

Confronting Challenges of Chinese Doctorate Education with Rapid Expansion

SHI Xiaoguang*

MA Yongxia**

NATSUME Tatsuya***

<Abstract>

Since the mid-1990s, China has witnessed a rapid massification of higher education including doctoral education. This article mainly consists of four parts, in addition to the introduction and conclusion. The second part describes the status quo of doctoral education in China, which includes the main achievement and configuration of the process. The third and fourth sections discuss the qualitative aspects of doctorate education – one of the major challenges confronting the Chinese doctorate given its astonishing growth. The authors analyze influential factors such as: governmental decrease of publically-funded expenditures, lack of adequate academic backgrounds of doctoral students, shortage of suitable guidance from advisors, and some flaws in training processes and procedures. The fourth part includes four possible initiatives to be undertaken for improving the quality and enhancing the competitiveness of doctorate education in China. In a sense, those initiatives, which are still under discussion, will indicate or determine? the future direction of doctorate education in China.

* Professor, Institute of Higher Education, Peking University, China Visiting Professor, Center for the Studies of Higher Education, Nagoya University

** Professor, School of Human & Social Science, Beijing Institute of Technology, China

*** Professor, Center for the Studies of Higher Education, Nagoya University

1. Introduction

The doctorate education as a significant portion of Chinese education system stands on top of the pyramid-shaped system. Since the mid-1990s, China has witnessed a rapidity of massification of higher education including doctorate education. This article, apart from describing the status quo of the doctorate education, would tend to shed light on the configuration, major challenges confronting the doctorate education, also will summarize the initiatives undertaken to improve the quality and enhance competitiveness of the doctorate education in China.

2. Configuration

The configuration of Chinese doctorate education is not what it was more than two decades ago. Particularly, since 2000 onward, the feature of doctorate education in China may also be described by a phrase—"the quantitative expansion with great speed", as the bulk of the doctorate education has been enlarged rather quickly, accompanying with the dramatic development and profound reform in socio-economic sphere, and with a realization of massification, privatization, and commercialization of the higher education. Whatever else it may be, both in terms of quantity or quality, that Chinese doctorate education lagged far behind many developed, even some developing countries worldwide two decades ago, but the today's doctorate education in China is reported as the largest system in the world in terms of enrolment, presenting some features as follows.

2.1 Quantitative Advantage

One of the most impressive features for Chinese doctorate education is marked with its astonishing growth. In quite prosaic terms, it is "big leap in twinkle". In a sense, the case extends far beyond a normal logic. According to Statistic of MOE, the enrolment of doctoral students has increased from 28,752 in 1995, to 222,500 in 2007. The later is as much 54 times as the former. With regard to the reward of PhD, the number of recipients has increased from 4,364 in 1995 to 41,400 in 2007. (Figure 1).

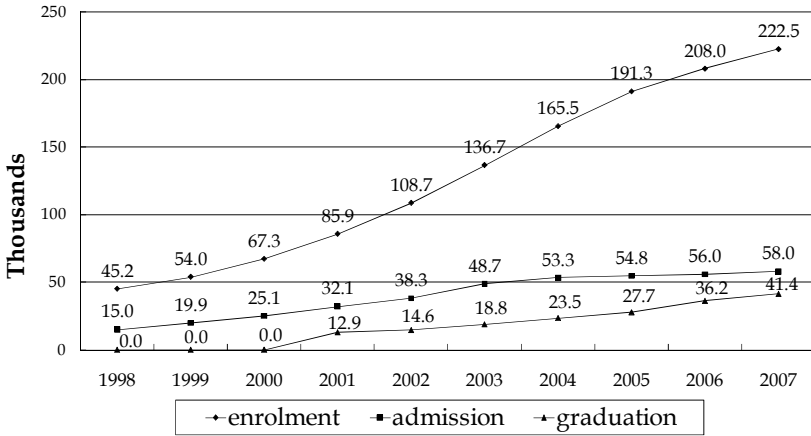


Figure1 Growth of Doctorate Education (1998-2007)

2.2 A Huge Institutionalized System

Another visible feature is that Chinese doctorate education system has been institutionalized in the last two decades. There are some evidences to illustrate the case. First, some authoritative administrations in charge of the graduate education (the doctorate education included) have been established. Those administrations are all governmental departments or agencies, such as ADC (the Academic Degree Commission, established in 1981) affiliated with the State Council, and operational procedure is confirmed and made use to accredit which organizations or units will have qualification to develop doctoral programs. As a result, there are 356 eligible organizations approved and allowed to develop the doctorate education. Among them, 260 bodies are universities nationwide, and the other 96 are research institutes affiliated with CAS (Chinese Academy of Science) and CASS (Chinese Academy of Social Science). Meanwhile, there are 1,676 programs developed and distributed in 1,361 areas of studies. Table 1 shows the distribution of officially-approved doctorate programs and fields of studies (Table 1). OAD (Office of Academic Degree affairs established in 1981), DGE (the Division of Graduate Education of MOE, established in 1982); the Working (functioning) office of graduate education

(1991) and DDMGE (the Division of Degree Management & Graduate Education established in 2004). Second, an environment of policy related to the doctorate education has come into being by constituting bylaws, statutes, regulations and rules. Third, certain benchmarks and operational procedure are confirmed and made use to accredit which organizations or institutions will have qualification of developing doctorate programs.

Table 1 Distribution of Doctorate Programs and Fields of Studies in China

Items Type	Fields	%	Ins.	%	Programs	%	Ins.	%
HEI	1,222	89.8	193	82.5	1,506	89.9	260	73.0
Academy	74	5.4	23	9.8	93	5.5	62	17.4
Other	65	4.8	18	7.7	77	4.6	34	9.6
total	1,361	100.0	234	100.0	1,676	100.0	356	100.0

Source: <http://www.cdgc.edu.cn:9090/xwwyh/detail.jsp?seq=99&boardid=93>

HEI=Higher Education Institutions Ins.=Institutions

2.3 Suppliers of Scientists and Academics

Generally, the doctorate education preparing PhD holders who will mostly become scientists, scholars or academics can play an important role in socio-economic development. According to Statistic of how many scientists or researchers who are now some ones responsible for the projects sponsored by the National Natural Science Foundation (NNSF) graduated and obtained PhD during the period from 2001 to 2006, the number of them has been increasing year by year so that the percentage has reached as high as over eighty percent of the totality of scientists in 2006 (Table 2).

Table 2 Number of PhD holders
in charge of National R & D Projects

Year	Total	Doctor	Master	bachelor	Other	Doctor (%)
2001	4,435	2,929	724	366	416	66.0
2002	5,808	4,041	950	461	356	69.6
2003	6,359	4,535	1,130	440	254	71.3
2004	7,711	5,872	1,132	480	227	76.2
2005	9,111	7,307	1,173	422	209	80.2
2006	10,271	8,493	1,189	407	182	82.7
Total	84,328	64,537	12,098	4,881	2,812	76.5

Source: <http://www.nsf.gov.cn/nsfc/cen/10yy/index.htm>

Another data can also indicate that the number of PhD holders who has been awarded the National Prize for Natural Sciences is increasing, because of their excellent performance and extraordinary contribution to the scientific development and the county's progress. Among the Prize grantees, the number of first contributors with doctoral degree increased year by year, from 45 percent in 2002 to 85 percent in 2007 (Table 3).

Table 3 Number of PhD holders
among the totality of National Prize for Natural Sciences

Year	Number of Prizes	First Author & Doctor	(%)
2002	24	11	45.8
2003	19	11	57.9
2004	28	15	53.6
2005	38	30	79.0
2006	29	20	69.0
2007	39	33	84.6
Total	177	120	67.8

Source: report, unpublished

From the table 2 and 3, we can observe that those who have completed their doctorate education and earned the doctoral degree are becoming the most leading forces in the development of science and technology in China. Therefore, the doctorate education is providing a great deal of intellectual supports with its producing potential scientific forces.

Not only has the doctorate education produced many potential scientific forces but also prepared numbers of academic who are conducting teaching, research and social service in the Institutions of Higher Education. From the table 4, it can be seen that there were just 3,882 faculty with the doctoral degree, taking up one percent of the total number of faculty in 1990, but the number increased to 108,605, taking up 10 percent of total faculty in 2006. As a result, more and more PhD recipients who have preferred to take posts of teaching and research at the Institutions of Higher Education has made it possible to enhance a level of the qualification of faculty's group.

Table 4 Faculty's Quality of Academic Degree by level

Year	Total	Doctor		Master	
		N.	%	N.	%
1990	394,567	3,882	1.0	73,467	18.6
1992	387,585	5,404	1.4	69,433	18.0
1993	387,808	6,583	1.7	73,690	19.0
1994	396,389	8,691	2.2	77,293	19.4
1995	400,742	10,443	2.6	81,420	20.3
1996	402,469	12,532	3.1	85,775	21.3
1997	404,471	15,500	3.8	90,491	22.3
1998	407,253	18,921	4.7	94,228	23.1
1999	425,682	23,136	5.4	100,492	23.6
2000	462,772	28,228	6.1	108,210	23.3
2001	531,910	34,853	6.5	121,546	22.9
2002	618,419	43,442	7.0	149,392	24.2
2003	724,658	53,612	8.0	182,517	25.2
2004	858,393	70,487	8.2	223,860	26.1
2005	965,839	88,450	9.2	269,003	27.9
2006	1,075,989	108,605	10.0	317,823	29.5

Source: CYBEB, 2007. N=Number

3. Qualitative Concerns

Concerns about qualitative issue are “hot topic” in both public communities and academic circles. Along with the rapid growth in terms of the enrolment and scale, the issue of quality assurance becomes one of the most perplexing challenges to the doctorate education. Several studies have recently come to the conclusion that the quality of the doctorate education is deteriorating (Qiao, 2007, Zhou, 2007). According a survey conducted by the research group of Peking University in 2004, about 47.8 percent of doctoral advisors considered the quality of the doctorate education as the “Unsatisfactory” (Min, 2006). In 2007, the Office of Academic Degree organized the Task Force to conduct the investigation nationwide. Its primary conclusion from the investigation has proved that the qualitative problem has posed the greatest challenge to Chinese doctorate education.

First, academic level of the doctoral dissertation is not still desirable and satisfying. Particularly in terms of the original contribution of dissertations. According to the questionnaire with the one of questions: “*What do you evaluate the dissertation for its original contribution?*” about sixty percent of interviewees who are, either advisors or administrators both gave it an evaluation with “Mediocre”. (Report, 2008) Moreover, if compared with the counterparts in other developed countries, the original contribution of the academic dissertations in most fields was really lower (Table 5).

Table 5 Original Contribution of Dissertation Compared with Overseas Counterparts (the parameter of overseas dissertations assumed as 1)

	HS	SS	NS	E	AGR	M	ADM	Total
Original contribution	1.1	1.1	0.9	0.8	0.6	0.6	1.0	0.8
Problem- solving	1.1	1.0	0.9	1.1	0.9	0.9	1.0	1.0
Revision theory	1.0	1.5	1.0	1.2	1.0	1.0	0.5	1.1
Theory-copying	1.3	1.0	1.1	1.1	1.2	1.3	1.0	1.2

Source: Report Unpublished,

HS=Human Science, SS=Social Science, NS=Natural Science, E=Engineering,

AGR=Agriculture, M=Medicine, ADM=Administration

Second, the research capacity of doctoral students needs enhancing. Although the number of the publications on academic journals, international and national, which are contributed by the doctoral students has increased fast from 2000 to 2006 (see table 6), however its quantitative growth of the publication did not change the disadvantageous status and marginal situation, particularly in the fields of natural science. The evidence is that both the Impact Factor and the Citation Rate of the publications are rather lower, and that their knowledge contribution is limited worldwide. Taking the SCI for instance, a statistic based on 17 institutions indicates that there have been 28,837 articles on 9,563 sorts of academic journals (cited by SCI), contributed by doctoral students from 2000 to 2006. The problem is that there are only 3,937 articles published on the top 20 academic journals, only taking 12.6 percent of the totality, and more than one third (34.5%) of them were published in Chinese version or on Chinese Journal (see the table 7).

Table 6 Articles published by doctoral students by types (2000-2006)

Year	SCI		EI		ISTP	
	Total	Per.head	Total	Per.head	Total	Per.head
2000	5,165	0.46	3,314	0.30	805	0.07
2001	7,670	0.57	5,001	0.37	998	0.07
2002	6,406	0.45	4,410	0.31	851	0.06
2003	8,675	0.48	6,126	0.34	1,486	0.08
2004	11,570	0.52	9,212	0.41	2,317	0.10
2005	15,674	0.57	13,795	0.50	3,133	0.11
2006	28,837	0.86	22,995	0.69	6,046	0.18

Source: ADC, 2007

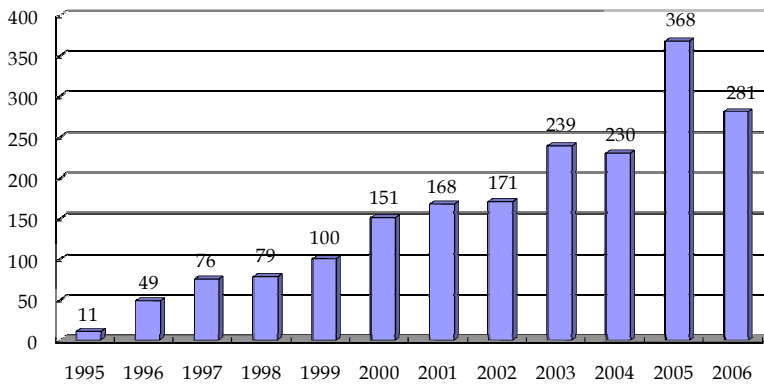
Table 7 Distribution of articles on the top 20 and its Impact factors in 2006

NO.	Title of Journals	N	IF
1	Acta Physica Sinica(in Chinese)	494	1.051
2	Chinese Physics Letters (in English)	378	1.276
3	Applied Physics Letters	345	4.308
4	Chemical Journal of Chinese Universities (in Chinese)	287	0.771
5	Chinese Science Bulletin (in English)	274	0.783
6	Journal of Crystal Growth	262	—
7	High Energy and Nuclear Physics (in Chinese)	246	0.271
8	Acta Chimica Sinica (in Chinese)	194	0.845
9	CA Chemical Analysis	180	0.397
10	Chinese Physics (in English)	163	1.256
12	J. Phys. Chem. B	151	—
13	Acta Metallurgica Sinica(in English)	148	0.366
14	Materials Letters	140	—
15	Spectroscopy and Spectral Analysis	140	0.557
16	Chinese Journal of Polymer Science	138	0.383
17	Journal of Catalysis	138	0.665
19	Acta Physico-Chimica Sinica	132	0.427
20	Phys. Rev. B	127	—
Sub-total		3,937	
Total		31,278	
Percentage		12.6	

Source: Task Force,B,2008,N=Number, IF= Impact Factor

Third, the internationalization of Chinese doctorate education is quietly inadequate, which indicates that Chinese doctorate education still lacks of competitiveness globally. From the Figure 2, we can see that the number of international students who are pursuing Chinese doctoral degree is very small, and only around 230 persons can be granted the doctorate annually. Such situation is impossible to be compared with the case in Western developed countries. That also indicates that the quality of the doctorate is

still lagging behind the international level.



Source: MOE, Educational YearBook, 2007

Figure 2 Numbers of PhD of Granting for International Students (1995-2006)

4. Negative Factors

The current negative evaluation has highly caused some concerns and anxiety for policy-makers, university administrators, education leaders and doctoral advisors. Numbers of publications has discussed about what forces are impacting on the quality (Li, 2007, Li and Wu, 2008). Objectively, the reasons are various, but some impacting forces are acknowledged by mostly.

First, the governmental incapacity of increasing more public expenditure in the doctorate education after the rapid expansion in its enrolment is perhaps the most disadvantageous factors impacting on the quality. For great access to the doctorate education has been realized in the case of limited input of public expenditure. Taking the R &D expending for instance, the table 8 shows that the distributive percentage of the national R & D expenditure didn't lean to those institutions of higher education which the commitment of producing the doctorates are taken, although their scale of the doctorate education had been rapidly enlarged. No doubt, it leads to the quality of the doctorate education to be impaired.

Table 8 Distribution of national R & D expenditure unit (billion. RBR)

year	Num.		Institutes affiliated with Enterprise		Institutes affected with Gov.		IHE	
	Total	%	Sub-Total	%	Sub-Total	%	Sub-Total	%
2000	89.57	100	54.06	60.3	25.82	28.8	76.60	8.6
2001	104.25	100	63.00	64.7	28.85	24.1	10.23	7.2
2002	128.76	100	78.78	66.9	35.13	23.2	13.05	7.6
2003	153.92	100	96.02	62.4	39.90	25.9	16.23	10.5
2004	126.63	100	131.40	66.8	43.17	22.0	20.09	10.2
2005	245.00	100	167.38	68.3	51.31	20.9	24.23	9.9
2006	300.31	100	213.45	71.1	56.73	18.9	27.68	9.2

Source: Chinese Annual Finance Bulletin on Science and Technology, 2000-2006

Second, the academic background of doctoral students becomes worse than before. According to the investigation conducted by the research group of Peking University among some advisors in some leading universities in 2004, about 40.9 percent of them thought that the doctoral students' academic background has tended to be degenerative (*Report, unpublished*). There are three evidences which may prove the case—(a) applicants for doctoral programs from the leading universities are less than thirty percent of the totality; (b) The admission rate of the programs has averagely increased from 2.1 percent in 1982 to 23.3 percent. It means that an applicant will be more easily admitted in a program than before; (c) the “inbreeding” phenomenon becomes common, for more and more applicants are selected from the programs they obtain the Master Degree.

The reason why the situations above occurred is complicated. On one hand, partly because the employment situation is getting extremely severe so that many promising candidates would enter into the job market as early as possible rather than take the opportunity to a further study. On the other hand, because of the vexing phenomenon of “Brain drain” which results in an embarrassment state in the process of admission. Many institutions find themselves in the competition of looking for the most promising applicants (graduates) with their master degrees, who either prefers to shooting for a possibility of studying abroad, or a desirable workplace.

Third, a shortage of suitable guidance of advisors' is another factor directly impacting on the quality improvement. Because of the rapid expansion of the doctorate education, the ratio of advisor-students increases. As a result, the advisors' workload has got overloaded. A survey conducted among the doctoral students in 2004 found that more and more doctoral students began to complain about their shortage of suitable guidance from the advisors. It revealed that more than 37.1 percent of advisors could only provided students with guidance once per month (Hou and Guo, 2005).

Forth, some flaws of training process and procedure are considered as a cause of the negative influence on the doctorate education. Those flaws are included as follows: (a) the selection and admission lack of a flexible system so that some promising candidates can not be accepted into the programs if they fail to pass contain subjects of the written exams; (b) the schooling length and year-based fellowship system are regulated rigidly so that both the advisors and doctoral students would rather debase a standard of the dissertation (or allow them to focus on some easier issues) than risk delaying the graduation. For the prolonged graduation might bring them about more headache, even in Chinese context, it might result in some negative evaluation to the students in their future professional career; (c) the relationship between advisors and students seems to be linked by some interests (seemingly, alike a kind of employment—which employers use money to buy employees' work), so that many doctoral students loss freedom of selecting an issue or a theme that they are interested in for their dissertation. Instead, some of them have to subject themselves to commit on the current projects their advisors are in charge of, (d) a deficient fellowship of the doctoral students can hardly guarantee them to have full heart for the studies as they have to think too much about making money to survive. According to the data of National Bureau of Statistic, the doctoral students' fellowship subsidy from governments is average YMB 280 per month, which is lower than the Urban Minimum Living Guarantee (average YMB 330) in 2007 (Report unpublished). As Professor Xu Zhihong, President of Peking University observed "the material amenities for the doctoral students are too low to let them full

heart for the pursuit of their doctorate. Since some of them have to spend on doing a part-time job, their school work is more or less affected” (Guo Shaofeng, 2007).

5. Future Directions

Abraham Lincoln used to comment that “If we could first know where we are and whither we are tending, we could then better judge what to do and how to do it” (Russell I. Thackrey, 1971). The phrase is a fitting introduction to a discussion of future directions of the doctorate education, for today’s doctorate education in China is at a crossroad. So we deem it timely to reconsider “what the future directions might lay before Chinese doctorate education”. There are some future possibilities that ought to be paid attention to.

The possibility One: It may be witnessed that some initiatives will be carried out in order to improve the quality of the doctorate education: (a) newly developed doctoral programs will be approved under a competitive procedure than before; (b) the numbers of doctoral students for an advisor to accept will be strictly limited in no more than 1 or 2 annually; (c) Comprehensive evaluations for the doctorate education will be periodically conducted by external or internal sides of universities; (d) the original contribution of a dissertation will be highly expected and encouraged.

The possibility Two: numbers of academic doctorates ought to be controlled but the professional doctorate needs speeding up in the near future because of some new changes of the employment for PhD recipients. The Statistic indicates that the academic posts in academic communities, such as universities, institutes have decreased from 61.1 percent in 1995 to 38.5 percent in 2006. On the contrary, the posts at other non-academic public sectors, such as governments, middle and high schools, and enterprises have increased from 5.6 percent to 16.7 percent during the same period. The case requires the institutions promptly responsive to the changing environment.

The possibility Three: More public funds will be expected to invest in the doctorate education increasingly, partly because the public expenditure in

the doctorate education will keep increasing while its scale of enrolment will be effectively controlled in the coming years. Once the public input increases, the current state of the doctorate education will be greatly improved. The additional expenditure might be used: (a) to improve some facility and infrastructure such as classrooms, Labs, resource centers, which are necessary for advancing teaching and research, (b) to increase the R & D fund will be allowed to spend on the bonus, subsidy and other treatments; (c) to enhance the standard of the fellowship that is important for doctoral students, (d) to set up some special programs available for doctoral students to conduct their research at some prestigious universities domestic and abroad for one year.

The possibility Four: Further reforming the doctorate education will be done in order to reshape a more flexible system including the schooling length arrangement, admission procedure, curricular design and dissertation requirement and so on. In details, it is visible that percentage of the doctoral students selected directly from the Master Programs will be enhanced greatly, which indicates that the Master degree is no more than precondition for those who are pursuing the academic doctorate.

6. Conclusion

The development of doctorate education in China over the last two decades has many complex and multidimensional implications. It is clear that the acclaims vs. criticism retrospect vs. prospect about the doctorate education signals for ending an age of simply quantitative pursuit and beginning with a period of claims for both the quantity and quality.

For a start, China has succeeded in shaping the entire system of doctorate education, from nothing in the early 1980s to something in the later 2000—namely the system of Chinese doctorate education is not what it was any more. As Chinese doctorate education has been making efforts to introduce the Western Model, norm as well as ideas, combining them with Chinese traditional ones for less than three decades. Up to now, it becomes the largest system worldwide in terms of its enrolment. In a sense, Chinese doctorate education has a good reason to display its achievement as

proudly as a peacock. Generally the achievement of Chinese doctorate education has been characterized by three aspects: First, a huge of productivity of the doctorate has not only attached an importance to the Institutions of Higher Education as suppliers of human resource, but also enhance the competitiveness of the Nation; Second, standards and conditions of the doctorate education have moved and continue to advance from a lower level toward a higher level of accomplishment; Third, the development of the doctorate education is mirroring the whole socio-economic progressive moves in the past twenty years.

Following with that, however, the doctorate education is being exposed with some severe problems essential to deal with. First, China is a populous nation with one of the largest (naturally) but not one of the strongest systems of the doctorate education; with one of the biggest sources but not one of the most desirable destinations of the oversea doctorate education. It means that Chinese doctorate education still lags far behind that of many developed Nations, as makes China--the largest developing country, can not help but suffer from the "brain drain", even though it is said that it also benefits from the "brain exchanges" at the age of the economic globalization and internationalization of higher education. It ought to be realized that the comparatively advantage of scale in terms of the enrolment does not make any sense sometimes. Second, the qualitative issue of the doctorate education is under question. Some say that it is a bad fruit of the rapid expansion with pursuit of quantity over quality, but others argue that it is not. No matter what it is, it is a time for Chinese doctorate education to speed down, and reconsider what it has done. This does not mean an attitude of the negativism but criticism, for the criticism is equivalent to the negativism. The criticism is a kind of reflection that is helpful to our concerns about the doctorate quality. We are in an age of the reflection, in which something is worth of reflecting.

In the end, we believe that Chinese doctorate education is confronting an unprecedented opportunity and challenge with a knowledge-based global economy and internationalization of higher education. At the crossroad of the future direction, although Chinese doctorate education doesn't necessarily stop moving forward, but indeed necessarily take a

break and have a look to recognize what the future possibility is ahead. Just as an old saying in China expressed, “grinding a reaphook before a harvest doesn’t mean doing useless work”. It reminds us of what we put it on the top agenda today to place a priority on quality over quantity is in favor of a tomorrow’s faster and better progress. We believe that if China maintains socially and economically stable in the coming years, its doctorate education will become not only one of the largest, but also the strongest systems worldwide. If it can progress steadily, step by step, it will certainly benefit the Nation as well as its people.

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中国における大学院博士課程の拡大と 直面する課題

施 曉 光*
馬 永 霞**
夏 目 達 也***

—<要 旨>—

1990年代半ば以降、中国の高等教育人口は急激な勢いで拡大し、博士課程の規模も拡大するに至った。本稿は4つの節からなる。第2節では中国における博士課程教育の現状を観察し、その形態や普及状況について述べる。第3節では博士課程教育の質的な変化に注目する。すなわち、博士課程教育の驚異的なペースでの拡大によって、どのような諸課題が生じているかを考察したい。具体的には、予算に占める政府支出の減少、学生の基礎学力低下、研究指導の不十分さ、コースワークや手続き上の未整備などの問題が挙げられる。第4節では、中国における博士課程教育の質向上と競争力強化のために4つの方策を提言する。これらの提言はまだ議論の段階にすぎないが、一定の方向性を示した上で意義があると思われる。

*北京大学教育学院・教授

名古屋大学高等教育研究センター・客員教授

**北京理工大学教育研究所・教授

***名古屋大学高等教育研究センター・教授