

Chapter 12

Global Comparison of Excellence Initiatives



Feng Zhuolin, Guo Xin, and Jia Xintong

Abstract Since the end of the 1980s, many countries around the world have been committed to building world-class universities to strengthen their competitiveness in the global higher education market. These excellence initiatives, initiated by China and a few other countries, have contributed significantly to enhance these countries' higher education capacity. This chapter focuses on the comparison of excellence initiatives and relevant policies among China and other countries, including highlighting data, excellence indicators, best practices, and relevant national policies. Moreover, it analyzes the latest research and shares inspiring stories about China's experience in developing academic excellence. The quantitative measures of Chinese universities funded by the Double World-Class Project have increased significantly, but it has taken them a long time to gain the soft power that matches their world rankings. While global excellence initiatives tend to integrate with national strategies to develop higher education and share same global visions, there are differences in terms of implementation measures or plans among countries that will be explored in this chapter. In the future, excellence initiatives will place more emphasis on international development as well as the will of the state.

Keywords Excellence initiatives · World-class university · Global comparison

Z. Feng (✉) · X. Guo · X. Jia
Shanghai Jiao Tong University, Shanghai 200240, China
e-mail: zlfeng@sjtu.edu.cn

X. Guo
e-mail: gx9522@sjtu.edu.cn

X. Jia
e-mail: jiaxt@sjtu.edu.cn

1 Introduction

1.1 *The Origin and Development of Excellence Initiatives*

In the time of intense global competition, a nation's competitiveness relies on its scientific and technological progress and knowledge innovation. Advancing the development of higher education and establishing world-class universities and leading research universities are key to guaranteeing the initiative of a nation, and rapidly improving the quality of skilled workforce and the strength of scientific and technological innovation (Liu & Li, 2011). Since the end of 1980s, more than 40 countries and regions around the world have implemented excellence initiatives to develop world-class universities or disciplines (Feng & Liu, 2019). These policies usually include excellence initiatives for universities, research institutions, field research, personnel, and school-enterprise cooperation.

Governments at all levels play an important role in designing and implementing these excellence initiatives. They provide centralized funding for universities or disciplines with advantage and potential to achieve excellence, so as to further enhance its higher education capacity in the global competition. In other words, most excellence initiatives share three main features: a top-down approach in policy implementation, centralized funding, and a strong focus on international academic excellence (Feng et al., 2017). Countries that invest in excellence initiatives span all seven continents across the globe, regardless of their socio-economic status. Countries with strong higher education systems are committed to consolidating their existing performances and continuously expanding their advantages in the global education market. Countries with strong higher education foundations are committed to forming and improving international competitiveness, seeking to climbing up the global echelon. Other countries are committed to making an international influence through conducting international research, so as to make their voices heard in global society. It is worth noting that higher education has been impacted by global crises in recent years, such as the ongoing global pandemic, rising nationalism, terrorism, and financial crisis, leading to changes in excellence initiatives globally. Instead of allocating funding and support evenly in all aspects, countries focus on building world-class universities or disciplines based on their existing advantages.

1.2 *Excellence Initiatives Around the World*

1.2.1 **Regional Distribution of Excellence Initiatives Around the World**

More than 40 countries or regions around the world have implemented various excellence initiatives. The world-class movement has become a global consensus to some extent. In terms of geographical distribution, excellence initiatives are mostly adopted in Europe and Asia. Nearly 20 countries in Europe, represented by Germany,

France, and Denmark, have developed excellence initiatives; nearly 10 countries in Asia, represented by China, Japan, the Republic of Korea (hereafter ROK), India, and Vietnam, have implemented initiatives and strategies to develop excellence. In comparison, the number of excellence initiatives in Oceania, North America, and other regions is relatively small.

Some countries in Northern Europe were among the very first to develop academic excellence. In the beginning of the 1990s, Denmark started the Centers of Excellence program, which aimed to strengthen Danish research by providing the best working conditions and organizational set-up for top researchers (Danish National Research Foundation, 1991). Many other countries in Europe followed closely and developed their own initiatives. For example, in 2005, German federal and state governments intended to enhance the graduate education sector and research institutions through the special funding project—Excellence Initiative and strived to construct a group of “excellent universities” (German Research Foundation, 2005). In 2010, French government issued Initiatives d’Excellence (Initiative of Excellence, hereafter IDEX), which focused on advancing technological innovation and technical transfer, and to construct five to 10 world-class universities with international competitiveness (Ministry of Education [MOE] of France, 2010a). Russian government launched the Project 5–100 in 2013, which aimed to have five universities reach the top 100 in the world by 2020. The goal of Project 5–100 is to reform higher education research and teaching and to enhance the country’s global competitiveness (Ministry of Education and Science of the Russian Federation, 2013).

Asian countries with relatively strong higher education systems also strive to maintain and improve their competitiveness by implementing excellence initiatives. In 2007, Japan launched the World Premier International Research Center Initiative, which focused on advancing cutting-edge research, establishing interdisciplinary fields, creating an international research environment, and reforming research organizations (Japan Society for the Promotion of Science, 2007). Some emerging economies in Asia regard higher education as a breakthrough and try to enhance their international influence by implementing excellence initiatives. In 1997, India launched two projects, Universities with Potential for Excellence (hereafter UPE) and Centers with Potential for Excellence in certain disciplinary areas, which aimed to enhance universities’ research and teaching excellence, promote innovative research in interdisciplinary and multidisciplinary fields, and improve their status and become a leader in specific fields within a short period of time (University Grants Commission, 1997a). In 2008, Vietnam began to implement the New Model University Project, and the plan aimed to establish high-quality “new model universities”. Different from highly-centralized projects in the past, this new project is more flexible in terms of its management and organization, so as to develop students’ innovative skills and help universities quickly meet international standards (Ministry of Education and Training of Vietnam, 2008).

1.2.2 Time Distribution of Excellence Initiatives Around the World

The development of excellence initiatives across the world can be divided into three stages: early development (1989–2000), steady growth (2001–2010), and accelerating expansion (2011–2020) (Feng & Liu, 2021).

Before the twenty-first century, the concept of globalization was still in the process of being formed, and excellence initiatives were pretty much in their early development and only a few countries had carried out plans to develop world-class universities or disciplines. Denmark launched its project, Centers of Excellence, in 1991 to provide top researchers with the best environment for teaching and research and improve its scientific research capacity. The project's selection was flexible and allowed interdisciplinary cooperation (Danish National Research Foundation, 1991). In the late 1990s, some developing countries also joined the race for world-class universities and disciplines. For example, China and India implemented programs of building excellent universities in 1995 and 1997 respectively, both aiming to provide substantive funding for universities with potential and to improve their competitiveness in the world (National Education Commission, 1995; University Grants Commission, 1997a).

After stepping into the twenty-first century, the development of excellence initiatives has been in steady growth. In particular, the emergence of third-party assessments, such as world university rankings, provided countries with a more intuitive way of comparing higher education capacity and further stimulated international competition. Under the increasingly fierce competition, a few developed countries intended to further reinforce their advantage, and some realized their stagnation and sought to revive their institutions; while emerging economies strived to gain visibility on the global stage. During this time, both developed and emerging countries started various types of projects to develop academic excellence.

After a decade of reform efforts, some countries have achieved initial success in developing world-class universities or disciplines, and excellence initiatives have entered a stage of accelerating expansion. More and more countries have implemented relevant policies and strategies on developing excellence, and many countries have successively launched follow-up plans based on the performance and progress of their previous excellence initiatives.

1.3 China's Excellence Initiatives

Chinese higher education has made remarkable progress in the past 30 years, due to Chinese government's attention and support as well as its universities' persistent efforts. Education is regarded as an important national strategy in China and Chinese government has formulated a series of significant long-term plans and initiatives to construct key universities, such as Project 211, Project 985 and the Double World-Class Project. The overall development plan for Project 211 and Project 985 mainly included promoting educational innovation, strengthening the scientific research

function of universities, and promoting the internationalization of higher education. *The Overall Plan for Promoting the Construction of World-Class Universities and World-Class Disciplines* was published in 2015, which clearly set the development goals of Chinese higher education: by the middle of the twenty-first century, it will develop top Chinese universities into world-class institutions (Liu et al., 2021).

1.3.1 Project 211

Before the reform and opening-up in 1978, Chinese government had selected several universities as national key universities, but the systematic projects of constructing world-class universities or disciplines did not start until Project 211 launched in 1995. Project 211 aimed at developing about 100 key universities and a number of key disciplines by the early twenty-first century. The project strived to “make some key universities and key disciplines be close to or reach the advanced level of the world, improve the conditions of universities, and make great achievements in talent training and scientific research” (National Education Commission, 1995). This funding scheme mainly focused on four aspects of development: disciplinary and interdisciplinary programs, digital campuses, faculty excellence, and university infrastructure. Compared with other key state projects since the founding of the new China, it was not only the largest scale project in the field of higher education but also the highest level of block grant at that time. Altogether, 116 universities were selected throughout the three phases of the project (Office of the Inter-Ministerial Coordination Group of Project 211, 2003).

With the support of the project, infrastructure and other conditions improved significantly at the selected universities, remarkably enhancing the overall strength of the universities. More importantly, the project inspired Chinese universities to compete internationally, and encouraged the thinking of universities on further developing world-class academic excellence (Wang & Cheng, 2014). However, there was still a large gap between China’s top universities and their international peers, in terms of faculty, teaching and research quality, and knowledge creation and innovation. To further narrow the gap and enhance public funding for higher education, Chinese government launched Project 985.

1.3.2 Project 985

Project 985 was launched in 1998 to develop a tertiary education system of international standing. This project was funded through block funding and resources from Chinese government as well as from other ministries and departments. The project intended to establish a number of world-class universities and to develop a number of key research centers of excellence within 10–20 years (MOE, 1998). Project 985 was implemented in three phases: 1999–2003, 2004–2009, and 2010–2015. Altogether, 39 universities were selected by Chinese government.

Project 985 is of great historical and practical significance to China's development of modernization and international competitiveness. As an integral part of the national talent development strategy, this project is not only conducive to improving the overall strength of China's higher education, contributing to the country's economic, social and cultural development, but also conducive to the exchange and mutual learning between Chinese culture and other countries (MOE & Ministry of Finance, 2004).

1.3.3 The Double World-Class Project

The Double World-Class Project is the third project to develop academic excellence after Project 211 and Project 985. In 2015, the State Council issued *The Overall Plan for Promoting the Construction of World-Class Universities and World-Class Disciplines*, and put forward the following goals: to develop a number of world-class universities and first-class academic disciplines by 2020; to have more universities and disciplines among the world's best and to enhance the country's overall higher education capacity by 2030; and to lead the number, quality and capacity of world-class universities and disciplines among the world's best, becoming a higher education powerhouse by 2050.

This project encourages diversified development of leading universities of various types (such as research universities, teaching universities, and art and music conservatories). It emphasizes performance evaluations and adopts a dynamic evaluation and funding approach to reward the high-performing institutions while eliminating under-performing institutions. The duration of each round is five years. The project selects 42 universities to participate in the first round, of which 36 are Class A and six are Class B, and 140 universities are designated to develop world-class disciplines (MOE et al., 2017a). World-class universities focus on the overall construction of the institution based on world-class disciplines and the comprehensive improvement of talent training and innovation ability, while universities designated to develop world-class disciplines focus on developing quality disciplines and forming the institution's features and identities.

The first round of the Double World-Class Project was completed in 2020. In 2022, the list of selected universities of the second round was published: the number of universities was increased to 147, while the list of the first-round of disciplines to be publicly warned (including revoked) was also published (MOE et al., 2022a). Different from the first round, the second round no longer distinguishes world-class universities and universities designated to develop world-class disciplines, but "emphasizes exploring the establishment of diversified development, diversified support, and diversified evaluation, and guides universities to focus on the innovation and breakthrough in relevant fields and directions, so as to create truly world-class universities" (MOE, 2022).

2 Highlighting Data

This section compares China's Double World-Class Project with excellence initiatives of 10 countries. The following countries and excellence initiatives were selected:

- Australia: ARC Centers of Excellence (ARC refers to Australian Research Council)
- Denmark: Centers of Excellence
- Finland: Centers of Excellence
- France: Initiative of Excellence (IDEX)
- Germany: Excellence Initiative
- Israel: Israeli Centers of Research Excellence (hereafter I-CORE)
- Japan: Top Global University Project
- ROK: Brain Korea 21 Plus (hereafter BK21 Plus)
- Russia: Project 5–100
- Vietnam: New Model University Project.

2.1 *Number of Higher Education Institutions Funded by Each Excellence Initiative*

In 2017, China officially launched the first round of the Double World-Class Project, in which 42 universities were selected aiming to become world-class and 140 universities were designated to develop world-class disciplines (MOE et al., 2017a). In 2022, 147 universities were selected in the second round of the Double World-Class Project (MOE et al., 2022a). The average number of higher education institutions (hereafter HEIs) funded by excellence initiatives in the other 10 countries (excluding China) is 19 (Fig. 1).

The number of HEIs funded by ROK and Japan's excellence initiatives is relatively large. ROK's MOE strictly examined 345 discipline clusters (large-scale units) and 866 discipline groups (small-scale units) which applied by 108 universities, and finally selected 195 discipline clusters and 280 discipline groups from 64 universities for the BK21 Plus project (MOE of ROK, 2013). The funded disciplines cover various academic fields, including natural science, technology, humanities, and social science, and the project targets at training global talents, specialized talents and innovative future talents (*ibid*). Japan's Top Global University Project received 109 applications from 104 universities. The committee reviewed these applications based on three criteria: internationalization, management, and education reform, and finally selected 37 universities, including 13 Class A universities and 24 Class B universities (MEXT of Japan, 2014a).

Most countries' excellence initiatives fund about 10–20 HEIs. Russia's Project 5–100 has funded a total of 21 universities, with 15 universities funded in the first cycle and an additional six universities added to the second funding cycle (Ministry of

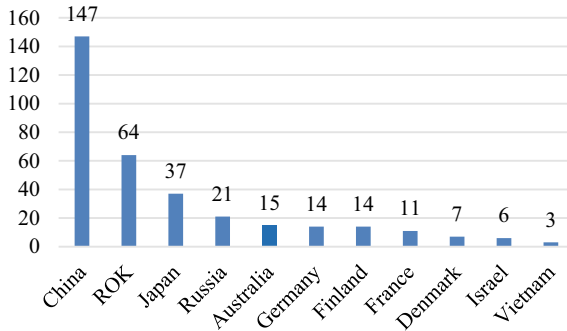


Fig. 1 Number of higher education institutions funded by each excellence initiative. *Source* MOE et al. (2017a), MOE of ROK (2013), Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT of Japan) (2014a), Ministry of Education and Science of the Russian Federation (2013), Australian Research Council (2009), German Research Foundation (2005), Academy of Finland (1995), MOE of France (2010a), Danish National Research Foundation (1991), Planning and Budget Committee of Israel (2011), Ministry of Education and Training of Vietnam (2008)

Education and Science of the Russian Federation, 2013). Australia's ARC Centers of Excellence has launched four phases, with 15 universities funded in total (Australian Research Council, 2009). Germany's Excellence Initiative has funded a total of 14 universities, with nine universities funded in the first round and 11 universities funded in the second round. Some universities, however, have received funding in both rounds (German Research Foundation, 2005). Finland's Centers of Excellence has funded 14 universities (Academy of Finland, 1995). France's IDEX has funded altogether 11 universities in two phases (MOE of France, 2010a).

The number of HEIs funded by Denmark, Israel, and Vietnam's excellence initiatives is relatively smaller. As the total number of universities in Denmark and Israel is small, the number of funded universities in the two countries is small as well. Denmark's Centers of Excellence has funded seven universities (Danish National Research Foundation, 1991); Israel's I-CORE has funded six universities (Planning & Budget Committee of Israel, 2011). The strength of higher education of Vietnam is not as strong as other countries, and this limitation may affect the universities funded by New Model University Project, as the number is only three (Ministry of Education and Training of Vietnam, 2008).

2.2 Funded Institutions as a Percentage of Total Higher Education Institutions

With the continuous expansion of China's higher education, the total number of Chinese universities has reached 2,738 (MOE, 2021b), and the percentage of universities funded by the Double World-Class Project is about 5.37%. For other 10 countries, the average percentage of HEIs funded by excellence initiatives in the total HEIs is about 10.88% (Fig. 2).

The percentage of HEIs funded by Finland, Denmark, and ROK's excellence initiatives is relatively higher. In Finland, the total number of universities is only 35, so the number of funded universities is not large, but the percentage reaches 40% (Ministry of Education and Culture of Finland, 2022), which is the highest among the 11 countries. Universities funded by Centers of Excellence account for 18.42% in the total 38 universities in Denmark (Study in Denmark, 2022). Universities funded by BK21 Plus account for 15.02% in the total 426 universities in ROK (MOE of ROK, 2021).

The percentage of HEIs funded by Israel and Australia's excellence initiatives are close to the average. The number of universities funded by I-CORE is not large, but it accounts for 10.17% of the total 59 universities of Israel (Israel Council for Higher Education, 2022). The universities funded by ARC Centers of Excellence account for 8.82% of the total 170 universities of Australia (Universities Australia, 2022).

The proportions of HEIs funded by Japan, France, Germany, Russia, and Vietnam's excellence initiatives are relatively low, and they are all lower than China's figure (5.37%). According to the statistics of the 2021 Basic Survey of Schools released by the MEXT of Japan, the total number of Japanese universities in 2021 is

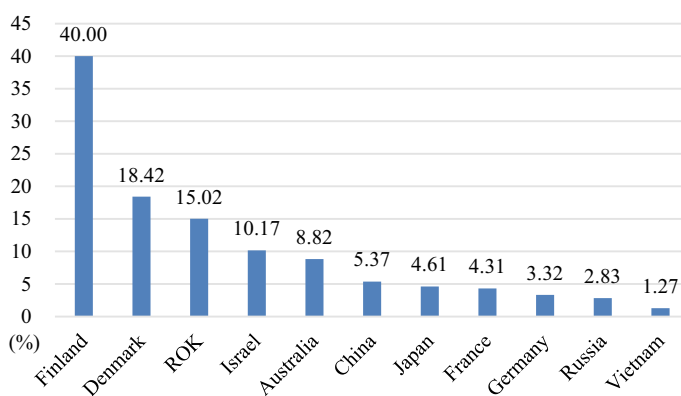


Fig. 2 Funded institutions as a percentage of total higher education institutions(%). *Source* Ministry of Education and Culture of Finland (2022), Study in Denmark (2022), MOE of ROK (2021), Israel Council for Higher Education (2022), Universities Australia (2022), MOE et al. (2017a), MOE (2021a), MEXT of Japan (2021b), MOE of France (2022), Ministry of Education and Research of Germany (2022), Study in Russia (2022), Ministry of Education and Training of Vietnam (2021a)

803 (MEXT of Japan, 2021b), and the universities funded by Top Global University Project account for 4.61%. Some European countries, including France, Germany, and Russia, have similar proportions of funded universities, ranging from 2 to 5%. Universities funded by IDEX make up 4.31% of the total 255 universities of France (MOE of France, 2022). Universities funded by Excellence Initiative make up 3.32% of the total 422 universities of Germany (Ministry of Education and Research of Germany, 2022). Universities funded by Project 5–100 make up 2.83% of the total 741 universities of Russia (Study in Russia, 2022). The percentage of universities funded by New Model University Project of Vietnam is only 1.27% (Ministry of Education & Training of Vietnam, 2021a), which is the lowest among the 11 countries.

2.3 Duration of Excellence Initiatives

The planning of China’s Double World-Class Project started from 2015, as planned, and it will continue to the middle of this century (the State Council, 2015). The goal is to improve the strength of leading universities and disciplines at the forefront of the world, and to build China as a powerful country in higher education (the State Council, 2015). The duration of the Double World-Class Project is about 35 years. The average duration of excellence initiatives of the other 10 countries is about 15 years (Fig. 3).

Denmark and Finland have the longest durations of excellence initiatives, which are more than 30 years, similar to China. Denmark’s Centers of Excellence is planned

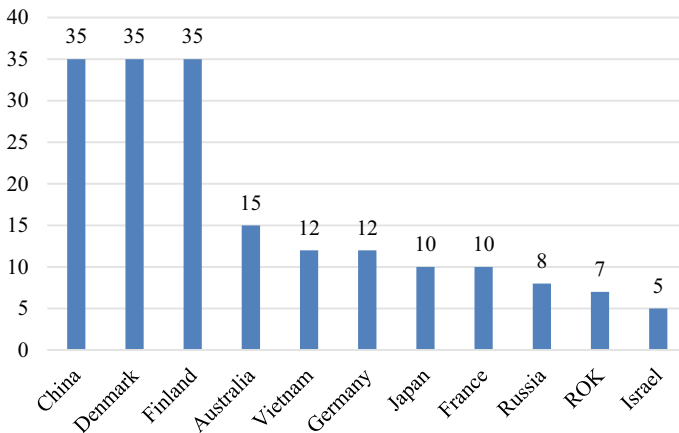


Fig. 3 Duration of excellence initiatives (year). *Source* the State Council (2015), Danish National Research Foundation (1991), Academy of Finland (1995), Australian Research Council (2009), Ministry of Education and Training of Vietnam (2008), German Research Foundation (2005), MEXT of Japan (2014a), MOE of France (2010a), Ministry of Education and Science of the Russian Federation (2013), MOE of ROK (2013), Planning and Budget Committee of Israel (2011)

for 35 years from 1991 to 2026 (Danish National Research Foundation, 1991). Finland's Centers of Excellence is planned to be implemented from 1995 to 2029, with a duration of 35 years (Academy of Finland, 1995).

Countries with a duration of 10–15 years include Australia, Vietnam, Germany, Japan, and France. Australia's ARC Centers of Excellence is planned for 15 years from 2009 to 2023 (Australian Research Council, 2009). Vietnam's New Model University Project has been implemented for 12 years from 2009 to 2020 (Ministry of Education and Training of Vietnam, 2008). Germany's Excellence Initiative has been implemented for 12 years, with the first round from 2007 to 2012 and the second round from 2012 to 2017 (German Research Foundation, 2005). Japan's Top Global University Project is planned for 10 years from 2014 to 2023 (MEXT of Japan, 2014a). France's IDEX has been implemented for 10 years, with the first phase from 2012 to 2016 and the second phase from 2018 to 2022 (MOE of France, 2010a).

Countries with a duration that is less than 10 years include Russia, ROK, and Israel. Russia's Project 5–100 has been implemented for eight years from 2013 to 2020 (Ministry of Education and Science of the Russian Federation, 2013). ROK's BK21 Plus has been implemented for seven years from 2013 to 2020 (MOE of ROK, 2013). Israel's I-CORE has been implemented for five years from 2011 to 2016 (Planning & Budget Committee of Israel, 2011), of which the duration is the shortest among the 11 countries.

2.4 Funding Period of Excellence Initiatives

China's Double World-Class Project takes a five-year round. The first round was from 2017 to 2021, and the second round started from 2022. The average funding period of the other 10 countries' excellence initiatives is about seven years (Fig. 4).

Those above the average include Vietnam, Japan, Denmark, ROK, and Finland's excellence initiatives. New Model University Project in Vietnam takes a 12-year cycle (Ministry of Education and Training of Vietnam, 2008). Japan's Top Global University Project has been implemented for a single ten-year phase (MEXT of Japan, 2014a). Denmark's Centers of Excellence has a 10-year cycle (Danish National Research Foundation, 1991). ROK's BK21 Plus has a seven-year cycle (MOE of ROK, 2013). Finland plans to implement Centers of Excellence from 1995 to 2029, with a six-year cycle in the early stage and an eight-year cycle in the subsequent stages (Academy of Finland, 1995), and the average funding period is about seven years.

Those with funding periods below the average include Germany, France, Russia, Australia, and Israel's excellence initiatives. Excellence Initiative in Germany lasts six years as a round (German Research Foundation, 2005). France's IDEX lasts five years as a phase (MOE of France, 2010a). Russia's Project 5–100 has been implemented for eight years from 2013 to 2020, with a four-year cycle (Ministry of Education and Science of the Russian Federation, 2013). Australia's ARC Centers of Excellence and Israel's I-CORE have three-year cycles (Australian Research Council,

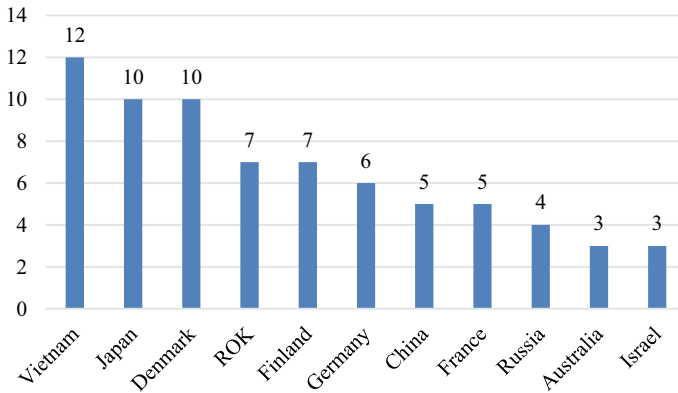


Fig. 4 Funding period of excellence initiatives (year). *Source* Ministry of Education and Training of Vietnam (2008), MEXT of Japan (2014a), Danish National Research Foundation (1991), MOE of ROK (2013), Academy of Finland (1995), German Research Foundation (2005), the State Council (2015), MOE of France (2010a), Ministry of Education and Science of the Russian Federation (2013), Australian Research Council (2009), Planning and Budget Committee of Israel (2011)

2009; Planning & Budget Committee of Israel, 2011), which is the shortest funding period among the 11 countries.

2.5 Total Funding Amount for Excellence Initiatives

In order to support the deep development of higher education, China's Ministry of Finance has set up a special fund for constructing world-class universities and disciplines and guiding characteristic development (Ministry of Finance, 2020). The fund has been steadily sustaining the development of the Double World-Class Project. From 2016 to 2020, RMB91.9 billion (Ministry of Finance, 2020), equivalent to US\$13 billion, has been allocated to the Double World-Class Project, and the amount is the highest among the 11 countries. The average funding amount for excellence initiatives in the other 10 countries is about US\$1.94 billion (Fig. 5).

France and Germany's funding amounts for excellence initiatives are significantly higher than the other eight countries. The funding for France's IDEX is about EUR 7.7 billion (US\$8.55 billion) (MOE of France, 2010b). The funding for Germany's Excellence Initiative is about EUR 4.6 billion (US\$5.26 billion), of which EUR 1.9 billion is invested in the first round and EUR 2.7 billion is invested in the second round; the state governments of the funded universities provide 25% of the funding and the federal government provides 75% (German Research Foundation, 2005). MOE of ROK and the National Research Foundation of ROK have invested about KRW 1910.3 billion (US\$1.46 billion) in BK21 Plus (MOE of ROK, 2013). The funding for Russia's Project 5–100 is about RUB 60.5 billion (US\$1.02 billion) (Ministry of Education and Science of the Russian Federation, 2013).

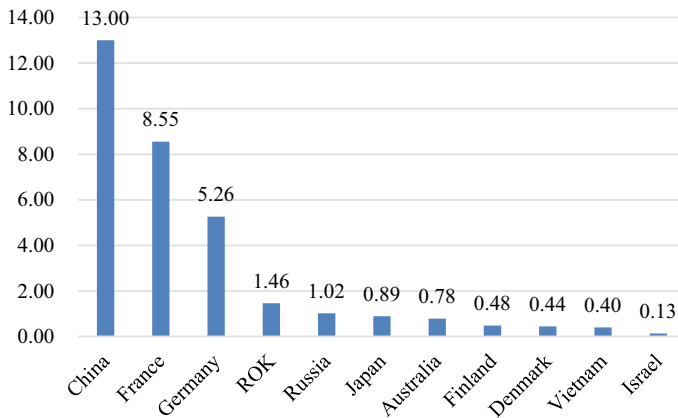


Fig. 5 Total funding amount for excellence initiatives (in US\$ billion). *Source* Ministry of Finance (2020), MOE of France (2010b), German Research Foundation (2005), MOE of ROK (2013), Ministry of Education and Science of the Russian Federation (2013), Xiong and Chen (2020), Australian Research Council (2009), Academy of Finland (1995), Danish National Research Foundation (1991), Ministry of Education and Training of Vietnam (2008), Planning and Budget Committee of Israel (2011). *Notes* 1. As the funding amount of some periods is unavailable, the total funding amount is calculated based on the funding of the following period: China 2016–2020, France 2012–2016, Germany 2007–2017, ROK 2013–2020, Russia 2013–2017, Japan 2014–2020, Australia 2009–2020, Finland 1995–2019, Denmark 1993–2020, Vietnam 2011–2020, and Israel 2011–2016. 2. The exchange rate used in Fig. 5 is the exchange rate of the latest year of which the funding amount is available

Other countries have invested less than US\$1 billion. The funding for Japan's Top Global University Project is about JPY 96 billion (Xiong & Chen, 2020), equivalent to US\$0.89 billion. Australia has invested about AUD 1.13 billion (US\$0.78 billion) in ARC Centers of Excellence (Australian Research Council, 2009). The funding amounts of Finland and Denmark are close, with about EUR 0.42 billion (US\$0.48 billion) and EUR 0.39 billion (US\$0.44 billion) respectively (Academy of Finland, 1995; Danish National Research Foundation, 1991). In 2009, Vietnamese government loaned US\$0.4 billion from the World Bank and the Asia Development Bank for the construction of New Model University Project (Ministry of Education & Training of Vietnam, 2008). I-CORE of Israel was ratified by Israeli government and adopted by Council for Higher Education in 2010; the Planning and Budget Committee of Israel and the Israel Science Foundation jointly operate it (Planning & Budget Committee of Israel, 2011). The funding for I-CORE is ILS 0.45 billion, equivalent to US\$0.13 billion (Planning & Budget Committee of Israel, 2011).

2.6 Total Funding for Excellence Initiatives as a Proportion of Total GDP in the Corresponding Period

During the period of the first round of the Double World-Class Project (2016–2020), China's total GDP is about US\$66.43 trillion (World Bank, 2022), and the total funding of the Double World-Class Project accounts for 0.20‰. As for the other 10 countries, the average proportion of the grant funding in their total GDP is about 0.15‰ (Fig. 6).

During the period of the first phase of IDEX (2012–2016), France's total GDP is about US\$13.25 trillion (World Bank, 2022), and the funding for IDEX makes up 0.65‰, which is the highest proportion among the 11 countries. Countries with proportions ranging from 0.10‰ to 0.20‰ include Vietnam (0.20‰), Germany (0.13‰), ROK (0.12‰) and Russia (0.12‰). Countries with proportions lower than 0.10‰ include Finland (0.09‰), Israel (0.07‰), Denmark (0.06‰), Australia (0.05‰), and Japan (0.03‰). During the first seven years of the implementation of Top Global University Project (2014–2020), the total GDP of Japan reaches about

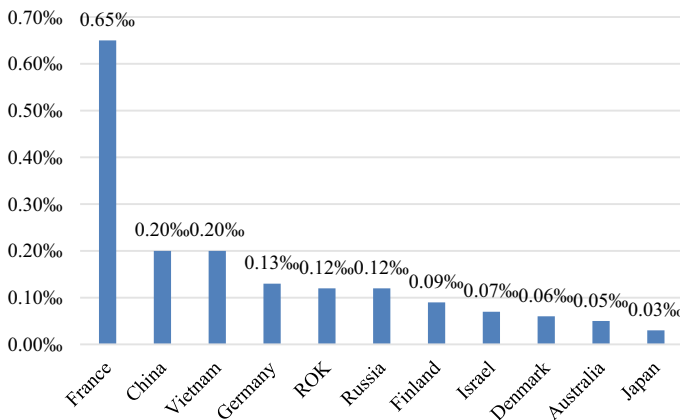


Fig. 6 Total funding for excellence initiatives as a proportion of total GDP in the corresponding period (‰). *Source* World Bank (2022); MOE of France (2010b), Ministry of Finance (2020); Ministry of Education and Training of Vietnam (2008), German Research Foundation (2005), MOE of ROK (2013), Ministry of Education and Science of the Russian Federation (2013), Academy of Finland (1995), Planning and Budget Committee of Israel (2011), Danish National Research Foundation (1991), Australian Research Council (2009), Xiong and Chen (2020), *Notes* 1. To calculate the proportion of total grant funding in the total GDP in the corresponding period, the periods covered in Fig. 6 is the same as that in Fig. 5. The total GDP of each country is calculated based on its GDP data in the following period: France 2012–2016, China 2016–2020, Vietnam 2011–2020, Germany 2007–2017, ROK 2013–2020, Russia 2013–2017, Finland 1995–2019, Israel 2011–2016, Denmark 1993–2020, Australia 2009–2020, and Japan 2014–2020. 2. The total GDP in the corresponding period are as follows: France US\$13.25 trillion, China US\$66.43 trillion, Vietnam US\$2.05 trillion, Germany US\$39.34 trillion, ROK US\$12.45 trillion, Russia US\$8.56 trillion, Finland US\$5.24 trillion, Israel US\$1.74 trillion, Denmark US\$7.42 trillion, Australia US\$16.12 trillion, and Japan US\$34.52 trillion

US\$34.52 trillion (World Bank, 2022), while the grant funding accounts for only 0.03%, which is the lowest among the 11 countries.

2.7 Funding for Excellence Initiatives Per Institution

During the period of 2016 to 2020, the average funding for each university of the Double World-Class Project of China is about US\$0.09 billion. The funding for excellence initiatives per institution in the other 10 countries is about US\$0.15 billion (Fig. 7).

The funding for each institution in France and Germany are significantly higher than that in other countries. Each HEIs of France's IDEX receives about US\$0.78 billion, and the amount is much higher than other countries. Each HEIs of Germany's Excellence Initiative receives about US\$0.38 billion. The funding for each HEIs in Vietnam's New Model University Project is unexpectedly higher than that of most countries. It allocates about US\$0.13 billion to each HEIs. The funding for each HEIs in Denmark, Australia, Russia, Finland, Japan, ROK, and Israel are between US\$0.02 billion and US\$0.06 billion.

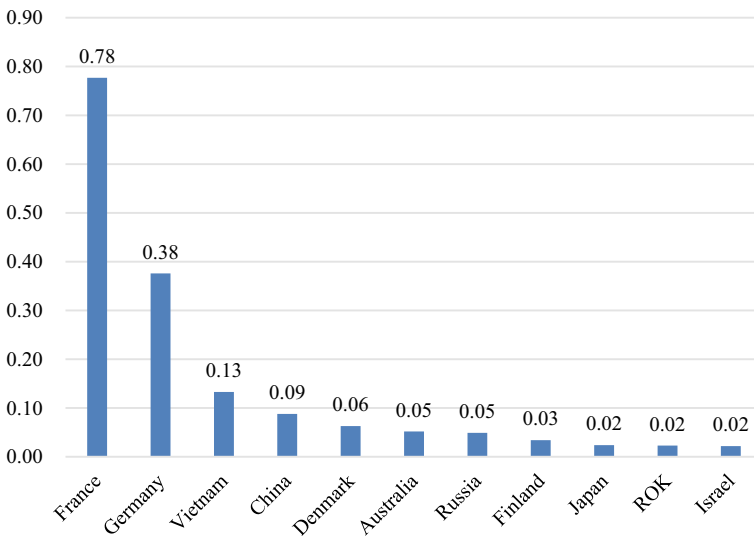


Fig. 7 Funding for excellence initiatives per institution (in US\$ billion). *Source* MOE of France (2010a, 2010b), German Research Foundation (2005); Ministry of Education and Training of Vietnam (2008), MOE et al. (2017a), Ministry of Finance (2020), Danish National Research Foundation (1991), Australian Research Council (2009); Ministry of Education and Science of the Russian Federation (2013), Academy of Finland (1995), MEXT of Japan (2014a), Xiong and Chen (2020), MOE of ROK (2013), Planning and Budget Committee of Israel (2011). *Note* Funding for excellence initiatives per institution are calculated based on the data in Figs. 1 and 5

Based on the analysis above, it can be found that China ranks first in the number of funded HEIs, the duration, and the total funding amount, ranks second in the proportion of total funding in GDP, and ranks fourth in the funding for each institution. These results indicate that China has placed great emphasis and efforts on the Double World-Class Project. However, it cannot be ignored that, regarding the percentage of funded institutions in total HEIs, China ranks in the middle among the 11 countries, therefore, further investment on more HEIs may be needed for the future development.

3 Excellence Indicators

3.1 Design

This section evaluates excellence initiatives from three dimensions: goals, resources, and outcomes. “Goal” refers to the objectives of excellence initiatives, “resource” refers to the durations and funding amounts for excellence initiatives, and “outcome” refers to the achievements of excellence initiatives.

3.1.1 Goal

Excellence initiatives of many countries are generally proposed to provide the best working environment to attract top talents and conduct world-leading research, so as to improve international competitiveness. Ultimately, these initiatives will help these countries take their share and gain visibility and reputation in global competition. Different countries tend to set up different goals based on their own situation and demand. Based on the level of development, countries and their development of excellence initiatives can be divided into three categories. For countries with a strong higher education system, such as Germany, France, and Japan, the goal is to reinforce the existing international competitiveness and to continue to expand the advantages in global education market. For countries with a relatively developed higher education, such as China, ROK and Russia, the goal is to improve its capacity and visibility in global competition. For countries where higher education development is still far from making influence in global higher education market, such as Vietnam, Thailand, and African countries, the goal is to gain their international standing in the global stage by conducting international research. The goals of excellence initiatives reflect trends and dynamic status of higher education development in each country. Moreover, idealized world-class universities are global organizations by nature and belong to the whole world. World-class universities should hold a vision that extends their development beyond national boundaries, contribute to global common goods,

embrace and respond to the challenges of human being, serve international community, and strive to make achievements that have far-reaching impacts on human civilization and social development (Van der Wende, 2009; Xu, 2013). To certain extent, many countries integrate their national strategies and global vision into their excellence initiatives, and at the same time advocate to solve global challenges by making innovative breakthroughs in scientific research and make contributions to global common goods and human well-being.

3.1.2 Resource

To attract high-quality HEIs to join excellence initiatives, many countries endeavor to provide strong financial support. It takes time to build world-class universities, particularly those universities that are capable of making national and international contributions. Since the 1990s, many countries have successively launched their excellence initiatives with the durations ranging from five to 35 years. Excellence initiatives require countries to integrate regional educational resources and need a long-term dynamic process to promote academic excellence and enhance the country's overall higher education strength (Li, 2005; Zhang & Liu, 2015). These reasons have led most countries to formulating long-term strategies and providing continuous funds to excellence initiatives for more than 10 years. Countries generally allocate block funding to a small number of selected institutions. Even though many factors affect the funding process, the financial support and resources provided by governments are always very attractive (Qiu & Ou, 2016).

3.1.3 Outcome

International standards are usually adopted to evaluate the outcomes of excellence initiatives. Global university rankings are the most direct approach to do so. Many countries also include specific goals in terms of their standing in global rankings in their strategic planning. The most common criterion of a strong global position is "entering the world top 100" which indicates "excellence". Universities' performance in global rankings is a key manifestation of the "outcome" of excellence initiatives. Some quantitative indicators of a university's strength, such as the number of research publications and the degree of internationalization, could raise a university's global ranking rapidly, but they cannot indicate whether a university has gained global reputation that matches its ranking. The recognition of peers could be used as an indicator of a university's intangible strength (Feng et al., 2022). Peer review is often employed by global rankings. It not only indicates that a university's achievements have been recognized by peer academics, but also implicitly shows a university's intangible resources, such as status, reputation, or level (Yan, 2007). The higher evaluation outcomes on peer review, the higher recognition a university has.

3.2 Definitions and Sources

This section compares China's Double World-Class Project and the excellence initiatives of 10 countries: Australia's ARC Centers of Excellence, Denmark's Centers of Excellence, Finland's Centers of Excellence, France's IDEX, Germany's Excellence Initiative, Israel's I-CORE, Japan's Top Global University Project, ROK's BK21 Plus, Russia's Project 5–100, and Vietnam's New Model University Project. In accordance with the design ideas, 10 indicators are selected (Table 1).

The "goal" dimension employs two indicators: "specific goals of excellence initiatives" and "concept of serving global common goods in excellence initiatives". The data are mainly from the official documents of excellence initiatives issued by governments. The evaluation results of "specific goals" include "sufficient" (++), "involved but not sufficient" (+), and "not involved" (-). "Sufficient" means that excellence initiatives have presented specific and quantitative development goals; "involved but not sufficient" means that excellence initiatives have mentioned the concepts of development goals at the macroscopic level; "not involved" means that excellence initiatives have not formulated any development goals. The evaluation results of "concept of global common goods" include "sufficient" (++), "involved but not sufficient" (+), and "not involved" (-). "Sufficient" means that excellence initiatives have explicitly put forward serving the common interests of global society and human being; "involved but not sufficient" means that excellence initiatives have put forward integrating in global communication, establishing a global cooperation network, or contributing to solving global problems; "not involved" means that excellence initiatives have not explicitly mentioned contribution to global development.

The "resource" dimension employs four indicators: "duration of excellence initiatives", "total funding amount for excellence initiatives", "total funding for excellence initiatives as a proportion of GDP", and "total funding for excellence initiatives as a percentage of government expenditure on higher education". The data of durations

Table 1 Evaluation indicators of excellence initiatives

Dimensions	Excellence indicators
Goal-1	Specific goals of excellence initiatives (++/±)
Goal-2	Concept of serving global common goods in excellence initiatives (++/±)
Resource-1	Duration of excellence initiatives (long term/medium term/short term)
Resource-2	Total funding amount for excellence initiatives
Resource-3	Total funding for excellence initiatives as a proportion of GDP
Resource-4	Total funding for excellence initiatives as a percentage of government expenditure on higher education
Outcome-1	Fluctuation ratio of the percentage of funded universities in world top 100
Outcome-2	Fluctuation ratio of the percentage of funded universities in world top 500
Outcome-3	Peer recognition: Standard value of the fluctuation of citation frequency by world top 100 universities

and grant funding are from the official documents published by governments,¹ the data of GDP are from World Bank (World Bank, 2022), and the data of government expenditure on higher education are from UNESCO Institute for Statistics (UIS, 2022).² The evaluation results of “duration of excellence initiatives” include “long term (L)”, “medium term (M)”, and “short term (S)”, which refer to “over 20 years”, “10–20 years” and “less than 10 years” respectively. The statistics of funding amounts are converted into US\$ for comparison. The results of “total funding for excellence initiatives as a proportion of GDP” and “total funding for excellence initiatives as a percentage of government expenditure on higher education” use the data of the total GDP of the country and government’s total expenditure on higher education in the corresponding periods.

The “outcome” dimension employs three indicators: “fluctuation ratio of the percentage of funded universities in world top 100”, “fluctuation ratio of the percentage of funded universities in world top 500”, and “peer recognition: standard value of the fluctuation of citation frequency by world top 100 universities”. The original data of world university rankings are from ShanghaiRanking (Academic Ranking of World Universities [ARWU]), Times Higher Education (THE World University Rankings), and Quacquarelli Symonds (QS World University Rankings). The method is calculating the fluctuation ratio of the percentage of funded universities in world top 100 and world top 500 since the emergence of world university rankings in 2003 or 2004 (the entering to any one of the three rankings counts). The original data of “peer recognition” are from the official websites of world top 100 universities. The information released on universities’ official websites is usually authorized, public, and dynamic; it covers the stakeholders including students, faculty members, and administrative personnel, and covers contents such as scientific research, teaching, and school service (Feng et al., 2022). The method is calculating the increase of the average frequency of funded universities mentioned by world top 100 universities (excluding their domestic universities) on official websites from 2003, and the highest value is standardized as 1.00.

3.3 Findings

Table 2 presents evaluation results of the excellence initiatives in selected countries in different dimensions.

In terms of “specific goals”, countries with “sufficient” performance, namely, specific and quantitative goals include France, Japan, ROK, Russia, and Vietnam. Their excellence initiatives have clearly defined their targets of international positions. France’s IDEX aims to construct five to 10 world top universities that are

¹ For some countries, the data of funding in some periods are unavailable, so the average numbers of the periods around are calculated as estimation.

² For some countries, the data of government expenditure on higher education in some periods are unavailable, so the average numbers of the periods around are calculated as estimation.

Table 2 Evaluation results of the excellence initiatives of the 11 selected countries

Countries	Specific goals	Concept of global common goods	Duration	Total funding amount (in US\$ billion)	Total funding in GDP (%)	Total funding in HE expenditure (%)	Fluctuation ratio of world top 100 (%)	Fluctuation ratio of world top 500 (%)	Peer recognition
Australia	+	+	M	0.78	0.05	0.38	-20.00	20.00	1.00
China	+	++	L	13.00	0.20	1.45	3.40	36.74	0.18
Denmark	+	+	L	0.44	0.06	0.26	14.29	0.00	0.84
Finland	+	-	L	0.48	0.09	0.48	0.00	7.14	0.28
France	++	-	M	8.55	0.65	5.25	18.18	63.64	0.21
Germany	+	+	M	5.26	0.13	1.06	7.14	7.14	0.76
Israel	+	+	S	0.13	0.07	0.82	33.33	0.00	0.70
Japan	++	++	M	0.89	0.03	0.65	2.70	-10.81	0.25
ROK	++	-	S	1.46	0.12	1.34	7.81	9.38	0.04
Russia	++	+	S	1.02	0.12	1.48	0.00	57.14	0.05
Vietnam	++	-	M	0.40	0.20	2.41	0.00	0.00	0.05

Notes: "L" refers to "long term" (over 20 years), "M" refers to "medium term" (10-20 years), and "S" refers to "short term" (less than 10 years)

competitive globally and improve the international competitiveness and reputation of French higher education and research departments (MOE of France, 2010b). The goal of Russia's Project 5–100, as the name points out, is to build five universities that are able to enter the world top 100 (Ministry of Education and Science of the Russian Federation, 2013). The goal of Vietnam's New Model University Project is to have three universities enter into world top 200 by 2020 (Ministry of Education & Training of Vietnam, 2008). The goals of Japan and ROK's excellence initiatives are more detailed. Japan's Top Global University Project sets specific goals for each participating university, including goals related to internationalization, governance, and education reform, and evaluates the implementation of these goals through various indicators (MEXT of Japan, 2014a). ROK's BK21 Plus puts forward to construct a number of world-class research universities in the top 100 of QS, it also stipulates the number of outstanding research talents to be produced in academic fields and new industries every year, and requires universities to raise the citation frequency of ROK's SCI papers (MOE of ROK, 2013). Although other countries' excellence initiatives have not put forward quantitative goals, they have outlined their development goals on a macro level. China's Double World-Class Project puts forward the goal of supporting a few high-quality universities and disciplines to become world-class, gradually making China a powerful country in higher education (the State Council, 2015). Denmark regards its Centers of Excellence as "the incubator of future top researchers" and seeks to create an energetic, creative, and international research environment for them (Danish National Research Foundation, 1991). Germany's Excellence Initiative aims to promote scientific and technological research in German universities, enhance their international competitiveness, and train more young scientists; it also increases the funding for outstanding universities, outstanding young researchers, collaborative projects between different universities, and international cooperation (German Research Foundation, 2005). There is hardly any excellence initiative that has not set development goals.

In terms of "concept of global common goods", excellence initiatives generally emphasize national development, while most of them do not directly mention global benefits. Only China and Japan's excellence initiatives involve the concept of serving the global common goods. China's Double World-Class Project requires universities to undertake scientific research tasks concerning human survival and development, provide world-class innovation platforms for talents, respond to global challenges, and defend human well-being (MOE et al., 2022b). Japan's Top Global University Project clearly states that its mission is to train talents who have global thinking and tolerance of different cultures, and who are able to make contributions to solving global problems, play a leading role in international community, and be willing to work for social welfare (MEXT of Japan, 2014a). However, it cannot be ignored that the idea of solving global problems through international cooperation has been followed by many countries. Australia's ARC Centers of Excellence explicitly seeks to develop collaboration with leading countries and their international academic centers or research projects, so as to build an extensive global network (Australian Research Council, 2009). Germany's Excellence Initiative emphasizes strengthening the cooperation between German universities and international academic institutions

(German Research Foundation, 2005). Israel's I-CORE puts forward to cooperate with world-leading research institutions and scholars (Planning & Budget Committee of Israel, 2011). In terms of "resources", China, Denmark, and Finland's excellence initiatives have long durations (more than 20 years); medium length duration for Australia, France, Germany, Japan, and Vietnam's excellence initiatives (10–20 years); and relatively short duration for Israel, ROK, and Russia's excellence initiatives (less than 10 years). In terms of "total funding amount for excellence initiatives", up to now, the largest investment is witnessed in China's Double World-Class Project, which has reached US\$13 billion (Ministry of Finance, 2020). The funding amounts for France, Germany, ROK, and Russia's excellence initiatives are also at a high-level exceeding US\$1 billion. The funding amounts for Japan and Australia's excellence initiatives are between US\$700 million and US\$900 million. The funding amounts for Finland, Denmark, and Vietnam's excellence initiatives are around US\$400 million. The funding for Israel's I-CORE is the lowest, which is only about US\$130 million (Planning & Budget Committee of Israel, 2011). In terms of "total funding for excellence initiatives as a proportion of total GDP", France has the highest figure of 0.65%. China, Vietnam, Germany, ROK, and Russia have relatively high proportions (over 0.10%). The figures for other countries are below 0.10%, and Japan has the lowest proportion (0.03%). In terms of "total funding for excellence initiatives as a percentage of government expenditure on higher education," figure larger than 1% equates to a large investment. The figures for France, Vietnam, Russia, China, ROK, and Germany are higher than 1%. The figure for Vietnam is 2.41%, second only to France (5.25%). Denmark has the lowest percentage, which is only 0.26%.

In terms of "outcomes", most of the funded universities in various countries have enhanced their world ranking standings during the periods of their excellence initiatives. However, the performance of different universities in world rankings has varied. Specifically, universities funded by France's IDEX have made the greatest improvement, as the percentages of world top 100 and world top 500 universities have increased by around 20 and 60% respectively. This achievement may come from France's large investments and the integration of higher education resources, such as university merger. Countries with a big increase in the percentages of world top 100 universities include Israel and Denmark, with an increase rate of nearly 35% and 15% respectively. However, the percentages of world top 500 universities in these two countries have not risen. This example shows that the two countries' universities that have made remarkable achievements during the period of excellence initiatives are still domestic elite universities. China's percentage of funded universities in world top 500 has risen greatly, with an increase rate of nearly 37%, while the percentage of top 100 universities has increased slightly. This example shows that China's excellence initiatives has made significant achievements in the scale of world-class universities, while efforts are demanded for quality improvement. In ROK and Germany, the percentages of funded universities in world top 100 and world top 500 have increased slightly, with the increase rates of around 8%. This example demonstrates that the world rankings of funded universities have generally improved

in these two countries. In Russia and Finland, the performance of the previous “disadvantaged” universities has been improved during the periods of excellence initiatives. In Russia, no funded university has entered world top 100,³ while the percentage of world top 500 has increased by 57%. In Finland, the percentage of funded universities in world top 100 has not changed, while the figure for world top 500 has increased by 7%. Among the 11 countries, only Australia and Japan have showed negative growth, as Australia’s percentage of world top 100 has dropped by 20% and Japan’s percentage of world top 500 universities has dropped by about 10%. However, this change does not mean their disappointing performance in higher education; to the contrary, it is connected with their solid foundation for higher education. Australia and Japan had a number of world top 500 or world top 100 universities in previous time, due to increasingly fierce global competition in recently years, the performance of some universities has been unstable, thus resulting the negative growth. Furthermore, Vietnam’s funded universities have not entered world top 500, which indicates that its excellence initiatives may have not made effective results yet.

In terms of “peer recognition”, the universities funded by Australia’s ARC Centers of Excellence have made the largest improvement, and they have been widely recognized by many world-class universities. Universities funded by Denmark’s Centers of Excellence, Germany’s Excellence Initiative, and Israel’s I-CORE have enhanced their indices of “peer recognition” by more than 0.70. Universities funded by Finland, Japan, France, and China’s excellence initiatives have made some progress, and their indices have increased by around 0.2. However, universities funded by Russia, Vietnam, and ROK’s excellence initiatives have only raised their indices by less than 0.10, and most of these universities have not exerted an impressive influence in the world.

3.4 Discussion

China’s Double World-Class Project has not stipulated specific or quantitative targets but put forth long-term development goals of developing academic excellence so as to help China become a strong higher education power. Different from Russia and Vietnam, China does not strive to make funded universities enter world top 100 or 200 within a period. Different from Japan and ROK, China has not employed specific performance indicators such as the number of innovative talents training projects, the citation frequency of academic papers, or the number of international faculty members and students. On the contrary, Chinese government encourages funded universities to build world-class universities with Chinese characteristics on their own foundations, and guarantees universities’ decision-making powers (Zhang

³ Russia’s Project 5–100 has not funded universities with the best comprehensive strength, such as Moscow State University, as these universities have already received independent government funds.

et al., 2019). In the second round of the Double World-Class Project, Chinese government was determined to give funded universities more autonomy. The second round does not distinguish world-class universities and universities that are designated to develop world-class disciplines, while it requires universities to prioritize innovative breakthroughs (MOE et al., 2022a). Tsinghua University and Peking University, two of the most prominent universities in China and also as the pilot institutions in this project, are being provided autonomy to manage and design their own world-class discipline construction (*ibid*). In nature, excellence initiatives have national attributes, as the goals, the financial support provided and the selection process are closely connected with the governments' decisions, so serving national interests is generally an important premise for these initiatives. The Double World-Class Project is different from the excellence initiatives of most countries, as it specifically points out to serve global common goods. The Double World-Class Project states that Chinese world-class universities should be able to solve the common issues in human development, respond to global challenges, and promote human well-being (MOE et al., 2022b).

China's Double World-Class Project include a long-term funding period (over 30 years) and includes five-year cycles, while only a few other countries such as Denmark and Finland have planned to concentrate on long-term projects. During the period of the first round of the Double World-Class Project, China allocated more than US\$13 billion in special funds to this project, which accounts for 0.20% of China's GDP and 1.45% of government expenditure on higher education in the corresponding period, and the funding amount is larger than those in most countries. To support the deep development of higher education, China's government expenditure on education has been steadily rising in recent years (Ministry of Finance, 2020). Chinese government has allocated special funds for building world-class universities and disciplines. At the same time, it has improved the budget system for local universities' characteristic development (*ibid*). Therefore, China's Double World-Class Project reflects its features of long funding duration, strong financial support, and diversified development.

As for the outcomes of the Double World-Class Project, funded universities have improved their global rankings, and have obtained some level of international recognition. In ARWU, THE, and QS, seven Chinese Double World-Class universities have entered world top 100 and 63 have entered world top 500, with an increase rate of 3 and 37% respectively in 2022. Chinese Double World-Class universities have expanded in scale in the early stages of the project. For example, the number of international papers, the ratio of international faculty members and students, and some other internationally recognized indicators have increased significantly, which lead to an increase in global university rankings. However, these funded universities are still relatively under-recognized in the world, with only 0.18 peer recognition value, which is considerably less compared to universities in Australia, Germany, and Israel. The same can be said to China's less satisfying performance in top grade indicators, such as the number of Nobel Prize and original research breakthroughs (Feng & Liu, 2021). The quality of Chinese top universities still needs further improvement. For the Double World-Class universities that have made significant progress in terms of

quantitative indicators, it will still take time for them to improve their soft power that matches their corresponding world-class standards (Feng et al., 2022).

4 Best Practices

4.1 *Sustainable National Strategies*

4.1.1 National Strategic Significance

Many countries all over the world use excellence initiatives as national strategies because of their shared goals to enhance international competitiveness. These countries and universities try to adapt to the unprecedented changes of the world through the process of pursuing excellence. These national governments endeavor to provide optimal working conditions, recruit talented workforce, conduct leading research, and develop world-class universities and disciplines, as a means to increase soft power and enhance their competitiveness in global competition. Emerging information technology (IT), artificial intelligence (AI), and the digital economy have created new industries; and a new round of scientific and technological revolution and industrial transformation is reshaping the patterns of global innovation and profoundly changing the nature of work. This raises the demand to optimize industrial structures and promote infrastructure building for new technological advancement (Liu et al., 2021). Excellence initiatives can effectively coordinate and integrate a nation's higher education resources, strengthen financial support in specific institutions and fields, accelerate the technology breakthrough, and explore new development path.

As a national strategy, excellence initiatives focus on developing future skilled workforce and enhancing the strength of scientific research (Liu & Zhang, 2016), to guide high-quality development for the future. For example, ROK's BK21 Plus aims to develop world-class graduate schools and train a highly skilled workforce for Korea's socio-economic development (MOE of ROK, 2013); and Japan's 21st Century Center of Excellence (COE) Program aims to train world leading high-tech talents in Japanese universities (Zhao & Jiang, 2013). Most excellence initiatives also recognize the importance of research in meeting the needs of the nation and actively respond to the actual demands of economic, social, technological, and cultural development. For example, Australian's ARC Centers of Excellence plans to take climate, biology, quantum computing, and other aspects of national priorities as its project's preferred research fields (Australian Research Council, 2009). As a national-level strategy, excellence initiatives originate from local realities, rely on the countries' resources, and serve the countries' demands.

4.1.2 Universities' Responsibilities to Build World-Class Universities

In the future, top universities in each country will focus on talent training and scientific research, continue their investment in building world-class universities, and practice their commitment to solving national and global problems. Universities that aspire to become world-class usually define their responsibilities “based on local needs and engaged with the world”. China’s Tsinghua University explicitly proposes to build a comprehensive, research-oriented, and open leading university, with “global visions, world-class standards, Chinese characteristics, and Tsinghua style”, which, in other words, aims to integrate international standards, national responsibilities, and institutional differences while developing academic excellence (Xiao & Jiang, 2015). University College London (UCL) in the U.K. takes “London’s global university” as the central development goal, and it aims to create a diverse intellectual community with an outstanding ability to integrate education, research, innovation, and enterprise for the long-term benefit of humanity, so as to better understand the world, create and share knowledge, and solve global problems (UCL, 2015). The school motto of Princeton University in the U.S. states that a university is “a vibrant community of scholarship and learning that stands in the nation’s service and the service of humanity”.⁴

Specifically, world-class universities should be committed to taking responsibility for social development, understanding major needs of human development, conducting breakthrough research, training world leaders for global governance, providing innovative solutions to social problems, and ultimately exerting its “world-class” influence to promote development of the world and progress of human being.

4.1.3 Sustainable and Continuous Financial Support

Building world-class universities is time consuming. The common features of excellence initiatives in various countries include long project durations and abundant financial support. Funding cycles usually range from 5–12 years with quite a few countries choosing a long-term funding cycle of 10 years or more. China carried out Project 985 in three phases during the period from 1998 to 2015 and supported the project with special long-term funds from Chinese central government (MOE, 1998). Following Project 985, China launched the first round of the Double World-Class Project in 2017 (MOE et al., 2017a); after the first five-year round, seven universities were added in the second round in 2022 (MOE et al., 2022a). German launched the first round of Excellence Initiative in 2006, and its federal government and state governments jointly funded the first round from 2007 to 2012; the second round started from 2011 and the funding period was from 2012 to 2017 (German Research Foundation, 2005).

⁴ <https://www.princeton.edu/meet-princeton>.

Strong financial support is needed to successfully implement excellence initiatives. A single institution in Japan's Top Global University Project receives US\$20 million (MEXT of Japan, 2014a); a single institution in Australia's ARC Centers of Excellence receives US\$50 million (Australian Research Council, 2009); and a single institution in Germany's Excellence Initiative receives US\$380 million (German Research Foundation, 2005). These financial investments have led to rewarding outcomes. One direct outcome is that funded universities' research productivity has been effectively improved, as the number of papers published on top journals, the number of patents, and the level of industry-university-research cooperation have significantly increased (De Filippo et al., 2016; Lehmann & Stockinger, 2019). With continuous funding support, selected universities can improve overall capacity, and gradually enhance their positions in global rankings and gain prestige in the global higher education market (Menter et al., 2018).

4.2 Strategic Planning Leading Excellent Development

At the institutional level, strategic planning is the process of making long-term goals and putting those goals into practice. Effective strategic planning contributes to universities' development. As international competition in higher education is intensifying, an increasing number of leading universities have formulated strategic plans to develop academic excellence. In nature, strategic planning typically sets long-term goals, designs comprehensive planning, translating the overall goals into step actions, and provides directional guidance for universities.

4.2.1 Long-Term Goals

Building world-class universities is regarded as a long-term vision which requires a lengthy process. Universities should propose more ambitious goals and targets than their current development. The timeline to achieve the goals should be set for 5–10 years or even longer; it requires long-term, dedicated efforts to work towards these goals.

For example, Shanghai Jiao Tong University (SJTU) includes in its strategic plan: to develop academic discipline clusters with world-class influence, to provide excellent faculty and students for other world-class universities, to attract global talents and build a global talent community; to make contributions to the country and the world, and to become an attractive destination for students around the world (Lin, 2021). Following the guidance of strategic plan, SJTU has adhered to the goal of pursuing excellence and improving the comprehensive strength of the university through long-term and continuous endeavor. Since 1996, SJTU invested in strategic planning to build a world-class university based on a 10-year cycle. In the process of laying a strong development foundation and gradually forming superiority, SJTU formulates the aim of building a world-class university in 2050 (Lin, 2021).

4.2.2 Comprehensive Planning

It is through comprehensive planning that institutions can seek to improve the quality of talent training, faculty, disciplines, scientific research, and internationalization to reach world-class standards, integrate the university's vision and goal into the work and study of faculty members and students so as to gain full recognition, and focus on the comprehensive development of the university.

University of California Riverside (UCR) is a case that successfully combines the vision of university with the development of faculty members and students. The university is committed to effectively serving students of low-income and under-represented ethnic minority groups, helping them complete their studies, and, at the same time, maintaining a high level of research productivity and excellence (Lin, 2021). Faced with the public pressure and the decline of confidence brought by global ranking, UCR immediately focuses on the implementation of its strategic plan "UCR 2020: The Path to Preeminence". This strategic plan elaborates a series of measures to pursue excellence, by improving academic level, increasing the enrollment opportunities and the diversity of students, and promoting the participation at local, national, and global levels (UCR, 2010). The key points of the strategic plan include developing outstanding faculty, paying attention to the statement and training of diversity to ensure the representation of female and minority faculty, forming a multicultural communication environment, helping students from low-income and minority backgrounds to improve academic performance, appointing a task force of UCR's Graduation Rate Initiative to improve graduation rates, and effectively promoting social mobility in the country (UCR, 2010). It can be found that the whole university has initiated a strong dialogue among stakeholders, which closely links the excellent development plan of the university with the personal development of its members, thus gaining wide recognition and support.

4.2.3 Step-by-Step Action Plans

The design and implementation of strategic planning needs to be divided into several specific plans in different development stages based on each university's features and demands. University leadership or external consultants usually play the role of overall implementing and coordinating the strategic planning process.

SJTU's "Three-Step" strategy for developing world-class university provides a good example. The first step covered the period from 1996 to 2010, during which the main task of SJTU was to restructure the university's organization, with the aim of building a comprehensive, research-oriented university with a high level of internationalization, thereby laying a solid foundation for building a world-class university (Lin, 2021). The second step covered the period from 2011 to 2020, during which the main task of SJTU was to make academic breakthroughs and further develop the advantages of the university, with the aim of reaching world-class status and entering (or getting close to) the world's top 100 list (*ibid*). The third step covers the period from 2021 to 2050, during which the main task of SJTU is to improve

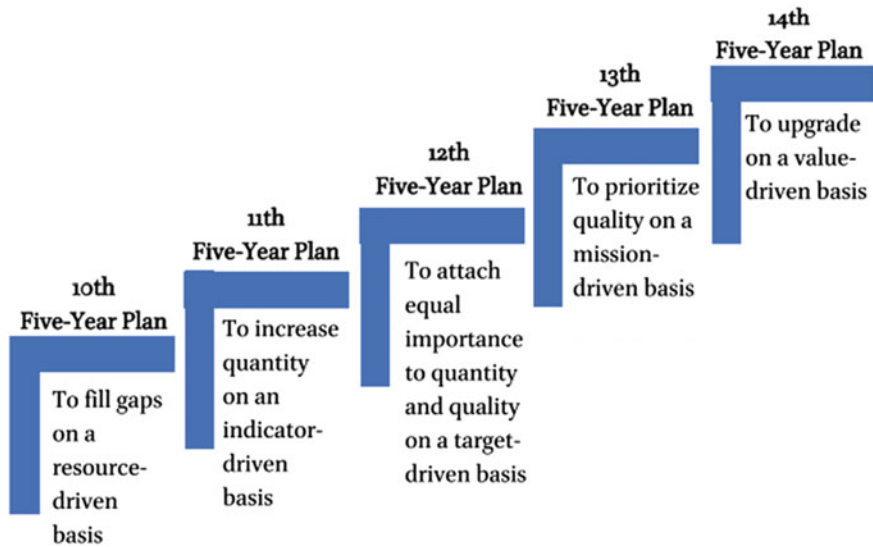


Fig. 8 Focuses of STJU's strategic plans in the past 20 years. *Source* Lin (2021)

the comprehensive strength, with the aim of fully realizing its goal to become a world-class university (*ibid*).

The third step has been divided into two stages. SJTU aims to reach the top echelon of global universities from 2021 to 2035, and then to become a world top university during the period between 2035 and 2050, in terms of the outcomes of talent training, the quality of scientific research, the governance system and the operational model, as well as the educational ideas, eventually becoming an academic palace gathering great masters (*ibid*) (Fig. 8).

4.2.4 Directional Guidance

The current world is ever-changing, such as the global economic downturns, the ongoing pandemic, and the slowdown of international collaboration; however, the trend of building academic excellence is likely to remain unchanged. University leadership should take on a forward-looking planning.

Within its 14th Five-Year Plan, SJTU is working “to comprehensively improve the overall strength of the university and to achieve world class status”. This plan aims to strengthen the university through talent recruitment and development, promote innovation through interdisciplinary cooperation and consolidate basic research, emphasize on developing international collaboration and global communities, and further consolidate an excellence culture within the university (Lin, 2021).

In addition, UCR's case also shows its emphasis on cutting-edge science and technology. Its future-oriented excellent development strategy specifically points

out promoting teacher cooperation in interdisciplinary and emerging academic fields and employing scholars from innovative groups such as transformational science and intelligent systems (UCR, 2010).

5 Inspiring Stories

5.1 *Guo Xinli: Devoting in Cross-Century Education Projects*

5.1.1 An Administrator of China's World-Class University Development

Directly Involving in the Design and Management of Project 211 and Project 985. Guo Xinli is the leader of Shandong University (SDU) of China (SDU, 2017). He has served as the director of the Department of Degree Management and Graduate Education of MOE, the office director of the Inter-Ministerial Coordination Group of Project 211, and the office director of Project 985 (*ibid*). Guo has been engaged in higher education management in MOE and its affiliated agencies for years and has gained abundant practical experience. At the end of the last century, how to train high-quality talents and conduct high-level scientific research has become an important question in China (MOE, 1998). With this background, Chinese government initiated two cross-century higher education projects: Project 211 and Project 985. Guo has been continuously involved in the construction of these projects since he was an officer of MOE (Guo, 2021). Looking back upon the initiation of China's world-class university construction efforts in the 1990s, Guo stated that the consensus of Project 211 and Project 985, at the very beginning, was to serve the development of the country; thus, they have set the goals of training high-quality talents and solving important problems for economic and social development (*ibid*). In order to realize the goals, he and a group of specialists devoted themselves to the planning and evaluation, working day and night (*ibid*). After years of hard work on Project 211 and Project 985, China's world-class university construction has grown from scratch. Guo successively presided over the compilation of *Project 211 Development Report* and *Project 985 Construction Report*, which systematically summarized the achievements and experience of China's world-class university building efforts and made predictions for the future (Office of the Inter-Ministerial Coordination Group of Project 211, 2007; the Compilation and Research Group of *Project 985 Construction Report*, 2011). Guo expects these projects could contribute Chinese solutions and wisdom to the development of higher education around the world.

Actively Promoting the Implementation of the 2011 Plan. When Project 211 and Project 985 have made some successful results, Guo was committed to maintaining the achievements and he participated in the 2011 Plan, which aims to comprehensively enhance the innovation ability of Chinese universities (Yuan & Guo, 2012). The core of the 2011 Plan is to improve the innovation abilities of talents, disciplines,

and scientific research by building national-level and university-led collaborative innovation centers (MOE & Ministry of Finance, 2014). Guo, as the principal person in charge of the 2011 Plan, has participated in an online forum with several MOE colleagues and answered questions about how to improve the quality of Chinese higher education (Ke & Wan, 2012). He introduced and emphasized MOE's future reform on talent training, which included enhancing students' comprehensive quality and innovation ability, strengthening the combination of talent training with industries and enterprises, improving the tutor system featured with scientific research and practical innovation, and strengthening the reform of teaching and the management of learning (Ke & Wan, 2012). The 2011 Plan is not as far-reaching as Project 211 and Project 985 because it is smaller in scale, shorter in duration, and does not directly target the development of world-class universities. However, the improvement of universities' innovation ability brought by the 2011 Plan has laid a foundation for the subsequent Double World-Class Project.

5.1.2 A Researcher of China's World-Class University Development

Long-Term Investigation in the Evaluation of Higher Education. In order to ensure the efficiency of world-class university and discipline development, Guo carried out evaluation studies as a professional researcher while working in MOE. He sought to establish a reasonable and feasible evaluation system; he published several academic papers and books such as *Research on the Selection Methods of Key Disciplines in Universities* and *The Road to China's Leading Universities: From Project 211 to the 2011 Plan* (Guo, 2002; Yuan & Guo, 2012). Guo proposed that the key to performance evaluation is rule, which should guide the evaluation direction, embody the idea of diversified evaluation and combine qualitative and quantitative methods (Guo, 2011). As for the evaluation of world-class universities, Guo (2004a) designed a general model of university funding based on evaluation results and applied it to the allocation of government's special funds of Project 211. The model insisted on the principle of fairness and competition and applied scientific evidence to funding of key development projects. As for the evaluation of world-class disciplines, Guo (2002) designed an evaluation index for universities' key disciplines; this system includes several aspects, such as the number of faculty members with senior professional titles, graduate students in school, master's and doctoral degrees awarded, papers published on foreign journals, over-provincial level awards, research projects, and research funds. These measures help verify the objectivity of experts' evaluation. Guo (2003a) also established an evaluation model for discipline effectiveness through Data Envelopment Analysis (DEA) method, which analyzes the input and output of the same discipline in different universities; the evaluation results are conducive to the development of disciplines.

Long-Term Investigation in the Reform of Graduate Education. Guo emphasizes the development of graduate education in world-class universities and conducted research on the quality improvement of graduate education. During his time working in MOE, Guo regularly made suggestions to a core Chinese journal of graduate

education named *Academic Degree and Graduate Education*. By learning from his practical work experience, he provided solutions for the problems of graduate education (Guo, 2004b; Zhou, 2012). Guo proposed that the establishment of graduate school system must be considered in the development of leading universities and key disciplines (Guo, 2003b). He argued that the functions of graduate school should be optimized, the approval and establishment of graduate school should be standardized, the global competitiveness of Chinese graduate education should be enhanced, and the organization and management team of graduate school should be strengthened. He proposed that graduate school should become a base for training high-quality innovative talents and solving important scientific and technological problems, and a model for the development of world-class universities and disciplines (*ibid*).

5.2 *Zhang Jie: A Man of Action in World-Class University Development*

5.2.1 A World-Class University President as Well as an Educator

Keeping Close Relationship with Students. Zhang Jie is a world-famous physicist, he was elected as an Academician of Chinese Academy of Sciences (CAS) in 2003, and elected as a Foreign Associate of National Academy of Sciences (NAS) of the U.S. in 2012, and he is the President of Chinese Physical Society (SJTU, 2022a). Zhang was appointed as the President of SJTU from 2006 to 2017, and currently in SJTU, he is a professor of the School of Physics and Astronomy, the Director of Academic Committee, the Honorary Dean of Zhiyuan College, and the Director of Tsung-Dao Lee Institute (SJTU, 2022a). As the president of SJTU, in addition to routine management work, he took pleasure in spending time with students. From the first month of taking office as the president, Zhang often posted on SJTU's BBS and communicated with students online (SJTU, 2010a). Since then, more and more students have affectionately called him "Jie Ge", which means "Brother Jie". He is delighted in this name and thinks it represents students' commendation and expectation (*ibid*). Zhang believed that listening to students' voices is significant for a university president, so every day he tried to spare time to get to know students' thoughts through the Internet (SJTU, 2007a). For example, he has directly responded to a post about the quality problem of desks and chairs in a teaching building, he appreciated these suggestions and put forward his wish of making SJTU a university full of love (SJTU, 2007a). Zhang was willing to get involved in the classroom and participate in campus activities with students. He once delivered a lecture on the theme of "Our Dream", which aimed to guide students to better understand the country and form student ideals; in the lecture, he patiently answered students' questions and enjoyed close communication with them (Chen & Du, 2014). He also served as the leading runner in the "U-Run 2015 SJTU Campus Marathon", which fulfilled the promise he made to students one year ago—serving as the leading runner

again in the next U-Run Marathon (SJTU, 2015). The students of SJTU commonly agreed that Zhang is a president with great personal charisma.

Advocating for the Concept of “Educating”. At the commencement and graduation ceremonies of SJTU, Zhang has repeated that the fundamental goal of a university is to educate individuals (*peiyang ren*) (SJTU,). SJTU is committed to training world-class leaders, and the concept of “educating” that Zhang has emphasized not only requires students to learn professional knowledge and skills in SJTU, but also demands them to develop morality and independent personalities (SJTU, 2013). More precisely, the concept of “educating” means that universities should educate well-rounded individuals with empathy, patriotism, sincerity, kindness, and virtue (SJTU, 2007a). For example, SJTU has established a hospice care association, through which students visit nursing homes and serve elderly adults without children to care for them (Sun, 2009). These ideas are in accord with the motto of SJTU, “When you drink from the stream, remember the spring. Love your country and add credit to your alma mater (*Yinshui Siyuan, Aiguo Rongxiao*)”. This motto represents the spirit of SJTU and it has been leading the university’s development. Although SJTU has a historic advantage in science and engineering, Zhang has never relaxed the requirements for developing liberal arts in his term of office, which has been conducive to strengthening the humanistic atmosphere of the university (SJTU, 2007a). Moreover, Zhang has designed a distinct orientation for humanities and social sciences of SJTU that differs slight from traditional liberal arts programs. His program places greater emphasis on the analysis of Chinese culture and images from distinctive perspectives (Sun, 2009).

5.2.2 A Reformer of World-Class University Development

Emphasizing the Reform of Innovative Talent Training. Zhang believes that the key point of building a world-class university is talent development. As president, he insisted on guiding the university to explore and practice an education system to foster top innovative talents. He encouraged faculty to have wide discussions on this topic, which finally determined that the idea of talent training in SJTU should be the trinity of “imparting knowledge”, “constructing ability”, and “cultivating personality”; the goal of talent training should to produce elite talents with innovative spirit and leadership in different fields for the new era (SJTU, 2009). In order to realize this goal, Zhang initiated a systematic reform of syllabus, curriculum systems, teaching, and practical activities in SJTU. Since 2009, SJTU has started to implement a new training model for top innovative talents, which could be summarized as “one center and three combinations” (Zhang & Wang, 2012). “One center” means student-centered and “three combinations” refers to the combination of class and after-class, teaching and research, and scientific literacy and humanistic spirit. Zhang pointed out that the new model would bring two major changes. First, the method of imparting knowledge would be changed as the application of new technologies made online courses possible. Second, the orientation of ability cultivation would

be changed, as the ability of discovering problems, raising questions, solving problems, integrating knowledge, and effectively communicating would be emphasized in the future (SJTU, 2010b). Generally speaking, the talent training reform initiated by Zhang aims to help students experience the spiritual pleasure of exploring the unknown and pursuing truth, rather than restricting them in skill acquisition (SJTU, 2009).

Emphasizing the International Influence of SJTU. World-class universities must have strong international influence, so Zhang made efforts to speed up the internationalization of SJTU and worked to realize a “comprehensive, innovative, and international” vision (SJTU, 2022b). He modestly stated that he had been learning from the presidents of foreign world-class universities and had communicated with 45 university presidents from different countries (International Affairs Division of SJTU, 2008). In order to understand the experience of other world-class universities comprehensively, Zhang led a visiting team and went to many universities, including Technical University of Munich and University of Munich in Germany, Group of Eight (Go8) in Australia,⁵ and the University of California in the U.S. (SJTU,). These visits help SJTU establish cooperation agreements with many world-top universities and expand its international affairs. Based on the experience, Zhang not only paid attention to the internationalization of student enrollments, but also worked to promote the internationalization of faculty and administrators. SJTU attaches importance to recruiting global talents and developing overseas training and is committed to training international teams with vision (International Affairs Division of SJTU, 2008). These measures have had some positive effects. In 2016, SJTU entered the world top 100 for the first time (QS, 2016). Since then, its global ranking has been continuously rising and its international influence has continued to increase.

Building a High-Quality Teaching Team. Zhang believes that high-quality teaching staff is the key to building a world-class research university. SJTU insists on recruiting and training outstanding talents. At the same time, it has formulated flexible and systematic evaluation criteria as encouragement (Sun, 2009). Zhang presided and published a “three-step strategy” of SJTU, which includes “recruiting and mentoring junior staff”, “three career tracks for faculty”, and “one merged tenure system”. The first step “recruiting and mentoring junior faculty” means that SJTU will recruit excellent young scholars worldwide, strengthen teacher training, and launch a pilot tenure-track system to provide more opportunities for junior staff (Zhang, 2014). The second step “three career tracks for faculty” designs three development routes for faculty, which are teaching-oriented, research-oriented, and research-teaching-parallel. This approach guarantees the school’s decision-making powers of recruiting, training, and evaluating faculty members (*ibid*). The third step “one merged tenure system” provides a system for overseas talents and local talents to “compete on one stage and improve together”. SJTU seeks to build a faculty system that includes both

⁵ Group of Eight (Go8) of Australia includes eight Australian leading universities: Australian National University, The University of Adelaide, The University of Melbourne, Monash University, The University of New South Wales, The University of Queensland, The University of Sydney, and The University of Western Australia.

tenure and contract systems, which works to create a fair, open, and competitive environment (*ibid*). Some world-class university presidents and well-known educators have expressed their agreement for faculty management reforms at SJTU, by stating that Chinese university leaders need to face the challenges of building world-class universities by making plans to overcome current difficulties (Cao & Yan, 2014).

6 Latest Research

6.1 General Overview

This section reviews the academic research on excellence initiatives during the past decade. Excellence initiatives are an important theme of educational research both in China and in the world. The Double World-Class Project has become a research focus in China since its promulgation in 2015; in the world, scholars mainly focus on the outcomes of excellence initiatives, the mobility of scientific research talents generated by excellence initiatives, and their impacts on national education system.

6.1.1 Latest Research in China

To investigate the latest research of excellence initiatives in China, “world-class universities” and “education” are searched as keywords in the China National Knowledge Infrastructure (CNKI) database. The proportion of academic articles on “world-class universities” over the total number of research articles in education from 2012 to 2021 is calculated (see Fig. 9). During the 10-year period, over 3,400 articles related to “world-class universities” were published, accounting for about 0.20% of total research articles in education and about 1.57% of research articles in higher education. These data indicate that the development of world-class universities have received constant attention in China. The proportion of studies on world-class universities has experienced a period of rising and then tended to be stable. The rise is closely connected with the time when the Double World-Class Project was issued. As mentioned in Sect. 1.3 of this chapter, China promulgated *The Overall Plan for Promoting the Construction of World-Class Universities and World-Class Disciplines* (the first policy document of the Double World-Class Project) in the end of 2015, and then the proportion of studies on world-class universities began to increase to 0.22% in 2016. In 2017, the issue of the implementation measures and the university list of the Double World-Class Project marked the official start of the first round of this project, which led to the outbreak of “world-class universities” related studies. The proportion rose rapidly and peaked at 0.31% in 2018. After 2019, with the stable progress of the Double World-Class Project, the proportion of studies on world-class universities gradually returned to normal. The figures were around 0.16% in 2020

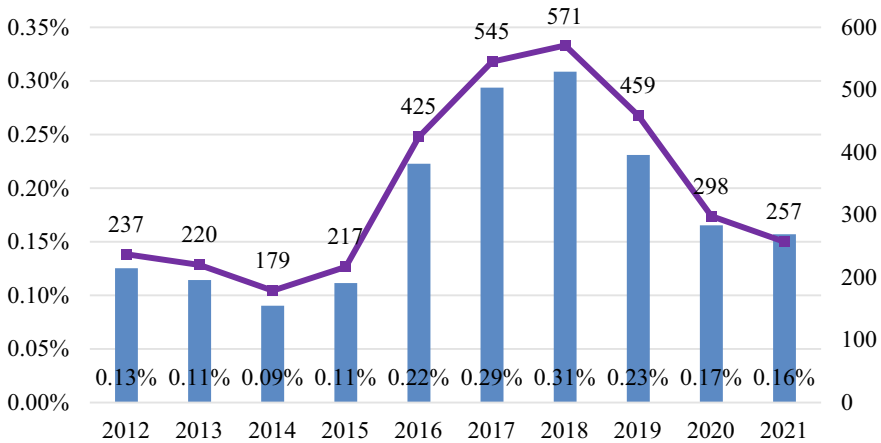


Fig. 9 Number and proportion of articles on “world-class universities” over total articles in education research in China (2012–2021). *Source* Compiled from search results from CNKI

and 2021, but still higher than the figures before the promulgation of the Double World-Class Project.

During the past 10 years, most research on world-class universities focused on the strategies of the Double World-Class Project, while others focused on strategies for building world-class universities and disciplines. It is evident that Chinese scholars have attached importance to this research topic with China’s constant promulgations of national strategies on improving the comprehensive strength and international competitiveness of higher education.

Research Embedded in Chinese Context. The existing research suggests that building world-class universities should be discussed in the Chinese context and serve decision-making and implementation of policies. Bai (2018) analyzes the logic of developing Double World-Class universities with “Chinese characteristics”, and proposes paths to academic excellence rooted in the Chinese context, including moral education as a fundamental task, inheriting and innovating national culture as a spiritual core, serving the nation’s strategic needs as a basic goal, providing education programs meeting people’s needs and expectation as an essential objective, and developing world-class subject disciplines and enhancing faculty quality as important starting points. Wang et al. (2019) combine their arguments with President Xi Jinping’s opinions on university development and propose enhancing university effectiveness by consolidating universities’ advantages and features, emphasizing on education equity, as well as shaping modern campus culture and further promoting comprehensive reform in universities. Guan (2016) analyzes the principles of building world-class universities with Chinese characteristics and proposes to explore universities’ uniqueness embedded in the Chinese context, to focus on disciplinary development to support national and regional innovation, to pursue excellence

while contributing to social and national needs, to build a modern university system by integrating traditional and local culture.

Research Related to Foreign Experience. Existing studies emphasize studying the successful experience of global top universities, so as to inspire China's world-class university development. Xue and Liu (2019) review the experiences of top universities in Singapore and summarize the lessons for emerging economies. They suggest that China should establish its culture to encourage innovation and entrepreneurship, recruit high-quality faculty, promote higher education internationalization, and further enhance university governance and management. Liang and Wei (2018) investigate how Switzerland broke through the dominance of U.K. and U.S. in global higher education market by building academic excellence and became one of the countries with the highest global innovation index. They argue that China should strengthen the government's role in decision making, fully develop universities' role in daily practices, and enhance internationalization activities of faculty and graduate students to promote research and innovation. Liu and Zhang (2016) summarize the common features of excellence initiatives in Germany, France, Russia, Japan and ROK. They argue that Chinese government should strengthen the financial and policy support to excellence initiatives, integrate regional higher education resources, form a diversified and well-connected higher education system, and improve a dynamic evaluation and funding system to reward the high-performing institutions while eliminating under-performing institutions. The comparative analysis on international experience reflects the guidance of government and the autonomy of universities are equally important in the pursuit of academic excellence.

Research on Developing World-Class Disciplines. Since the Double World-Class Project, the development of world-class disciplines has increasingly become a heated topic for research. Based on the influence of the Double World-Class Project on universities' discipline reform, Hu (2019) proposes approaches to develop quality disciplines, including integrating several related or similar disciplines into discipline clusters, breaking through subject boundaries and forming inter- and cross-disciplines, and developing an ecosystem to restructure subjects and disciplines. Wu (2019) summarizes the distribution of Chinese universities in global discipline rankings and suggests building a sustainable disciplinary ecosystem and reinforcing "brand" disciplines. Other researches focus on reforming evaluation methods and student development through strategic planning.

6.1.2 Latest Research in the World

To investigate the latest research of excellence initiatives in the world, "excellence initiative" and "education" are searched as the key words in Web of Science (WOS), and the proportions of academic articles on excellence initiatives over the total number of articles in education from 2012 to 2021 are calculated (see Fig. 10). During the 10-year period, about 1,300 papers related to "excellence initiative" were published, accounting for about 0.10% of total research articles in education and about 0.33% of total research articles in higher education. These data show that

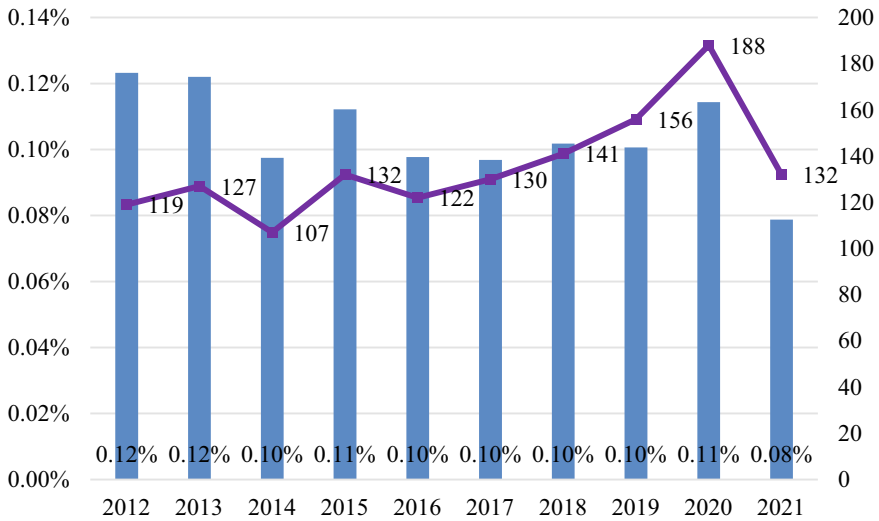


Fig. 10 Number and proportion of articles on “excellence initiatives” over total articles in education research worldwide (2012–2021). *Source* Compiled from search results from WOS

“excellence initiatives” are an important topic of educational research. During the past 10 years, the total number of educational articles has rapidly increased from 96,000 to 167,000, while the proportion of articles on “excellence initiative” has remained stable in range of about 0.08–0.12%. In these 10 years, a number of countries launched excellence initiatives and pursued world-class university movements, reflecting in increasing research interests in such topics.

Existing literature related to “excellence initiatives” mainly focuses on outcomes of these projects. One such focus is on the effect of these initiatives’ on promoting scientific research. De Filippo et al. (2016) analyze the research output of Spanish universities after the implementation of Spain’s Campus of International Excellence. The results show that the number of academic articles published on *Nature* and *Science* by these universities increased, which means the quality and productivity of scientific research improved. Lehmann and Stockinger (2019) investigate the entrepreneurship activities of Germany universities after they have participated in Excellence Initiative. They find that the cooperation between universities and industries as well as the number of patents increased.

The second research focus is excellent initiatives’ effect on the mobility of scientific research talents. Cuntz (2016) argues that excellence initiatives have attracted overseas talents and intensified the international competition for elite scientists among the countries with similar policies. According to the records of the European Research Council, experts choose countries with high-quality scientific system, rather than countries which provides more funds than their homeland. Tsvetkova and Lomer (2019) investigate the competitiveness of the Project 5–100 universities in

global talent market. They find that, with the influence of the project, these universities seek to recruit more outstanding scientists from all over the world, work to build excellent academic reputation with the help of scientific research breakthroughs, both of which promote the mobility of scholars.

Another popular research focus is excellence initiatives' impact on national education system. Egorov et al. (2020) argue that, since the beginning of the twenty-first century, Russia has strived to build a stronger higher education system. Since then Russia has merged regional universities, established federal universities, and promoted excellence initiatives to enhance universities' global competitiveness and contribute to national education and research. It is pointed out that the task of Russian higher education system has been transferred to comprehensively promoting socio-economic development and enhancing innovation potential. Highman (2020) also recognizes France's series of strategies to establish excellence centers, attract international students, and adjust the curriculum and research plans of HEIs, which help France maintain its leading position in higher education worldwide. Moreover, France has even reorganized and consolidated a number of universities to enhance their influence and to further improve its higher education system.

6.2 Research on Evaluating Excellence

Despite achievements, China's further development of excellence initiatives has hit bottlenecks. On the one hand, it is urgent for China to change its focus from quantity to quality development and to promote the deep development of higher education. Yu and Zhang (2019) compare the research productivity of universities of China's Double World-Class Project, the Ivy League in the U.S., and the U.K.'s Russell Group.⁶ They argue that, although the research quality of Chinese universities has been on the rise, compared with the U.S. and the U.K., there is still a gap in research quality and influence. They note that the academic output of Chinese universities mainly relies on the cooperation within Chinese institutions while international cooperation should be strengthened. Fan and Du (2019) explore comments from social media and leading academics on China's Double World-Class Project and summarize the existing problems. These problems include nepotism preventing the diversification of teaching staff, a lack of emphasis on critical thinking, and a lack of balance between the planning and implementation of international strategies. On the other hand, the misunderstanding of policies hinders the development of Chinese higher education. Zhou and Zong (2019) point out some problems in China's Double World-Class Project. For example, the concentration of quantitative and intangible resources on top universities have led to a weak bottom of higher education system. The pursuit of quick breakthroughs in certain disciplines has disturbed the discipline ecosystem, and the identity labels generated by key university projects have resulted

⁶ The Ivy League includes eight leading universities of the U.S., and the Russell Group includes 24 leading universities of the U.K.

in competitive barriers among universities. To tackle these issues, Chinese scholars have proposed new approaches to evaluating “excellence” by dividing into evaluation of world-class universities and world-class disciplines.

6.2.1 Evaluation of World-Class Universities

Evaluating the performance of world-class universities is conducive to guiding the reform of universities and promoting competition. Zhong et al. (2019) perform a quantitative evaluation on 42 Double World-Class universities from the perspective of National Natural Science Foundation of China (NSFC), in which they set the number of NSFC projects, the amount of funds, and the number of project leaders as key indicators for evaluating basic research competitiveness. After statistical analysis, they find clear gaps among the 42 universities. Feng et al. (2019) propose that the evaluation system of world-class universities should not only reflect Chinese characteristics, but also conform to international standards. They build an evaluation system that consists of four dimensions: talent training, scientific and technological research, social influence and international reputation, and assign weights to them. Specific indicators include teaching quality, academic strength, scientific and technological projects, scientific and technological platforms, alumni donations, influence on media, international faculty members and students, and academic influence. Their evaluation results show that China’s world-class universities have made strong achievements as a whole. Cui et al. (2017) argue that the criteria of evaluation system of world-class universities should be optimized. They believe it is necessary to take talent training and teaching quality as key tasks and assign maximum weights to them, so as to guide universities in emphasizing and improving the quality of teaching, the quality of doctoral education, the strength of young scientific research talents training and the academic output of research teams. Many scholars have also pointed out that teaching quality is important in the evaluation of world-class universities, as it helps to change universities’ one-sided focus on scientific research indicators and urges universities to focus on teaching, rather than solely on rankings.

6.2.2 Evaluation of World-Class Disciplines

Evaluating the effectiveness of discipline development helps universities better understand their current development level, their strengths and weaknesses, and formulate discipline-specific development strategies. Discipline evaluation is an important method to measure the quality of disciplines. Based on the conditions of China, many scholars have made in-depth research on the connection between the development of world-class disciplines and the discipline evaluation conducted by MOE of China. Xu (2018) argues that discipline evaluation from MOE guides the development of world-class disciplines; therefore, evaluation targets should focus on several key disciplines rather than all disciplines, the evaluation index should focus on the integration of system rather than core elements, and evaluation concepts should

focus on discipline systems rather than disciplines themselves. The improvement of these three aspects could promote the evaluation of China's world-class discipline development. Zhou and Zhang (2018) point out the different criteria of discipline evaluation and the selection of world-class disciplines. They argue that the development of world-class disciplines gives more emphasis to state security and state interests. It also requires the development of a number of new disciplines and interdisciplinary courses that cover the fields of philosophy, social sciences, natural sciences and engineering technology. Zhang (2019) argues that discipline evaluation should serve the development of world-class disciplines, and the target of discipline evaluation could be further adjusted to serving the Double World-Class Project. Moreover, the subordinated functions of discipline evaluation such as motivating the competition of rankings and accountability should be emphasized. Discipline evaluation of MOE could be used as one method to underpin the development of world-class disciplines, but the different focuses of discipline evaluation and world-class discipline development should be considered.

6.3 Research on Innovative Workforce Development

Several studies concentrate on excellence initiatives' motivation on innovative workforce development. Scholars propose that the implementation of excellence initiatives would optimize the methods of teaching and learning, improve the standards of moral education, and promote students' diversified career development.

6.3.1 Transforming Teaching and Learning

Since the 1990s, China has carried out various projects of building key universities and has made great achievements. With the progress of the Double World-Class Project, many scholars argue that the methods of training talents in world-class universities can be further optimized. Wang and Gao (2018) find that the Double World-Class Project has promoted education reform and innovation and many Chinese top universities have begun to practice new talent training approaches. For example, Peking University adopted diversified approaches for student development, including interdisciplinary teaching and learning, liberal arts education, general education, and core curriculum. Nanjing University established a "3-3" model for developing undergraduate students' innovative skills and talent. Ma (2016) proposes recommendations to develop world-class undergraduate education, including developing small-size class teaching, promoting research-based learning, enhancing knowledge structure, emphasizing students' choices, integrating practice with theoretical studies, and eventually forming an educational model of combining class instruction, practicum, and campus culture. To achieve world-class status, Chinese universities should emphasize student-centered and well-rounded education.

6.3.2 Emphasizing Moral Education in Student Development

One of the most important objectives of the Double World-Class Project is to strengthen moral education (*lide shuren*) (MOE et al., 2022b). Moral education aims at developing students' moral quality and has been fully integrated in the process of student development. Zhang (2020) recognizes moral education as an integral part of the Double World-Class Project and a strategic support system. Li and Wu (2020) argue that ideological education plays an important role in moral education, and should be integrated into teaching and learning activities, so as to shape a discipline system of philosophy and social science with Chinese characteristics. Wang (2020) compares moral education of top U.S. universities and some Chinese Double World-Class universities and suggests that moral education could achieve better results through university leaders' guidance. A well-organized curriculum system, scientific research, and campus culture all contribute to developing moral education.

6.3.3 Encouraging Diversified Career Development for Students

Diversified paths should be encouraged in terms of students' career development, which can be considered as an important form of education output. Li et al. (2019) find that doctoral students at Chinese universities tend to choose academic professions after graduation, as the proportions of doctoral graduates at the two types of universities (Class A and Class B) within the Double World-Class Project reach 65.73% and 83.45%. Xu and Shen (2019) analyze graduates' employment at 63 Double World-Class universities and find that doctoral graduates' career paths have become increasingly diversified in recent years. Despite academic professions being the primary career choice, the number of graduates choosing jobs in industry has increased, with a decrease in graduates pursuing employment in government organizations. Training doctoral student is an essential task of top universities. While Chinese doctoral graduates are enthusiastic for academic work, with the excellence initiatives implemented, doctoral graduates tend to seek diversified career paths.

7 National Policies

7.1 Fundamental Policies of China's Excellence Initiatives

Before the launch of the Double World-Class Project in 2015, China's excellence initiatives mainly consist of Project 211 (launched in 1995) and Project 985 (launched in 1998). Although these two projects have been officially integrated into the Double World-Class Project, they have made the foundation of China's excellence initiatives and greatly promoted the development of Chinese higher education in the early twenty-first century.

7.1.1 Project 211 and Related Policies

In 1995, Chinese National Education Commission (the predecessor of MOE) launched Project 211 and issued its overall plan. The project aimed at developing the overall conditions and environment of Chinese universities, improving key disciplines and public service system of higher education, enhancing student development, and raising international reputation of Chinese HEIs. The plan proposed to eventually develop 100 key universities and a number of key disciplines (National Education Commission, 1995). Altogether, 94 universities were funded in the first two rounds of the project.

In 2002, during the period of China's 10th Five-Year Plan, MOE and the other two central agencies issued guidelines concerning strengthening the development of Project 211, which highlighted the targets of improving education quality, promoting innovation mechanisms, adjusting discipline structure, further strengthening information technology, and improving the transformative ability of scientific research (National Planning Commission et al., 2002). At the same time, the guidelines defined the strategic significance of Project 211, which is to serve the national strategy of development by relying on science and education, help the transformation towards knowledge economy, and improve higher education (*ibid*). In 2003, Chinese government issued regulations on the implementation of Project 211, which clarified each stakeholders' responsibilities and specifies procedures and management of the project, including budget, expenditure, final accounts, and supervision of special funds (Ministry of Finance et al., 2003; Office of the Inter-Ministerial Coordination Group of Project211, 2003). After five rounds of application, 116 universities including branch schools were selected as Project 211 universities and received long-term support from the project. Project 211 continued until 2016, when MOE declared the relevant policy documents of Project 211 invalid (MOE et al., 2016). In 2019, Project 211 was officially integrated into the Double World-Class Project (MOE, 2019).

7.1.2 Project 985 and Related Policies

At the end of the 1990s, China issued an action plan for education revitalization, with the goal of developing a number of world-class universities and world-class disciplines (MOE, 1998). This action plan opened the curtain of Project 985. This project had been implemented in three phases since 1999. Within the first round, 35 universities were selected to develop world-class universities. In 2004, Chinese government issued guidelines concerning strengthening the development of Project 985. The guidelines particularly stated to further develop a number of world-class universities with international reputation via governance reform, platform building, conditions support, and international cooperation (MOE & Ministry of Finance, 2004). In the second phase starting in 2004, four universities were added and a complete list of Project 985 was published. In 2013, during the third phase, MOE issued regulations on the implementation of Project 985 to strengthen project management, including

the selection and evaluation processes (MOE & Ministry of Finance, 2013). Similar to Project 211, MOE declared the relevant policy documents of Project 985 invalid in 2016. Subsequently in 2019, Project 985 was officially integrated into the Double World-Class Project (MOE et al., 2016; MOE, 2019).

7.2 *National and Local Policies of China's Double World-Class Project*

Since the launch of the Double World-Class Project in 2015, Chinese government has successively issued a series of policies in the following years to construct the policy framework of the project and improve the practice. The first round of the project has been completed and the second round starts in 2022. Moreover, Shanghai has also issued several policies related to the Double World-Class Project following the guidance of Chinese central government and based on its local conditions.

7.2.1 **Development Stages of National Policies**

The Early Preparation Stage. Since China formally launched the Double World-Class Project, MOE and other central agencies have successively issued policies related to the overall plans, implementation procedures, and evaluation measures of the project (see Table 3). In the early preparation stage, Chinese central government formulated the overall plan and the expected implementation measures. In 2015, the *Overall Plan* of the Double World-Class Project was promulgated, and it outlines the overall requirements, development tasks, reform tasks, supporting measures, and organizations of the project (the State Council, 2015). It clearly defines the goal of promoting a number of leading universities and disciplines to reach world-class level, gradually improving the overall strength of higher education, and building China as a powerful higher education country; it emphasizes teaching staff, innovative talents, scientific research, cultural heritage, and achievements transformation (*ibid*). In 2017, after more than one year's research and discussion, the *Implementation Measures* of the Double World-Class Project were published, which discloses the selection conditions, selection procedures, support methods, dynamic management, and other project management elements (MOE et al., 2017b). Institutions selected for the Double World-Class Project should be widely-recognized leading universities, and high-quality, influential, and irreplaceable disciplines (*ibid*). Government departments, universities, and industry organizations form an expert committee to review and decide upon the list of institutions selected for the Double World-Class Project. Chinese central government and local governments provide special financial support and a dynamic adjustment mechanism has been made based on a five-year cycle (*ibid*).

Table 3 National policies related to the Double World-Class Project

Issue dates	Policy documents
October 24, 2015	<i>The Overall Plan for Promoting the Construction of World-Class Universities and World-Class Disciplines</i> (hereafter the <i>Overall Plan</i>)
January 24, 2017	<i>Implementation Measures for Promoting the Development of World-Class Universities and World-Class Disciplines (Provisional)</i> (hereafter the <i>Implementation Measures</i>)
September 20, 2017	<i>Notice on Issuing the List of World-Class Universities, Universities Designated to Develop World-Class Disciplines, and World-Class Disciplines</i> (hereafter the <i>List of the Project</i>)
August 8, 2018	<i>Guidelines on Accelerating the Development of the Double World-Class Project</i> (hereafter the <i>Guidelines</i>)
December 30, 2020	<i>Evaluation Measures of the Effectiveness of the Double World-Class Project (Trial)</i> (hereafter the <i>Evaluation Measures</i>)
January 26, 2022	<i>Guidelines on Further Promoting the Development of the Double World-Class Project</i> (hereafter the <i>Guidelines on Further Promotion</i>)
February 9, 2022	<i>Notice on Publishing the List of the Second Round of the Double World-Class Project</i> (hereafter the <i>List of the Second Round</i>)

Implementation of the Project. The first round of the project ended in 2022, when a second round was also launched. During the first round, the initial list of the selected universities was officially announced in 2017, and then the project entered an implementation stage. The first group, as mentioned in 1.3 and 2.1 of this chapter, included 42 universities aiming for world-class status and 140 universities designated to develop world-class disciplines (MOE et al., 2017a). In 2018, Chinese government issued the *Guidelines* for the Double World-Class Project, which emphasizes talent training as the essential task (MOE et al., 2018). The document puts forth recommendations to comprehensively deepen the reform of university and promote the in-depth development of disciplines, so as to form a coordination of universities and disciplines (*ibid*). In 2020, the *Evaluation Measures* was published, which provides evaluation criteria for the project. The evaluation process mainly includes midterm self-evaluation and final evaluations being conducted by expert committee. Evaluation results provide evidence for future funding in subsequent rounds (MOE et al., 2020).

The Second Round. The second round of the project began in 2022. In 2022, Chinese government published the *Guidelines on Further Promotion* of the project, which puts forward the strategic positioning of the new stage and explicitly prioritizes high-quality development (MOE et al., 2022b). In the same year, the *List of the Second Round* was published and seven additional universities were added to the list, with a total of 147 universities having been selected by the project (MOE et al., 2022a). However, the disciplines of 15 universities from the first-round were publicly warned or revoked (*ibid*). The second round does not distinguish world-class universities and universities that are designated to develop world-class disciplines; instead, it emphasizes on innovative breakthroughs (*ibid*).

7.2.2 Key Features of Recent National Policies

The contents of China's Double World-Class Project reflect some key features including focusing on Chinese characteristics, implementing dynamic management, and emphasizing coordination among stakeholders.

Focusing on Chinese Cultures and Values. Relevant plans of the Double World-Class Project highlight the need to build world-class universities and disciplines to serve the local needs, enhance the national development, and contribute to people's well-being (MOE et al., 2018). The *Evaluation Measures* incorporates various evaluation dimensions and indicators with Chinese characteristics. For example, the evaluation of "scientific research" requires universities to develop Chinese philosophy and social sciences. The evaluation of "cultural inheritance and innovation" requires universities to inherit and develop Chinese traditional culture (MOE et al., 2020). The *Guidelines on Further Promotion* points out that the basic principles of the Double World-Class Project are embedded in the Chinese context, highlighting Chinese advantages, and exploring paths to deepen socio-economic transformation in China (MOE et al., 2022b).

Implementing Dynamic Management. Compared with the relatively fixed list of Project 211 and Project 985, the Double World-Class Project implements a dynamic mechanism of rewarding high-performing universities and eliminating the under-performing ones, and emphasizes this process. The *Overall Plan* designs a five-year cycle and decides to provide dynamic support to universities based on performance evaluation, namely, Chinese government increases support for universities that have made good progress and reduces support for universities that lack progress (The State Council, 2015). Chinese government provides follow-up guidance on the organization and implementation of the project, dynamically monitors the development process, and works to discover timely problems (*ibid*). The *Implementation Measures* elaborates on the process of dynamic management, which requires universities to publish middle and final self-evaluation reports. An expert committee also provides advice according to the results of self-evaluation and third-party evaluation (MOE et al., 2017b). Dynamic management requires changing the fixed identity of universities and establishing an "in and out" adjustment mechanism for universities and disciplines (*ibid*). The *Evaluation Measures* stipulates that performance evaluation should combine usual dynamic monitoring with periodic evaluation, and integrates continuous tracking, monitoring, and evaluation in the development process and results (MOE et al., 2020).

Emphasizing Coordination among Stakeholders. Emphasizing coordination and joint efforts among stakeholders is another key point of the Double World-Class Project. Conducting the project is not only the responsibility of Chinese government and the universities. The *Overall Plan* suggests that the government, society, and universities should form a pattern covering diversified investment and joint efforts, while relevant government departments and industry enterprises should be encouraged to actively participate in the project. It also encourages universities to broaden their financing channel and actively attract social donations (the State Council, 2015). The *Guidelines* establishes joint efforts of the Double World-Class Project covering

the responsibilities of university, support from local governments, guidance from Chinese central government, and participation of third-party evaluation agencies (MOE et al., 2018). The *Guidelines on Further Promotion* seeks to improve the innovation system by realizing the collaboration of major scientific research platforms, integrating resources and forming joint forces. In order to guarantee the implementation of the project, it was important to form a pattern of diversified investment, establish and improve a long-term investment mechanism which includes the coordination of Chinese central government, local governments, enterprises and other social sectors (MOE et al., 2022b).

7.2.3 Local Policies in Shanghai

Chinese local governments generally rely on the guidance of Chinese central government to carry out the Double World-Class Project, so there are very few local policies related to this project. However, the development level of higher education in different provinces and cities is different, and local governments should consider their conditions in practices. For example, Shanghai, with its strong higher education power, has issued policies related to the Double World-Class Project, such as the *Implementation Guidelines of Shanghai*, the *Implementation Plans of Shanghai*, and the *14th Five-Year Plan of Shanghai Education* (see Table 4).

In the beginning of the Double World-Class Project, Shanghai Municipal People's Government issued the *Implementation Guidelines of Shanghai* in response to national policies in 2018. Based on the national policies, the *Implementation Guidelines of Shanghai* includes some local contents. It seeks to support universities funded by the local municipal to be included in Double World-Class Project. It enhances universities' autonomy via the reform of decentralization, management, and service, and reinforce strong local funding (Shanghai Municipal People's Government, 2018). At the end of the first round in 2021, Shanghai government issued the *Implementation Plans of Shanghai*. Focusing on the next five years of the project, this policy requires that Shanghai serve the national strategy and develop Shanghai's new advantages (Shanghai Municipal Education Commission et al., 2021). It argues that Shanghai

Table 4 Shanghai local policies related to the Double World-Class Project

Issue dates	Policy documents
February 22, 2018	<i>Implementation Guidelines of Shanghai on Promoting the Development of World-Class Universities and World-Class Disciplines</i> (hereafter the <i>Implementation Guidelines of Shanghai</i>)
July 21, 2021	<i>Implementation Plans of Shanghai to Accelerate the Development of World-Class Universities and World-Class Disciplines (2021–2025)</i> (hereafter the <i>Implementation Plans of Shanghai</i>)
July 26, 2021	<i>The 14th Five-Year Plan of Shanghai Education Development</i>

Sources Compiled from Shanghai Municipal People's Government and Shanghai Municipal Education Commission

should emphasize university governance reform, top innovative talent development, high-quality teaching staff, students' innovative skills, international cooperation, and focus on promoting Peak and Plateau Discipline Development Plan, High-level Local University Development Plan and University Innovation Ability Promotion Plan⁷ (*ibid*). Similarly, *the 14th Five-Year Plan of Shanghai Education* specifically requires further implementing the Double World-Class Project and improving educational quality (Shanghai Municipal People's Government, 2021). It seeks to support the selected universities that are affiliated to central ministries (these universities are usually top universities in China), reinforce their leading positions, further enhance their contributions to the country, and ensure strong financial support for the project (*ibid*).

Shanghai's practice shows it attaches great significance to maintain and develop local advantages, emphasize university governance reform, and encourage the participation of local universities in the project. The policy documents have repeatedly mentioned the existing local advantages such as Peak and Plateau Discipline Development Plan (Shanghai Municipal Education Commission et al., 2021). *The Implementation Guidelines of Shanghai* clarifies the foundation for discipline development, optimization of discipline distribution, long-term strategic cooperation between central ministries and local municipal government, and higher education resource concentration (Shanghai Municipal People's Government, 2018). *The Implementation Plans of Shanghai* also emphasizes maintaining existing planning. Shanghai is committed to promoting governance reform in higher education to strengthen the inner motivation of "double world-class" development (Shanghai Municipal Education Commission et al., 2021). *The Implementation Guidelines of Shanghai* argues that the autonomy of university is the breakthrough that will solve management problems while the reform of decentralization, management and service in higher education should be used as a lever to promote innovations in education system (Shanghai Municipal People's Government, 2018). Shanghai argues that the universities of the Double World-Class Project should play a leading role and motivate leading local universities to improve and participate at the world-class level (Shanghai Municipal People's Government, 2021). *The Implementation Plans of Shanghai* emphasizes that Shanghai local universities that are affiliated to central ministries should fully make use of their advantages, promote the diversified development of local universities, and encourage them to pursue excellence in their fields and work to enter the list of the Double World-Class Project (Shanghai Municipal Education Commission et al., 2021).

⁷ These three plans are initiated by Shanghai government, aiming to improve the innovation ability of HEIs of Shanghai, encourage scientific breakthroughs, improve the quality of talent training, and accelerate the development of world-class universities and disciplines.

7.3 Policies of Excellence Initiatives in Other Countries

Policies of excellence initiatives in different countries are closely connected with their local conditions. Generally, excellence initiatives in developed countries and emerging economies have presented different characteristics regarding the goals, contents, and evaluation methods.

7.3.1 Developing Excellence Initiatives in Developed Countries.

Goals of Excellence Initiatives. The main purpose of excellence initiatives in developed countries is to improve international competitiveness. France's IDEX aims to promote the integration of disciplines, and advance technological innovation and technical transformation, so as to boost the French economy (MOE of France, 2010c; Zhang & Zhang, 2016). Japan's Top Global University Project aims to improve the international compatibility and competitiveness of higher education through various measures, such as raising the proportion of international students and faculty members, setting performance indicators, and promoting English as a medium of instruction (MEXT of Japan, 2014b). Germany's Excellence Strategy (the continuation of Germany's Excellence Initiative) boosts German research capacity by strongly supporting scientific research in universities (German Research Foundation, 2019a).

Contents of Excellence Initiatives. At present, the existing excellence initiatives of developed countries are mainly distributed in Central and Western Europe and East Asia. In terms of the duration of funding, France's IDEX is from 2012 to 2022 (MOE of France, 2010b), Germany's Excellence Strategy, which is the continuation of Excellence Initiative, is from 2019 to 2025 (German Research Foundation, 2019a), and Japan's Top Global University Project is from 2014 to 2023 (MEXT of Japan, 2014c). In terms of the key point, IDEX, Excellence Strategy and Top Global University Project belong to academic development category, as they focus on academic excellence (Feng et al., 2017). In terms of the funding scale, IDEX selected 11 universities, Top Global University Project selected 37 universities, and Excellence Initiative selected 14 universities.

Evaluation of Excellence Initiatives. In terms of the selection process, all of these projects are highly competitive and have a pre-selection stage, and the selection generally involve multiple stakeholders. France's IDEX includes a pre-selection stage and formal selection stage; it employs external experts to assist in the evaluation, and the selection results and funding amounts are signed and confirmed by French Prime Minister (MOE of France, 2010c). Germany's Excellence Strategy includes draft proposal stage and complete proposal stage, and it is investigated by a special assessor in the whole process (German Research Foundation, 2019b). In terms of the selection criteria, excellence initiatives of developed countries mainly focus on four aspects: research, personnel, management, and cooperative partnership. IDEX uses a three-level marking system, and it emphasizes the intensity of research, personnel training, leadership of organizations, resource allocation, and cooperative economic

partnerships (MOE of France, 2010c). Germany's Excellence Initiative uses a five-grade marking system, it emphasizes originality and quality of research, academic experience of faculty, the management of development planning, personnel, finance, infrastructure framework, the diversity and equality of team members, and cooperation with other institutions (German Research Foundation, 2005). Top Global University Project pays attention to the internationalization of the project (MEXT of Japan, 2014c).

7.3.2 Developing Excellence Initiatives in Emerging Economies

Goals of Excellence Initiatives. The purpose of excellence initiatives in emerging economies is to improve the strength of scientific research at the world-class level. Emerging economies aim to improve the quality of a number of universities and then improve the overall strength of scientific research of the country. For example, India's UPE aims to support a number of HEIs to reach world-class level of scientific research and teaching, and then drive the overall national development (University Grants Commission, 1997b). Russia's Project 5–100 also emphasizes integrating into the global education market (Ministry of Education and Science of the Russian Federation, 2013).

Contents of Excellence Initiatives. At present, existing excellence initiatives of emerging economies are mainly distributed in Asia and Eastern Europe. In terms of key point, India's UPE, Russia's Project 5–100, and Vietnam's New Model University Project belong to the academic development category, which focus on academic excellence. In terms of funding scale, the numbers of funded institutions in emerging economies are quite different, with most countries funding around seven institutions and a few countries funding dozens of institutions. Take India's UPE as an example, during the period of the ninth Five-Year Plan of India (1997–2002), five universities received financial support from Indian University Grants Commission (University Grants Commission, 1997a). During the period of the 10th Five-Year Plan (2002–2007), the 11th Five-Year Plan (2007–2012), and the 12th Five-Year Plan (2012–2017), UPE funded four, six and 10 universities respectively (University Grants Commission, 1997a). Russia's Project 5–100 selected 15 universities in 2013 and six universities in 2015 (Ministry of Education and Science of the Russian Federation, 2013). Vietnam's New Model University Project has funded three universities (Ministry of Education & Training of Vietnam, 2008).

Evaluation of Excellence Initiatives. Both international and domestic experts are invited to evaluate excellence initiatives in emerging economies, including university senior management, academics, scholars, etc. For example, UPE invites educators, quality management experts, discipline experts, and staff of Indian University Grants Commission to make decisions together (University Grants Commission, 1997b). Vietnam's New Model University Project is not a project created by selection, but a new university established by Vietnam's MOE and foreign universities (Asian Development Bank, 2010). The evaluation processes of excellence initiatives of these emerging economies are as strict as that of developed countries, which include

annual evaluations, midterm evaluations, and final evaluations. UPE has a midterm evaluation conducted by a standing committee that includes the chairman of Indian University Grants Commission, and a final evaluation conducted in the last year of the project (University Grants Commission, 1997a). The chairman of Indian University Grants Commission visits every university, evaluates the university's performance and achievement based on the goal of the project. Evaluation results are used to make suggestions on professional plans, for the universities' development in the next stage and for the consideration and revision of the standing committee (University Grants Commission, 1997a). The selection criteria of emerging economies are slightly different from that of developed countries, as their criteria place greater emphasis on student development.

8 Summary

8.1 *Internationalization: The Standard Consensus of Excellence Initiatives*

The excellence initiatives of various countries have reached a consensus of maintaining global vision while integrating with national strategies. Global concepts, standards and actions are important strategic consensus of excellence initiatives. Excellence initiatives aim to actively promote the development of world-class universities and disciplines, tackle major global challenges through innovative breakthroughs in scientific research, and make contributions to global common goods. International standards are essential in designing and implementing excellence initiative. Through these initiatives, universities are expected to reinforce their leading positions in the increasingly competitive global market. To reach the top 100 in global university rankings is commonly regarded as an intuitive indicator for achieving excellence. Excellence initiatives focus on strengthen university competitiveness as a whole as well as individual disciplines, actively promoting international collaboration and communication with world-top research institutions and researchers, and forming a solid global network. Because of various global crises in recent years, the process of internationalization of higher education has been hindered. Although the process of globalization has been impacted, global society will keep developing towards "a community of shared future for mankind". The trend of internationalization of higher education will not be reversed, but it might not be further expanded to all fields. Governments may not choose strategies which infiltrates international attributes into all levels and fields in their excellence initiatives. More likely, based on the actual strength of their higher education, different countries will focus on specific aspects of international development, such as international cooperation of advantaged disciplines, and international exchanges of faculty members and students, so as to promote more focused academic excellence.

8.2 *Serving the Country: The Attribute Consensus of Excellence Initiatives*

National attributes of excellence initiatives are also evident. The goal setting of excellence initiatives aligns with national strategies. Excellence initiatives of many countries have put forward the demands of defending the long-term benefits of the country, and aim at furthering the development of science, technology, society, economy, and culture. The state plays a key role in promoting excellence initiatives, as government departments or related institutions manage the investment, midterm supervision, and outcomes evaluation of excellence initiatives. The success of excellence initiatives is closely connected to the state's investment and support. A few institutions with potential and advantage should be selected and funded, so as to maximize the spillover effect of key institutions and benefit national development. Countries concentrate higher education resources to organizing and promoting excellence initiatives, so excellence initiatives must reflect the will of the state and should inevitably take on the responsibility of continuously serving future national strategies. As opinions of nationalism has risen, the need to protect national interests has been reflected in excellence initiatives, and the specific measures include resolving bottlenecks by relying on the innovations of world-class research institutions and training elite talents in specific fields.

8.3 *Tactical Plans: The Differences of Excellence Initiatives*

Various countries have formed consensus on the goals, key points, motivators, and targets of excellence initiatives as well as the efforts devoted to excellence initiatives. However, it should be noted that on the basis of these strategic consensus, there are differences in the tactical plans of countries. Based on the strategic consensus of enhancing international competitiveness, countries have chosen different tactics according to their development levels, such as improving international visibility and reinforcing international leading status. Based on the strategic consensus focusing on scientific research challenges, countries have chosen different tactics, such as making breakthroughs in specific research fields, developing cross-disciplinary integration, and strengthening the training of future scientific research leaders. Based on the strategic consensus that government should be the main motivator of excellence initiatives, governments of different countries have chosen their own tactics to support excellence initiatives directly, indirectly or through entrustment. As for the specific tactical plans for excellence initiatives, countries have chosen appropriate modes according to their own situation as well as their certain strategic consensus.

Due to the different conditions of higher education in different countries, tactical plans would differ. Specific implementation measures and strategies of excellence initiatives in different countries are influenced by many factors. What are the factors that affect the choice of tactical plans? To what extent have these factors affected

the choice of tactical plans? How effective are different tactical plans in national strategies? These are the research questions and topics that can be further studied in the future.

References

- Academy of Finland. (1995). Finnish Centres of Excellence. Retrieved June 15, 2022, from <https://www.aka.fi/en/research-funding/programmes-and-other-funding-schemes/finnish-centres-of-excellence/>.
- Asian Development Bank. (2010). Vietnam: Preparing the higher education sector development project (HESDP). Retrieved June 6, 2022, from <https://www.adb.org/sites/default/files/project-document/63092/42079-01-vie-tacr-03.pdf>
- Australian Research Council. (2009). ARC Centres of Excellence. Retrieved June 15, 2022, from <https://www.arc.gov.au/grants/linkage-program/arc-centres-excellence>.
- Bai, Q. (2018). Zhongguo tese “shuangyiliu” daxue jianshe de luoji genju yu luojing xuanze (The logical basis and path selection for building a Double World-Class university with Chinese characteristics). *Chongqing Daxue Xuebao (journal of Chongqing University)*, 24(6), 208–216.
- Cao, J.J., & Yan, W.Q. (2014). Gaoshuiping shizi duiwu shi jianshe yiliu daxue de guanjian (The key of constructing world-class university is high-quality faculty). *Guangming Ribao (Guangming Daily)*, p.11. (2014, October 17).
- Chen, Z. T., & Du, X. (2014). Shanghai jiaoda: Xiaozhang zoushang sizheng jiangtai (Shanghai Jiao Tong University: The president steps up the platform of ideological and political course). *Shanghai Jiaoyu (shanghai Education)*, 13, 9.
- Cui, Y. B., Li, J. L., Pei, X., & Wan, M. (2017). Woguo shijie yiliu daxue jianshe pingjia tixi de goujian ji wanshan lunsu (Reflections on the construction and perfection of the evaluation system for the construction of world-class universities in China). *Xuewei Yu Yanjiusheng Jiaoyu (academic Degrees & Graduate Education)*, 34(11), 23–29.
- Cuntz, A. (2016). Do public R&D funds affect the location choices of elite scientists in Europe? *Research Evaluation*, 25(4), 383–395.
- Danish National Research Foundation. (1991). What is a center of excellence? Retrieved July 5, 2022, from <https://dg.dk/en/what-is-a-center-of-excellence>.
- De Filippo, D., Casani, F., & Sanz-Casado, E. (2016). University excellence initiatives in Spain: A possible strategy for optimising resources and improving local performance. *Technological Forecasting and Social Change*, 113(2), 185–194.
- Egorov, A., Leshukov, O., & Froumin, I. (2020). “Regional flagship” university model in Russia: Searching for the third mission incentives. *Tertiary Education and Management*, 26(1), 77–90.
- Fan, X. X., & Du, X. X. (2019). Yi yuwai meiti he zhuanjia shijiao weijing kan “shuangyiliu” jianshe (China’s Double World-Class Project in the eyes of foreign media and experts). *Xiandai Daxue Jiaoyu (modern University Education)*, 35(3), 17–25.
- Feng, Y. J., Zhao, X., & Zhu, L. M. (2019). Zhongguo tese shijie yiliu daxue jianshe chengxiao pingjia tixi lilun jiangou yu shijian yanzheng (Theoretical construction and practice verification of construction effectiveness evaluation system for world-class universities with Chinese characteristics). *Jiangsu Gaojiao (jiangsu Higher Education)*, 35(1), 20–26.
- Feng, Z. L., Guo, X., & Xiao, G. (2022). Shijie yiliu daxue tonghang jiande yingxiangli: “Yinyong” luoji xiade daxue yingxiangli pingjia (The peer influence in world-class universities: The evaluation of university’s influence with the logic of “citation”). *Jiangsu Gaojiao (jiangsu Higher Education)*, 6, 37–44.
- Feng, Z. L., & Liu, N. C. (2019). *Shijie yiliu daxue pingjia yu jianshe (Evaluation and construction of world-class university)*. Shanghai Jiao Tong University Press.

- Feng, Z. L., & Liu, N. C. (2021). *Shijie yiliu daxue jianshe lanpishu (The blue book of building world-class universities)*. Shanghai Jiao Tong University Press.
- Feng, Z. L., Liu, X. Y., Jiang, Y. C., & Liu, N. C. (2017). Shijie yiliu daxue zhongdian jianshe xiangmu de pingjia biao zhun yu pingjia yaosu (The evaluation criteria and elements of excellence initiatives on building world-class universities). *Gaodeng Jiaoyu Yanjiu (journal of Higher Education)*, 38(12), 43–50.
- German Research Foundation. (2005). Excellence Initiative (2005–2017). Retrieved May 2, 2022, from http://www.dfg.de/en/research_funding/programmes/excellence_initiative/index.html.
- German Research Foundation. (2019a). Excellence strategy. Retrieved May 2, 2022, from www.dfg.de/en/research_funding/programmes/excellence_strategy/index.html.
- German Research Foundation. (2019b). Review process for clusters of excellence in the Excellence Strategy 2018 – reviewer survey. Retrieved May 2, 2022 from <https://zenodo.org/record/3077603>
- Guan, C. Y. (2016). Shijie yiliu daxue jianshe de jiben yuanze jiqi zhongguo tese (The basic principles and Chinese characteristics of world-class university development). *Jiangsu Gaojiao (jiangsu Higher Education)*, 32(5), 20–23.
- Guo, X. L. (2002). Gaodeng xuexiao zhongdian xueke pingxuan fangfa yanjiu (Research on the selection methods of key disciplines in universities). *Zhongguo Gaojiao Yanjiu (chinese Higher Education Research)*, 04, 26–30.
- Guo, X. L. (2003a). Jiyu DEA de xueke youxiaoxing pingjia (Efficiency measurement for the subject based on DEA). *Zhongguo Guanli Kexue (chinese Journal of Management Science)*, 06, 78–81.
- Guo, X. L. (2003b). Yi zhongdian jianshe daidong gaodeng jiaoyu de zhengtong fazhan (Promoting the overall development of higher education with key construction). *Xuewei Yu Yanjiusheng Jiaoyu (academic Degrees & Graduate Education)*, 11, 2–5.
- Guo, X. L. (2004a). Jiyu pingjia de daxue bokuan moxing jiqi yingyong (The evaluation-based university funding model and its application). *Gaodeng Gongcheng Jiaoyu Yanjiu (research in Higher Education of Engineering)*, 02, 29–32.
- Guo, X. L. (2004b). Baozheng zhiliang tuchu tese zaichuang huihuang (Ensuring quality, highlighting characteristics and creating greater glory). *Xuewei Yu Yanjiusheng Jiaoyu (academic Degrees & Graduate Education)*, 10, 2–3.
- Guo, X.L. (2011). Jixiao pingjia de guanjian shi guize de zhiding (The key to performance evaluation is the formulation of rules). *Daxue (Xueshuban) (University [Academic])*, 10, 17–19.
- Guo, X.L. (2021). Kuashiji de jiaoyu gongcheng (Cross-century education projects). *Renmin Ribao (People's Daily)*, p. 5. (2021, March 26).
- Highman, L. (2020). Remapping French higher education: Towards a multi-tiered higher education system? *Tertiary Education and Management*, 26(2), 199–214.
- Hu, J. H. (2019). “Shuangyiliu” jianshe dui daxue xueke tiaozheng de yingxiang (The influence of the Double World-Class Project on discipline adjustment in universities). *Nanjing Shida Xuebao (Shehui Kexue Ban) (Journal of Nanjing Normal University [Social Science Edition])*, 46(4), 20–26.
- International Affairs Division of Shanghai Jiao Tong University. (2008). A dialogue about “the internationalization of universities” between Chinese and American university presidents. *Guoji Rencai Jiaoliu (international Talent)*, 01, 46–47.
- Israel Council for Higher Education. (2022). Institutions. Retrieved April 30, 2022, from <https://che.org.il/en/institutions/>.
- Japan Society for the Promotion of Science. (2007). The world premier international research center initiative. Retrieved July 4, 2022, from <https://www.jsps.go.jp/english/e-toplevel/index.html>.
- Ke, J., & Wan, Y.F. (2012). 2011 Jihua shifang zhongguo gaoxiao chuanguan huoli (The 2011 Plan releases the innovation vitality of Chinese universities). *Zhongguo Jiaoyu Bao (China Education Daily)*, p. 2. (2012, April 21).
- Lehmann, E. E., & Stockinger, S. A. E. (2019). Entrepreneurship in higher education: The impact of competition-based policy programmes exemplified by the German Excellence Initiative. *Higher Education Quarterly*, 73(1), 70–84.

- Li, C. F., Chen, H. J., & Shen, W. Q. (2019). Boshi yanjiusheng xueshu zhiye xuanze de qunti chayi: Jiyu zhongguo boshi biyesheng diaocha shuju (Differences between different categories of doctoral candidates in academic professional orientation: Based on the data of Chinese doctoral graduates). *Xuewei Yu Yanjiusheng Jiaoyu (academic Degrees & Graduate Education)*, 36(8), 36–41.
- Li, P., & Wu, Y. C. (2020). “Shuangyiliu” beijing xia tuijin gaoxiao sizhengke yitihua jianshe (Promoting the integration of ideological and political courses in universities in the background of Double World-Class Project). *Zhongguo Gaodeng Jiaoyu (china Higher Education)*, 17, 9–11.
- Li, X. F. (2005). Zhongguo jianshe shijie yiliu daxue yanjiu zongshu (A summary of correlative researches on China’s world-class university development). *Qinghua Daxue Jiaoyu Yanjiu (Tsinghua Journal of Education)*, 2, 82–87+101.
- Liang, H. Q., & Wei, H. (2018). Ruishi shijie yiliu daxue jianshe lujing tanxi (An analysis of the development of world-class universities in Switzerland). *Jiangsu Gaojiao (jiangsu Higher Education)*, 34(3), 101–107.
- Lin, Z. Q. (2021). The future of Chinese universities: Pathways and strategies. In Liu, N. C., Wu, Y., & Wang, Q. (Eds.), *World-class universities: Global trends and institutional models* (pp. 157–168). Brill.
- Liu, B. C., & Li, R. H. (2011). Woguo shijie yiliu daxue jianshe yu riben chuangujian daxue zhuoyue yanjiu zhongxin zhengce bijiao yanjiu (A comparison between the world-class university development policy in China and COE policy in Japan). *Waiguo Jiaoyu Yanjiu (studies in Foreign Education)*, 8, 9–14.
- Liu, B. C., & Zhang, W. (2016). Guoji bijiao shiye xiade chuangujian shijie yiliu daxue zhengce yanjiu (National strategies to build world-class universities: An international and comparative perspective). *Bijiao Jiaoyu Yanjiu (comparative Education Review)*, 06, 1–8.
- Liu, N. C., Wu, Y., & Wang, Q. (2021). *World-class universities: Global trends and institutional models*. Brill.
- Ma, L. T. (2016). “Shuangyiliu” jianshe buneng qeshi benke jiaoyu (Undergraduate education is indispensable to the development of Double World-Class Project). *Zhongguo Daxue Jiaoxue (China University Teaching)*, 32(5), 9–14+26.
- Menter, M., Lehmann, E. E., & Klari, T. (2018). In search of excellence: A case study of the first excellence initiative of Germany. *Journal of Business Economics*, 88(9), 1105–1132.
- Ministry of Education. (1998). *Mianxiang 21 shiji jiaoyu zhenxing xingdong jihua (Action plan for education revitalization in the 21st century)*. Retrieved April 15, 2022, from <http://old.moe.gov.cn/publicfiles/business/htmlfiles/moe/s6986/200407/2487.html>.
- Ministry of Education. (2019). Guanyu 985, 211 mingdan de zixun (Consultation on the list of Project 985 and Project 211). Retrieved June 17, 2022, from http://www.moe.gov.cn/jyb_hygg/hygg_zczx/moe_1346/moe_1366/201911/t20191128_409940.html.
- Ministry of Education. (2021). *2020 Nian quanguo jiaoyu shiye fazhan tongji gongbao (The 2020 statistical bulletin of national education development)*. Retrieved April 15, 2022, from http://www.moe.gov.cn/jyb_sjzl/sjzl_fztjgb/202108/t20210827_555004.html.
- Ministry of Education. (2022). Jiaoyubu youguan fuzeren jiu dierlun “shuangyiliu” jianshe youguan qingkuang da jizhe wen (The officer of Ministry of Education responded to reporters’ questions regarding the second round of the Double World-Class Project). Retrieved September 4, 2022, from http://www.moe.gov.cn/jyb_xwfb/s271/202202/t20220214_599080.html.
- Ministry of Education, & Ministry of Finance. (2004). *Guanyu jixu shishi “985 gongcheng” jianshe xiangmu de yijian (Guidelines on continuing to implement Project 985)*. Retrieved April 20, 2022, from http://www.moe.gov.cn/srcsite/A22/s7065/200406/t20040602_174769.html.
- Ministry of Education, & Ministry of Finance. (2013). *Guanyu yinfa “985 gongcheng” jianshe guanli banfa de tongzhi (Notice on printing and distributing administrative measures for Project 985)*. Retrieved April 20, 2022, from http://www.moe.gov.cn/srcsite/A22/s7065/201301/t20130108_146802.html.

- Ministry of Education, & Ministry of Finance. (2014). *Guanyu gongbu 2014 niandu “2011 xietong chuangxin zhongxin” rending jiegou de tongzhi* (Notice on publishing the list of 2011 Collaborative Innovation Center in 2014). Retrieved April 20, 2022, from <https://kjc.seu.edu.cn/2014/1024/c10082a104325/page.htm>.
- Ministry of Education, the Degrees Committee of the State Council, & State Language Commission. (2016). *Guanyu xuanbu shixiao yipi guifanxing wenjian de tongzhi* (Notice on declaring a batch of normative documents invalid). Retrieved June 17, 2022, from http://www.moe.gov.cn/srcsite/A02/s5911/moe_621/201606/t20160622_269365.html.
- Ministry of Education, Ministry of Finance, & National Development and Reform Commission. (2017a). *Guanyu gongbu shijie yiliu daxue he yiliu xueke jianshe gaoxiao ji jianshe xueke mingdan de tongzhi* (Notice on publishing the list of world-class universities, universities designated to develop world-class disciplines, and world-class disciplines). Retrieved June 20, 2022, from http://www.moe.gov.cn/srcsite/A22/moe_843/201709/t20170921_314942.html.
- Ministry of Education, Ministry of Finance, & National Development and Reform Commission. (2017b). *Guanyu yinfa tongchou tuijin shijie yiliu daxue he yiliu xueke jianshe shishi banfa (zanxing) de tongzhi* (Notice on printing and distributing the implementation measures for promoting the development of world-class universities and world-class disciplines [provisional]). Retrieved June 20, 2022, from http://www.moe.gov.cn/srcsite/A22/moe_843/201701/t20170125_295701.html.
- Ministry of Education, Ministry of Finance, & National Development and Reform Commission. (2018). *Guanyu gaodeng xuexiao jiakuai “shuangyiliu” jianshe de zhidao yijian* (Guidelines on accelerating the development of the Double World-Class Project). Retrieved June 20, 2022, from http://www.moe.gov.cn/srcsite/A22/moe_843/201808/t20180823_345987.html.
- Ministry of Education, Ministry of Finance, & National Development and Reform Commission. (2020). *Guanyu yinfa “shuangyiliu” jianshe chengxiao pingjia banfa (shixing)* (Notice on printing and distributing the evaluation measures of the effectiveness of the Double World-Class Project [trial]). Retrieved June 20, 2022, from http://www.moe.gov.cn/srcsite/A22/moe_843/202103/t20210323_521951.html.
- Ministry of Education, Ministry of Finance, & National Development and Reform Commission. (2022a). *Guanyu gongbu di'erlun “shuangyiliu” jianshe gaoxiao ji jianshe xueke mingdan de tongzhi* (Notice on publishing the list of the second round of the Double World-Class Project). Retrieved June 20, 2022, from http://www.moe.gov.cn/srcsite/A22/s7065/202202/t20220211_598710.html.
- Ministry of Education, Ministry of Finance, & National Development and Reform Commission. (2022b). *Guanyu shenru tuijin shijie yiliu daxue he yiliu xueke jianshe de ruogan yijian* (Guidelines on further promoting the development of the Double World-Class Project). Retrieved June 20, 2022, from http://www.moe.gov.cn/srcsite/A22/s7065/202202/t20220211_598706.html.
- Ministry of Education and Culture of Finland. (2022). Korkeakoulu, muut julkiset tutkimusorganisaatiot ja tiedelaitokset (Universities, other public research institutions, and scientific institutions). Retrieved June 15, 2022, from <https://okm.fi/korkeakoulu-ta-tiedelaitokset>.
- Ministry of Education and Research of Germany. (2022). Studium (Study). Retrieved May 2, 2022, from https://www.bmbf.de/bmbf/de/bildung/studium/studium_node.html.
- Ministry of Education and Science of the Russian Federation. (2013). Project 5–100. Retrieved May 4, 2022, from <https://5top100.ru/en/about/more-about/>.
- Ministry of Education and Training of Vietnam. (2008). New Model University Project. Retrieved June 10, 2022, from <https://english.vietnamnet.vn/fms/education/140075/vietnam-halts-new-model-university-project.html>.
- Ministry of Education, Culture, Sports, Science and Technology of Japan. (2014a). Top Global University Project. Retrieved July 4, 2022, from <https://tgu.mext.go.jp/en/about/index.html>.
- Ministry of Education, Culture, Sports, Science and Technology of Japan. (2014b). Top Global University Project. Retrieved July 4, 2022, from http://www.mext.go.jp/b_menu/houdou/26/09/_icsFiles/fieldfile/2014/10/07/1352218_02.pdf.

- Ministry of Education, Culture, Sports, Science and Technology of Japan. (2014c). Top Global University Project (2014–2023). Retrieved July 4, 2022, from <https://tgu.mext.go.jp/en/downloads/pdf/sgu.pdf>.
- Ministry of Education and Training of Vietnam. (2021a). 2019–2020 Higher education. Retrieved June 10, 2022, from <https://moet.gov.vn/thong-ke/Pages/thong-ko-giao-duc-dai-hoc.aspx?ItemID=7389>.
- Ministry of Education, Culture, Sports, Science and Technology of Japan. (2021b). 2021 Basic survey of schools. Retrieved June 10, 2022, from https://www.mext.go.jp/content/20211222-mxt_chousa01-000019664-1.pdf.
- Ministry of Education of France. (2010a). Future investment: Excellence initiative. Retrieved May 2, 2022, from <https://www.enseignementsup-recherche.gouv.fr/cid51351/initiatives-d-excellence.html>.
- Ministry of Education of France. (2010b). Investments for the future programme. Retrieved May 2, 2022, from <https://uk.ambafrance.org/Investments-for-the-Future-Programme>.
- Ministry of Education of France. (2010c). Second programme d'investissements d'avenir (The second future investment plan). Retrieved May 2, 2022, from <https://anr.fr/fileadmin/aap/2014/ia-idex-isite-2014.pdf>.
- Ministry of Education of France. (2022). Principaux établissements d'enseignement supérieur (Major institutions of higher education). Retrieved May 2, 2022, from <https://data.enseignementsup-recherche.gouv.fr/pages/home/>.
- Ministry of Education of Republic of Korea. (2013). BrainKorea21 four. Retrieved June 10, 2022, from <https://bk21four.nrf.re.kr/sub01/sub104/subteamlist.do>.
- Ministry of Education of Republic of Korea. (2021). History of higher education institutions. Retrieved June 10, 2022, from <http://english.moe.go.kr/sub/infoRenewal.do?m=0305&page=0305&s=english>.
- Ministry of Finance. (2020). Caizhengxing jiaoyu jingfei touru lianxu ba nian zhan GDP 4% yishang (Financial investment in education has accounted for more than four percent of GDP for eight consecutive years). Retrieved June 20, 2022, from http://www.mof.gov.cn/zhengwuxinxi/caijin_gshidian/zgcjb/202010/t20201020_3606944.htm.
- Ministry of Finance, National Development and Reform Commission, & Ministry of Education. (2003). *Guanyu yinfa "211 gongcheng" zhuanxiang zijin guanli banfa de tongzhi* (Notice on printing and distributing the measures for the administration of special funds for Project 211). Retrieved April 15, 2022, from http://www.moe.gov.cn/jyb_xxgk/gk_gbgg/moe_0/moe_9/moe_38/tnull_52.html.
- National Education Commission. (1995). "211" *Gongcheng zongti jianshe guihua* (Overall plan of Project 211). Retrieved June 20, 2022, from http://www.cssn.cn/zt/zt_xkzt/zt_yjxzt/gdjyzcbq/zchmgj/201909/t20190927_4978564.shtml?COLLCC=2171805228.
- National Planning Commission, Ministry of Education, & Ministry of Finance. (2002). *Guanyu "shiwu" qijian jiaqiang "211 gongcheng" xiangmu jianshe de ruogan yijian de tongzhi* (Notice on several guidelines on strengthening the development of Project 211 during the period of the 10th five-year). Retrieved June 17, 2022, from <https://www.66law.cn/tiaoli/118270.aspx>.
- Office of the Inter-Ministerial Coordination Group of Project 211. (2003). *Guanyu yinfa "211 gongcheng" jianshe shishi guanli banfa de tongzhi* (Notice on printing and distributing the administrative measures for the implementation of Project 211). Retrieved April 15, 2022, from <http://xkb.zuel.edu.cn/2003/0803/c374a4807/page.htm>.
- Office of the Inter-Ministerial Coordination Group of Project 211. (2007). "211 *Gongcheng*" fazhan baogao (1995–2005) (Project 211 development report [1995–2005]). Higher Education Press.
- Planning and Budget Committee of Israel. (2011). The I-CORE program. Retrieved June 15, 2022, from <https://www.isf.org.il/#/specialPrograms>.
- Qiu, J. P., & Ou, Y. F. (2016). Yaou siguo shijie yiliu daxue jianshe bijiao yanjiu (A comparative study of world-class university development in four Asia and European countries). *Gaojiao Fazhan yu Pinggu* (Higher Education Development and Evaluation), 32(04), 36–44+88–89.

- Quacquarelli Symonds. (2016). University highlights. Retrieved July 22, 2022, from <https://www.qschina.cn/en/universities/shanghai-jiao-tong-university>.
- Shandong University. (2017). Xianren lingdao (Current leaders). Retrieved July 17, 2022, from <https://www.sdu.edu.cn/info/1024/1111.htm>.
- Shanghai Jiao Tong University. (2007a). Zhang Jie xiaozhang: 1977 nian gaokao gaibianle wo yisheng (President Zhang Jie: The 1977 college entrance examination changed my life). Retrieved July 25, 2022, from <https://news.sjtu.edu.cn/jdyw/20180404/11795.html>.
- Shanghai Jiao Tong University. (2007b). Zhang Jie xiaozhang fangwen meiguo jiaozou daxue (President Zhang Jie visited University of California in the U.S.). Retrieved July 25, 2022, from <http://news.sjtu.edu.cn/jdyw/20180405/1293.html>.
- Shanghai Jiao Tong University. (2009). Zhang Jie: Jiyang lixiang zhuyi yu jianshe yiliu daxue (Zhang Jie: Promoting idealism and building a world-class university). Retrieved July 25, 2022, from <https://news.sjtu.edu.cn/mtjj/20180405/56065.html>.
- Shanghai Jiao Tong University. (2010a). Zhuanfang shangjiaoda “jie ge”: Xiaozhang shi daxue jing-shen de daiyanren (An exclusive interview with SJTU “jie ge”: The president is the spokesperson of university spirit.). Retrieved July 25, 2022, from <http://news.sjtu.edu.cn/mtjj/20180405/55048.html>.
- Shanghai Jiao Tong University. (2010b). Shanghai jiaoda xiaozhang Zhang Jie: Lixiang yu shijian (SJTU President Zhang Jie: Ideal ad practice). Retrieved July 25, 2022, from <http://news.sjtu.edu.cn/mtjj/20180405/62319.html>.
- Shanghai Jiao Tong University. (2011). Xiaozhang Zhang Jie shuaituan fangwen deguo (President Zhang Jie led a delegation to visit Germany). Retrieved July 25, 2022, from <http://news.sjtu.edu.cn/jdyw/20180405/477.html>.
- Shanghai Jiao Tong University. (2012). Xiaozhang Zhang Jie shuaituan fangwen aodaliya (President Zhang Jie led a delegation to visit Australia). Retrieved July 25, 2022, from <http://news.sjtu.edu.cn/jdyw/20180405/1457.html>.
- Shanghai Jiao Tong University. (2013). Zhang Jie: Xiushen, xiuxin, xiuxue (Cultivating morality, mind and study). Retrieved July 25, 2022, from <http://news.sjtu.edu.cn/mtjj/20180405/62870.html>.
- Shanghai Jiao Tong University. (2015). Shanghai jiaoda xiaoyuan malasong kaopao: “Jie Ge” lingpao fu yinian zhiyue (SJTU Campus Marathon started: The leading runner “Jie Ge” fulfilled his one-year contract). Retrieved July 25, 2022, from <http://news.sjtu.edu.cn/mtjj/20180405/53776.html>.
- Shanghai Jiao Tong University. (2016). Zhang Jie xiaozhang biye dianli yanjiang (President Zhang Jie’s speech on graduation ceremony). Retrieved July 25, 2022, from <http://news.sjtu.edu.cn/mtjj/20180405/65969.html>.
- Shanghai Jiao Tong University. (2022a). Jiaoshi minglu (List of faculty). Retrieved October 15, 2022, from <https://www.physics.sjtu.edu.cn/jsml/zhangjie.html>.
- Shanghai Jiao Tong University. (2022b). Xuexiao jianjie (University introduction). Retrieved July 25, 2022, from <https://www.sjtu.edu.cn/xxjj/index.html>.
- Shanghai Municipal Education Commission, Shanghai Municipal Finance Bureau, & Shanghai Municipal Development and Reform Commission. (2021). *Guanyu yinfa Shanghai shi jiakuai tuijin shijie yiliu daxue he yiliu xueke jianshe shishi fangan (2021–2025 nian) de tongzhi (Notice on printing and distributing the implementation plans of Shanghai to accelerate the development of world-class universities and world-class disciplines [2021–2025])*. Retrieved June 22, 2022, from http://edu.sh.gov.cn/shgy_gdjj_syljs_1/20211217/c381ea762b9a44a283fa7b463faed588.html.
- Shanghai Municipal People’s Government. (2018). *Guanyu benshi tongzhou tuijin yiliu daxue he yiliu xueke jianshe shishi yijian (Implementation guidelines of Shanghai on promoting the development of world-class universities and world-class disciplines)*. Retrieved June 22, 2022, from https://www.shanghai.gov.cn/nw42843/20200823/0001-42843_55342.html.
- Shanghai Municipal People’s Government. (2021). *Guanyu yinfa Shanghai shi jiaoyu fazhan “shisiwu” guihua de tongzhi (Notice on printing and distributing the 14th Five-Year Plan of*

- Shanghai education development). Retrieved June 22, 2022, from http://edu.sh.gov.cn/shgy_fzgh_jygh_2/20211217/cde5ba3760ac487386881796bf6d15d0.html.
- Study in Denmark. (2022). Higher Education Institutions. Retrieved May 2, 2022, from <https://studyindenmark.dk/study-options/danish-higher-education-institutions>.
- Study in Russia. (2022). Russian higher education in figures. Retrieved May 4, 2022, from <https://studyinrussia.ru/en/why-russia/russian-education-in-figures/>.
- Sun, T. (2009). Zhang Jie: Jiaoda de yiliu zhilu (Zhang Jie: The development path of SJTU towards world-class status). *Kexue Xinwen (science News)*, 11, 44.
- The Compilation and Research Group of Project 985 Construction Report. (2011). “985 Gongcheng” jianshe baogao (Project 985 construction report). Higher Education Press.
- The State Council. (2015). *Guanyu yinfa tongchou tuijin shijie yiliu daxue he yiliu xueke jianshe zongti fang'an de tongzhi (Notice on printing and distributing the overall plan for promoting the construction of world-class universities and world-class disciplines)*. Retrieved June 20, 2022, from http://www.moe.gov.cn/jyb_xxgk/moe_1777/moe_1778/201511/t20151105_217823.html.
- Tsvetkova, E., & Lomer, S. (2019). Academic excellence as “competitiveness enhancement” in Russian higher education. *International Journal of Comparative Education and Development*, 21(2), 127–144.
- UNESCO Institute for Statistics. (2022). UNESCO Institute for Statistics database. Retrieved July 6, 2022, from <http://data.uis.unesco.org/>.
- Universities Australia. (2022). Australia higher education. Retrieved June 15, 2022, from <https://www.universitiesaustralia.edu.au/>.
- University College London. (2015). UCL 2034: A 20-year strategy for UCL. Retrieved June 4, 2022, from <https://www.ucl.ac.uk/2034/>.
- University Grants Commission. (1997a). Universities of excellence scheme. Retrieved June 10, 2022, from https://www.ugc.ac.in/pdf.news/1952943_XII-Plan-Guidelines-For-UPE-and-UoE-Revised.pdf.
- University Grants Commission. (1997b). Guidelines for Universities with Potential for Excellence during the XI plan period (2007–2012). Retrieved June 10, 2022, from <https://www.ugc.ac.in/oldpdf/xiplanpdf/upe290409.pdf>.
- University of California, Riverside. (2010). UCR 2020: The path to preeminence. Retrieved June 4, 2022, from https://strategicplan.ucr.edu/sites/default/files/2019-03/ucr_2020_-_final.pdf.
- Van der Wende, M. (2009). European responses to global competitiveness in higher education. *Research and Occasional Paper Series*, 7.
- Wang, J. Y., Zhang, J., & Peng, Y. (2019). Lun xinshidai zhongguo tese shijie yiliu daxue jianshe: Xuexi Xi Jinping zongshuji guanyu jiaoyu de zhongyao lunshu (On the development of world-class universities with Chinese characteristics in the new era: Study Jinping Xi’s important expositions on education). *Jiaoyu Yanjiu (educational Research)*, 40(3), 4–11.
- Wang, Q., & Cheng, Y. (2014). Reflections on the effects of the 985 project in the Chinese mainland. In Cheng, Y., Wang, Q., & Liu, N.C. (Eds.), *How world-class universities affect global higher education: Influences and responses*. Sense Publisher.
- Wang, R. (2020). “Shuangyiliu” daxue lide shuren zhi lujing xuanze (The path choice of Double World-Class university to train talent through fostering virtues). *Jiangsu Gaojiao (jiangsu Higher Education)*, 11, 104–108.
- Wang, Y. Z., & Gao, X. J. (2018). “Gaoxiao xueke yuren: Gaodeng jiaoyu xiandaihua” yanjiu shijian xin jinzhan: Jiyu 2017 nian gaodeng jiaoyu guoji luntan lunwen ji wenben fenxi (New progress in the research and practice on “universities, disciplines and training of talents: Modernization of higher education”: Based on the text analysis of the memoir of the 2017 Higher Education International Forum). *Xiandai Jiaoyu Guanli (modern Education Managemet)*, 37(2), 10–16.
- World Bank. (2022). GDP (current US\$). Retrieved July 6, 2022, from <https://data.worldbank.org/indicator/ny.gdp.mktp.cd>.

- Wu, J. X. (2019). Juji yu fensan: Shijie yiliu xueke de fenbu tezheng yanjiu (Aggregation and decentralization: A study on the distribution of world-class disciplines). *Yanjiusheng Jiaoyu Yanjiu (Journal of Graduate Education)*, 34(3), 78–84.
- Xiao, H. Y., & Jiang, S. Y. (2015). Quanqihua shiye xia de qinghua daxue fazhan zhanlue (Development strategies for Tsinghua University from the globalization perspective). *Qinghua Daxue Jiaoyu Yanjiu (Tsinghua Journal of Education)*, 36 (01), 41–47+52.
- Xiong, H. J., & Chen, Y. J. (2020). Riben “dingji guojihua daxue” xiangmu shishi shuping (The connotation of Top Global University Project implementation in Japan). *Gaojiao Wenzhai (Higher Education Digest)*, 5, 5.
- Xu, C. H. (2013). Yingmei yiliu gaoxiao de xueke jianshe yu qishi (The discipline construction of world-class universities in the U.K. and U.S. and its enlightenment). *Jiangsu Gaojiao (Jiangsu Higher Education)*, 6, 155–157.
- Xu, G. M. (2018). Xueke pinggu yao yinling yiliu xueke jianshe (Discipline evaluation should usher in world-class discipline development). *Gaojiao Fazhan Yu Pinggu (Higher Education Development and Evaluation)*, 34(3), 8–11.
- Xu, Z. P., & Shen, H. (2019). Woguo “shuangyiliu” daxue boshi biyesheng jiuye tezheng fenxi (Analysis on the employment characteristics of doctoral graduates from Double World-Class universities in China). *Xiandai Jiaoyu Guanli (modern Education Management)*, 38(3), 106–111.
- Xue, S., & Liu, Z. M. (2019). “Houfaxing” shijie yiliu daxue jianshe de lujing ji qishi: Yi xinjiapo liangsuo daxue weili (On the path and enlightenment of the construction of “newly formed” world-class universities [NFWCUs]: A case study of two universities in Singapore). *Gaoxiao Jiaoyu Guanli (Journal of Higher Education Management)*, 13(4), 27–38.
- Yan, G. C. (2007). Xueshu renke yu xueshu xitong neibu de yunxing guize (Academic recognition and the latent rules within academic community). *Gaodeng Jiaoyu Yanjiu (Journal of Higher Education)*, 4, 21–28.
- Yu, L., & Zhang, Y. D. (2019). Zhongguo “shuangyiliu” jianshe daxue jichu keyan shengchanli yu shijie yiliu daxue de chaju (How far is Double World-Class universities’ productivity of basic research away from world-class universities). *Zhongguo Keji Luntan (Forum on Science and Technology in China)*, 35(10), 154–163+170.
- Yuan, G. R., & Guo, X. L. (2012). *Zhongguo gaoshuiping daxue jianshe zhilu: Cong 211 gongcheng dao 2011 jihua (The road to China’s leading universities: From Project 211 to the 2011 Plan)*. Higher Education Press.
- Zhang, H., & Liu, B. C. (2015). Faguo chuangujian shijie yiliu daxue de zhengce jiqi tezheng (The policy of creating the world-class university in France and its characteristics). *Gaodeng Jiaoyu Yanjiu (Journal of Higher Education)*, 36(04), 89–96.
- Zhang, H., & Zhang, M. Q. (2016). Faguo chuangujian shijie yiliu daxue de zhanlue shijian: Yi suobang daxue weili (The strategies and practices of building world-class universities in France: Taking Sorbonne Université as an example). *Bijiao Jiaoyu Yanjiu (Comparative Education Review)*, 38(6), 22–41.
- Zhang, J. (2014). Developing excellence: Chinese university reform in three steps. *Nature*, 514(7522), 295–296.
- Zhang, N. X., & Wang, C. C. (2012). Tansuo tongwang shijie yiliu daxue de tese zhilu: Fang Shanghai jiaotong daxue xiaozhang Zhang Jie (Exploring the road of building world-class university: An interview with Zhang Jie, the president of Shanghai Jiao Tong University). *Daxue (Xueshuban) (University [Academic])*, 05, 4–25.
- Zhang, Y. Q. (2019). “Shuangyiliu” jianshe xuyao shenmeyang de xueke pinggu: Jiyu xueke pinggu yuanningu de sikao (Whan kind of discipline evaluation is needed for the Double World-Class Project: Reflection based on the meta-evaluation of discipline evaluation). *Qinghua Daxue Jiaoyu Yanjiu (tsinghua Journal of Education)*, 40(5), 11–18.
- Zhang, Y. Q., Wu, D. G., Sui, Y. F., Lu, X. Z., Bie, D. R., Gong, F., Chen, H. J., Chen, T. Z., Wang, J. H., & Shi, J. H. (2019). Zhongguo gaodeng jiaoyu 70 nian shiren tan (Seven-decade history

- of Chinese higher education: A discussion among 10 scholars). *Suzhou Daxue Xuebao (Jiaoyu Kexue Ban) (Journal of Suzhou University [Educational Science Edition])*, 7 (03), 22–50.
- Zhang, Z. W. (2020). Gaoxiao lishen zhiben zaiyu lide shuren: Xinshidai “shaungyiliu” jianshe genben renwu de zhanlue sikao (The foundation of universities is moral education: Strategic reflection on the fundamental task of the Double World-Class Project in the new era). *Renmin Luntan (People’s Tribune)*, 25, 32–35.
- Zhao, J. F., & Jiang, J. P. (2013). Riben “21 shiji zhuoyue zhongxin jihua” yanjiu (A Study of Japan’s “Excellence Center Project in the 21st Century”). *Xiandai Daxue Jiaoyu (modern University Education)*, 01, 70–77.
- Zhong, Y. H., Lu, C. Y., Liu, J., Wang, H., & Sun, Y. (2019). “Shuangyiliu” gaoxiao jichu yanjiu jingzhengli fenxi: Jiyu guojia ziran kexue jijin (Analysis of competitiveness of basic research in Double World-Class universities: Based on National Natural Science Foundation of China). *Keji Guanli Yanjiu (science and Technology Management Research)*, 39(20), 85–90.
- Zhou, J. L., & Zhang, J. L. (2018). Xueke pinggu yu yiliu xueke jianshe de zhidu pingheng (Mutual complementation and co-governance: Institutional balance between discipline evaluation and world-class discipline construction). *Gaojiao Fazhan yu Pinggu (Higher Education Development and Evaluation)*, 34(6), 1–8+117.
- Zhou, W. H. (2012). Zhongguo xuwei yu yanjiusheng jiaoyu xuehui xueshu jiaoliuhui zai beijing juxing (The meeting of the Chinese Society of Academic Degrees and Graduate Education was held in Beijing). *Xuwei Yu Yanjiusheng Jiaoyu (academic Degrees & Graduate Education)*, 01, 54.
- Zhou, Z. G., & Zong, X. H. (2019). “Shuangyiliu” jianshe zhengce de zhidu tiaoshi, shishi luoji yu tuijin jizhi (Institutional adjustment, implementation logic, and promotion mechanism of Double World-Class Project). *Xiandai Jiaoyu Guanli (modern Education Management)*, 38(6), 11–17.

Feng Zhuolin is professor at the Center for World-Class Universities, the School of Education, Shanghai Jiao Tong University. Her primary research interests are development strategies and performance evaluation of world-class universities

Guo Xin is a doctoral student at the School of Education, Shanghai Jiao Tong University.

Jia Xintong is a research associate at the Center for World-Class Universities, the School of Education, Shanghai Jiao Tong University.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits any noncommercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if you modified the licensed material. You do not have permission under this license to share adapted material derived from this chapter or parts of it.

The images or other third party material in this chapter are included in the chapter’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

