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# From the former Soviet patterns towards the US model? Changes in Chinese doctoral education

**Futao Huang**

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Futao Huang

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**Futao Huang** is Professor at Research Institute for Higher Education at Hiroshima University. He is also an International Co-Investigator, Centre for Global Higher Education. Email: futao@hiroshima-u.ac.jp

**Abstract**

The purpose of this study is to provide an overview of Chinese doctoral education, focusing on its recent changes, main characteristics, and major issues and challenges by analysing national statistics and documentation, as well as cases of individual universities. The study begins with a brief introduction to the outline and key features of Chinese higher education and global drivers as well as national contextual factors. It then discusses recent changes and challenges which have taken place in Chinese doctoral education since the mid-1990s. This study suggests that although there is still evidence of the impact of Soviet ideas on the existing system of doctoral education, China's doctoral education has become increasingly affected by the US model in relation to the role of coursework and quality assurance frameworks. Furthermore, various challenges facing Chinese doctoral education include an increased marketisation or deregulation of government control on doctoral education, a lack of quality assurance mechanisms, and lower quality full-time faculty members.

## **Introduction**

In contrast to many Western countries like the US and the UK, doctoral education in the People's Republic of China (hereafter China) started as late as the early 1980s. In 1982 only 302 doctoral students were enrolled. Since then, impacted by global and international drivers and national contextual factors, there has been not only a quantitative growth in the number of doctoral students and doctoral degree holders, but also a diversifying of the structure and functions of doctoral education in China. Although the former Soviet patterns of academic systems and higher education systems have maintained a strong influence on the formation of modern Chinese higher education (including graduate education), more distinctive characteristics of Chinese doctoral education have also emerged since the early 1990s when China began to build up its market economy with distinctive Chinese characteristics. Doubtless, Chinese doctoral education is confronted with numerous issues and challenges, but it appears that with an increase in the rate of higher education enrolment and continuous reforms in doctoral education, the scale of Chinese doctoral education will expand and its missions, structure and functions will be more diversified in the future.

The purpose of this study is to provide an overview of Chinese doctoral education, focusing on its recent changes, main characteristics, and major issues and challenges. The study will analyse national statistics and documentation, as well as cases of individual universities. The study begins with a brief introduction to the outline and key features of Chinese higher education and global drivers as well as national contextual factors. It then discusses recent changes and challenges which have taken place in Chinese doctoral education since the mid-1990s. The study concludes by presenting the main characteristics and prospects of Chinese doctoral education, and implications for study, policy and institutional practice.

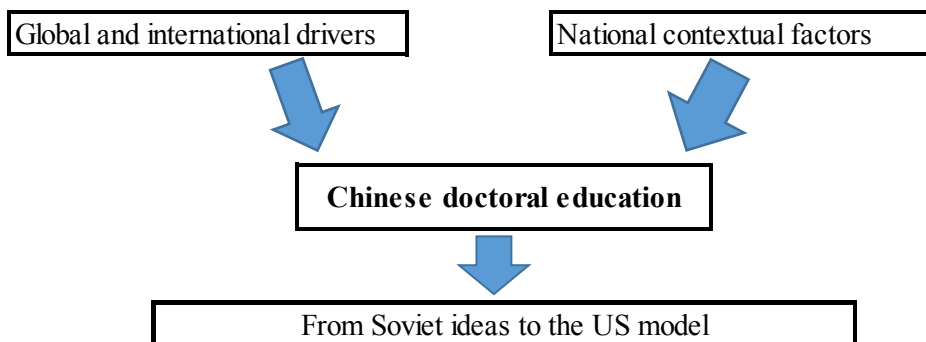
## **Previous studies and conceptual framework**

In contrast to existing studies of policy, financing, governance arrangements, quality assurance, and internationalisation of Chinese higher education, there have been few English publications on the topic of Chinese doctoral education. Zhang, in one of these, describes the main features of Chinese doctoral education in the early 2000s. Zhang gives a brief introduction to funding issues; types of institutions where

doctoral education is undertaken; forms of doctoral study; students and their programmes of study; and supervision (among other issues). Zhang argues that PhD education in China is relatively young but fast developing (Zhang, 2007). Recently, several Chinese researchers published an article focusing on a comparative study of European and Chinese doctoral education in collaboration with international academics (Bao, Y, Kehm, B. M. Kehm & Ma, Y., 2016). By identifying the similarities and differences of doctoral education between Europe and China, their study claims that China has just started to diversify its doctoral training. In contrast to these previous studies, this study addresses the issue of how Chinese doctoral education has been transformed from being influenced by former Soviet ideas to the US model. This research is based on an analysis of the official statistics issued by the Chinese government, field work and case studies.

In common with many other countries, since the late 1990s changes in Chinese doctoral education have been increasingly affected by both global and international drivers and domestic factors. This study employs the following conceptual framework.

<Figure 1> Conceptual Framework



Source: Author (2016)

In order to pursue the research question mentioned earlier (has Chinese doctoral education been moving from the former Soviet patterns to the US model?) the present study employs two focus questions.

1. What main changes have occurred in Chinese doctoral education?
2. What key challenges confront Chinese doctoral education?

In terms of methodology, the data in this study is mainly drawn from national statistics issued by the Ministry of Education (MoE) in China. All these statistics are gathered and annually published by the MoE, and can provide reliable and hard evidence of changes in Chinese doctoral education. In addition, this study also presents three case studies focused on the process of doctoral education in practice. The analysis of the three cases are supported by major findings from interviews which were conducted by the author and his colleagues several years ago. Finally, relevant findings from field work and interviews by existing studies are provided, with the purpose of identifying the real challenges facing Chinese doctoral education in recent years.

## **Background and driving forces**

The current Chinese higher education institutions (hereafter HEIs) consist of four sectors. They include national universities which are founded, administered and largely financed by the Ministry of Education (hereafter MoE) and other central ministries; public institutions which are established and funded by local authorities; the non-government or private universities sector which is founded and operated by private corporate, private enterprises, social organisation etc; and independent colleges which used to be second-level colleges within national and public universities, but are currently categorised as private sector. Because these independent universities can still use the titles of the universities to which they were once affiliated, they are considered to be different from other non-government sectors in this study. Since the mid-1990s, a lot of Sino-foreign run higher education institutions and academic programmes have emerged. The vast majority of these institutions and programmes are either affiliated with existing universities or colleges, or delivered by current higher education institutions. Recently, branch campuses of foreign universities in China have also appeared. By type of student, regular HEIs enrol full-time students while adult education institutions are mainly concerned with mature students and students in service. By level of educational programme, there are junior colleges in which short-cycled programmes are provided for two to three years. The length of study at undergraduate education level lasts four years but normally takes five years in the fields of engineering and medical science. Graduate education is made up of master-level programmes and doctoral education. The length of study at master-level programmes varies largely depending on different

institutions and disciplines, ranging from 1.5 years to three years. The standard period of study at doctoral education level ranges from three to five years, but it can also be prolonged to as long as eight years, especially for mature students or students in service who are pursuing doctoral degrees in professional disciplines. By type of academic programme, or discipline, there are comprehensive universities (offering a wide variety of disciplines), specialised or professional HEIs or universities (such as polytechnics), medical and agricultural, arts, pedagogical institutions, and colleges of higher vocational and technical education. By mission or function, there are research-intensive universities, teaching-centered HEIs and HEIs emphasising both teaching and research activities.

According to the statistics of the MoE, as of 2014 there are 2,529 regular HEIs. Among these, 1,202 institutions are qualified to provide undergraduate programmes with bachelor degrees and 1,327 institutions focus on the provision of vocational and technical education. Although the gross rate of Chinese higher education enrolment reached 37.5 per cent of the relevant age cohort by 2015 and China has not become one of the 'high participation systems' of higher education (according to Martin Trow's definition), the total number of students enrolled in various types of HEIs is 35,590,000. This means that China has the largest higher education population in the world (MoE, 2015).

With respect to the origins of Chinese higher education, the formation of the modern Chinese higher education system after the establishment of the People's Republic of China in 1949 was considerably influenced by the Soviet patterns. For example, the number of comprehensive universities declined from 47 to 14, while there was a rapid increase in the numbers of specialised HEIs in engineering and agriculture institutions: from 159 in 1951 to 174 in 1954 when the model of the former Soviet higher education system was introduced to China (MoE, 1984). Although China tried to establish its own higher education systems in the 1960s by dropping the Soviet model, it seemed to have continuing impact on China's higher education prior to the 1980s (Huang, 2006). By the early 1990s, the main characteristics of China's higher education systems could be summarised as follows.

Firstly, similarly to the former Soviet academic and higher education systems, there was a clear division of labour between the two separate parts of the sector in the



Chinese academic systems: universities or HEIs and research institutes. As the primary mission of individual universities/HEIs was to produce professional and vocational graduates, except for very few universities that were administered by the MoE and other ministries and departments at a central government level, a vast majority of HEIs were specialised and professional institutions focused on the delivery of practical and applied programmes of study. Research activities were basically undertaken in research institutes outside universities and especially in the Chinese Academy of Sciences or Social Sciences.

Secondly, because there was no national academic degree system until the early 1980s, there was no provision of graduate education, including doctoral education and training, in either HEIs or research institutes. Only after the launch of the Regulation on the Academic Degree Systems of the People's Republic of China in February 1980 did doctoral education and training in China come into existence in real earnest.

Thirdly, as a socialist country, the MoE and other ministries and departments at both the central and local level regulated and controlled all HEIs in relation to almost all administrative and academic matters. These ranged from setting standards for approving new institutions, recruiting new entrants, providing new academic programmes, determining priorities of teaching and research activities, to appointing key institutional leaders and allocating revenues. All HEIs were established and financed by either national government or local authorities. No private institutions were allowed and nor were there any institutions or programmes collaboratively provided by China and foreign partners.

Global and international drivers and national contextual factors (RIHE, 2010) have led to enormous changes in Chinese doctoral education and training. To illustrate, in relation to prominent global and international drivers also common to many other countries and societies, there has been a demand for building a knowledge-based society. Since the early 1990s, more and more countries have asked their universities and research institutes to play a central role in establishing a knowledge-based economy and society by fostering graduates with creativity and carrying out innovative research activities.

The second driver pertains to the increasing impact of globalisation and internationalisation. Compared to the situation prior to the 1980s, doctoral education and training worldwide has tended to focus more on producing doctoral holders equipped with transferrable skills who are more responsive and relevant to changing labour markets at home and abroad. A related driver is that the rapid process of internationalisation has made doctoral education and training more competitive at a supra-national level, and so more doctoral programmes with regional and international perspectives are developed.

Third is the growing force of the market on higher education, or the marketisation of higher education. Although not all societies have been influenced by the rule of the market, it is true that even doctoral education and training has been increasingly influenced by this trend. Evidence includes a growth in numbers of private doctoral students, an increased reliance on private resources to operate doctoral education programmes, a massive expansion in numbers of doctoral programmes and training activities which are market oriented, and requirements for doctoral education to be more accountable, transparent, efficient, and effective to various stakeholders, etc. (Nayyar, 2008).

In addition to these global and international drivers, national contextual factors have also stimulated changes in Chinese doctoral education and training. One of the most important factors has been the reforms made, at both national and institutional levels, to the old higher education systems modelled on the Soviet Union. From the perspective of doctoral education, these include three major aspects.

The first has been to build up comprehensive universities, especially research-intensive universities, by merging specialised institutions into large research universities with full-scale and high-level disciplines. After 1992, as China made further efforts to transform a planned economy to a market one with Chinese characteristics, several important government documents and acts were issued, such as an Outline for Reform and Development of Education in China of 1993, the Education Act of 1995 and the Higher Education Act of 1998. They emphasised that totally new education systems should be established while the distinctive Chinese market economy was being formed.

The second has involved the implementation of national policy and strategies of creating several world-class universities by strengthening research capacity and enhancing the international competitiveness of Chinese universities. The launch of the 211 Project and 985 Project has led to the emergence of more than 100 research-intensive universities. These universities have played a decisive role in providing doctoral education and training in China.

Third is the massification of Chinese higher education, especially since 1998. As mentioned earlier, gross higher education enrolment increased from 9.8 per cent of the age group in 1998 to 37.5 per cent of the relevant population in 2015. The steady and rapid expansion of undergraduate students has also resulted in a remarkable expansion in numbers of graduate students.

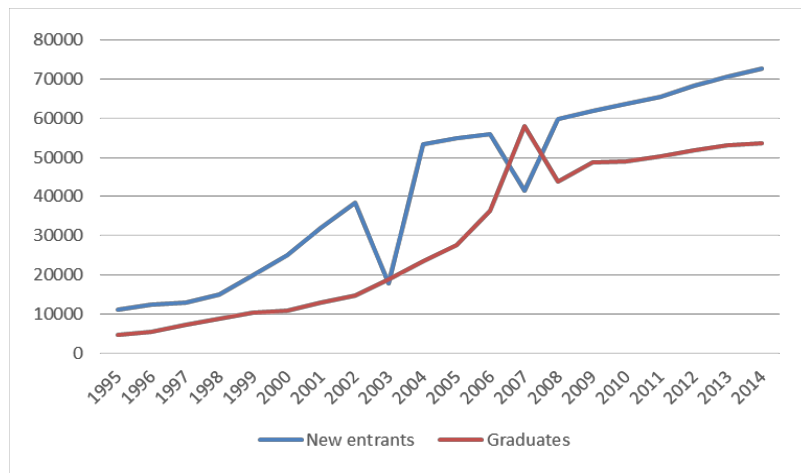
To sum up, all these powerful driving forces have contributed to the quantitative growth and qualitative improvement of China's doctoral education over the last two decades.

## **Changes and challenges in Chinese doctoral education**

### **Quantitative growth and diversification of structure**

As noted above, when China established its doctoral education in 1982, there were only about 30 doctoral candidates. By 1988, the number of doctoral students or candidates had increased to 10,525 and graduates to 1,538. With the rapid and steady rise in numbers of undergraduate students since 1998 (other than for 2003 and 2007), there has been a similar growth in numbers of doctoral students. Figure 2 shows that over the period 1995 to 2014, the number of new entrants and graduates at a doctoral level increased more than sixfold (from 11,056 in 1995 to 72,634 in 2014) and more than tenfold (from 4,641 to 53,653) respectively.

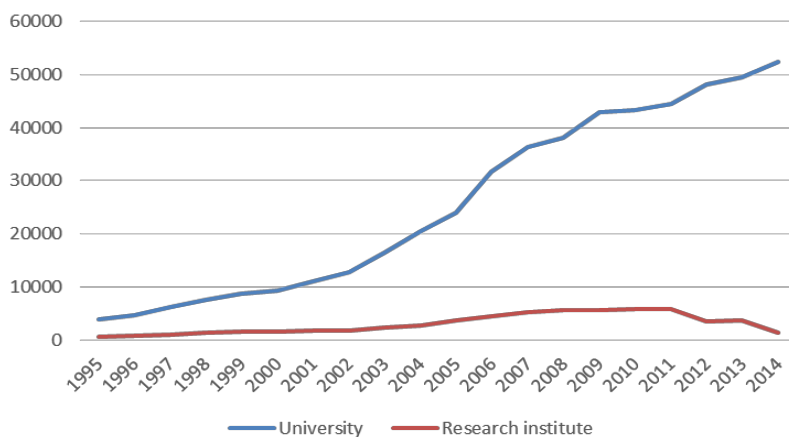
<Figure 2> Changes in numbers of new entrants and graduates 1995-2014



Source: MoE (2015)

Unlike in many countries such as the US, Germany and Japan, in China, partly as an effect of the former Soviet styles, even in recent years both universities/HEIs and research institutes are involved in providing doctoral education and training. For example, Figure 2 indicates that although numbers of doctoral graduates from research institutes have declined since 2011, they are still concerned with doctoral education and training. However, Figure 3 clearly shows the numbers of doctoral graduates from universities or HEIs have increased in a continuous and surprisingly rapid manner with a continual decrease in numbers of those from research institutes from 1995 to 2014. For example, as of 1995, the proportion of doctoral graduates from research institutes accounted for 16 per cent of the total, but it had reduced to seven per cent by 2013.

<Figure 3> Changes in numbers of doctoral graduates by sector 1995-2014



Source: MoE (1996, 2015)

Like both undergraduate and master-level students, the number of doctoral students enrolled in individual HEIs and research institutes is in accordance with the state planning system. Prior to the early 1990s, almost all doctoral candidates were full-time students and were funded by the government. Not only did they not pay any tuition or fees, they were also provided with student dormitories or housing facilities on campus. Students from low-income backgrounds received a stipend from the government to cover part of their living expenses. Since the late 1990s, with the adoption of a national cost-recovery policy in higher education, other types of doctoral students have also been admitted to HEIs and research institutes. The previous study shows that as early as 1985 the Chinese government stated in its publication *Decision to Reform Educational Structure* that HEIs 'could enroll a small number of students who pay tuition'. This was the first national policy introducing cost-recovery to Chinese HEIs. From the mid-1980s to 1992, the two-track enrolment of paying tuition and not paying tuition co-existed in the Chinese higher education system. Since 1997, all Chinese HEIs have adopted the policy of charging tuition and fees from students, including those who study in both national and public HEIs (Li and Min, 2001).

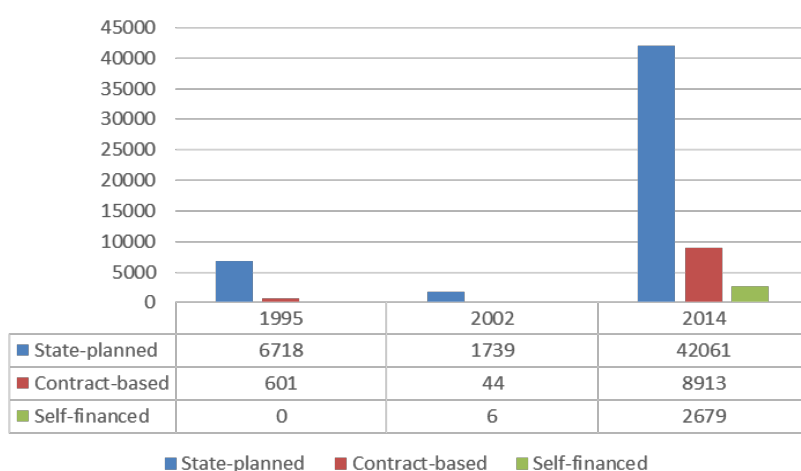
In terms of funding source, there are three broad types of doctoral student in China. First, there are the traditional doctoral students who are financially supported by public funding. Most of them are full-time students. The second type are contract-based students. Before they are admitted to a doctoral programme, they have to sign a contract with their workplace, or sponsoring HEI or institute, releasing them to commence their doctoral education. In most cases, they are funded by their current affiliation, sponsoring university, institution or organisation for which they are contractually bound to work for an agreed period after graduation. Although some are full-time students and are required to be employed in their sponsoring universities, institutions, organisations or places of work after completion of their study, a majority pursue their doctoral degrees in service. Self-financed or private doctoral students have to pay for tuition and fees, and accommodation or other living expenses if they stay on campus. Some of them are full-time students, but pursue their doctoral degree at their own expense because their entry-level exam mark is not high enough to qualify for financial support. Others are part-time students who undertake their doctoral education while working as young academics in HEIs at

their own expense. In most cases, they are reimbursed in part by their affiliations after they earn their doctoral degree.

As discussed earlier, the introduction of the rule of the market to higher education in China, especially since the mid-1990s, is one of the main reasons for the diversification of doctoral students. The marketisation of higher education and the necessity to generate more revenue through recruiting private students has not only resulted in a rapid increase in numbers of non-governmental or private HEIs and independent colleges, but has also brought about changes in doctoral education in China in relation to the type of students undertaking doctoral study.

As Figure 4 demonstrates, there were no private or self-financed doctoral students in China until 1995. The majority of doctoral graduates were recruited and financed based on the state planning system. In 2002, there were only six self-financed doctoral graduates, but by 2014 that number had increased to 2,679. Over a 20 year period, the proportion of state-planned doctoral graduates dropped from 91.8 per cent of the total to 78.4 per cent. By contrast, self-financed or private doctoral graduates increased by 5 per cent while the proportion of contract-based graduates expanded from 8.2 per cent of the total to 16.6 per cent. In other words, although state-planned graduates still accounted for the bulk of the total, its share had declined, corresponding with a growth in numbers of both contract-based and self-financed doctoral graduates.

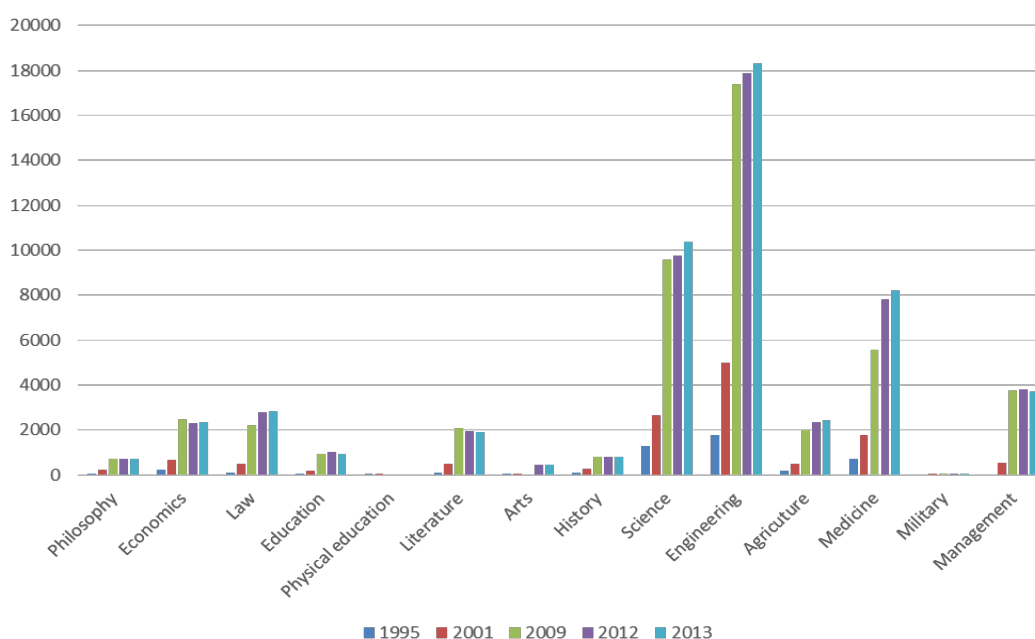
<Figure 4> Changes in numbers of graduates by type of students 1995-2014



Source: MoE (1996, 2015)

Despite a rapid growth since the late 1980s in non-government or private HEIs, including four-year universities, no non-government or private university, nor any independent college, is currently qualified to confer doctoral degrees. The main reason for this is that from the outset private HEIs and independent colleges were expected to become teaching-centered institutions, to offer short-term applied vocational programmes, and to foster graduates who contribute to the economic development of the community.

<Figure 5> Changes in numbers of graduates by discipline 1995-2013



Source: MoE (1996, 2015)

Although various reforms were carried out to restructure the Chinese higher education system – which had been based on the ideas of the former Soviet state since the early 1980s – when China adopted its open-door policy the Soviet influence on key aspects of Chinese higher education was still considerable. For example, Figure 5 shows that for the period 1995 to 2013, the largest number of doctoral graduates were from engineering, followed by science, and then medicine. This indicates that Chinese doctoral education still pays much attention to the provision of applied programmes.

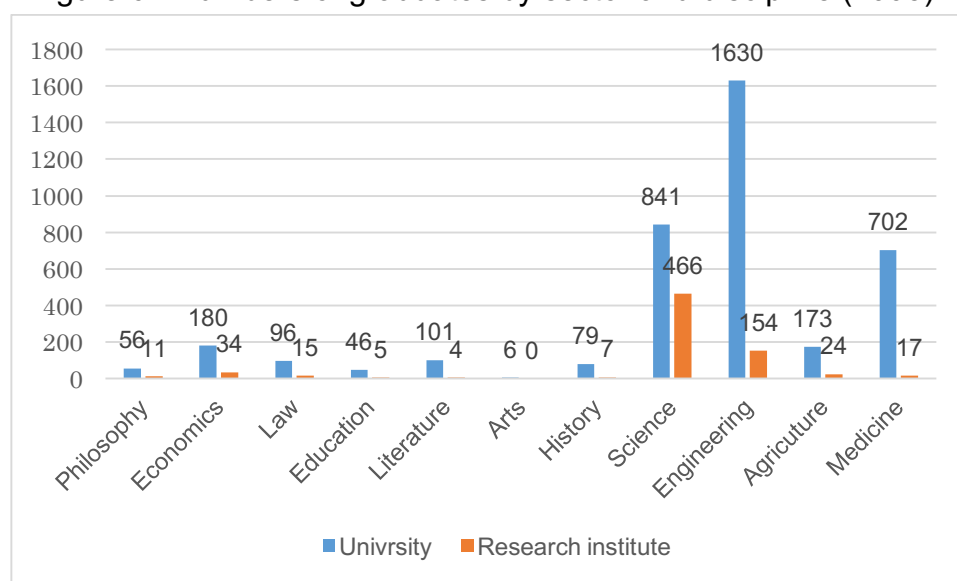
There are clear differences between universities and research institutes in terms of the doctoral programmes they offer despite major changes in the number of graduates from the different sectors by disciplines. Figure 6 shows that as of 1995, the largest number of university doctorates graduated in engineering (1,630 graduates), followed by science (841). By contrast, in research institutes the majority were in science (466), followed by engineering (154). According to Figure 7, by 2013 the largest number of doctoral-holders still came from engineering (17,162 graduates), followed by those from science (8,855). This is despite the fact that there had been a surprising rise in the number of doctoral graduates in universities and a decline in numbers in research institutes.

The same is true for research institutes. The majority graduated from science (1,541), followed by engineering (1,169). The reason for the increased numbers of doctoral graduates in universities and the decline in research institutes is the growth in universities with authority to award doctorates while the number of research institutes declined.

It is clear that by the early 2000s, an apparent division of labour between the two different sectors continued to exist. Universities provided a wider variety of doctoral programmes, especially in engineering, science and medicine, whereas research institutes offered fewer programmes and concentrated on science and engineering. With the rapid expansion of research universities since the late 1990s, doctoral education and training in China has relied more on individual universities and less on research institutes, which suggests that the impact of the former Soviet academic system on China has declined.

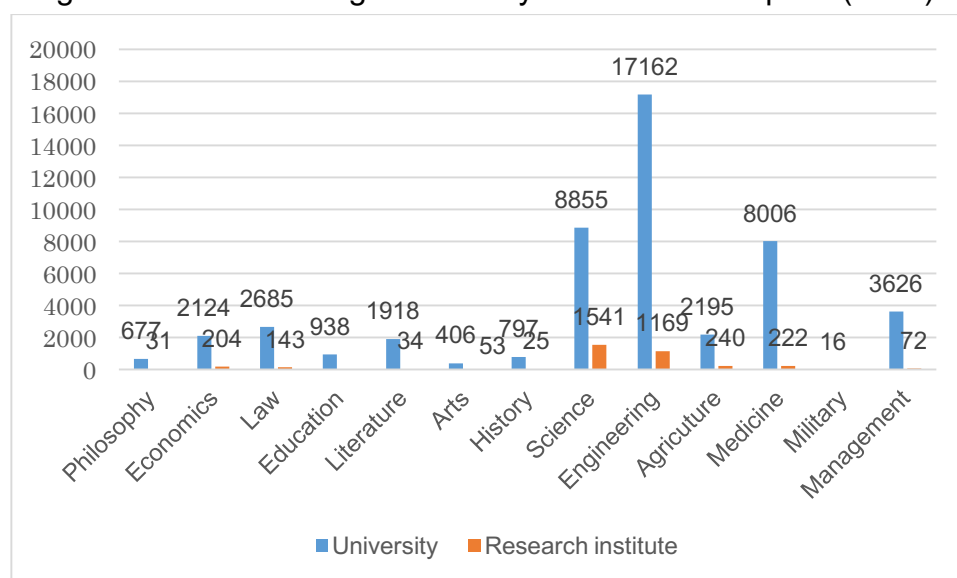


<Figure 6> Numbers of graduates by sector and discipline (1995)



Source: MoE (1996)

<Figure 7> Numbers of graduates by sector and discipline (2013)



Source: MoE (2014)

The forms and process of doctoral study differ from the UK and Australia, but are similar to the US. Chinese doctoral education and training is based on coursework and a structured curriculum, accompanied by a comprehensive examination and the submission of a doctoral dissertation. Despite significant differences in different HEIs and disciplines, the process of doctoral education and training consists of five stages. In the first stage, doctoral students spend one year completing all required courses and obtaining academic credits. In the second stage, students have to pass

a comprehensive examination in their second academic year. The purpose of the comprehensive examination is to assess students' overall competencies, including basic and professional knowledge, and research abilities in particular. Those who pass the examination move onto the third stage. In this stage they are supervised in their review of the literature, develop a research proposal, and make an oral defence of their research proposal or preliminary research findings. The fourth stage is mainly concerned with a mid-term assessment of students' progress in their research and progress in publishing research articles in academic journals. In the final stage students submit their dissertation, which is reviewed by an examination and defence committee consisting of students' supervisors and external reviewers. They then undertake an oral defence of their dissertation.

Table 1 contains case studies of three leading universities in China (Huang and Li, 2010). Shanghai Jiao University was one of the first Chinese modern universities focusing on engineering education. It has become a comprehensive and research-intensive university since the 1990s. Modelled on the Soviet model of the early 1950s, Huazhong University of Science and Technology was established as a typical college of technology. It has also expanded since the early 1990s into a huge research-intensive university with a wide variety of disciplines. By contrast, Xiamen University used to be a private university founded by an overseas Chinese national in the early 1920s. It is famous for its humanities and social sciences, especially in economics, international trade, and financing, although it is also recognised for the quality of its research in chemistry. The different origins and contexts have resulted in several differences in terms of length of study, required numbers of academic credits, and required number of published articles, etc. For example, the average length of study in Shanghai Jiaotong is one year longer than in the other two universities. Its students also require more academic credits than the other two. Both Shanghai Jiaotong and Huazhong University of Science and Technology instituted standards which require students to publish a minimum number of research articles in identified academic journals. Xiamen University has not laid out similar requirements for its students.

It is worth mentioning that it is considered a normal part of their doctoral education and training for students to be involved in research activities before completing obtaining doctoral degrees. These three case studies reveal that 86.5 per cent of

doctoral students participated in their supervisors' research projects in Shanghai Jiaotong; as high as 93.7 per cent of doctoral students in Huazhong University of Science and Technology were members of their advisors' research projects; 56 per cent of doctoral students in Xiamen undertook research projects supervised by their advisors, though this is much lower than the other two universities. One of the reasons for this is that Xiamen University has fewer professors who are qualified to recruit doctoral students and more disciplines in the humanities and social sciences.

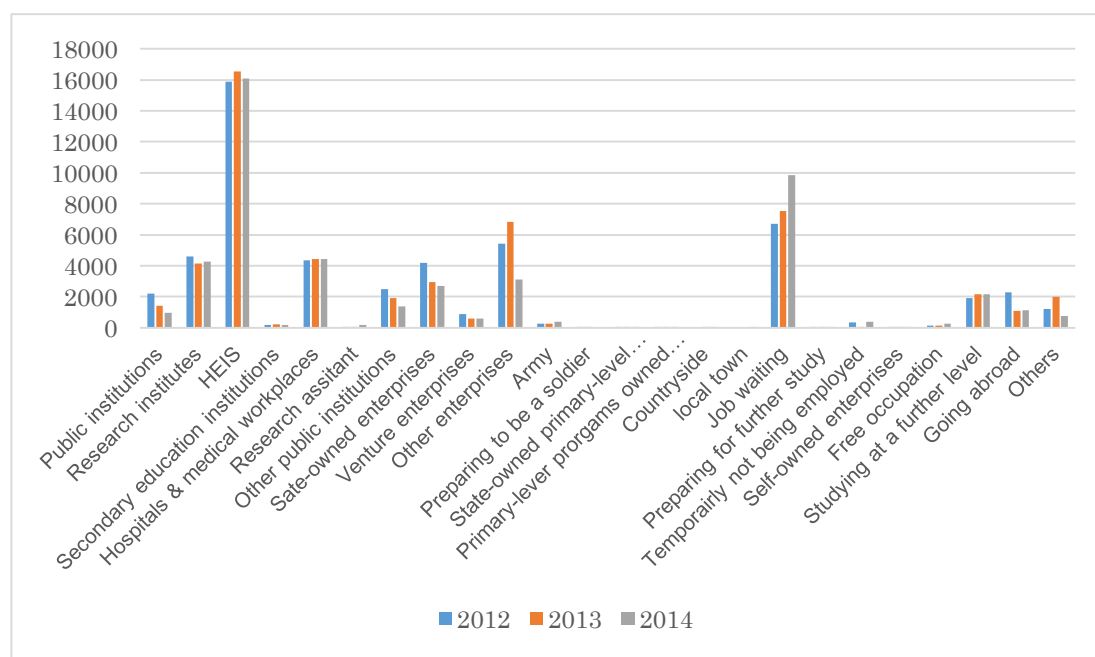
Furthermore, in order to expand students' scope of research, academic networking, and especially international perspectives, the three universities established policies to encourage and even provide financial support for their students to attend international conferences at home and abroad. It is reported that 86.5 per cent of doctoral students in Shanghai Jiaotong have attended various academic conferences and 46 per cent have participated in international conferences during their study. Nearly half the doctoral students from Huazhong University of Science and Technology participated in international conferences. As Xiamen University began to fund doctoral students to attend international conferences, their numbers increased year by year from 2000 to 2005.

<Table 1> Process of doctoral education

	Shanghai Jiaotong Uni.		Huazhong Uni. Of Science and Technology		Xiamen Uni.	
Length of Study	3-5 years		3-5 years		3-7 years	
Length of study on average	4 years		3 years		3 years	
Process of doctoral education & training	Coursework in the first academic year	17 academic credits	Coursework in the first academic year	12 academi credits for Science & Engineering, 14 academic credits for Humanities & Social Sciences	Coursework in the first academic year	12-14 academic credits
	Comprehensive exam from the third term	Scores of completed courses Review of literature concerned • Assessment on doctoral candidates' research abilities	Comprehensive exam from the third term	Scores of completed courses Review of literature concerned • Assessment on doctoral candidates' research abilities	Comprehensive exam from the second academic year	Basic theory & professional knowledge
	Submission of doctoral dissertation proposal	After the third term	Submission of doctoral dissertation proposal	Exam on qulifications of submitting research proposal	Submission of doctoral dissertation proposal	After comprehensive exam
	Mid-term check or exam of doctoral dissertation	Awards & scholarship for excellent doctoral candidates	Mid-term check or exam of doctoral dissertation		Social investigation	
	Publications of research papers	2 or more than 2 articles publishd in indexed journals like Science Citation Index (SCI), Engeeing Index (EI), Chinese Social Sciences Citation Index(CSSCI)	Publications of research papers	E.g. Engineering on average 1-2 articles in SCI journals, 3-5 articles in EI journals; Chemistry, 3 articles in SCI journals	Mid-term check or exam of doctoral dissertation	
	Preparatory oral defense of doctoral dissertation	Preparatory oral defense of doctoral dissertation			Publications of research articles	
	Open oral defense of doctoral dissertation	Open oral defense of doctoral dissertation			Preparatory oral defense of doctoral dissertation Open oral defense of doctoral dissertation	

Source: Huang and Li (2010)

<Figure 8> Changes in the destination of employment of doctoral graduates



Source: China Higher Education Student Information and Career Center (2015)

With regard to changes in employment of all doctoral graduates, Figure 8 suggests that the largest number of doctoral graduates were employed in HEIs during 2012-14. Because their major destination of employment is an HEI and nearly 4,000 graduates found their jobs in research institutes during the period, there is little doubt that Chinese doctoral education and training devoted much of its efforts to producing university faculty members and researchers. However, many were also employed in other enterprises, hospitals and medical workplaces, though these numbers changed over time.

At an institutional level, similar trends can be identified by discipline and location of different universities based on case studies. Table 2 illustrates that the percentage of doctoral graduates who were employed in HEIs accounts for the largest proportion of the totals across all universities. This is especially true of those universities located in the northwest and southwest parts of China. For example, over 70 per cent of doctoral graduates from the two universities located in the southwest part of China were employed in HEIs. More than 60 per cent of those from the northwest and central regions of China became university faculty members. Even in Beijing, where there appear to be more options for employment and more attractive alternatives for doctoral graduates, the percentage of graduates from the three most prestigious universities in Beijing who found jobs in HEIs comprised the largest share of the total.

<Table 2> Destination of employment of doctoral graduates at an institutional level

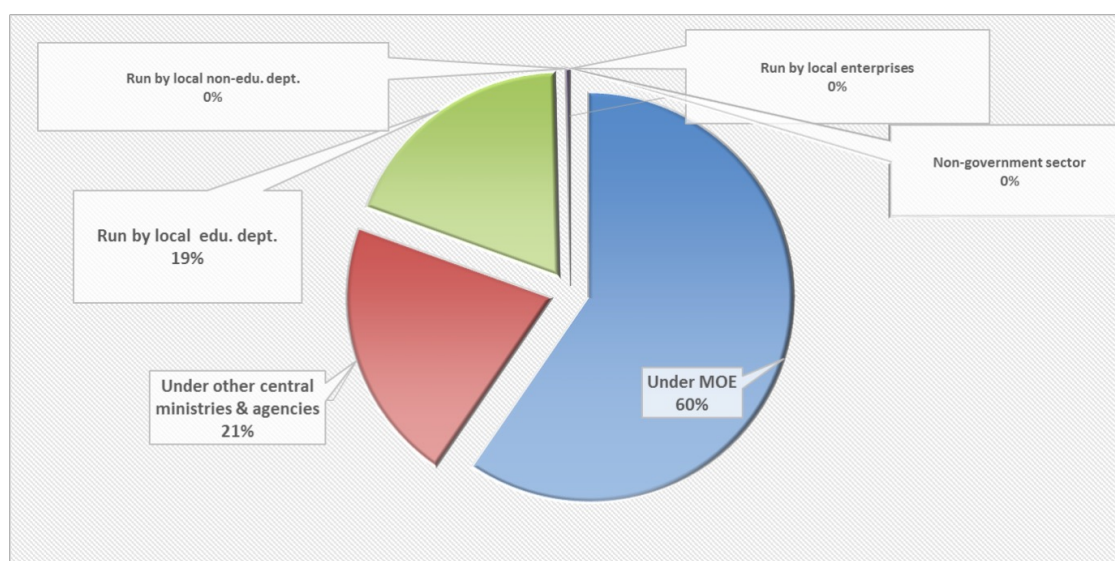
University	Location	Party & government institutions	HEIs	Research institutes	Other public institutions	Medical workplaces	Enterprises & company	Army
Peking Univ.	Beijing	6.72	39.69	15.94	10.63	---	25	1.72
Tsinghua Univ.	Beijing	10	30.4	25.7	3.9	---	29.2	0.8
China Univ. of Political Science and Law	Beijing	26.35	41.92	5.39	2.99	---	17.96	0.6
Wuhan Univ. of Technology	Central China	5.56	64.29	7.14	3.17	---	13.5	5.56
Zhongnan Univ. of Economics and Law	South-west China	12.27	72.39	1.23	5.52	0	7.98	0
Zhongnan Univ.	South-west China	1.81	70.52	7.71	2.04	12.02	5.22	0.68
Xi'an Jiaotong Univ.	North-west China	1.56	53.79	14.51	0.23	13.17	13.17	3.57
Lanzhou Univ.	North-west China	1.5	61.65	12.03	6.39	7.52	10.52	0.38

Source: China Higher Education Student Information and Career Center (2014).

Not all doctorate graduates become academics, but some gain employment in a diversity of non-academic workplaces. For example, according to the same annual report above, by 2014 the largest proportion of doctoral graduates from both Shanghai Jiaotong University and Fudan University located in Shanghai were employed in hospitals and medical institutes. Their percentages rose to 40.9 per cent and 39.8 per cent respectively while the percentages of those working in HEIs after graduation only accounted for 19.6 per cent and 25.3 per cent of the total graduates in the two universities respectively.

Noticeably, the number of doctoral graduates looking for work has grown steadily. As the numbers of doctoral graduates continues to increase, more and more doctoral graduates will find it difficult, or that it will take longer, to gain employment.

<Figure 9> Numbers & percentages of graduates by sector in 2013



Source: MoE (2014).

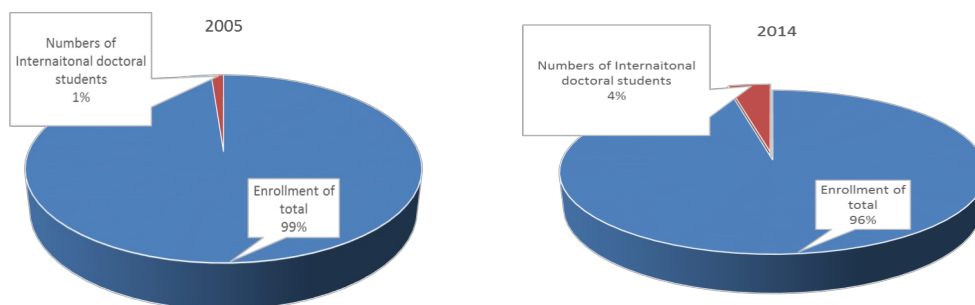
As already mentioned, not all HEIs are permitted to provide doctoral-level degree programmes and training. Figure 9 shows that over 80 per cent of doctoral graduates come from universities and research institutes administered by the MoE and other central ministries and agencies. Approximately 100 of these universities are called 'leading' or 'key' universities in China. They enjoy relatively higher academic freedom and autonomy as well as more favorable working conditions, are allocated more public funding, offer more doctoral programmes, and have more opportunities to undertake international academic exchange activities when compared with other HEIs. By contrast, the HEIs run by either local enterprises or non-government sectors are not qualified to provide any doctoral education programmes. As a result, these programmes are generally offered by key universities and national research institutes that are either administered and/or funded by the MoE, and other central ministries or departments, or by the China Academy of Science or Social Science.

## Challenges for Chinese doctoral education

Several challenges confront doctoral education and training in China. Firstly, from the perspective of internationalisation, although there has been a growth in numbers of inbound international students studying doctoral programmes in Chinese universities, when compared with many advanced countries such as the US, the UK, Australia, and Japan, inbound international doctoral students constitute a tiny

proportion of the overall doctoral student population. For example, according to Figure 10, their numbers increased from 2,304 in 2005 to 12,114 in 2014, from one per cent to only four per cent within the same period.

<Figure 10> Changes in International Students at doctoral level



Source: MoE (2015).

Secondly, academic corruption in Chinese higher education can also be identified at doctoral level. Earlier study indicates that corruption of doctoral education in China is especially evident in two aspects (Yang, 2015). One is that many universities spend a lot of money on 'public relations' or use their networking to influence reviewers who evaluate their application to provide doctoral programmes. Being allowed to grant doctoral degrees not only increases the university's revenues through recruiting self-financed doctoral students, but also makes it much easier for their academics to be promoted to professor or senior researcher. The following interview with a professor from Zhejiang University shows the negative impact from not using social networking or offering a bribe to key officials (Shen, 2004, 2007):

All of our professors were asked to use their 'public relations' and even to bribe any authority who might exert primary influence on whether our application for providing doctoral degree programmes could be approved or not. It is ridiculous that the amount of money sent by the discipline of history in one famous normal university in Shanghai to those key persons evaluating which discipline could be qualified to award doctoral degree has kept getting larger and larger every year. We do not send money to anyone concerned, so up to now, we cannot issue any doctoral degrees yet.



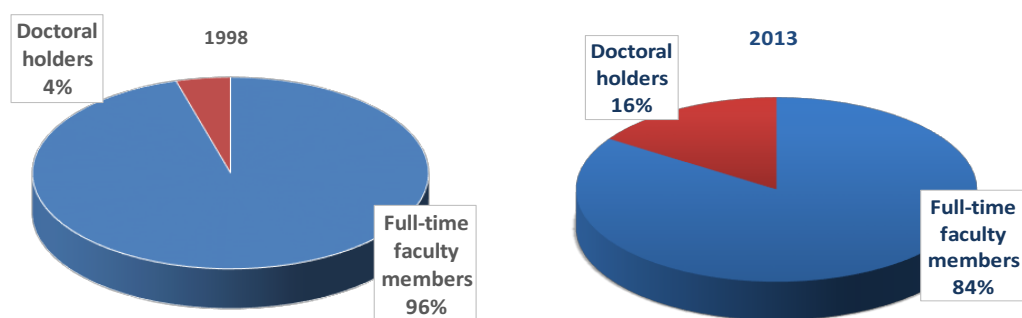
The other factor is the existence of a privileged class, which includes government leaders and businessmen, who seek doctoral degrees through either a contract or self-financed basis. There is ample evidence to show that they cannot give the necessary time or effort needed for doctoral study, nor fulfil the minimum requirements for graduation from a doctoral programme. This has contributed to an erosion in values and to the corruption of doctoral education.

Thirdly, with the dramatic increase in doctoral students, there has been a corresponding increase in the numbers of doctoral graduates seeking employment. The national data in Table 2 and 3 suggest that, despite a very high rate of employment in absolute terms, the percentage of job seekers increased from 12.6 per cent in 2012 to 14.4 per cent in 2013, and was as high as 20.2 per cent in 2014. Even in top universities like Peking University and Tsinghua University, as of 2014, the rate of unemployed doctoral graduates was 3.2 per cent and 2.4 per cent respectively. In a local university like Hunan University in Southwest China, the percentage of doctoral students who were not employed in 2014 reached 19.8 per cent.

Fourthly, some disciplines were unable to meet the minimum standards required in providing doctoral degree programmes. As a result, four universities were failed by the MoE in 2016 and are now no longer qualified to award doctoral degrees. Five universities have been asked to stop recruiting doctoral students for two years and to make improvements to their doctoral education in line with requirements set out by the MoE (Research Group of Year Report of China Degree and Graduate Education Development & Data Center of National Degree and Graduate Education, 2014).

Fifthly, although the percentage of full-time faculty members with doctoral degrees, especially in leading research-intensive universities, has increased, the percentage is still small compared with the US and Japan. As indicated in Figure 11, even though the percentage rose from 4 per cent in 1998 to 16 per cent in 2013, a huge majority of Chinese faculty members do not hold a doctoral degree. This will impact the quality of doctoral education even though there are much higher percentages of faculty members with doctoral degrees in leading universities in China.

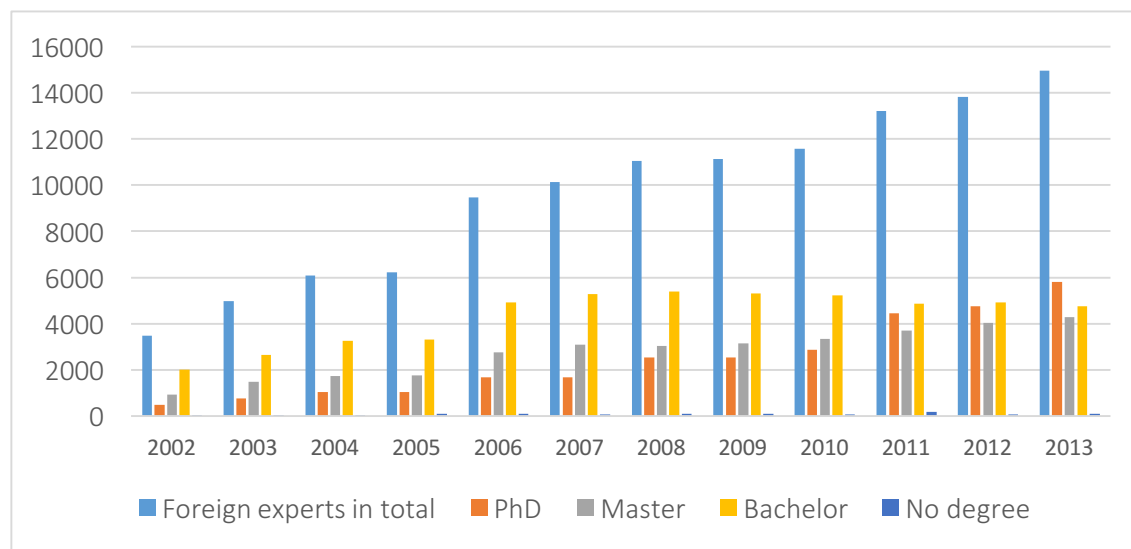
<Figure 11> Changes in Doctoral Degree Holders 1998-2013



Source: MoE (1999, 2014).

Finally, with the increased influence of economic globalisation and the growing international competition in higher education, the Chinese government has implemented several national projects in the early 1990s to attract international faculty members to Chinese campuses, particularly to leading or research-intensive universities. Attracting globally-famous international full-time academics enhances the status of their own academics, forms international academic networks, exposes graduate students and young academics to international perspectives, improves the university's global reputation, and raises its standing in the global university ranking systems. As shown in Figure 12, there has been a steady increase in international faculty working in Chinese HEIs, but the percentage of those international faculty members or experts with doctoral degrees is still low. At an institutional level, the percentage varies greatly, but even in leading universities it has not surpassed five per cent of the total.

<Figure 12> Changes in International Faculty members or Experts in Chinese HEIs



Source: MoE: *Yearbook of China's Education* 2003-2014 with author's modifications.

## Concluding remarks

This study suggests that although there is still evidence of the impact of Soviet ideas on the existing system of doctoral education, there is little doubt that China's doctoral education and training has become affected over time by the US model. This is especially true in relation to the role of coursework and quality assurance frameworks in doctoral education and training.

Secondly, until recently, as a result of the Soviet legacy, both HEIs and research institutes are involved in the provision of doctoral education, though there has been a drop in numbers of doctoral graduates from research institutes.

Thirdly, the priority of engineering, sciences and medicine, as well as rigid hierarchical structures of academic institutions has remained intact. However, with the implementation of market reforms, there has been a growth in the number of different types of doctoral candidates, and social sciences such as management, law, and economics have begun to occupy a larger share of the doctoral education sector in China.

Finally, various challenges confront Chinese doctoral education. Some are the result of the rapid growth of doctoral education; some stem from an increased marketisation or deregulation of government control of doctoral education; others appear to be caused by the lack of quality assurance mechanisms and the lower quality of full-time faculty members. Another issue might be that the level of Chinese doctoral education needs to attract more talented international faculty members to its doctoral programmes.

Major implications for research, policy and institutional practice include the following points:

- It is necessary to define *doctoral education and training* in a changing higher education landscape at both global and domestic levels. Much more efforts are required for China to establish quality assurance frameworks for its doctoral education at institutional and national levels based on its own national context and international trends in this regard.
- China needs to enhance the attractiveness of Chinese doctoral education internationally.
- It is expected that China should shift its doctoral education from a research-based model to a model more relevant and responsive to a changing labour market and increased global competitiveness without losing its core value of pursuing original research.

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Centre for Global Higher Education  
UCL Institute of Education  
London WC1H 0AL

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