech, complementing the previous educational initiative "Project 211". In addition, sponsored by the central government, Shanghai Jiao Tong University (SJTU) began to conduct research and produced the Academic Rankings of World Universities (ARWU) to determine the quality gap between Chinese HEIs and the world's best universities.

Every education system is shaped to some extent by its national economic and political environment. Since the economic reform was implemented in 1978, China's economy has been on the upsurge for forty years. With the GDP growth rate averaging between 7 and 8 percent a year in recent decades, China nowadays has become the world's second-largest economy (World Bank, 2015). The change has built up a solid economic foundation for higher education development. Meanwhile, the forty-year stable political environment has also safeguarded the upgrading of Chinese higher education, enabling the system to make further progress toward international stature. China's campaign of building world-class universities thence started.

Statement of the Problem

The performance of Chinese higher education had been far behind those of western countries, where modern universities were first launched. According to the data derived from the National Center for Education Development Research (NCEDR) (2001), graduates of two-year associate degrees in China only amounted to 3.8 percent of those employed in 1999. By the end of the twentieth century, no Chinese university had been recognized in the top 200 universities in any rankings in the world, nor was any Chinese scholar awarded a Nobel Prize in medicine, physics, chemistry, literature or economics.

However, the situation has greatly improved since China conducted higher education reform with the explicit goal of building "world-class" universities. The results were illustrated by a rapid ascension of a few Chinese universities in global rankings. For instance, in 2003, when Shanghai Jiao Tong University (SJTU) released its first ARWU report, only 14 Chinese universities were included in the top 500. None of them was listed in the top 200. By 2016, the number has increased to 45 among the top 500, two of them debuting in the top 100. In 2017, Tsinghua University further jumped to the 58th, and Peking University positioned at the 71st (ARWU Report, 2017). Moreover, more and more Chinese universities have regularly attained major global rankings. (Tables 3, 4, 5 and 6)

Table 3: Standings of Top Chinese Universities in *ARWU* from 2003 to 2017

ARWU	**2003-2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Peking	201-300	151-200	201-300	151-200	151-200	101-150	101-150	71	71
Tsinghua	201-300	151-200	151-200	151-200	151-200	101-150	101-150	58	48
Fudan					151-200	151-200	151-200	101-150	101-150
Shanghai Jiao Tong				151-200	151-200	101-150	101-150	101-150	101-150
Zhejiang				151-200	151-200	151-200	101-150	101-150	101-150
University of Science & Technology of China						151-200	151-200	101-150	101-150

Source: ARWU Ranking Report (2003-2017)
http://www.shanghairanking.com/ARWU2017.html
(accessed February 9, 2018)

Table 4: Standings of Top Chinese Universities in *THE* from 2011 to 2018

THE	2011	2012	2013	2014	2015	2016	2017	2018
Peking	37	49	46	45	48	42	29	27
Tsinghua	58	71	52	50	49	47	35	30
Fudan					193		155	116
University of Science & Technology of China							153	132

Source: THE World University Rankings (2011-2018)
https://www.timeshighereducation.com/world-university-rankings/2018/world
(accessed February 9, 2018)

Table 5: Standings of Top Chinese Universities in *QS* from 2015 to 2018

QS	2015	2016	2017	2018
Peking	57	41	39	38
Tsinghua	47	25	24	25
Fudan	71	51	43	40

Source: QS World University Rankings (2015-2018)
https://www.topuniversities.com/qs-world-university-rankings
(accessed February 9, 2018)

Table 6: Standings of Top Chinese Universities in *USNWR* in 2015

USNWR	2015
Tsinghua	**59**
Peking	**41**
Fudan	**96**
Shanghai Jiao Tong	**136**
Zhejiang	**106**
University of Science & Technology of China	**131**
Nanjing	**180**
Sun Yat-sen	**198**

Source: U.S. News & World Report (2015)
https://www.usnews.com/rankings
(accessed by February 9, 2018)

Since the plan of building world-class universities was implemented at the very beginning of the new century, these universities achieved the goals of academic excellence in global higher education range in a period of fewer than twenty years. This rapid development is

astonishing for a developing country with an antiquated higher education system. Chinese higher education's rapid leap has attracted international attention (Marginson & Van Der Wende, 2006; Salmi, 2009; Hazelkorn, 2009; Sonnez, 2015; Paulk, 2017). However, relatively few details on the progress have been reported in academic research compared to the cases in other countries.

Purpose of the Study

Since Tsinghua University appeared in all these rankings, and thanks to its prominence in the Chinese educational system, it was determined that this institution that traces its beginning to the missionary effort in China would serve as the case study. Through examining the transformation that Tsinghua University went through in achieving its international stature, the study aims to explore how a Chinese higher education institution built a "world-class" university. These exercises taken by the University of Tsinghua may inspire higher education leaders in other countries with new ideas to improve their educational systems and the performance of their HEIs. Moreover, by comparing the actual course of events with theory, this study aims at developing a comprehensive explanation on the Chinese practice of building "world-class" research universities in the context of global ranking competition.

Research Questions

While previous research has shown the impact of university rankings on higher education reforms in other countries (Rhee, 2011; Ward, 2013; Erkkila 2014; Okebukola, 2013; Hazelkorn, *et al.*, 2009; Bernasconi, 2011), this present study focuses only on a Chinese case. Through

exploring the transformation of Tsinghua University in the process of developing its international stature in global rankings, the study aims to answer the following three questions:

(1) How did Tsinghua University become a world-class research university?

(2) How did international university rankings impact the transformation?

(3) Why did Tsinghua University improve so rapidly? (What are the reasons behind the rapid improvement?)

Theoretical Foundation

Establishing research universities in countries where they do not exist or upgrading existing universities to serve as research universities is a worldwide phenomenon (Mohrman, Ma, and Baker, 2008). A successful effort in building a world-class research university does not occur in a single institution by itself. Rather, it must perform within a holistic context in which economic, political, social and cultural factors all play different roles. Therefore, the analysis on a given case in terms of building world-class universities should be based on a theoretical foundation.

Salmi (2011) proposes a tertiary education ecosystem to analyze the development of HEIs. According to this theory, eight forces can systematically influence the performance of a research university. These include (1) the political and economic stability, rule of law, basic freedoms, (2) vision, leadership, and reform capacity, (3) governance and regulatory framework, (4) quality assurance and enhancement, (5) resources and incentives, (6) articulation and information mechanism, (7) location, (8) telecommunications and digital infrastructure. Salmi

asserted these key forces can have a facilitating or constraining effect in each case, depending on the circumstances (Salmi, 2011).

Several scholars have identified the common characteristics of "world-class" universities based on a series of empirical studies (Niland, 2000, 2007; Altbach, 2004; Khoon *et al*. 2005). Salmi (2009) synthesized them into three complementary categories: (a) a high concentration of talent; (b) abundant resources to offer a rich learning environment and to conduct advanced research; and (c) favorable governance features that encourage leadership, strategic vision, innovation, and flexibility that enable institutions to make decisions and manage resources without being encumbered by bureaucracy. Salmi suggested these three sets of factors—talents, resources and visionary leadership—constitute the common features that high ranked research universities share (Salmi, 2009). As a theoretical model, this study will employ Salmi's three factors to analyze Tsinghua University's performance.

Conceptual Framework

The conceptual framework grounding this study is Hazelkorn's (2009) model for analyzing the impact of university rankings on higher education. In the theory, Hazelkorn suggests that rankings can influence higher education in three dimensions: academic responses, institutional responses, and policy responses (Hazelkorn, 2009).

Academic responses refer to a series of institutional practices in promoting academic research and knowledge. The exercises may include the recruitment of academic talent and post-graduate students who show promise as researchers; encouraging faculty to publish research papers in targeted journals by offering high rewards; and offering priority funding to productive

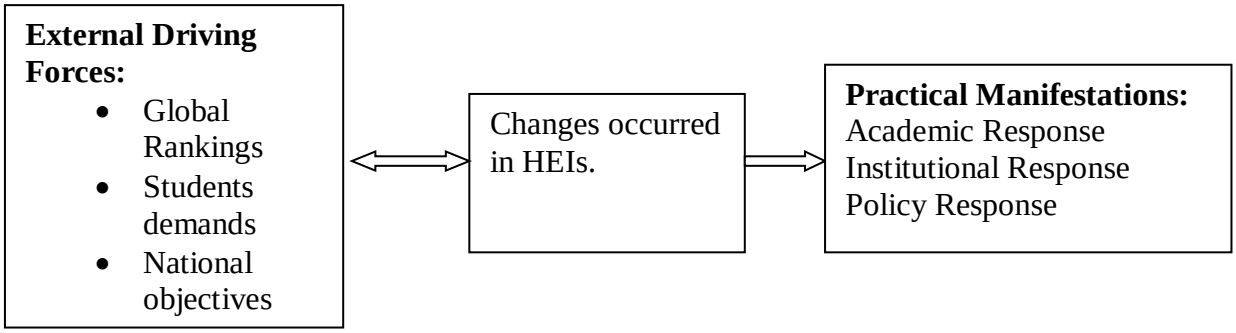
disciplines. Nowadays, the knowledge-producing capacity of HEIs is considered a manifestation of national competitiveness. The academic output is the shared indicator captured in major global rankings. Despite disproportional weighting distribution on research outputs, such methodology guides HEIs across the world making research a priority of university function, rather than teaching and learning.

Institutional responses refer to activities related specifically to institutional administration such as the organization's restructuring, institutional decision-making, and project implementation. The particular actions consist of merging departments; changing administrative policies, making a strategic plan, and allocating institutional resources. Hazelkorn (2009) indicates that institutional restructuring and the reorganization of research institutes and graduate schools according to ranking criteria often require special or targeted investment.

Policy responses are presented mainly by the actions taken by national education authorities. The activities may include making national education reform objectives and policies, promulgating legislation and regulations, implementing corresponding initiatives, as well as granting funds.

The three sets of responses interact dynamically. The extent and depth that an institution is impacted may vary based upon different contexts. Likewise, in the real world, a variety of factors may exert an impact on HEIs' behaviors besides rankings. It is indeed difficult to separate other variables from the impact of rankings on HEIs changes. However, Hazelkorn's framework outlines the dimensions of the influence of the rankings and explains the role that rankings play in shaping higher education entities. Figure 1 below shows his conceptual framework in flowchart format.

Figure 1: Hazelkorn's (2009) Framework Regarding Rankings' Impacts on Higher Education



Definitions

University Rankings

University rankings are grading systems in higher education which rate the educational performance of institutions and rank them sequentially in order. It was originated in the U.S in the late of 19th century, and spread from national level to a regional level and then upwards to an international scale in the 1990s. According to the Institution for Higher Education Policy (IHEP), there were, at least, eleven international ranking systems in the world by 2014. Four of them enjoy the most popularity in the world. They are the *Academic Ranking of World Universities* (ARWU) produced by Shanghai Jiao Tong University (SJTU) in China; the *Times Higher Education World University Rankings* (THE) launched by a British publication the *Times Higher Education Supplement*; and the *QS World University Rankings* (QS), as well as the *U.S. News & World Report* (USNWR).

Tsinghua University

Tsinghua University, one of the top Chinese universities, is located in Beijing of China. It covers 1,112 acres, comprising 20 schools and 57 departments. The university accommodated

47,762 students in the year of 2017, including 15,619 undergraduates and 19,062 graduate students, along with approximately 13,081doctoral candidates (Tsinghua official website, 2018). Table 7 portrays the university's profile based on the information published on its official website.

Table 7: Profile of Tsinghua University

Name	Tsinghua University
Type	Public
Established	1911
Schools	20
Departments	58
Undergraduate Majors	80
Academic Staff (by 2017)	3,416
Administrative Staff (by 2017)	8,710
Students (by 2017) Undergraduate Postgraduate	47,762 15,619 (32.7%) 32,143 (67.3%)
Campus	Urban, 1,112 acres
Motto	"Self-Discipline and Social Commitment"
Affiliations	Association of East Asian Research University (AEARU); Association of Pacific Rim Universities (APRU), C9, BRICS Universities League

Source: *www. Tsinghua.edu.cn* (accessed March 8, 2018)

Party Secretary

The Party Secretary is a unique administrative position in Chinese higher education institutions. Along with the university president who is responsible for the administration of the university, a committee of the Chinese Communist Party headed by a Party Secretary is

embedded in every public HEI in China. The Party Secretary's position is often at the same rank as the president of the university. In general, the Party Secretary is appointed by the Party Committee of a higher rank. They play four roles in HEIs, including decision-maker, administrator, coordinator, and political power representative (Jiang & Li, 2016). As an important decision maker, the secretary has the power to appoint deans of schools and office directors. As a coordinator, the Party Secretary needs to coordinate the relationship among the president, department heads, internal and external organizations, particularly local governmental departments that control university funds. As a political power representative, the Party Secretary must observe the Party's policies, serving as a political nucleus in HEI. Overall, the Party Secretary is highly involved in the institution's administration and governance in Chinese higher education.

Significance of the Study

The study examines the transformation of a Chinese higher education institution in building a world-class university, particularly in a context set apart by increasing global competition in educational performance. It highlights methods of national higher education management that may be an inspiration to the leaders in other universities to improve the internal and external practices in their own higher education institutions.

First, the study contributes to literature that examines rankings' influence on higher education reform, particularly regarding the exercises of building world-class research universities. Although there have been numerous studies focused on the practice of building world-class research universities worldwide, some of them lack sufficient details to prove the

suggestion, particularly in terms of the Chinese cases. Few studies have been conducted to discover how the Chinese HEIs have transformed and what roles rankings have played in the transformation. By tracing the process of Tsinghua University's reform and examining the factors that contributed to its achievement, the current study aims at answering these questions regarding how global rankings have influenced Chinese HEI's transformation into a top-notch world research university.

Second, the study has important policy implications for Chinese higher education leaders. After achieving its dream of putting Chinese institutions among the world best universities, China should comprehensively reflect on the influence of rankings so as to make further improvements. Being listed in the top 100 of the global rankings does not mean that the quality of Chinese higher education has no room for improvement. The path to world-class universities is littered with problems and challenges. Such achievements may bring both positive and negative consequences to China's higher education depending on whether or not China overvalues the importance of ranking status. For further development of higher education, Chinese leaders should identify potential problems in a rapid changing environment and attempt to make further improvement in the future.

Third, the research enhances an understanding of the Chinese higher education system, which may foster and facilitate educational cooperation between China and other nations. Over the past decade, China has become an increasingly popular market for transnational education ventures. Increasingly, higher education institutions and organizations worldwide have sought to capture a share of the lucrative Chinese educational market. As the data provided by the Observatory on Borderless Higher Education (2016) suggested, China had become the top host

country of international branch campuses by the end of 2015, reflecting a dramatic increase from 13 in 2010 to 32 in 2015. However, researchers also suggested that there were various challenges in these collaborations (Helms, 2008). Due to the misunderstanding of the regulations and culture of the Chinese higher education system, many issues were raised during implementation and impeded the establishment of an effective educational partnership with Chinese higher education institutions. Through conducting this study, the researcher intends to bring a more explicit and accurate depiction of the culture of the contemporary Chinese higher education system.

Summary

Overall, in the age of the knowledge economy, the quality of higher education is considered a symbol of national competitiveness. As one of the fastest-growing economies in the world, China has engaged in the practice since the start of the new century.

Represented by a significant ascension of Chinese university standings in international university rankings, China's higher education system has made a significant improvement in building world-class research universities over the past 16 years. The change has attracted widespread attention from the public and the media. However, the scholarly research on the topic is inadequate. Given the gap in the professional research literature, this study attempts to explore how Chinese higher education has been able to climb the ladder in a relatively short period of time and how global rankings have impacted upon Chinese higher education's transformation by using Tsinghua University as an example. The study is meant to provide higher education leaders

across the world with new references and insights to improve their practices in higher education management.

The study is organized into four sections. The major literature on the practice of building world-class research universities and the impact of rankings on the transformation is reported in Chapter II. Next, the research methods are described in Chapter III. The process of the transformation of Tsinghua University toward academic excellence is detailed as findings in Chapter IV. Lastly, the results of the case study and its implications are discussed in Chapter V.

CHAPTER II

LITERATURE REVIEW

The development of academic institutions has become a pivotal dimension of the 21st-century knowledge-based economy. Amid a variety of practices for building a knowledge-based economy, building “world-class” universities has become one of the common approaches adopted by countries that urgently want to improve competitiveness worldwide (Rhee, 2011; Mukherjee, 2011; Jayaram, 2011; Bernasconi, 2011). Despite various strategies, the impact of global university rankings has appeared invariably in the transformations of these academic institutions, either in an explicit way or in an implicit way. The role that the rankings have played in the practice has attracted a lot of attention from researchers.

Literature Search Strategy

Using "university rankings" as a key term and narrowing the publication years from 2000 to 2018, this author conducted a literature research in three major education databases: JSTOR, oaFindr, and ProQuest Dissertations and Theses. There were over 7,190 publications on university rankings, of which 1,680 were peer-reviewed articles. Sorted by relevance, over 40 articles were downloaded and read. In addition, academic conference papers published by international agencies such as UNESCO, OECD, and the World Bank were also sought after. The following paragraphs briefly synthesize the themes in these articles. In the discussion, special emphasis is given to the impact of rankings on higher education institution management and national education policies.

History of Tsinghua University

The university was established in 1911, partly funded by the "Boxer Indemnity". In 1901, after being defeated by the eight-allied powers in the Boxer Rebellion, the Qing government was forced to pay the conquerors a substantial war reparation of 450 million silver taels (around $333 million U.S. dollars at the then exchange rate) in a course of 39 years according to the *Treaty of 1901*. As one of the invaders, the United States excessively claimed the indemnity. Historian Hunt (1972) suggested that, according to the records of U.S. National Archives, Secretary of State John Hay demanded the Chinese government pay $25 million U.S dollars in 1901, nearly twice the American claims for damages made in the summer of 1900. When the heavy financial burden exacerbated the hostility of the Chinese to foreigners, the United States federal government became concerned that too much indemnity might upset China's foreign trade, within which American merchants had an important stake. The United States finally decided to return the surplus amounting to nearly 11 million U.S. dollars to China, and required that "China should devote the money only to education" (Hunt, 1972. p. 541). As a direct result, Tsinghua College, a school primarily focused on preparing Chinese students to study in the U.S., was funded.

After the People's Republic of China (PRC) was founded in 1949, Tsinghua was claimed by the Communists and was restructured with other institutions in the early 1950s. During this period, Tsinghua functioned as a national industrial technology training college. After the implementation of economic reform and policies in 1978, Tsinghua incorporated a

multidisciplinary system and gradually transformed itself into a full-range comprehensive research university.

Over recent years, Tsinghua has been steadily climbing up in major international rankings. In 2015, it was placed in the group of 101-150 in ARWU, 49th in THE, and 47th in QS respectively. In 2017, Tsinghua improved its position to 48th in *ARWU*, 35th in THE, and 24th in QS. Meanwhile, since 2016, Tsinghua has been ranked as the best engineering and computer science school in the world, topping both Massachusetts Institute of Technology (MIT) and National University of Singapore (NUS) (USNWR, 2016).

Since it was built, Tsinghua has produced many notable graduates. These include the current Party General Secretary and Chinese President Xi Jinping, the former Party General Secretary, President Hu Jintao, former premier Zhu Rongji, and former chairman of the National People's Congress Wu Bangguo. Tsinghua also has two Nobel Prize Winners, Tsung-Dao Lee and Yang Chen Ning. The Chinese refer to Tsinghua as "China's MIT", comparing the impact of the university with other prominent higher education institutes in the West.

Ranking and its Proliferations

Usher and Savino (2006) defined university ranking as a "list of certain groupings of institutions, comparatively ranked according to a common set of indicators in descending order" (Usher & Savino, 2006. p.1). They were originally conceived at the national level, with the United States being the first to employ them. In his book *"The Great Brain Race: How Global Universities Are Reshaping the World*", Wildavsky indicates the earliest college evaluation in the U.S. can be traced back to the 1895 "*Illustrated History of the University of California*", in

which a chart indicates a snapshot of the fitness level of the men at the University of California, comparing the physical prowess of the undergraduates to those at Yale, Amherst, and Cornell (Wildavsky, 2012). In 1906, James Cattell, an American psychologist at the University of Pennsylvania, published "*American Men of Science*", in which he ranked institutions on the basis of the number of eminent scientists associated with an institution. The practice was regarded as the first U.S. ranking attempt. Since then, a number of ranking practices were implemented during the subsequent decades. Most of these earlier rankings focused on educational outcomes represented by "great graduates" rather than on "institutional reputation" in these early-age rankings.

Since the early 1960s, survey-based reputational methodology began to supplant the previous systems. With the expansion of America's higher education in the 1970s, the growth of admission at elite universities led to a robust competition for reputation and ranking. Under such circumstances, numerous ranking reports were produced and disseminated to students and parents, informing them how to make a sound choice of colleges. These rankings include The *Gourman Report*, published from 1967 to 1997; The *New York Times Selective Guide to College* launched in 1981; and *the U.S. News* launched in 1983 (Usher & Savino, 2006; Salmi & Saroyan, 2007; Wildavsky, 2010).

In the 1990s, national ranking spread to other regions. From North America and Western Europe to East Asia, Africa and Latin America, university rankings or league tables were developed in over 30 countries (World Bank data, 2007). Sooner later, as higher education became globalized, international university ranking systems emerged and attracted a greater public attention.

The first international ranking was produced in 1997 by *Asiaweek* magazine. The ranking only ranked the universities in Asia. In 2003, Shanghai Jiao Tong University released China's first international university ranking, "the *Academic Ranking of World Universities*" (ARWU). Its birth caused a tidal wave in the rating world. The U.K. produced the *Times Higher Education* (*THE*) and the *QS World Ranking* (*QS*) in 2004. Then, Taiwan issued the *Performance Ranking of Scientific papers of World Universities* in 2007. In 2008, the *U.S. News* expanded the rating worldwide and renamed it as the *U.S. News & World Best Colleges Report.* At the same time, Spain, Indonesia, Russia, Netherlands, Australia, and the European Commission also participated in the practices. According to the Institution for Higher Education Policy (IHEP), there were at least eleven international ranking systems in the world by 2014.

In examining the causes of its unexpected growth, Marginson (2006) argues that the prominence of higher education and the concomitant rise of ratings grew out of three key developments. They are (1) mass higher education has become the norm across the world; (2) research and innovation are key to most products and services, and the basic research conducted in universities is the most fertile source of new ideas; (3) for governments, higher education has become a place where social opportunities are provided, the source of innovations, and a site of global networking (Marginson & Van Der Wende, 2006). All of these factors combined contributed to the ranking proliferation.

Major International University Rankings

The *ARWU*

The Academic Ranking of World Universities (ARWU) is one of the major global university rankings. It was first released by Shanghai Jiao Tong University (SJTU) in 2003, and therefore it is called the "*Shanghai Ranking*". This ranking periodically examines and ranks more than 2,000 universities every year and then posts the top 500 on the website of SJTU. In the system, each institution is given an overall points scale and ranked relative to other institutions.

The ranking assesses the performance of world universities by using six key indicators, including the number of alumni and staff winning Nobel Prizes and Field Medals, the number of highly cited researchers selected by Thomas Reuters, the number of articles published in 21 broad subject Journals of Nature and Science, the number of articles indexed in Science Citation Index (SCIE), and Social Sciences Citation Index (SSCI), as well as the Arts and Humanities Citation Index (AHCI) and per capita performance of a university (The website of ARWU).

The ranking initially used the quantitative information only. Data are collected mostly from independent third parties, such as the official site of the Nobel Prizes, the official site of the International Mathematical Union, and various Thomas Scientific sites. To improve the validity and transparency of the ranking results, the authors of *ARWU* recently incorporated qualitative data derived from surveys sent to the heads of faculties and departments of the top 100 universities worldwide across a wide range of subjects. According to the official website of ARWU, the survey was designed with three sets of questions. The first question asks the participants to list the top-tier journals in their primary subjects. The second question asks them to identify the most influential and credible international awards, and the third question requires participants to list the names of living researchers who have made the most important

contribution to the body of knowledge in their subjects. They give the leaders criteria to evaluate the top journals and awards in the survey, and update the results on the official website quarterly.

The *ARWU* is widely viewed as the first international ranking in the world. Due to the imperfect methodology, it has been widely criticized by academics and worldwide higher education leaders for its disproportionate focus on research publication indicators, the overweighting of science-related disciplines, and the preference given to the academic papers written in English (Altbach, 2006; Billaut, Bouyssou, and Vincke, 2009; Dill and Soo, 2005; Usher and Savino, 2006; Ward, 2013).

The *THE(S)* & *QS*

The Times Higher Education World University Rankings (THE) released its first league table report in 2004, in association with the research firm Quacquarelli and Symonds (QS). At the outset, the name of the ranking was formally called the "*THE-QS* World University Rankings". However, the collaboration between the two companies ended in 2009. Following that, the two companies produced their own versions of university rankings beginning in 2010. While *THE* adopted a new scheme to create its rankings, *QS* chose to use the pre-existing methodology.

THE improved its methodology of rating by collaborating with Thomson Reuters, a multinational mass media and information firm. The new methodology contains 13 separate indicators grouped into five categories: Teaching; research; citations; international mix; and industry income. *THE* is the only ranking that examines a teaching environment compared with other rankings. Besides institutional comparisons, the *THE* also includes subject rankings, as

well as five national and regional league tables which include Asia, Latin America, Japan, the U.S., and the BRICS and Emerging Economies.

QS is notable for its 48 subject rankings and graduate employability rankings, along with five independent regional tables encompassing Asia, Latin America, Emerging Europe and Central Asia, the Arab Region, and the BRICS. However, it has been criticized for over-reliance on subjective indicators and reputational surveys, which tend to fluctuate from year to year (Bookstein, Seidler, Fieder, & Winckler, 2010).

The *USNWR*

The U.S. News & World Report (*USNWR)* was created on the foundation of American domestic university rankings. In 2008, the *U.S. News* expanded the rating worldwide and the ranking was renamed the U.S. News & World Best Colleges Report. Data in its rankings were collected primarily through surveys sent to each school annually, as well as from third-party data sources like school websites and government websites. The ranking has gained enormous influence in education and other relative sections since it was released. According to Smith (2013), the U.S. News & World Best Colleges Report in 2014 attracted 2.6 million visitors and 18.9 million page views in one day.

Table 8: Major International University Rankings in the World

Name of Ranking	Year	Abbreviation	Country/Region	Produced Institution
Academic Ranking of World Universities	2003	ARWU	China	Centre for World-Class Universities, Shanghai Jiao Tong University, China
QS World Universities Rankings	2004 2010	QS	UK	Quacquarelli Symonds, a British Company, UK
Times Higher Education World Universities Rankings	2004 2010	THE	UK	Times Higher Education, UK
Webometrics Rankings of World Universities	2004		Spain	Cybermetrics Lab, Spanish Consejo Superior de Investigaciones Cientificas, Spain
Performance Ranking of Scientific papers of World Universities	2007		Taiwan	Higher Education Evaluation & Accreditation Council of Taiwan
U.S. News & World Best College Rankings	2008		US	U.S. News& World Report, US
CWTS Leiden Ranking	2008	CWTS	Netherlands	Centre for Science and Technology Studies, University of Leiden, The Netherlands
SCImago Journal and Country Ranking	2009		Spain	SCImago Research Group, Spain
UI GreenMetric Ranking of World Universities	2010		Indonesia	Universities Indonesia, Indonesia
U-21 Ranking of National Higher Education Systems	2012	U-21	Australia	Institute of Applied Economic and Social Research, Australia
U-Multirank	2014	U-Multirank	European Commission	European Commission

What do these Rankings Measure and How do they Measure

By nature, rankings, be they at regional, national, or global levels, are used to measure the quality of higher education. By selecting a range of indicators and assigning each indicator a weight, ranking aggregates a final score and then ranks them sequentially to represent HEI's performance.

Rankings are produced mainly by newspapers and magazines, universities, research centers, or governments. Data used to produce these rankings are derived from three sources: independent third parties such as public databases, surveys designed and distributed to various education stakeholders such as students, university leaders, as well as employers; and university sources. Each of the data sources has its advantages and disadvantages. The use of each source of data and the different weight given to each indicator make a great deal of difference in the final scores.

In most cases, research productivity is the most popular aspect assessed in rankings. This is because, firstly, the research data are widely available and easily measurable; and secondly, research productivity is considered the most important indicator of higher education quality (Hazelkorn, 2003; Salmi & Saroyan, 2007). Accordingly, indicators related to research publications are generally given the highest weight in rankings. For instance, the number of articles published in a few particular journals and the number of citations account totally for about 40 percent weight in ARWU, compared to 60 percent in THE and 20 percent in QS. Moreover, since research and citation data are usually derived from Thomson Reuter's Web of Science or Elsevier's Scopus, the databases in which only the bio- and medical sciences research data are most accurate, the research in humanities have been much neglected.

Besides research productivity, other common items measured in major rankings include university reputation, faculty/students ratio, the extent of internationalization, as well as the resources and expenditures that an institution has. Table 9 shows the main indicators and weightings employed in each of the four major international rankings.

Such practice is highly debatable. Hazelkorn (2013) suggested the methodology ignored the full breadth of higher education activities. Meanwhile, rankings are often criticized for favoring a fraction of large prestigious institutions. According to the Institutional Association of Universities (IAU), there are over 17,000 HEIs in the world. Most rankings publish universities only up to top 200, which represent less than 1.2 percent of the world's HEIs. In addition, despite the huge difference in regional context and ranking methodology, the results of major international rankings are often similar. The very top universities in the world are always American and British institutions. For example, in all three major international rankings, ARWU, THE, and QS, at least 15 American research universities and 2 British universities appear in the top 25 every year. Harvard, MIT, Yale, Cambridge, and Oxford emerge in the top ten positions in all global university rankings. For improving the spectrum, these major international rankings have attempted to create sub-institutional rankings or subject rankings.

Table 9: Indicators and Weights of *ARWU, THE*, and *USNWR*

Ranking System	Main Indicators	Weighting
ARWU	□ Quality of Education □ Quality of Faculty 1. No. Nobel Prize/Field Medal 2. No. HiCi Researchers □ Research Output 1. No. Articles in Nature/Science 2. No. Articles in Citation Index □ Size of Institution	10% 20% 20% 20% 20% 10%
THE	□ Teaching (the Learning Environment) □ Research (Volume, Income, and Reputation) □ Citations (Research Influence) □ International Outlook (Staff, students, Research) □ Industry Income (Knowledge Transfer)	30% 30% 30% 7.5% 2.5%
QS	□ Academic Reputation □ Employer Reputation □ Faculty/Student Ratio □ Citations per Faculty □ International Faculty Ratio □ International Student Ratio	40% 10% 20% 20% 5% 5%
USNWR	□ Global research reputation □ Regional research reputation □ Publication □ Books □ Conferences □ Normalized citation impact □ Total citations □ No. of publication that among the 10% most cited □ % of total publications that are among the 10% most cited □ International collaboration □ % of total publications with international collaboration □ No. of highly cited papers that are among the top 1 % most cited in the respective field □ % of total publications that are among the top 1 % most highly cited papers	12.5% 12.5% 10% 2.5% 2.5% 10% 7.5% 12.5% 10% 5% 5% 5% 5%

Sources: Data from the official websites of the three major rankings. Retrieved from:
http://www.shanghairanking.com/subject-survey/survey-methodology-2017.html
https://www.timeshighereducation.com/world-university-rankings/methodology-world-university-rankings-2016-2017

https://www.topuniversities.com/qs-world-university-rankings/methodology
and https://www.usnews.com/education/best-global-universities/articles/methodology

Rankings' Impact

Over the past decade, there has been considerable research on rankings. Some examine the indicators and weights used to create these rankings (Clarke, 2004; Dehon, McCathie, and Verardi, 2009; Billaut, Bouyssou, and Vincke, 2009; Shin, Toutkoushian and Teichler, 2011). Among them, one well-known study is "*Should you believe in the Shanghai Ranking*", written by French researcher Billaut and his colleagues in 2009. The authors analyzed ARWU's methodology by using the concept derived from Multiple Criteria Decision Making (MCDM). They examined the consistency of each indicator with the measuring target and then pointed out that the criteria used by ARWU were not relevant to assess the quality of academic institutions. The research exemplarily represented a cluster of studies that argue about rankings' methodology.

Other studies look at the rankings' increasing impact on student's college selection, HEIs decision making, and national higher education policy *et. al.* (Hazelkorn, 2007; 2008; 2009; Dill and Soo, 2005; Erkkilä, 2013; Kehm and Stensaker, 2009; King, 2010; Shin and Kehm, 2013). What follows here introduces the literature and synthesizes the views of these studies according to the different aspects of rankings' impact they examined.

First, rankings are reported to have affected students' application decisions (Lipman Hearne, 2006; Perna, 2006; Kallio, 1995; Clarke, 2007). In a research article, Clarke (2007) synthesized that perceived academic quality, reputation of the institution in general, particular academic programs, and commercially produced ranking publications are the four most important factors that influence students' decision making in university selection. He suggests

that these elements are taken into consideration particularly by those high-achieving students from high-income families when they choose universities. Clarke concludes that rankings contribute to the exacerbation of stratification and inequity of higher education (Clarke, 2007).

The impact of rankings on prospective students can be explained from a market perspective. When students use rankings as an information tool to determine their dream universities, rankings, in essence, represent a commercialization of goods. Based on the market theory, the supply of a resource will increase when the demand for the goods rises with real benefits offered to consumers. Given this perspective, it is not a surprise that rankings have seen remarkable growth worldwide and have had a significant influence on students' choices, particularly under a worldwide higher education expansion environment.

Second, rankings are reported to have immediate implications on school admission (Dill and Soo, 2005; Haycock, 2006; Clarke, 2007; Hazelkorn, 2007, 2008, 2009, *etc*.). Many universities manipulate admission data in order to increase student enrollment, especially for those students who are likely to be the assets in terms of improving or enhancing their positions in the ranking race. Clarke (2007) synthesized these recruitment strategies into three categories: (1) implementing the early-decision program; (2) offering larger amounts of merit aid to high-achieving students; (3) investing heavily in student consumption benefits. Brewer and his colleagues (2002) suggested that this pursuit of prestige through increased investments in admissions selectivity is reinforced by commercial college ranking systems that use student input as a primary measure in their assessment of institutions.

In addition, as reputation of the institutions is commonly measured in most ranking systems, many universities have accordingly brought strategic changes in management for

pursuing better performance. In a study conducted by Hazelkorn in association with the Program of Institutional Management in Higher Education (IMHE) and the International Association of Universities (IAU) in 2006, among 202 higher education leaders from the world, 137 admitted that their institutions used rankings as a management tool to modify the priorities in order to achieve a maximum academic productivity. The specific practices may include implementing new curriculums; embedding rankings in 'target agreements' with faculties; establishing a special unit to monitor rankings; providing more scholarships and staff appointments; and hiring more Nobel laureates, *etc.* (Hazelkorn, 2007, 2009). In addition, in order to increase international student recruitment and tuition revenue, many universities worked hard to improve and maintain their international stature (Caldwell, 2010). On the UNESCO Forum on Higher Education held in 2009, Hazelkorn (2009) observed that "because rankings usually favor large size comprehensive institutions, many universities accordingly established or restructured research institutions with special or target investment. And, the practice is pervasive across higher education" (Hazelkorn, 2009. p. 6).

Organizational theory suggests an organization's behaviors are shaped by both internal and external forces (Greenwood/Hinings, 1993). In response to dramatic environmental changes, a shift in organizational structures and activities may increase short-term profit performance and long-term survival chances (Haveman, 1992). As rankings play an important external role in higher education direction, it is not surprising that rankings have exerted such a great influence in provoking internal structural changes, as well as institutional decision making.

Third, rankings are reported to have the ability to guide national higher education reform (Wildavsky, 2010; Ward, 2013; Erkkila, 2014; Okebukola, 2013. *et.al.*). While human capital is

an important output of universities, so is the research on which so much innovation and economic growth depend. It is important for governments to strike the right balance in accessing universities. Rankings inform governments as to whether their own policies are well considered or their scholarship funds are well spent. In his book "*The Great Brain Race: How Global Universities are Reshaping the World*", Wildavsky suggested that rankings provided a gauge whereby a nation that wants to increase the quality and quantity of its institutions can measure its progress (Wildavsky, 2010).

Rankings can also have geopolitical implications. For instance, largely because its top institution of higher education, L'ecole Normale Superieure rue d'Ulm, Paris *ENS* was rated at only 71st in the 2013 *Shanghai Ranking* report, the French government called for a large-scale higher education reform which later expanded to other European countries (Ward, 2013; Erkkila 2014). Erkkila (2014) argued that the issues made the European university model a policy concern for the European Union (EU). In the ongoing reforms, global university rankings play a policy discourse role, guiding the planning of initiatives and funding allocation. In addition to that, rankings also offer references for developing countries or regions to develop their own indicators of excellence. For example, Okebukola (2013) reported that by emulating ARWU, THE, and Webometrics templates, both Nigeria and the African Union have produced their own national and regional rankings.

From the industry production standpoint, policymakers believe the quality of higher education could be improved by controlling the quality of input; managing the process of production, as well as measuring the outputs. The theory explains why rankings can profoundly influence higher education systems in so many countries. However, successful institutional

changes depend not only on the intended change itself, but also on the congruency of fit between content, context, and process considerations (Damanpour, 1991).

Although it has become a common phenomenon that rankings lead HEIs to reforms, the detailed transformation process of higher education system as a whole varies depending on different national socioeconomic contexts. In 2009, IHEP observed 20 HEIs in Australia, Germany, Japan, and Canada, investigating how rankings have influenced the universities in the four countries (Hazelkorn, *et al.*, 2009). It is reported that all the higher education systems in the four countries have experienced a certain degree of transformation under the globalized ranking culture.

For example, in Australia, the higher education system originally consisted of research universities and vocational colleges. In order to deal with demographic pressure and enhance "the quality, diversity, and equity of access to higher education" (Higher Education Funding Act, 1988), the Australian government conducted education reforms since 1987. As the reform provoked severe funding tensions, many Australian universities relied on international recruitment for funds. This new reality made Australian higher education institutions sensitive to rankings. In order to improve higher education competitiveness, the Rudd government released a new education reform plan in 2008, confirming that Australia intended to build a world-class higher education system. In the process, Australian universities were given more autonomy regarding institutional decision-makings. Higher education leaders paid serious attention to rankings. Many HEIs conducted more and more ranking-oriented practices. They used rankings as political leverage to lobby for funding. They invested more resources to improve research productivity than teaching.

In Germany, the higher education system underwent deterioration and is now embarking on a path back to excellence. Germany was the country where the modern western higher education system was created. German higher education institutions, therefore, were recognized as the world's best universities. However, over the past two decades, few German institutions were listed in top 50. For example, Munich University was profiled as 55th in the 2008 ARWU report, while Heidelberg University stood at the 57th in THE in the same year. The situation provoked wide concern in Germany and led to national higher education reform.

German HEIs embarked on the Initiative for Excellence (*Exzellenzinitiative*) starting in 2005. This marked a significant shift of their higher education development strategy from the traditional emphasis on egalitarianism toward competition and decentralization. The initiative promoted top-level research institutions through building a German "Ivy League". Recognizing the importance of benchmarking, the Centre of Higher Education Development, in association with the German Academic Exchange Service and the weekly newspaper *Die Zeit*, published German university rankings in 2005 (CHE University Ranking Website). Since then, the ranking, along with the other international league tables, has sharply increased the German HEIs' consciousness on educational performance. In German HEIs, these rankings are used to inform and identify strategic plans, as well as to help the institutions to clarify their profile and missions. The particular approaches used to promote ranking position include reorganizing departments; merging small units into large ones to enhance their visibility, and constantly improve the monitoring instruments.

Despite different social backgrounds and some potential negative effects, the rankings served as a tool to develop policies that restored and reinforced the international statures of their

HEIs. In contrast, in some developing countries the most popular reform practice to academic excellence is to build world-class universities. According to the World Bank Forum Report of "*The Road to Academic Excellence*" (Altback & Salmi, 2011), countries that have attempted at building world-class universities for the sake of their national competitiveness include Singapore, South Korea, Russia, India, China, Brazil, Chile, and Malaysia. By using a mix of strategies, these countries have upgraded the international statures of their universities entirely, and the global ranking systems invariably play an important role for these institutions. For example, the National University of Singapore used global university rankings as a benchmark to assess the improvement of the institution (Mukherjee & Wong, 2013), while South Korea built up its new private university "Pohang University of Science and Technology" with an international reputation according to the major global rankings (Rhee, 2013).

Hazelkorn (2009) suggests there have been two discernible patterns in national initiatives of building world-class institutions. One is the "Neo-liberal model", which refers to the approach that selects a small group of research-intensive universities in the country to compete globally. The other one is the "Social-democratic model" which aims to build a horizontally differentiated high performing system to support excellence wherever it occurs. Regardless of which strategy is adopted, these cases suggest rankings have become one of the most significant external driving forces of higher education reform.

As one of the fast-growing developing countries, and the nation where the first international university ranking was produced, China has launched a series of initiatives to develop the international stature of its tertiary education system.

Major Governmental Initiatives to improve HEIs' Performance in China

Project 211

Beginning in 1995, The Ministry of Education of China launched the initiative "Project 211" for promoting 100 key universities from narrowly specialized colleges to research institutions. From 1996 to 2013, a number of specialist institutions were merged in order to create large comprehensive universities that focus on not only teaching but also research. The Chinese government allocated nearly US$20 billion to more than 100 universities to improve their facilities (National Bureau of Statistics of China, 2014). Meanwhile, a number of prioritized specializations, mostly in the fields of sciences and technology, were identified and sponsored. According to the data of MOE (2017), 112 higher education institutions were designated as "Project 211 Institutions" by 2013. The project has paved a way for China's higher education to shift its focus from technological training to research development.

Project 985

"Project 985" is another initiative operated by the Chinese government with the particular purpose of establishing "world-class" universities in the 21st century. It was officially launched in 1998 right after Jiang Zemin's speech at the 100th-anniversary celebration of the birth of Peking University. Compared to "Project 211", "Project 985" has an explicit goal of making a small group of key Chinese universities into the world's best. In the initial phase from 1998 to 2003, nine universities, including Peking, Tsinghua, Fudan, Zhejiang, Nanjing, Shanghai Jiao Tong, Xi'an Jiaotong, Harbin Institute of Technology, and the University of Science and Technology of China, were designated founding members. In the second phase, from 2004 to 2010, the number of universities was expanded to 39. According to "*China Education Statistics*

Year Book" (2010), the Chinese government granted twice as much funding to Project 985 compared to Project 211. Besides developing new research centers and improving facilities, much of the funding was used for international conferences, to attract world-renowned faculty and scholars, and to support Chinese faculty to attend conferences abroad. By participating in such activities, Chinese universities demonstrated their ambition to be included in the top-ranked institutions in the world. By 2011, both “Project 211” and “Project 985” were closed and replaced by the "Double First Class University Plan”.

Double First Class University Plan (Shuangyiliu)

The “Double First Class University Plan” is a renewed initiative replacing the “Project 211” and “Project 985”. It was proposed in 2015 and has been implemented since 2017. The goal of the plan is to position a few first-tier Chinese universities on the major world university rankings. The term “Double First Class” means both universities and disciplines are involved. The full list of the sponsored universities and disciplines encompasses 42 first tier universities and 465 first tier disciplines selected from amongst 140 HEIs including those first-class universities (Ministry of Education of PRC, 2017).

Thousand Talents Program

The Thousand Talents program is a national-level recruitment plan. Through the initiative, the Chinese government invites leading overseas experts, including Chinese scholars and international talents, to China to strengthen scientific research, innovation, and entrepreneurship. The program was launched in 2008 and has been implemented since. It is comprised of two mechanisms: one for permanent recruitment into Chinese academics, and one for short-term appointments. The latter category is typically for those international experts who

are winners of major prizes such as the Nobel Prize and the Fields Medal. The program is led directly by the State Council. The talents are provided with a wide range of benefits including the prestigious title, high pay, and visa privileges. It also provides a one-time bonus of RMB 1 million (US$ 153,000) to select individuals, and assured assistance with housing and transportation costs. The professorship is recognized as the highest honor awarded by the Chinese government. The Thousand Talents Scholars are also eligible for high levels of government funding (National Talent Development Plan, 2010).

Given the overall improvement of Chinese higher education, the research that has examined the performance of Chinese higher education institutions in building world-class university is inadequate. Among the studies conducted in China, only the reform case of Shanghai Jiao Tong University was reported so far by the university itself (Liu, Wang & Wang, 2011). In order to add more literature reference in the field of research, the study will investigate another Chinese university, Tsinghua University, to explore the transformation process of the university in pursuing its "world-class" status, as well as the impact of rankings on the change from an observer's standpoint.

Summary

Overall, as an evaluation system, rankings are created and operated under a context that higher education is in a competitive global market. They are assessing higher education performance with different choices of indicators and weightings. The obsession with the reputation status associated with global rankings has been reshaping higher education institutions worldwide.

CHAPTER III

RESEARCH METHOD

This study examines the process of the transformation of a Chinese higher education institution into a world-class research university. It aims to offer a better understanding of the impact of global university rankings in reshaping contemporary higher education institutions in China. Using Tsinghua University as a case study, this research attempts to answer the following three questions:

(1) How did Tsinghua University become a top world research university?

(2) How did the international university rankings affect the transformation?

(3) Why did Tsinghua University improve so quickly? (What are the reasons for the rapid improvement?)

Research Design and Rationale

The research uses a case study methodology. According to Yin (2014), the case study method is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context. It is well suitable when the contextual conditions are pertinent to the phenomenon of the inquiry (Yin, 2014). Because a university's transformation is a complex phenomenon and takes place in a specific context within which "the changing contents and the context have high congruency" (Yin, 2014. P6), it is appropriate to adopt a case study design to explore and analyze the new phenomenon.

In general, in a single case design, the rationale for choosing a case of analysis is to select a critical, unique and revelatory case for testing a well formulated theory, documenting a rare case, or analyzing a phenomenon that is inaccessible to scientific investigation (Yin, 2014). In the present study, the case of Tsinghua University's transformation in pursuing its world-class profile is selected because of its exemplary and revelatory nature. Tsinghua University, located in the center of politics and culture of China, possesses the most prestigious reputation in the Chinese higher education sector. It has been regularly included in the four major global university rankings and has shown the most significant standing improvement among the other Chinese HEIs in these rankings over the past decade (Tables 1.3 to 1.6). The university, therefore, is qualified to serve as a case in the study. This chapter introduces the information about the methodology of the study and outlines the specific procedures regarding data collection and analysis. In addition, a discussion about the validity and reliability of the research is included.

Methodology

This is a qualitative case study that explores the process of transformation that a Chinese university went through in building up its academic excellence position in global rankings. The qualitative method design helps researchers to gain an in-depth, rich understanding of the factors that contributed to China's upgrade of a few elite universities on global ranking ladders.

Data Collection

The study collected qualitative data. According to Yin (2014), a case study often uses multiple sources of evidence. The most commonly used data sources in doing case studies

include documentation, archival records, interviews, direct observations, participant-observation, and physical artifacts (Yin, 2014). Of the six methods, this study adopts three: the in-depth individual interviews, the documentation review, and the direct observation to collect the research data.

Qualitative interview is a method that helps researchers to explore the views, experiences, beliefs, and motivations of participants (Chadwick, Gill, Stewart, and Treasure, 2008), and are believed to provide an in-depth understanding of social phenomena (Creswell, 2007).

In the phase of research preparation, this author initiated contacts with university administrators via emails, informing them of her research plan and requesting permission to collect data on campus. After obtaining their verbal permission, the researcher flew to Beijing and immersed herself in the University of Tsinghua to conduct the research in January 2018.

During the time of immersion, eight semi-structured onsite interviews were conducted with three categories of interviewees: (1) an official at Chinese Ministry of Education, (2) a Tsinghua administrator at the University level, (3) six faculty and staff members and students. Participants were recruited through a convenience sampling technique. Convenience sampling is a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in the study. According to Creswell (2007), the method can provide useful information for answering questions and hypotheses (p.144).

The participants were asked to respond to questions on the topic regarding how Tsinghua achieved world-class university status. The interview questions were designed based on Hazelkorn's (2009) theory that rankings influence higher education institutions in three respects:

academic performance; organizational restructuring, and higher education policy. Given their different professional positions, these questions were asked from multiple perspectives (Appendix A). The approach ensured that participants could express themselves broadly on the research questions.

Each interview lasted from 40 minutes to 120 minutes and was recorded with a smart phone with permission of all interviewees. Written notes were taken during the interviews; so were field notes after each meeting. All of these records and notes have been translated, transcribed, and then, coded for themes.

In addition to interviews, I also reviewed the documentary information and archival records. Yin (2014) suggests that documentary information is likely to be relevant to every case topic in case studies. During the searching process, I found thousands of documents that recorded a variety of achievements made by the university. By following the guideline that only documents relevant to building the university to a "world-class" ranking should be included, the process has eliminated many irrelevant ones. The final documents reviewed in the study include Tsinghua's Yearbooks from 1998 to 2015, "The Strategic Plan of Tsinghua University (2020-2050)" made in 2017, several laws and regulations of higher education and relevant policy statements issued by the Ministry of Education of China, as well as a number of reports in the newspapers "People's Daily" (*Renmin Ribao*) and "China Education Daily" (*Zhongguo Jiaoyu Bao*). The book entitled *The History of Tsinghua University* was accessed in the Beijing Metropolitan Library (*Shoudu Tushuguan*) and was found extremely useful for this project. (Tables 10 and 11)

Table 10: Major Documents Reviewed

Name	Categories
Tsinghua Yearbooks (1998-2015)	Historical document
Tsinghua University Strategic Plan (2002-2020)	Policy document
Tsinghua University Strategic Plan (2020-2050)	Policy document
"The History of Tsinghua University"	Book

Table 11: Relevant Laws and Regulations Reviewed in Document Reviews

Law and Regulations	Year the Document was Issued
Higher Education Law of the People's Republic of China	1998
Interim Measures for the Administration of Colleges and Universities Engaged in Oversea Education	2002
Outline of the National Medium-and Long-term Program for Education Reform and Development (2010-2020)	2009

Most of these documents and records are online and are searchable. Because the most important use of document information is to corroborate and augment evidence from other sources (Yin, 2014), the documentary information was collected in two phases. Prior to the interviews, background information and archival records about the university were reviewed to better understand Tsinghua's initial status. After the interviews and observations, articles were reviewed in order to confirm the consistency of the information acquired. Through reviewing the documentation and archival records, not only did the author confirm that the development of Tsinghua had happened in accordance with the information derived from other sources, she also gained a thorough understanding of how rankings exert influence within the Chinese higher education system.

Further, direct observations through self-immersion at the University were conducted. Yin (2014) noted the importance of experience with a subject under investigation. Because a case study takes place in a real-world setting, the researcher is able to create an opportunity for

direct observation (Yin, 2014). While conducting the study, this author lodged on Tsinghua campus, visited places of significance, and witnessed the improvement in facilities as well as the morale of Tsinghua's faculty and students. This immersion helped me obtain more detailed information about the university's transformation. Table 12 lists major locations visited and observed on Tsinghua campus.

Tsinghua University has a long history, so some of its buildings, including classrooms and offices, lack elevator-access and remain equipped with squat toilets. In contrast, clusters of newly-built halls are furnished with advanced facilities. During meal times, this author also informally discussed with students and faculty in several of the dining halls, in an effort to learn their experiences and opinions about the University. This was conducted during the last period of China's Fall semester of 2017 which ended in late January 2018 when Chinese New Year approached. Naturally the faculty members and students were quite busy doing their final assessments. Through observing their activities on campus, the researched gained valuable information related to the faculty's workload and students' learning attitudes. The field notes were summarized in later chapters to delineate overarching findings. Such data complemented the information gained from interviews and document reviews, providing multiple perspectives regarding the institution's performance.

Table 12: Major Locations Observed on Tsinghua Campus

	Location	Year the Building was Constructed
1	The Old Gate	1767
2	Tsinghua University Library (the oldest one)	1916
3	School of Economics and Management	1984
4	Tsinghua University Science Park	2002
5	Institute for Advanced Study	1997
6	Schwarzman College	2016
7	Dining Halls	N/A

Lastly, a database was created in order to sort the various sources of data. Yin's (2014) suggests that the information gained this way be divided into two categories: the evidentiary database, and the researcher's report. The compilation of all the data on Tsinghua was stored in a digital file created in the computer. The information was collected for research purposes only. After the study is completed, all recordings, transcripts and other information gathered about subjects will be destroyed.

Prior to collecting the data, the author fortunately gained IRB exemption approval from the Institutional Review Board (IRB) of the University of Bridgeport (Appendix B).

Data Analysis

After data collection was completed, the process of analyzing the data began. Yin (2014) states that data analysis strategy in case studies should follow some cycles involving the original research questions, the data collected, the interpretation of the data, and the researcher's ability to state findings and draw conclusions. As the study aims to explore the impact of the global rankings race on HEIs, the research questions focus on the process and outcomes of transformation after the University underwent a series of reforms. The strategy used for data

analysis thus followed the theoretical propositions that guided the study, in particular, Hazelkorn's theory of rankings' impact on higher education.

Despite different contexts, Hazelkorn (2009) indicated that the changes resulting from the rankings race in higher education generally have three categories: academic responses, institutional responses, and national level policy responses. Academic responses mainly refer to the actions of producing research and knowledge, rebalancing research/teaching and learning, and applying new curriculum through modeling advanced programs in the world. Institutional responses consist of the redefining of school mission and vision; the organizational restructuring or the creation of the new departments; faculty and staff appointments and work loading, and financial resources allocation of the institution. National policy responses include updating national higher education objectives, proposing national initiatives, as well as providing preferential policies and increasing educational funds (Hazelkorn, 2009).

Before the data analysis began, all of the information gathered through the collection process was sorted into Hazelkorn's three categories: academic responses, institutional responses, and national policy responses. The step helped to identify the strategy and specific techniques to be used in data analysis. Among the classifications, the interview records were further separated into different groups based on the interviewees' professional positions.

Next, coding was initially conducted by using words and phrases from the interview transcripts. Then, similar words and phrases were grouped into meaning units. This phase helped to extract the thematic statements in the study, which in turn formulated the research findings. After the meaning units were clustered into themes, a textual description of the system transformation was developed to construct an understanding of the phenomenon. Meanwhile,

field notes and documentary review reports were also coded for themes, and compared with the themes derived from interview records. These significant statements and units of meanings were then used to write a description. This process allowed the researcher to interpret the findings in terms of "what happened" (textural), "how it happened" (structural), and ultimately, to develop an "essence of what happened" (Creswell, 2007).

To achieve higher credibility, pattern matching was applied after coding. Pattern matching is a logic that compares an empirical study with a predicted one made before researchers collected the data (Trochim, 1989). Yin (2014) ranks pattern matching as one of the most desirable techniques used in case study analysis, and the comparable patterns may include dependent variables or independent variables, or even a logic model. In the analysis, themes emerging from the three data sources were compared; Tsinghua's changing pattern was contrasted with the pattern that had emerged in other cases. The logical model is to determine if the pattern that emerges in the present study appears to be similar with the pattern demonstrated in previous research.

Role of the Researcher

This researcher was born and educated in China, pursuing her Ph.D. in the United States. Having received the bachelor degree from Beijing Normal University, she taught in both high school and college level institutions in China for a decade, with an in-depth understanding of the education system there. In 2011, she came to the U.S. for graduate study, and earned a master degree at the University of Bridgeport's (UB) East Asian and Pacific Rim Studies program. Since 2014, she has been enrolled in the doctoral program in Educational Leadership offered by

UB's School of Education. During this time, she also worked as a graduate assistant in several departments, participating in a variety of research and administration activities in the University. Her studies and professional experiences both in the U.S. and in China have equipped her with a keen interest in the field of higher education management. Through conducting the research, she has gained a valuable understanding of the impact of international rankings on policy-making in higher education.

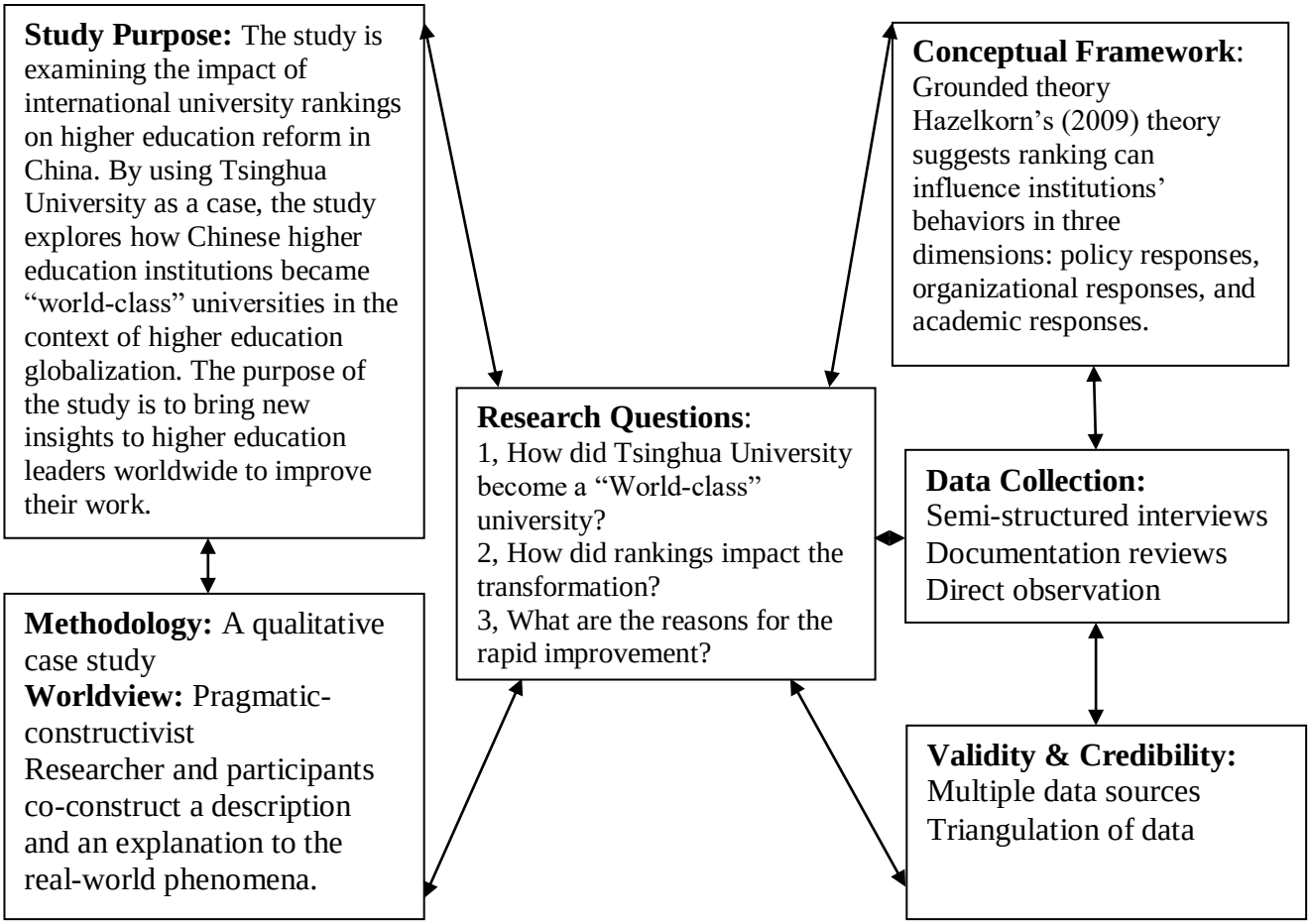
Research method theorists have observed that the researcher's personal experiences and beliefs cannot be separated from the phenomenon investigated, but rather they have an effect on the research process, from data collection and analysis to its interpretation (Lincoln and Guba, 1985; Creswell, 2007). In the study, the researcher holds a pragmatic constructivist stance. In the process of data collection, she self-identified as a questioner, active listener, and an observer. She was reminded that the purpose of the research was to learn how China built some of the world's best universities in a global competitive context. Her aim was to be as open and receptive as possible to participants' perspectives and beliefs. Furthermore, since she shared the same cultural background and language with participants, the participants' ideas were more accessible.

In analyzing and interpreting data, she synthesized her own identity, knowledge, and understanding, based on participants' narrations. Her views on higher education management were developed through the four-year doctoral program of study in the U.S., which allowed her to examine a complicated education phenomenon from a theoretical perspective. Her Chinese educational background facilitated a better understanding of the Chinese HEIs' strengths and weaknesses. In analyzing data, it was easy to recognize the cultural clues in the participants'

expressions as well as to more accurately understand the meaning of participants' phrases. Her reflective field notes also recorded her rich interactions with Tsinghua faculty and students.

In summary, the research questions and purpose led to a qualitative case study method in the present format. Figure 2 demonstrates the graphics model of the research methodology. Guided by case study techniques, data from multiple sources that formulated in the triangulation fashion was collected. In the data analysis phase, all the evidence was attained and examined through a consistent and coherent theoretical stance.

Figure 2: Graphic Research Matrix



Research Validity and Reliability

Ensuring research validity and reliability is one of the most critical phases in establishing the trustworthiness of a qualitative research. In case study analysis, reliability and validity can be affected by many factors, such as (1) overloaded data, (2) a single case design, (3) credibility of the inquirer and interviewees, and (4) reader's and users' philosophical bias (Kohn, 1997). In general, external validity is enhanced by a multiple-case design, while internal validity is strengthened by the method of triangulation.

Triangulation means using more than one method to collect data on one topic. This method can help a researcher to capture different dimensions of a phenomenon and assure the validity of research. Patton (2002) explains that the triangulation approach has four types: data triangulation, investigator triangulation; theory triangulation; and methodological triangulation. In the present study, the triangulation method was applied as a core approach to achieve research validity and reliability. First, data was collected from multiple sources, including face-to-face interviews, documentary reviews, and direct observation on campus. All sources of evidence were reviewed and analyzed together. The findings thus were based on the convergence of information from triangulated sources. This practice strengthened the validity of the study.

Second, in conducting interviews, participants were not only from the Ministry of Education official or university administrators but also from the faculty and staffs, as well as the students in the institution. Because their perspectives and perceptions were different from each other due to the distinct identification, their statements constituted an overall and precise explanation of Tsinghua's changes. Moreover, all of the interview data was audio-taped to instill confidence in its reliability as an impartial and accurate record of the interview.

Lastly, prolonged engagement also contributed to the research credibility. In January 2018, the researcher relocated to Tsinghua and her experience there provided an opportunity to have an in-depth understanding of the institution through a variety of activities mentioned in previous sections.

During the phase of data analysis, the collected information was scrutinized and interpreted. The interview transcripts and research notes were analyzed from a theoretical stance, which contributed to a methodological coherence to the study.

Limitations of Research Method

Every study has limitations. Ismail (2004) defines limitations as factors that influence research outcomes. Those factors may include the size of the sample, honesty of all responses, background of participants, and methods of data collection (Ismail, 2004). Creswell (2007) suggests that limitations are not within the researcher's control. They need to be reported within the study in order to help readers understand that these shortcomings were taken into account during the study.

The present study has its share of limitations. First and foremost, the research involves only one case, Tsinghua University. Although the single-case study is a common design in case studies, the evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more robust. Yin (2014) stresses that the single-case design is eminently justifiable under certain conditions. These are where the case represents (a) a critical test of existing theory, (b) an extreme or unusual circumstance, or (c) a common case, or where the case serves a (d) revelatory or (e) longitudinal purpose (Yin, 2014). In the instant study, only

Tsinghua being examined may not be sufficient to represent all Chinese higher education institutions as a whole, though it is indeed an extreme case and qualified to reveal the path that China used to build its universities' international status. As a result, it is also difficult to draw a generalization from the findings of the study.

Second, the changes in any higher education institution may not be attributed to the effect of ranking alone. Many alternative factors may also have influenced the institutional management and academic transformation. It is difficult to separate the impact of rankings on the change in higher education from the general impact of other variables. Although the qualitative case study was not intended to disaggregate the influence of rankings from other factors, the inquiry increased the internal validity threats.

Third, although the data collected in the case study constitute a triangulation, providing a solid verification about the impact of rankings in reshaping Chinese HEI, the study is also limited in its selection of participants. Only a few students, faculty, and administrators were interviewed. As the data collected in the study is not as large as an exploratory qualitative study should be, it may influence the credibility of the research. In addition, investigating the dynamic of a large-size university from an outsider's perspective may result in bias. The culture of the organization may not be fully understood unless the researcher has been personally involved in the organization.

The study is a qualitative research design by nature. When one conducts a study by using both qualitative and quantitative research design, it will provide a better understanding of the research problem than either type alone (Creswell, 2007). However, this study was conducted with only one kind of data strand. The validity and reliability of the study were threatened.

Summary

In conclusion, based on the research questions and purpose, the study adopted a qualitative case study design to explore the process of Tsinghua's transformation to become a world-class university. Data was collected through the in-depth individual interviews, the documentation review, and the direct observation. The multiple data sources constituted data triangulation, which increased the research credibility. After data collection was completed, the process of data analysis followed Hazelkorn's theory of ranking's impact on higher education. The research method provided an in-depth understanding on the specific case of Tsinghua University's transformation. On the other hand, using qualitative data alone and investigating only a single case added the difficulty to making a solid generalization in a research conclusion.

CHAPTER IV

RESULTS

The study explores the development of Chinese higher education in building world-class universities and examines the impact of world university rankings on Chinese higher education institutions. Through investigating the process of Tsinghua's transformation, the study is meant to offer a better understanding of China's higher education, as well as the impact of rankings in reshaping its higher educational institutions.

Accordingly, the research asks the three questions:

(1) How did Tsinghua University become a top world research university?

(2) How did the international university rankings impact the transformation?

(3) Why did Tsinghua University improve so rapidly? (What are the reasons for the rapid improvement of Tsinghua University?)

The previous chapter details how qualitative data were obtained through face-to-face interviews, documentation reviews, and direct observation. The purpose of the design is to provide an in-depth and holistic understanding within a real-world context about rankings influence on higher education reform.

Eight interviews were conducted during the study. The participants included a Ministry of Education official, a high-level administrator of Tsinghua University, two faculty members, one staff, and three students. Among the three students, two of them were graduate students from the School of Economics and Management; the third was a sophomore from Tsinghua Xinya College, a newly established undergraduate school administrated with a board of trustees.

The three faculty and staff members included a history professor from the School of Humanities, a businessman-turned instructor of entrepreneurship who managed a Tsinghua University-run enterprise, and a staff member working at Schwarzman College. Appointments were made with all three prior to the actual meeting, and they were informed that the discussion would revolve around the topic of rankings' impact and Tsinghua's transformation. The purpose was to ascertain their opinions about Tsinghua's advance and the reasons behind.

Participants were recruited through a convenience sampling technique. Research questions were designed according to Hazelkorn's (2009) model regarding rankings influence in reshaping higher education institutions. In addition, the researcher reviewed a series of relevant documentations and conducted direct observation at Tsinghua University. The data collected through all of the sources were coded and analyzed in order to generate the research findings. This chapter presents the comprehensive research results by following a question-and-answer format. Yin (2014) suggests that the question-and-answer format is developed based on the questions in the case study database. The format "helps to reduce the problems of writer's cramps, because the researcher can proceed immediately to answer the required set of questions" (p.185).

Findings:

Question 1: How did Tsinghua University become a world best research university?

To respond to the first interview question inquiring about how Tsinghua achieved a rapid and significant ascent in rankings, the high-level administrator of Tsinghua recalled and recounted the process of the university becoming world-class. She said,

"The process went through three phases. The startup moment could be traced back to the late 1980s and the early 1990s. In phase I, from 1994 to 2002, Tsinghua elevated the university from a technology-focused training college to a full-range comprehensive university through conducting a large-scale organizational restructuring. In phase II, from 2003 to 2011, Tsinghua achieved a major breakthrough in improving scientific articles productivity by implementing the "Thousand Articles Plan". In phase III, from 2012 to present, Tsinghua University accelerated the pace of internationalization and promoted broad and extensive collaboration with the institutions in other countries. These activities developed and enhanced the university's position as a world-class comprehensive research institution, shifting Tsinghua from a national-level renowned university to a top world institution."

The MOE officer said,

Building world-class research university is a national strategy. Chinese leaders recognized the significance of developing research universities in relation to economic growth. Under the Communist Party's leadership, the Chinese government has invested a great deal of funding in higher education institutions, encouraging them to produce new technology. A series of consecutive initiatives have been implemented over the past thirty years. They included "Project 211", "Project 985", "Double First Class University Plan" etc. Tsinghua is one of the best universities in China. The university has made a significant improvement during the recent years. Each step the institution took to academic excellence was under the leadership of the central government."

Faculty 1 said,

"Tsinghua originated its ambition to build world-class university in the late 1990s. However, at that time, nobody was sure what a "world-class" university would be like. All we knew of was just a few well-known universities in West such as Yale, MIT, Oxford, and Cambridge, etc.

Since the new century started, Tsinghua issued a series of new policies, vigorously encouraging research activities and publications. During the recent years, a number of young new teachers were recruited. Most of them have the background of studying abroad.

Teachers felt more and more pressure on their shoulders, especially those new teachers. In general, we should teach three or more courses in each semester. Young teachers are required to publish a certain number of research articles in high-impact international journals for promotion.

The faculty's competition for tenure is fierce in Tsinghua. Within the first nine-year period, every newly recruited teacher has only two opportunities to participate in the selection for the tenure status, making research published is one of the most critical prerequisites to win the competition. If you do not have any publications, you cannot succeed. If you fail, you will not be able to stay at the university."

Faculty 2 responded, saying,

"Tsinghua started to construct a science park in 1994. After twenty years of development, the park has become a nationwide science and technology base. It has accommodated over 1,000 companies and corporations, including 'Google China Research Institute,' 'Oracle China,' P&G, MSN, etc. By providing advanced technology, Tsinghua helped enterprises across the country make profits. The university itself also got stronger."

The staff responded, saying,

"Schwarzman College was built up in 2015. This is a one-year Master degree program. It was sponsored by Mr. Schwarzman, the chairman of Blackstone Group. He was a member of the advisory board of Tsinghua Economics and Management School in 2010. He donated US$100 million of his own money and helped raise US$400 million from over 40 partners and more than 30 top entrepreneurs around the world.

Since it was built, the program has been considered as one of the most competitive and prestigious fellowships in the world since all incoming students are selected from the most prominent undergraduate program in the world. Once enrolled, students will be free from tuition and any other costs."

Student 1 (Graduate student) said,

"Tsinghua campus has changed rapidly. New buildings were constructed. New programs were implemented. New teachers came in. New courses were introduced. Teachers and students are very hard working. Many students study seven days a week. There is no weekend break, because we are Tsinghua's students. We are supposed to be the best."

Student 2 (Undergraduate student) said,

"Tsinghua's progress in global rankings is a reflection of China's overall rise. Tsinghua became more and more open. Teaching methods have become more westernized, inspiring and encouraging us to participate in more discussions and activities."

Student 3 (Graduate student) said,

"Tsinghua nowadays are becoming more and more flexible. Besides general studies relevant to my major, my school also provides students with career training."

To verify the interviewees' information, the university's historical documentation was reviewed. Tsinghua's *Yearbooks* (1994-2015) thus recorded:

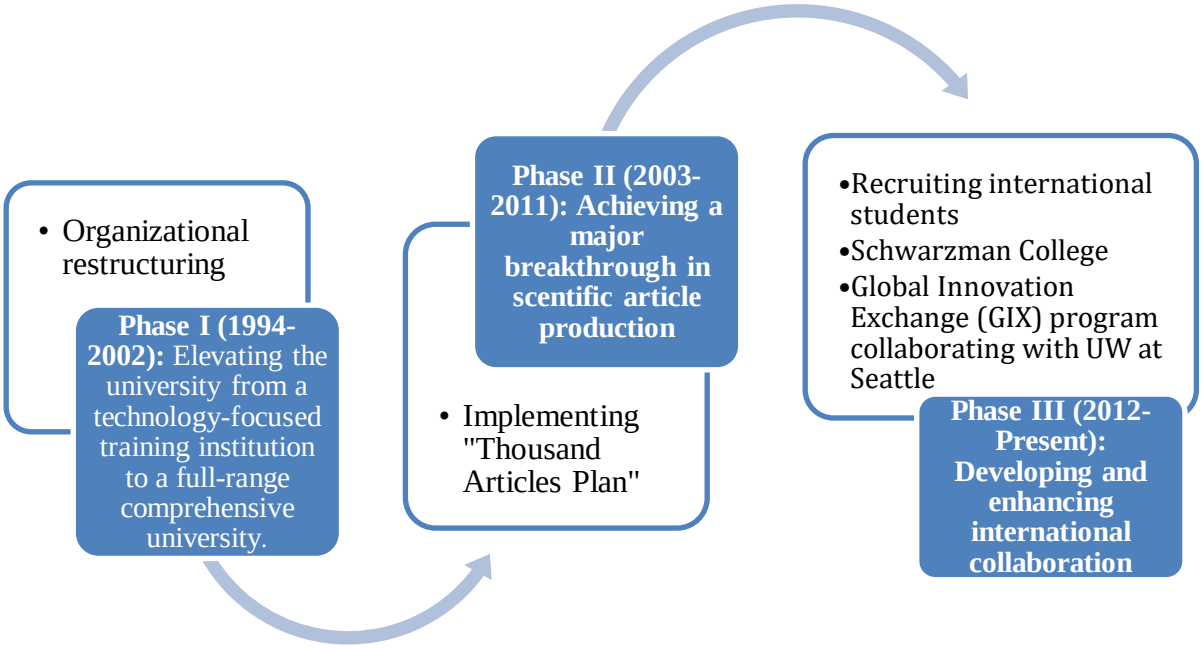
- *"In 1994, the School of Information Science and Technology was established.*
- *In 1996, the School of Mechanical Engineering was established.*
- *In 1999, the School of Law was rebuilt; The Central Academy of Arts & Design was merged into Tsinghua Academy of Arts & Design.*

- *In 2000, the School of Civil Engineering, and the School of Public Policy & Management were built.*
- *In 2001, the School of Medicine, and the School of Software were built.*
- *In 2002, the School of Journalism and Communication was built.*
- *In 2003, two first-tier hospitals were merged into the Tsinghua School of Medicine.*
- *In 2004, the School of Aerospace Engineering was established.*
- *In 2006, Peking Union Medical College (Beijing Xiehe Yixueyuan) was merged into the Tsinghua School of Medicine.*
- *In 2008, the School of Marxism was built.*
- *In 2009, the School of Life Sciences was built.*
- *In 2011, the School of Environment was built. Tsinghua celebrated its 100th anniversary.*
- *In 2015, the School of Pharmaceutical Sciences was built."*

Source: *Tsinghua's Yearbooks* (1994-2015)

The History of Tsinghua University, a book published by Tsinghua Press in 2009, describes the similar process of development of the university. According to the information derived from the three data sources, a flowchart of the institution's transformation is developed (Figure 3).

Figure 3: Steps of Tsinghua University's Reform toward a "World-class" University



Question 2: How did the international university rankings impact the transformation?

In responding to the second interview question "how did the international university rankings impact the transformation?" or "what the role did rankings play in the changes?", all the interview participants, including the official from the Ministry of Education (MOE), the high-level leader of Tsinghua, the faculty, and staff, as well as the three students, consistently agreed that the university rankings, including ARWU, THE, QS, USNWR, and those newly developed national ranking reports, indeed played a benchmark role in guiding the reform.

The official from MOE commented on the question, saying:

> *"The wide variety of rankings provided useful information that guided the Chinese higher education reform. In 2001, Shanghai Jiao Tong University submitted the original world best universities comparison consultation report to MOE for its review. Enlightened by the report, the MOE conducted a large-scale national higher education evaluation of over 400 universities from 2004 to 2008. The results identified the strengths*

and weaknesses of the higher education system through comparisons with ARWU, and they were used to come to a consensus on system reform."

On the day when the interview was conducted, the researcher saw that newest ARWU Report had just come to the desk of the high-level administrative leader of Tsinghua. In responding to the question, she said,

"Tsinghua University was positioned within the 200-300 bracket globally in 2003 ARWU Report. By seeing the number, we realized the huge gap between Tsinghua and those best universities in the U.S. Meanwhile, we heard that the number of publications from MIT was over 3000 per year, while our number was less than 300 from the whole university. The situation stimulated us to implement the "Thousand Articles Plan" beginning in 2003."

When asked why Tsinghua focused only on increasing the research publications, she added, *"because the number of published articles is one of the primary indicators in the Shanghai Rankings."*

A faculty participant recalled Tsinghua's situation in the late 1990s. He said,

"Nobody knew what a 'world-class' university entailed at the very beginning of Tsinghua's reform. I remember in 1994, a university leader defined the concept of 'World-class' in a meeting, saying 'Tsinghua University would achieve the goal of becoming a world-class institution as long as we had more programs than Peking University (Tsinghua's neighbor and rival, also one of the most prestigious universities in China.) had.' Today that definition sounds naive. But it showed that even upper-leaders did not know what constituted a world-class university at the early stage of reform. At that time, what we knew about 'world-class' universities was just a few well-known Western university names such as Yale, Harvard, MIT, etc. 'Rankings, particularly ARWU provided us an explanation with detailed and measurable indicators, helping to clarify the concept of a 'World-class university.'"

A student participant said,

> *"We are so proud of Tsinghua's progress. However, rankings sometimes are not objective. Some indicators are appropriate only to those universities in the West. For example, the number of international students is an important indicator commonly used in major global ranking systems. This is because international students in western HEIs make up a considerable percentage of the whole student body. The number is regarded as the proxy of diversity. However, Chinese universities generally do not have a large number of international students. Recently, Tsinghua has been making efforts to attract more students that are international. This is good for Tsinghua to pursue academic excellence. But it is not good if all of its efforts are for the sole purpose of achieving a better rankings position."*

Regarding the role rankings played in Tsinghua's transformation, pieces of evidence were found in several reviewed documents. For instance, a meeting memo, in which a discussion of the third period strategic plans conducted in June of 2013, recorded several specific performance indicators were to assess (Tsinghua News, 2013). They included (1) the scale of the schools, (2) the academic productivity highlighted by the number of journal articles published in *Nature and Science*, and the number of patent applications, (3) the number of highly cited authors, prestigious faculties, and Chinese Science Academy members, (4) research funding, (5) disciplinary development represented by the number of key disciplines and of key national laboratories and research centers accredited with national and international recognition, (6) internationalization manifested by the proportion of international students, visiting scholars, and courses being taught in a bilingual approach. The researcher found these elements to be highly consistent with the indicators of the ARWU.

According to these responses and the documents, it is safe to say rankings played a significant role in Tsinghua's reform. Primarily, rankings benchmarked the University's position with its global counterparts, identifying the gap between Tsinghua and those model HEIs. Then, rankings, particular those detailed indicators, provided the university with a framework by which the strategic plans were formulated. In the process, ranking played a model role, guiding every step of the transition.

Question 3: Why did Tsinghua University improve so rapidly? (What are the reasons for the rapid improvement of Tsinghua University?)

To respond to the question why Tsinghua improved in the ranking race so quickly, the MOE official said:

> *"Since the early 1950s, China adopted the Soviet Union's system to administrate the higher education system. The flaws of the system have been gradually exposed as when China is facing more and more challenges of globalization and is intending to develop a knowledge-based economy in the 21st century. Chinese leadership have placed hope in higher education. Tsinghua is one of the best universities in China. The State Council and the MOE provided the university with a plenty of resources, which included funds for additional special projects. Tsinghua's success represented the success of higher education reform. The Chinese higher education system has shifted from the Soviet model to the American model or European model that has been dominating the world's best universities for centuries."*

Tsinghua's administrator said,

> *"Tsinghua's achievement should be attributed primarily to all the faculty members and students who have been dedicated to the university's development. Tsinghua, indeed, has some extraordinary advantages that many other Chinese*

universities do not have. These include the rich financial resources, human resources, and long history. Among these factors, the most important determinant for Tsinghua success, I think, is its unique culture of patriotism. Just as the university's motto says: 'Self-discipline and Social Commitment', Tsinghua's people work proactively and dedicatedly not for own well-being only, but for the benefits of the nation."

The faculty deemed many factors could explain Tsinghua's rapid development in pursuing world-class status. One faculty mentioned,

"*Tsinghua has the best students selected from across the country through GaoKao, a great deal of national funding, as well as the dedicated faculty members."*

All of the interviewees, including faculty and students, are proud of the University's accomplishments. The students' views included that: (1) Tsinghua deserves the honor of being listed in the top 50 in the ARWU because the University has made significant contributions toward the economic development of the nation through technology innovations and research; (2) Tsinghua's progress is a microcosm of China's economic rise; and (3) Tsinghua is the best university in China, having unmatchable resources and advantages that most other schools cannot obtain.

Study Results

The study explored the transformation of a Chinese university to world-class status. It also examined the impact of university rankings on China's higher education reform. In Tsinghua's case, the study answered three explicit questions, including (1) How did Tsinghua University become a top world research university? (2) How did rankings impact the

transformation? (3) Why did Tsinghua University improve so rapidly? (What are the reasons for the rapid improvement of Tsinghua University?)

Based on the collected data, the answer for the first question is concluded below:

Tsinghua became a world research university through a three-step process. Since 1994, Tsinghua University conducted a large-scale of institutional restructuring and reorganization. The original 49 disciplines were consolidated into 16 for undergraduates. From then on,13 new programs and schools were added (Table 13). The organization's structure was changed in three ways. First, old departments were upgraded through expanding or merging with other programs. Second, traditional disciplines were resumed, such as "Law School". Third, via merging, Tsinghua was able to incorporate some external research institutes into its subdivisions. This was exemplified by Tsinghua Academy of Arts and Design, which was integrated by Tsinghua and the Central Academy of Arts and Design, an independent institute particularly focused on fine arts and industrial design. The exercise not only enriched the academic disciplinary structure of Tsinghua University, but also improved the participating institution's reputations.

Table 13: Restructuring and Reorganization of Tsinghua University

Year	Name of New Department of College	The Way of Establishment
1994	School of Information Science and Technology	Reformed from the Department of Electronic Engineering
1995	Accounting	New major
1996	School of Mechanical Engineering	Newly established
1998	Program of Public Policy & Management	New major
1998	Mass Media	New major
1999	School of Law	Restored
1999	Academy of Arts and Design	Merged with the Central Academy of Arts & Design
2000	School of Public Policy & Management	Newly established
2000	School of Architecture	Newly established
2000	School of civil engineering	Newly established
2000	Institute of Applied Technology	Newly established
2001	School of Medicine	Newly established
2002	School of Journalism & Communication	Newly established
2004	School of Aerospace Engineering	Newly established

Source: *Tsinghua Yearbooks*, 1998-2015; *The Outline of Tsinghua*, 2005

Since 2003, Tsinghua University entered into the second phase of reform. In the same year, Shanghai Jiao Tong University published the first ARWU report on its website. Tsinghua quickly seized upon the implications of rankings and put a plan into actions. Beginning in 2001, Tsinghua implemented an initiative named the "Thousand Articles Plan." The plan explicitly encouraged faculties and graduate students to vigorously engage in research and to produce publications. In order to encourage faculty and graduate students to have more research papers published, the university promised many incentives to reward those who published their research outcomes in notable journals such as the Science Citation Index (SCI), a scientific article index that covers more than 8,500 significant journals across 1,500 disciplines.

The effect of the strategy was significant. By collecting data from the Tsinghua website and the official website of Clarivate Analytics (previously the Intellectual Property and Science

Business of Thomson Reuters), it can be observed that the number of high-quality published papers written by Tsinghua faculty members and graduate students has increased tremendously over the nine years, from less than 300 in 1998 to 1,132 in 2001 for Science Citation Index (SCI) publications, and from 280 to 1,449 for Engineering Index publications (EI). Since then, the production of the academic research papers has been constantly increasing for years (Table 14). In addition, since 2003, the number of published papers was carefully collected by a newly established department the *Institute of Research of Tsinghua University*.

Table 14: Number of Published Articles from 2001 to 2006

YEAR	SCI	Citi	EI
2001	1132	644	1449
2002	1899	1196	2094
2003	2212	1691	2584
2004	2321	1747	2299
2005	2915	2844	3242
2006	2801	3129	3317

Note: SCI=Science Citation Index; Citi=Citation; EI=Engineering Index
Source: *Tsinghua News* from 2000 to 2007
http://www.tsinghua.edu.cn/publish/thunews/9649/2011/20110225231817781770626/20110225231817781770626_.html
(accessed February 8, 2018)

Meanwhile, Tsinghua built up more subdivisions and affiliations to promote research and knowledge production. For example, It established the Center for Advanced Study in 1997 and renamed it as the Institute for Advanced Study. The department modeled after Princeton's Institute for Advanced Study and aimed to elevate the university to be one of the world's foremost educational institutions of advanced learning in China. According to the School website, the center currently engages in theoretical studies in physics, computer science, mathematics, and biology, specifically devoted to strengthening basic research capabilities in the

wide range of scientific disciplinary areas, along with establishing close relationships with the world's centers of advanced learning.

In order to foster creativity and excellence in research, the university also actively recruits young talent and distinguished scholars from inside and outside of the country. Based on an archival article published on Tsinghua official website, in recent years, the number of foreign visiting scholars invited annually by Tsinghua University is nearly 1,000. Of them, approximately 200 served as long-term faculty worked in the University (Qinghua Shiyuan, 2015). In these exercises, innovative and cross-disciplinary research efforts, especially those that might pave pathways leading to new scientific and technological developments, have been strongly encouraged. The action raised the University to the level of a more research-focused institution.

By the end of the first decade of the 21st century, Tsinghua had completed its transformation from a technological-focused institution to a comprehensive research university. Beginning in 2012, the University started to strengthen its world brand through increasing the collaboration with world prestigious universities. During the third period, the institution further promoted its world-class status to a higher level.

One of the major approaches used to enhance internationalization is to build an international collaboration program primarily on Tsinghua's campus, then overseas. In 2015, Tsinghua established Schwarzman College, operating a one-year Master program concentrated in global affairs. The college is invested by the chairman of the American corporation Blackstone Group, Mr. Stephen A. Schwarzman and other top world entrepreneurs.

According to the staff interviewee, the Schwarzman College is regarded as one of the most competitive and prestigious fellowship programs in the world. Not only are the students selected from the best undergraduates in the world, the school also has a distinguished advisory team which includes Condoleezza Rice, the 66th Secretary of States; Colin Powell, the 65th Secretary of State; Henry Kissinger, the 56th U.S. Secretary of States, Tony Blair, former British Prime Minister; and Nicolas Sarkozy, former French President (Website of Schwarzman College). The college is introduced as China's "Ivy League". Its establishment has greatly broadened the students and faculty's horizons. It also displays an internationalized Tsinghua to the world.

The college is located on the Tsinghua campus in one building separate from the rest colleges of the University. On the day when the interview was conducted, this author visited the College and saw a small yard designed with the exquisite Chinese gardening style in an independent and quiet area of the University. Several international students were talking at the resplendent lobby where donors' names are found carved on the wall of the hallway with different font sizes, representing the different amount of funds they contributed.

Along with the action of building an "Ivy League" in China, Tsinghua has also attempted to go abroad, establishing its branch campus to operate dual-degree joint programs with other world's best universities. According to the official website, Tsinghua has established an international collaborative program with the University of Washington (UW), which was rated 14th on the ARWU 2018 ranking (ARWU Report, 2018; Holtz, 2018). In 2015, Tsinghua built a branch campus in Seattle, launching the *Global Innovation Exchange* (GIX) program. Tsinghua annually sends its students to study at Seattle campus for sixteen months. The students are

taught not only by UW's professors but also by the local industry leaders and entrepreneurs. In addition, regarding administration, the student application and admission should follow UW's rules. Tsinghua's administrators jointly participate in board meetings with UW's leaders. The initiative has been supported by the Chinese government. From China's perspective, the purpose of collaboration is not only for Tsinghua students to study cutting-edge technology from a top American university but also to improve Chinese higher education quality and enhance Tsinghua's image as a top institution in the world.

Moreover, Tsinghua developed a partnership with the University of Geneva in Switzerland, creating the Asian Universities Alliance (AUA) to shape the future landscape of Asia's higher education and address regional and global challenges and has become a member of the *Association of East Asian Research University* (AEARU); the *Association of Pacific Rim Universities* (APRU), and the *BRICS Universities League*.

In terms of international students' recruitment, Tsinghua University has steadily increased the enrollment of international students in recent years. According to the data derived from Tsinghua official website, the university had enrolled 3,500 international students in the academic year of 2017 (Tables 15 and 16).

Table 15: Tsinghua New Coming International Students (2016-2017)

2016-2017 New coming students	Total Number of New Students	Number of International Students	%
Undergraduate	3726	301	8.07
Graduate students	5545	632	11.4
Ph. D students	3110	72	2.3
	12381	1005	8.1

***Source**:* Tsinghua Official Website (accessed February 8, 2018)

Table 16: Number of International Students Enrolled in Tsinghua University by 2017

By 2017	Total Students Enrolled	Total International Students Enrolled	%
Undergraduate	15619	1227	7.9
Graduate	19062	1249	6.5
Ph. D	13081	389	2.9
	47762	2476	5.2

***Source*:** Tsinghua Official Website (accessed February 8, 2018)

Summary

Overall, Tsinghua experienced three phases in building its world-class status. During the 1994-2002 period, Tsinghua completed a shift from a technology-focused institution to a comprehensive full-range university. From 2003 to 2011, the University achieved a major breakthrough, becoming a research-focused higher education institution. In the last phase, from 2012 to present, Tsinghua has been focusing on strengthening its position as a world's best university in global rankings. In the transformation, Tsinghua emulated the governance of other top higher education institutions, particularly adopting the U.S. model. Through all these activities, Tsinghua greatly enhanced its academic performance. The governance of the university has started to change.

Regarding the role that global rankings have played in the reform (the second question), it is safe to say that rankings exerted a profound influence in Tsinghua's transformation. In the early stage of the reform, ranking benchmarked Tsinghua's position with the other world best research universities that the university desired to catch up to. The comparison helped the policymakers of Tsinghua make clarified reform goals. In implementing its reform, Tsinghua

constructed the world-class university by following a model derived precisely from the measure system of the ARWU. All of the targeted improvement areas in its strategic plans were closely tied to the factors that are taken into account in the ranking. In the absence of other relevant literature and references drawn from other countries, the ARWU undisputedly became the only authoritative emulating system, having the highest reliability to guide the reform. According to its system, the reform framework of Tsinghua was constructed. All of these practices directly contributed to the improvement of the most salient indicators of the university in those major global rankings. In the process, the rankings played a role beyond a benchmark.

The system that Tsinghua University emulated is American style. This has been clearly illustrated by those newly established schools and programs. The practices not only significantly improved the academic performance of the universities but also brought Chinese higher education to a global network. In addition, along with the transformation, the management style of Chinese higher education system has gradually shifted from the Soviet Union's model to the western model. Although it is unclear to what degree the Chinese system will be ultimately westernized, the trend toward a universal higher education system influenced by the university rankings is undeniable.

In the responses to the inquiry on the factors contributing to Tsinghua's success, participants of the study referred to various elements. First and foremost, Tsinghua University has enjoyed a very large amount of funding from the government which directly contributed to its success in gaining a world's best university position. Second, Tsinghua's reform practices have been firmly linked to national development objectives. It reflected the effect of a strong leadership in guiding the reform of a large-size institution. Third, the vigorous recruitment of

talent has made a significant contribution to Tsinghua's achievement. In addition, Tsinghua has several distinguishing characteristics that significantly contributed to its rapid improvement. All of these factors will be discussed in next chapter.

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Interpretation of Findings

The study explored how Tsinghua built its world-class university status in China, and how global university rankings impacted the transformation. Tsinghua University was selected and examined in the study because of its successful climbing of the ranking ladder. The project employed a single case qualitative research method. Data were collected through individual interviews, documentation reviews, and direct observations. The findings revealed that Tsinghua University achieved its academic excellence through a three-stage strategy. In the transformation, the university rankings, particularly the three major global schemes: ARWU, THE, and QS, played not only a benchmark role but also served as a model for the university to frame its reform practices. This chapter presents several themes emerging from the research findings. The discussions are based on the findings from the study, along with other research literature. The purpose of the discussions and recommendations is to help higher education leaders worldwide to have a better understanding of China's higher education reform. Tsinghua's success and the problems that emerged from the transformation may inspire new insights into the creation of a world-class universities in other countries.

Findings in Chapter IV presented the experiences of Tsinghua University in its transformation from a narrowly specialized higher education institution to a world-class research university. The university achieved its world-class position in global rankings through a three-

step reform practice. Since 1994, the university embarked on organizational restructuring. The exercises gradually shifted the technologically focused institution to a full-range research university, laying the foundation for research performance improvement. In the second period, from 2003 to 2011, the university made a major breakthrough in research production. The progress rapidly closed the gap between Tsinghua and its model universities such as MIT and Harvard in the U.S. From 2012 to the present, the institution has been enhancing its international brand through a series of exercises of internationalization.

Tsinghua's transformation justified Hazelkorn's theory regarding the influence of global rankings in shaping contemporary higher education. According to Hazelkorn (2009), the impact of rankings on higher education can be analyzed from three dimensions: academic response, institutional response, and policy response (Hazelkorn, 2009). Academic response refers to the institutional focus on producing knowledge, rebalancing research and teaching, as well as curriculum reforms. Institutional responses are those actions pertaining to organizational administration, such as organizational restructuring, resources allocation, and recruiting high-achieving students and faculties. Policy responses generally include national-level educational reform policies and initiatives. All of these exercises are connected to rankings and contribute to further improvement in the global reputation race. Applying Hazelkorn's (2009) theory to Tsinghua, several important themes emerge from the case.

Academic response: *Research and scholarship became the priority of the university.*

Since being selected to be a target university in the national plan of building world-class universities, Tsinghua has made significant achievement in producing high impact research over the past two decades. Accompanying this exercise, the major function of the university has

shifted from teaching and learning to research and scholarship. According to the interviewed leader and the reviewed documents, at the time of this writing, Tsinghua's faculty members produce over 2,000 articles per year, having roughly reached a level comparable to that of major U.S. universities.

In addition to the respectable number of published papers, Tsinghua was also striving to boost academic productivity by adding new graduate-level programs and research institutes, especially in science and technology fields. For instance, in 2002, Tsinghua founded *Zhou Pei-Yuan* Center for Applied Mathematics. The institute is independent of the Department of Mathematical Sciences, focusing on interdisciplinary research on basic sciences. In 2009, the university built up the Center for Advanced Study, simulating the same-name program at Princeton. The institute is currently concentrated on theoretical studies in physics, computer science, mathematics, and biology. Its core mission is to foster scientific research productivity. In 2010, Tsinghua established the Institute for Interdisciplinary Information Sciences. All of the activities provided the faculty with the best research environment for generating high-impact academic outputs.

To sustain and enhance the productivity of research, Tsinghua has been reinforcing international research partnership. Tsinghua actively established joint programs with research entities outside the country. Moreover, in operating the collaborative programs, Tsinghua put special emphasis on science and technology related subjects. For example, the dual degree joint program of GIX, operated jointly with the University of Washington, accepted only students who majored in computer science, electrical engineering, and applied mathematics.

In terms of academic professional recruitment, Tsinghua has two Nobel Prize winners. Among the over 3,400 full-time faculty, 51 are members of National Academy of Sciences; 37 of National Academy of Engineering. The University has hundreds of domestic award recipients. Such a stock of talents has no match in any other Chinese university. Thanks to its strong training in sciences, Tsinghua graduates majoring in technology and science related disciplines have been favored in job market.

The study also found that the faculty's workload is too heavy at Tsinghua. Once hired as an assistant or associate professor, the successful candidate must meet the minimum requirements. In general, they are required to teach three or four courses with satisfactory student course evaluations each semester. To prepare for promotion, they must have a certain number of research articles published in high-impact international journals. All assistant professors must apply for and pass their tenure review within nine years of their initial appointment. Those who fail their tenure reviews will not be able to stay at their positions. Despite the increasing pressure due to the high standards and competition, most faculty members have enjoyed working at the university simply because it is the best university in China.

The academic improvements achieved at Tsinghua have shown firm connection with global rankings. As mentioned earlier, research productivity is one of the most critical indicators to measure academic excellence in most rankings. In *ARWU*, research outputs are assigned 40 percent of its score. *THE* and *QS* give research outcomes 20 percent weighting respectively. In *USNWR*, bibliometric indicators make up 75 percent of its total measurement. Accordingly, increasing the number of research publications becomes a shared objective in many institutional practices. In Tsinghua's case, it was implementing the "Thousand Articles Plan" that resulted in

a rapid increase of academic publications in major peer-review journals. In addition, a larger scale of high-level professional recruitment also sustained the productivity of academic outcomes.

Institutional response: *Organizational restructuring was undertaken under a strong authority leadership.*

Since Tsinghua embarked on its reform to academic excellence in the 1990s, the university has been in ongoing organizational restructuring. Responding to the demands of socio-economic development on human resources and echoing the calling of the nation, Tsinghua built new programs, merged with other institutes outside the University, and restored the old prestigious schools. These practices were meant specifically to strengthen the research productivity and enhance its reputation. It is no surprise to see that these new programs are all research-orientated.

In general, organizational restructuring is more challenging than creating a new structure in a building. Bowman and Deal (2008) suggest reorganizing, or restructuring is a powerful but high-risk approach to improvement. An organization's structure at any moment represents its resolution of an enduring set of basic tensions or dilemmas (Bowman & Deal, 2008). Despite having rich funding, Tsinghua's reorganizing and restructuring have also experienced many struggles with resistance and turbulence. Under these circumstances, it is necessary for Tsinghua to have a strong leadership.

The planning and implementing of reform policies in Tsinghua have been led by an administration team. Currently, the group consists of a president, a chairperson of the University Council, six vice presidents who are in charge of the various divisions of the institution, and nine

vice chairpersons of the University Council. The President is responsible for providing overall leadership to the University, as well as advocating for the institution's needs with external audiences. The chairperson of the University Council supports the President, participating in all the decision-making on important issues.

The reform policies are developed by the core administrator team and the Office of Strategic Planning. Every other department and subordinate schools also draft plans according to the University's objectives and their individual situations. Reform policies are never decided alone by the individual department or by the University itself. Often, the department proposals are discussed in the University; while the university-level decisions are sent to the MOE and the State Council for approval.

Tsinghua's reform has been under the strong leadership of the central government authority. While building Tsinghua into a world-class university is part of the national strategic plan, the overall reform practices have been directed by the Central Government through the committee of the Communist Party embedded in the University. As mentioned earlier, the presence of a Party Committee and Party secretary in public funded HEIs is ensured by national legislation. The Party secretary plays a role as a party representative, serving as a kind of political nucleus (Jiang & Li, 2016). This management model has been in place during the whole process of the transformation.

Recently, accompanying with internationalization, Tsinghua's administrative structure has been slowly changing. In order to promote international collaboration, the committee of the Communist Party has been regrouped as the University Council. The Party Secretary is the chairperson of the council. In addition, in 2014, a new undergraduate program (Xinya College)

established on Tsinghua's campus adopted the administration model of American liberal arts colleges in which the organizational structure is constituted with the board of trustees, the president, the division of academic affairs, student affairs, *et. al*. In the new system, the management authority is entrusted to the president and the board of trustees.

Hazelkorn (2009) suggests that the structure of systems and the organization of institutions would be impacted correspondingly when rankings became the determinant in academic decision making in higher education (Hazelkorn, 2009). In order to reduce the gap between Tsinghua and the world's best universities, particularly those in the west, Tsinghua intentionally selected factors of governance to reform and selectively built research-related programs and institutes. Special emphasis is placed on research performance and internationalization in overall organizational management.

***Policies response**: Building Tsinghua into a world-class university is for meeting the needs of the country.*

Tsinghua's practice of building world-class research universities is basically a national action. The purpose is to promote and sustain the economic development of the nation. Out of China's 3,910 higher education institutions, eighty percent of them are state run. It is no doubt that China chose a pathway that is most suitable to meet its national needs.

Hazelkorn (2009) pointed out two policy positions in most national practices of building world-class HEIs: "the Neo-liberal model" and "the Social-democratic model". The nations that take "the Neo-liberal model" would like to select a small number of research-intensive universities to compete globally, while the countries that select the Social-democratic model"

give more preference to building a system of horizontally differentiated high performing institutions (Hazelkorn, 2009).

China has opted for the Neo-liberal model. Since the reform commenced in 1978, China selected a few existing universities with potentials to implement the national plan. Chinese leaders believe the development of a small number of world-class universities can further improve the overall quality of higher education in the country. To achieve the goals, the Chinese government generously invested in a number of the top universities and key disciplines through "Project 211" and "Project 985", as well as the recently renewed "Double First Class University Plan".

The "Project 211" was implemented in 1996. In the first phase, from 1996 to 2000, 100 designated universities received approximately US$ 2.2 billion government priority funding to improve their facilities and programs. Two public information service entities were established during the period: the "China Education and Research Network" (CERNET) and the "China Academic Library and Information System" (CALIS). In the second period, from 2001 to 2005, The State strengthened the project by allocating another US$ 725 million to build the "Modern Equipment and Facilities Sharing System" (MEFSS). Since 2006, the project commenced the third phase in which the core objective changed from improving information infrastructure to enhancing the development of key subjects. By 2013, there had been 112 higher education institutions designated as "Project 211 Institutions". A number of prioritized specializations which were mostly in the fields of sciences and technology were sponsored by the government (Ministry of Education of PRC, 2017; National Bureau of Statistics of China, 2014).

Supplemental to "Project 211", in 1998, the Chinese government selected a smaller group of elite universities for specifically developing world-class research universities in "Project 985". In the initial phase from 1998 to 2003, nine universities, including Peking, Tsinghua, Fudan, Zhejiang, Nanjing, Shanghai Jiao Tong, Xi'an Jiaotong, Harbin Institute of Technology, and the University of Science and Technology of China, were designated as founding members. In the second phase, from 2004 to 2010, the number of universities was increased to 39. According to the "*China Education Statistics Year Book*" (2010), the Chinese government granted twice the amount of funding to "Project 985" than it had to "Project 211". Besides developing new research centers and improving facilities, much of the funding of "Project 985" was used to hold international conferences; to attract world-renowned faculty and scholars, and to support Chinese faculty attending conferences abroad (Ministry of Education of PRC, 2017).

After "Project 211" and "Project 985" ended, in 2017, the Ministry of Education, the Ministry of Finance and the National Development and Reform Commission jointly released the "Double First Class University Plan", aiming to develop a group of world-class higher education institutions and disciplines by 2030. Being one of the top national universities, Tsinghua was unquestionably selected as a preferred institution in all the three of these initiatives, and served as a model for other universities.

Overall, the practice of building "world-class" research universities is a government initiative for promoting national economic and social development. The Chinese government enacted a series of policies not only for promoting university performance, but also to develop the world brand of its HEIs, and in turn, to strengthen the national competitiveness in the world.

Based on the research findings, it is safe to say that Chinese reform policies including strategic plans and objectives were made under the increasing influence of rankings. Tsinghua internal changes of administrative structure and its significant academic improvement also demonstrated that global rankings have played a critical role in guiding Chinese higher education institution's transformation.

Discussion

This study focuses on exploring how Tsinghua became a world-class research university, and the role that global rankings played in that transformation. Findings of the study illustrated what role global rankings played in Tsinghua's reform. It demonstrates that it is not only a benchmark role by which the university measured the gap between itself and other top world universities, but also it also served as a model to emulate in the pursuit of institutional excellence. Although controversial, the weighting indicators adopted in those major global rankings provided a specified framework to its reform, guiding every step of Tsinghua's transformation.

Obviously, Tsinghua has become a world-class research university now. It seems that the road to research excellence for Tsinghua has not been so difficult. The University has a long history and a good reputation. More important, Tsinghua is always the No. 1 selected institution among all the HEIs in China. Tsinghua has, therefore, enjoyed rich financial resources supported from the central government for decades. These unique conditions have predetermined the university's success. In addition to these advantages, Tsinghua's has also made its own efforts in the transformation. In order to have a better understanding of Tsinghua's case, the crucial factors

contributing to the success and the problems that emerged from the transformation are discussed in this section.

Based on many case studies, Salmi (2009) suggested there are three common determinants, which contributed to raising the stature of a HEI in global competition. They are (1) a high concentration of talent; (2) abundant resources to offer a rich learning environment to conduct advanced research; and (3) favorable governance features that encourage leadership, strategic vision, innovation, and flexibility that enable institutions to make decisions and manage resources without being encumbered by bureaucracy.

In Tsinghua's case, first, the recruitment of talent has made a significant contribution to its achievement. According to an archival article published on the Tsinghua official website, in recent years, the number of foreign visiting scholars annually invited by Tsinghua University is nearly 1,000. Of them, approximately 200 went on to work as long-term faculty at the University (Qinghua Shiyuan, 2015). In addition to foreign faculty, Tsinghua arranged, at least since 2015, an annual recruitment fair in the U.S., looking for "full professors, associate professors, senior researchers from U.S. leading universities. These meetings are held annually at Stanford, Berkeley, MIT, and the University of Chicago. Tsinghua promises the academic talents a high salary; research funds and intelligent students, as well as comprehensive accommodation benefits (Tsinghua Jobs, Official Website of Tsinghua). Such practices are also supported by the Chinese government through the national initiative "Thousand Talents Program".

Second, in terms of funding, a factor which is indispensable for building world-class universities, there is no doubt Tsinghua has obtained and enjoyed tremendous funding from the central government through the initiatives of "Project 211", "Project 985", and the "Double First-

class Universities Plan". But for a school with the size of Tsinghua, the operating cost and annual budget are also incredibly high. A survey conducted by the MOE in 2017 reveals that the total budget of Tsinghua University in 2017 has reached at US$3.48 billion, exceeding all of the other 75 HEIs under the central authority governance (China News.net, 2017). In a typical year, Tsinghua's revenue is sourced about 40 percent from the government; 30 percent from research income and technical services; 20 percent from tuition and fees; and 10 percent from other sources such as university-run enterprises profits (Tsinghua Financial Management Regulation, 2011). Although the accurate number of Tsinghua's expenditure in 2017 was not available for public review, a detail regarding the financial pressure was reported in the investigation. In an interview, a university leader mentioned many research projects at Tsinghua were actually supported not by government funds, but by enterprises, either outsider-run or university-run. Tsinghua started to get involved in business as far back as the 1990s. By providing technical services, the university-run businesses have helped enterprises across 30 cities and regions with earnings totaling US$ 58 billion profit over the past 10 years (Tsinghua News, 2015).

Third, regarding governance, as mentioned earlier, Tsinghua's transformation was definitely under a strong leadership of the central authority. With respect to policymaking, all the strategic plans were formulated according to the guidelines of the State Council and the Ministry of Education of China. The University works closely with the MOE to set policies related to program development and international collaboration. Pertaining to institutional administration, a Chinese version of an administrative system combined with the joint management of President and Party Secretary has heralded the reform. As the representative of the Chinese Communist Party, the Party Secretary participated in all the decision-making practices of the reform.

Such a system is different from the dominant model of the board of trustees in the west. However, in China, the Communist Party's leadership is constitutionally assured in public higher education institutions. It is stipulated in the Higher Education Act Chapter IV Article 39 that in every publicly funded higher education institution there shall be a committee of the Chinese Communist Party that leads the institution, where the president of the institution is responsible for the administration. Moreover, almost all presidents in Chinese public universities are Party members too. Since party secretary plays the roles of key administrator and representative of the Communist Party, they are in fact at the same administrative rank as the president.

The model brings both advantages and disadvantages. On one side, the system ensures a great internal coherence in administration between national interest and institutional interest. As most universities in China are state-run and funded by the governments, the various levels of the government are actually the primary stakeholders of higher education. Under this coherent institution system, it is easier for the university and the government to achieve a common goal. This is explicitly exemplified in Tsinghua's case. As one of the most prestigious universities in China, and having the largest proportion of science and technology related disciplines which are closely connected to the national interest, Tsinghua has played a model role in the overall national initiative of building world-class universities. The university is thus almost entirely under the aegis of the national administration. As a result, the efficiency of reform is enhanced. However, on the other hand, the vague system has also become the most significant obstacle for Chinese HEIs to promote educational collaborations with its international counterparts.

Besides the three key elements, several other factors also contributed to Tsinghua's success. One is its outstanding internal organizational culture. Management theorist Edgar

Schein suggests that organizational culture plays a critical role in institutional development (Schein, 2010). He defines organization culture is a pattern of shared basic assumptions that shape adaptation and internal integration of an organization. It has three levels of implications. First, culture is recognizable in the most accessible forms of its manifestation. Second, culture can be expressed through an organization's strategies, goals, and desired preferences. The last level and also the deepest level of culture are "basic underlying assumptions" which include some unconscious actions, generally accepted beliefs, perceptions, thoughts, and feelings (Schein, 2010).

In response to a generic interview question about the source of the outstanding accomplishment that Tsinghua made in building a world-class university, the majority of the interview participants directly referenced the institutional mission which is “fostering great virtues that meet the needs of the country”. The patriotism ideology worked very well at Tsinghua. It is not only the faculty and staff who devote themselves to their work, the students are also educated to dedicate their life to their country, rather than focusing only on their personal well-being.

Another factor can be attributed to a developing national trend. Since the implementation of economic reform in 1978, China has made a great improvement in social economics over the past forty years. In the higher education sector, after the end of the “Cultural Revolution” (1966-1976), Deng Xiaoping resumed the National Higher Education Entrance Examination (*Gao Kao)*, which marked a new era of Chinese higher education. In 1985, Deng’s inscription that “Education should be geared to the needs of modernization, of the world and of the future” guided Chinese higher education reform. Thereafter, Chinese higher education went through an

unprecedented expansion. Enrollment expansion further brought the quality issue to the forefront. Under the background, China's initiative of building world-class research universities was timely. Moreover, since the Chinese government massively expanded enrollment of higher education in the late 1990s to the current initiatives of building world-class universities, higher education policies enacted in China maintained consistency and consecutiveness regarding objectives and policy orientation over the past three decades. Chinese third-, fourth-, and fifth-generational leaders have not lost sight of the vision. These constant and consistent policies greatly increased the likelihood of success.

Overall, as Greenwood and Hinings (1993) suggested, an organization's behaviors are shaped by both internal and external forces or conditions. In Tsinghua's case, three determinant elements clearly appeared on the road to academic excellence, as well as two other relevant factors. However, there remains a critical problem in the transformation that needs to be addressed.

Like many other countries, Chinese higher education institutions emulated the U.S. model to build its research universities. In the process of simulation, some practices have significant contradiction to the spirit of academic freedom, which has prevailed in the western higher education institutions for hundreds of years. For example, the curriculum of Marxism is mandated for all undergraduate students regardless of their majors in all of the Chinese public HEIs. In addition, the Chinese government still imposes limits on information access. These activities have been frequently criticized by the Western counterparts as lacking of academic freedom. The circumstance has translated into a lingering impression and will hamper the further development of Chinese higher education and national competitiveness.

Recommendations

The case study presented here explored how China built a world-class research university under a context in which university rankings play a crucial role in determining the orientation of the reform. Tsinghua University was selected to serve as a case. The study attempted to answer three explicit questions: (1) How did Tsinghua become a world best research university in a relatively short period of time, (2) How did the global university rankings impact the transformation? and (3) Why did Tsinghua improve so rapidly. By examining the process of transformation of Tsinghua University, the study aimed to develop a better understanding not only of China's higher education reform, but also of the influence of global rankings. Furthermore, the researcher wished to provide higher education leaders new insights to better serve their institutions.

Given the complicated nature of the phenomenon and the relatively simple method design, the representativeness of the single case of Tsinghua is not adequate to draw a general conclusion about how rankings changed the Chinese higher education sector as a whole. As described above, Tsinghua University achieved a significant improvement in global ranking by following a three-phase procedure. However, this does not mean all other Chinese HEIs have taken the same steps and have gained equivalent achievement. Tsinghua is one of the most prominent universities in mainland China. Its size and resources are such that few other higher education institutions in the country could match. Moreover, each university has its own pathway to academic excellence based on different contexts. Therefore, Tsinghua's case is useful to

examine how international university rankings influences the process of building a world-class university in China, but is not able to represent the reform of entire Chinese HEI sector. More studies are needed for providing overall and comprehensive understanding in terms of the improvement of Chinese universities and the role that rankings play in reshaping the Chinese higher education.

Second, as suggested, an organization's behaviors are shaped by both internal and external forces (Greenwood & Hinings, 1993). It is difficult to separate the impact of global rankings from other critical factors which are commonly regarded as having a close connection with institutional performance. Many other factors may also be able to influence a transformation process. Therefore, it is impossible to attribute the changes of Tsinghua University and the Chinese higher education as a whole to the impact of global rankings. The study did not intend to disaggregate the impact of rankings from other variables. Instead, it attempted to discover a correlation between ranking's influence and higher education's transformation. However, it is difficult to draw a conclusion based on Tsinghua's case that there is a significant connection between the university's improvement and rankings' impact. This is because the influence of rankings is subtle and hard to measure despite it appears everywhere. Therefore, further studies on each key factor that affects higher education institutions are still needed.

Third, as both rankings and universities always continue to evolve and never remain static, the study on the impact of ranking in shaping higher education institutions is not conclusive. Rather, it should be a sustained project deserving a long-term tracing and a complex system of examination. Therefore, more in-depth and prolonged case studies are needed in the future for higher education leaders to develop a full understanding of rankings influence and the

underpinnings of a world-class university. In addition, not only is a comprehensive examination of the rankings' impact necessary, an observation on the social and temporal context should also be conducted. This practice will increase the likelihood of developing new management theories and improving the administrations and services of higher education institutions.

Conclusions

In an age of the knowledge economy, the quality of higher education has been given much more attention than ever before. Recognizing the significance of research universities in sustaining national competitiveness and the important impact of global university rankings on higher education, the paper explored how China built its world-class research university in the context of global ranking race.

Tsinghua University, one of the most prestigious higher education institutions in mainland China, started its transformation into a research university beginning in the mid of the 1990s. The road to academic excellence consisted of three stages, lasting twenty-seven years. From 1994 to 2002, Tsinghua experienced an overhaul of organizational restructuring, shifting the institution from a scientific and technological-focused institution to a comprehensive full-range university. The change laid the foundation for the University to participate in the competition of world's best HEIs. From 2003 to 2011, the university achieved a major breakthrough in research production. The number of publications in major international academic journals grew exponentially. In the last stage, from 2012 to present, Tsinghua has been focusing on strengthening its international status as a world's best university in global rankings. Through practicing a variety of collaborations with its international counterparts, the university

has learned the Western model, particularly the U.S. model, and incorporated it into their own system. Consequently, Tsinghua became one of the "world-class" universities.

Tsinghua's case showed a certain degree of consistency with Salmi's (2011) theory. Salmi (2011) asserted that when talent, resources, and governance are adequately aligned, new universities have the potential to grow into high-quality research institutions within two or three decades. Tsinghua has rapidly moved up in global university rankings since 2003.The crucial contributors to Tsinghua's success include (1) highly qualified and dedicated professionals, (2) rich financial funding, (3) a strong leadership from the central authority maintaining a high level of consistency, (4) a patriotic organizational culture, and (5) an enterprising spirit. The trajectory of Tsinghua University to become a world-class research university has brought valuable reference and significant implication to Chinese higher education.

As China selected the "Neo-liberal model", a small group of elite universities was supported by the strong power of central government to academic excellence. Through building the world-class universities, these universities have elevated to comprehensive research institutions. China has also become an active player in the international education arena. It greatly improved the image of Chinese HEIs in the world. The structure of Chinese higher education was also improved. More and more Chinese universities carry out internationalized activities, recruiting international talent and students. The transformation has not only improved the education performance of these institutions but also encouraged bolder plans for the future. For example, Tsinghua recently issued its renewed strategic plan for increasing its ranking among the world's best universities, setting the goal for the university to be in the top 30 by 2030 and in the top 10 by 2050 (Tsinghua University Strategic Plan, 2017).

However, on the other hand, the preoccupation with rankings has also created new conflicts and challenges to Chinese higher education. First, while the policies related to higher education reform are mostly made and carried out by the central government, HEIs in China lack autonomy in administration. Although the central government has attempted decentralized reform since the middle of 1980s, centralization remains the primary characteristic of higher education administration, especially in the practice of building world-class universities. The situation along with the government control of information and curriculum may hinder the sustainability of higher education in future. Second, the strategy of supporting only a small group of universities increases stratification of the Chinese higher education system. Since investment concentrated on a small group of highly selective universities, the left-out institutions may suffer from resource scarcity, which in turn may result in an imbalanced development of higher education. Third, the competition for maintaining the obtained international status and making further development may be fiercer in accompanying with more world-class universities act on the global higher education stage. In the context, China should make more efforts in improving the environment of academic freedom.

Overall, Tsinghua University has made a great deal of progress in establishing itself as a world-class research university over the past twenty-seven years. Throughout the endeavor, Tsinghua has transformed its narrower technological focus to a broader disciplinary scale, transforming into a comprehensive research university. The goal of Tsinghua's development has shifted from domestic to international standards. The strategies employed in the reform very effectively improved the University's stature in those global rankings. Meanwhile these tactics reflected the improved understanding of the Chinese higher education leaders regarding what

constitutes a “world-class” university. Accordingly, it is safe to say that the capability of research and the quality of teaching and learning at the University have been enhanced, as salient progress has been made in those major international rankings. Further development might be enhanced by focusing on cultivating a true quality culture in the University instead of relying primarily on an indicator- or ranking-oriented approach.

References

Altbach, P.G. (2004). The Costs and Benefits of World-Class Universities. *Academe* 90 (1): 20–23.

Altbach, P.G. (2006). The Dilemmas of Ranking. *International Higher Education* 42.

Altbach P.G. & Salmi, J. (2011). The Road to Academic Excellence: The Making of World-class Research Universities. *Published by the World Bank in 2011.*

Balan, J. (2012). Research University in Latin America: The Challenges of Growth and Institutional Diversity. *Social Research: An International Quarterly*. Vol.79, No.3 pp. 741-770.

Baty, P. (2010). Measured, And Found Wanting More. Retrieved from https://www.timeshighereducation.com/features/measured-and-found-wanting more/412341.article

Bernasconi, A. (2011). Private and Public Pathways to World-Class Research Universities: The Case of Chile. Article in the Book "*The Road to Academic Excellence: the making of World-class Research Universities"* (edited by Philip G. Altbach and Jamil Salmi. Printed by The International Bank for Reconstruction and Development, The World Bank. Washington DC. 2011.

Brewer, D., Gates, S. M. & Goldman, C. A. (2002). In Pursuit of Prestige: Strategy and Competition in U. S. Higher Education. *New Brunswick:* Transaction Press.

Billaut, J. C., Bouyssou, D. B., & Vincke, Phil. (2009). Should You Believe in the Shanghai Ranking? --- An MCDM View. *Scientometrics Springer* 2010. 84: p.237-263.

Bowman, L. & Deal T. (2008). *Reframing Organizations: Artistry, Choice, and Leadership*. San Francisco, CA: Jossey-Bass Publishers.

Caldwell, B. J. (2010). Educational Reform and Change in Australia. Retrieved from https://www.eduhk.hk/apclc/roundtable2011/paper/Brian%20J.Caldwell.pdf

Chadwick, B., Gill, P., Stewart, K. & Treasure, E. (2008). Methods of data collection in qualitative research: Interviews and focus groups. *British Dental Journal*, 204 (6) 291-295.DOI: 10.1038/bdj.2008.192.

Clarke, M. (2004). Weighing Things Up: A Closer Look at U.S. News and World Report's Ranking Formulas. *College and University* 79 3 p.3-9.

Clarke, M. (2007). The Impact of Higher Education Rankings on Student Access, Choice, and Opportunity. *Higher Education in Europe,* Vol.32, No. 1, April 2007.

Creswell, J. W. (2007). *Qualitative inquiry & research design: Choosing among five approaches*. Thousand Oaks, CA: Sage.

Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, 34: pp.555–590.

Dehon, C., Mccathie, A. & Verardi, V. (2009) Uncovering excellence in academic rankings: a closer look at the Shanghai Ranking, *Scientometrics*, 83, pp. 515–524.

Dill, D. D. & Soo, M. (2005). "Academic Quality, League Tables, and Public Policy: A Cross-national Analysis of University ranking systems" *Higher education* 49, 4. pp. 495-533.

Erkkila, T. (2013) Global University Rankings. Challenges for European Higher Education. *Basingstoke, Palgrave Macmillan*.pp.107-123.

Erkkila, T (2014). Global Universities Rankings, Transnational Policy Discourse and H. E. in Europe. *European Journal of Education*, Vol. 49, No. 1, 2014.

Greenwood, R. & Hinings, C. (1993). Understanding Strategic Change: The Contribution of Archetypes, *Academy of Management Journal*, 36, 5, 1993, pp. 1052.

Haveman, H. (1992). Between a rock and a hard place: Organizational change and performance under conditions of fundamental environmental transformation. *Administrative Science Quarterly*, 37: 48–75.

Haycock, K. (2006). Promise Abandoned: How Policy Choices and Institutional Practices Restrict College Opportunities. *A Report by the Education Trust.* Washington, DC: 2006.

Hazelkorn, E. (2007). The Impact of League Tables and Ranking System on Higher Education Decision-making. *Journal of Higher Education Management and Policy*. 19(2). pp.87-110. OECD, Paris.

Hazelkorn, E. (2008) Learning to live with league tables and ranking: the experience of institutional leaders, *Higher Education Policy*, 21, pp.193–215.

Hazelkorn, E. (2009). Impact of Global Rankings on Higher Education Research and the Production of Knowledge. *UNESCO Forum on Higher Education*, Research and Knowledge.

Hazelkorn, E., Peterson, P.M., Moynihan, A., Helms, M.R., Leegwater, L., & Looney, S. (2009). Impact of College Rankings on Institutional Decision Making: Four Country Case Studies. *Issue Brief of Institute for Higher Education Policy*. May 2009.

Hazelkorn, E. (2013) World-class Universities or World-class systems? Rankings and Higher Education Policy Choices. In Hazelkorn, E., Wells, P., Marope, M. (Eds), *Rankings and accountability in higher education: Uses and misuses* (pp. 113–127). Paris: UNESCO. pp.71-94.

Helms, R. M. (2008). Transnational Education in China: Challenges, Critical Issues, and Strategies for Success. *London: Observatory on Borderless Higher Education*.

Higher Education Funding Act 1988 –Sect 2A Objects of Act (2010). Austlii. Edu.su. Retrieved from http://www8.austlii.edu.au/cgibin/viewdb/au/legis/cth/consol_act/hefa1988221/

Holtz, J. (2018). Rankings: UW is No. 14 in the world, third among U.S. public universities, plus on Money and Washington Monthly Best-of lists. UW News. Retrieved from http://www.washington.edu accessed August 27, 2018.

Hunt, H. M. (1972). The American Remission of the Boxer Indemnity: A Reappraisal. *The Journal of Asian Studies*, Vol.31, No. 3. 1972.

IMHE Info. (2007). How do rankings Impact on Higher Education? The Brief of Programme on Institutional Management in Higher Education. Retrieved from http://www.oecd.org/education/imhe/39802910.pdf

Ismail, O. (2004). Significance of Limitations. Retrieved from http://www.othmanismail.com/classes/BEL600/5_Significance_Limitations.htm

Jayaram, N. (2011). Toward World-Class Status? The IIT System and IIT Bombay. Article in the Book "*The Road to Academic Excellence: the making of World-class Research Universities"* (edited by Philip G. Altbach and Jamil Salmi. Printed by The International Bank for Reconstruction and Development, The World Bank. Washington DC. 2011.

Jiang, H. & Li, X. B. (2016). Party Secretaries in Chinese Higher Education Institutions: What Roles Do They Play? *Journal of International Education and Leadership* Vol. 6. 2. Summer 2016.

Kallio, R. E. (1995). Factors Influencing the College Choice Decisions of Graduate Student. *Research in Higher Education*. Vol 36. 1. pp.109-124.

Kehm, B. M. & Stensaker, B. (2009). University Rankings, Diversity, and the New Landscape of Higher Education *Global Perspectives on Higher Education* Vol. 18. Sense Publishers. Rotterdam/Boston/Taipei.

Khoon, K. A., Shukor, R., Hassan, O., Saleh, Z., Hamzah, A., & Ismail, R. (2005). Hallmark of a World-Class University. *College Student Journal* 39 (4): 765–68.

King, R. (2010) Governing Universities Globally: Organizations, Regulation and Rankings *Handbook on Globalization and Higher Education* Reprint. Edward Elgar Publishing Ltd.

Kohn, L. T. (1997). Methods in Case Study Analysis. Center for Studying Health System Change *Technical Publication* No. 2. 1997.

Li, L. X. (2004). China's Higher Education Reform 1998-2003: A Summary. *Asia Pacific Education Review.* 2004. Vol. 5. No. 1. pp. 14-22.

Lincoln, Y. S., and Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.

Liu, N. C., Wang, Q., & Wang, Q. H. (2011). Building World-Class Universities in China: Shanghai Jiao Tong University. Published in the book *"The Road to Academic Excellence: The Making of World-Class Research Universities*. Edited by Altbach, Philip. G. and Salmi, Jamil. in 2011 by The World Bank. Washington, D.C.

Marginson, S. & Van Der Wende, M. (2006). Globalization and Higher Education *Presented at OECD.*

Marginson, S. & Van Der Wende, M. (2007). To rank or to be ranked: the impact of global rankings in higher education, *Journal of Studies in International Education*, 11, pp. 306–329.

Marope, M. & Wells, P. (2013). University Rankings: The Many Sides of the Debate. Rankings and accountability in higher education: Uses and misuses (pp. 113–127). Paris: UNESCO. pp. 7-22.

Ministry of Education of PRC, 2017. (in Chinese). Notice from the Ministry of Education and Other National Governmental Departments Announcing the List of Double First Class Universities and Disciplines. Retrieved from http://www.moe.gov.cn/srcsite/A22/moe_843/201701/t20170125_295701.html (accessed on May 10, 2018).

Mohrman, K., Wanhua M., & Baker, D. (2008). "The Research University in Transition: The Emerging Global Model." *Higher Education Policy* 21 (March): 5–28.

Mukherjee, H. & Wong, P. K. (2011). The National University of Singapore and the University of Malaya: Common Roots and Different Paths. Article in the Book "*The Road to Academic Excellence: the making of World-class Research Universities"* (edited by Philip G. Altbach and Jamil Salmi. Printed by The International Bank for Reconstruction and Development, The World Bank. Washington DC. 2011.

National Bureau of Statistics of China (2005), China Statistical Yearbook, *China Statistics Press, Beijing* .

National Bureau of Statistics of China (2014), China Statistical Yearbook, *China Statistics Press, Beijing* .

National Center for Education Development Research, P.R. China. (2001). Green Paper on Education in China. Beijing: *Educational Science Publish House*.

National People's Congress. (1998). The People's Republic of China Higher Education Act. Chapter IV, Act30. Retrieved from http://www.moe.gov.cn/publicfiles/business/htmlfiles/moe/moe_619/200407/1311.html (accessed Jan 20, 2018).

National Talent Development Plan 2010-2020 (2010). Retrieved from http://www.gov.cn/jrzg/2010-06/06/content_1621777.htm (accessed May 18, 2018).

Niland, J. (2000). The Challenge of Building World-Class Universities in the Asian Region. *On Line Opinion*, February 3. Retrieved from http://www.onlineopinion.com.au/view.asp?article=997 (accessed April 10, 2006).

Niland, J. (2007). The Challenge of Building World-class Universities. In *The World Class University and Ranking: Aiming Beyond Status*, ed. Jan Sadlak and Nian Cai Liu, 61–71. Bucharest: UNESCO-CEPES.

Okebukola, P. A. (2013). An African Perspective on rankings in higher education. In Hazelkorn, E., Wells, P., Marope, M. (Eds), *Rankings and accountability in higher education: Uses and misuses* (pp. 113–127). Paris: UNESCO. pp.141-170.

Observatory on Borderless Higher Education (2016). Report on International Branch Campuses: Trends and Developments.

Patton, M.Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Paulk, D. (2017). Tsinghua Named World's Best Engineering Computer Science School. Sixth Tone. Retrieved from http://www.sixthtone.com/news/1001057/tsinghua-named-worlds-best-engineering%2C-computer-science-school (accessed June 30, 2018).

Powell, W.W.; & Snellman, K. (2004). The Knowledge Economy. *Annual Review of Sociology*. School of Education and Department of Sociology, Stanford University. 2004.30: p.199-220.

Rhee, B. (2011). A World-Class Research University of Science and Technology, the Republic of Korea. Article in the Book "*The Road to Academic Excellence: the making of World-class Research Universities"* (edited by Philip G. Altbach and Jamil Salmi. Printed by The International Bank for Reconstruction and Development, The World Bank. Washington DC. 2011.

Salmi, J. & Saroyan, A. (2007) League tables as policy instruments: Uses and Misuses. *Higher Education Management and Policy*, Vol.19, No.2 pp. 1-38.

Salmi, J. (2009). *The Challenge of Establishing World-Class Universities*. World Bank, Washington, D.C.

Salmi, J. (2011). The Road to Academic Excellence: Lessons of Experience. Article in the Book "*The Road to Academic Excellence: the making of World-class Research Universities*" (edited by Philip G. Altbach and Jamil Salmi. Printed by The International Bank for Reconstruction and Development, The World Bank, Washington DC. 2011.

Schein, E. (2010). *Organizational Culture and Leadership*. San Francisco, CA: Jossey-Bass Publishers.

Shen, H.; Hua, S., & Bruce, E.D. (2017). Higher Education Finance in China. Retrieved from

http://gseweb.gse.buffalo.edu/org/inthigheredfinance/files/Country_Profiles/Asia/China.pdf

Shin, J. C., Toutkoushian, R. K. & Teichler, U. (2011). University Rankings: Theoretical Basis, Methodology and Impacts on Global Higher Education (*Dordrecht, Springer).*

Shin, J. C. & Kehm, B. M. (Eds) (2013) Institutionalization of World-Class University in Global Competition (*Dordrecht, Springer*).

Smith, S. (2013), U.S. News Pulls Social Levers to Break Records for Best Colleges Package. Retrieved from http://www.minonline.com/u-s-news-pulls-social-levers-to-break-records-for-best-colleges-package/#.U9fIXfldXTo

Sonnez, F. (2015). Chinese University Tops MIT in Engineering Rankings. *The Wall Street Journal.* October 8, 2015. Retrieved from https://blogs.wsj.com/chinarealtime/2015/10/08/chinese-university-tops-mit-in-engineering-rankings/ (accessed April 27, 2018).

Trochim, W. (1989). Outcome Pattern Matching and Program Theory. *Evaluation and program planning*, 12, 355-366.

Tsinghua Financial Management Regulations. (2011). Retrieved from http://www.tsinghua.edu.cn/publish/newthu/openness/cwzcjsfxx/cwzcjsfxx.html (accessed June 25, 2018).

Tsinghua Jobs, Offical Website of Tsinghua. Retrieved from http://www.tsinghua.edu.cn/publish/thu2018en/newthuen_cnt/07-faculty-1.html (accessed May 25, 2018).

Tsinghua News, (2013). Strategic Plan of Professional Development in Tsinghua University. Retrieved from: http://www.tsinghua.edu.cn/publish/thunews/9649/2013/20130429135711814694340/20130429135711814694340_.html (accessed June 30, 2018).

Tsinghua News, (2015). "TusPark: 20 years of Innovation. Retrieved from: http://www.tsinghua.edu.cn/publish/newthuen/9365/2015/20150417082714652616824/20150417082714652616824_.html (accessed June 13, 2018).

Tsinghua University Strategic Plan, (2017). [清华大学一流大学建设高校建设方案] Retrieved from:

https://www.tsinghua.edu.cn/publish/newthu/openness/jbxx/2017syljsfa.htm (accessed March 10, 2018).

Usher, A. & Savino, M. (2006). A World of Difference: A Global Survey of University League Tables. *Education Policy Institute*: January 2006.

Ward, T. (2013). How the Shanghai Rankings have transformed French Higher Education. *Journal for GLDP*. Fall 2013.

Wildavsky, B. (2010). *Great Brain Race, How Global Universities are Reshaping the World.* Princeton University Press

World Bank (2014). *World Development Report 2015: Risk and Opportunity---Managing Risk for Development.* World Bank, Washington, DC

World Bank (2015), "*Gross domestic product 2015", World Development Indicators*, World Bank, http://databank. worldbank.org/data/download/gdp.pdf.

Yin, R. K. (2014). *Case Study Research: Design and Methods* (5th ed). Los Angeles, CA: Sage.

Zhu, Y.X. & Ma, G.C (2014). *Restart Education Reform*. [重启教育改革-中国教育改革十八讲] Joint Publishing. Beijing, China. Nov 2014.

Appendix A: Interview Questions

Eight face-to-face interviews were conducted in the study. The semi-structured open-ended questions regarding Tsinghua's changes in pursuing world-class status were asked for responses from a variety of interviewees. According to their different position and perspective, the questions were designed respectively.

For the Ministry of Education of PRC officials, the interview questions are:

1. What role has the Ministry of Education played in improving the quality of Chinese higher education?

2. How have the improved global rankings changed Chinese higher education policy and foreign university interactions with Chinese universities?

3. How did the development transform Chinese higher education system?

For university officials, the interview questions are:

1. How did Tsinghua University achieve a significant ascent in global ranking standings during a relatively short period of time (15 years)?

2. What did the role the rankings play in institutional decision making in the institution?

3. What do you think are some of the benefits and new challenges faced by Tsinghua University as a result of the position improvement in rankings?

For academic faculty, staff, and students at the University of Tsinghua

1. Have you noticed the position progress that Tsinghua recently made in global rankings? What are the most significant changes you perceived in either academic or organizational management field in the university over the past decade?

2. How have the global rankings affect your teaching, learning, or working?

3. How do you feel about the improvement? Or what are your opinions about the transformation of China's higher education?

Appendix B: IRB Exemption Approval

EXEMPTION DETERMINATION

December 6, 2017

Ms. Lu Pang
School of Education
University of Bridgeport

Dear Ms. Pang,

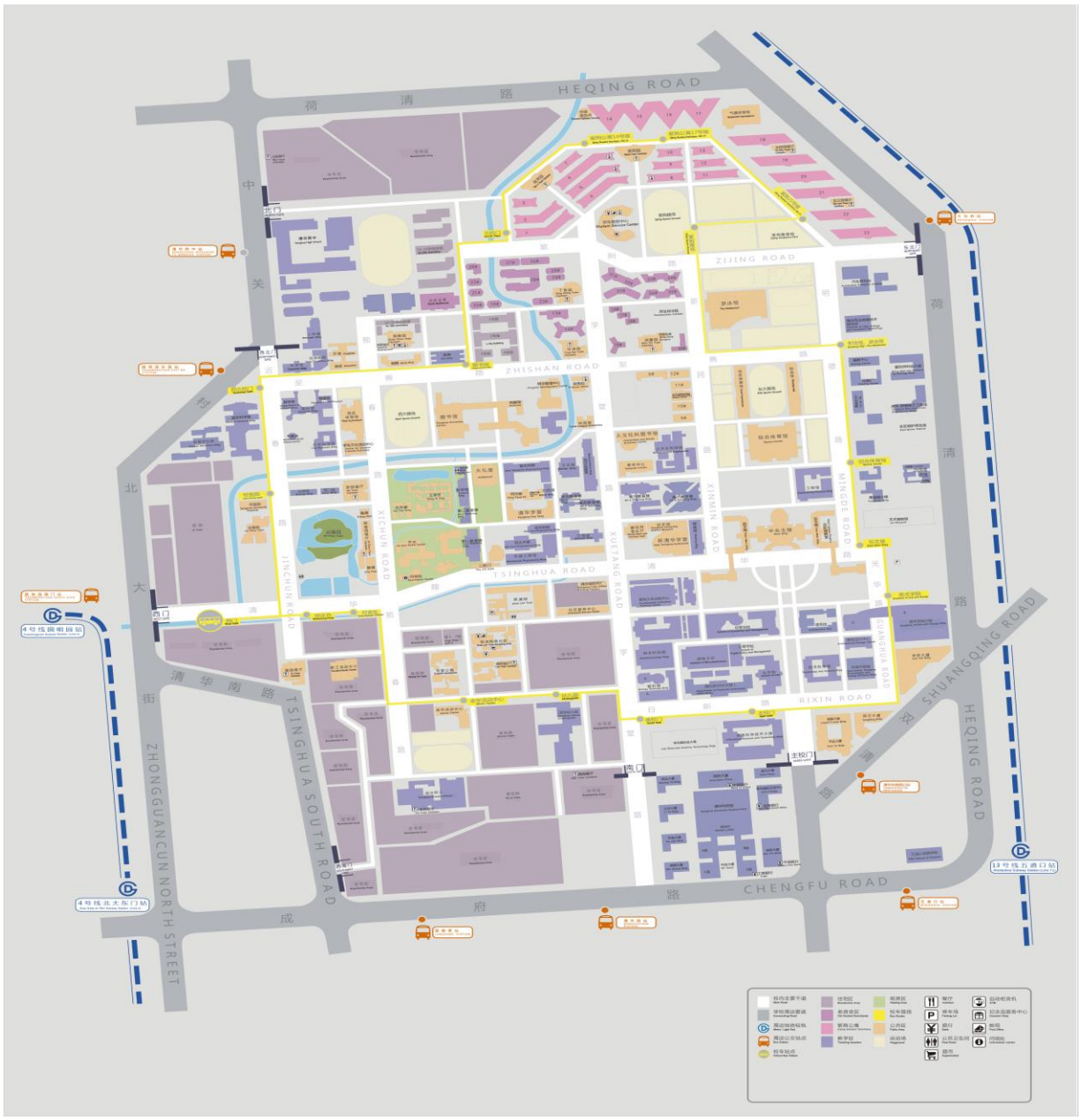
On *December 6, 2017* a designated IRB representative determined that your proposed study meets the criteria for exemption:

Type of Review:	*Exemption Determination*
Project Title:	How Have International University Rankings Transformed Chinese Higher Education
Investigator:	Lu Pang
Exemption:	45 CFR 46.101(b)(2)
Exemption Description:	Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Sincerely,

Christine Hempowicz, Ed.D.
IRB Administrator

CC: Dr. Thomas Ward and Dr. Chunjuan Nancy Wei

126 Park Avenue • Bridgeport CT 06604 • Tel: 203.576.4978 • E-mail: irb@bridgeport.edu

Appendix C: Tsinghua University Campus Map