

## The diversification of doctoral students in Japan and its policy implications

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### Abstract

The number of students entering doctoral programs reached its peak of 18,232 in 2003, but the number has continued to drop, resulting in 14,903 doctoral students in 2019. There is an array of reasons for this trend, including dismal career opportunities after graduation and financial burdens during and after study. Under this trend, the ratio of non-traditional students tripled to 42.3% in 2019 from 14.6% in 2000, while that of traditional students declined to 9.2% in 2019 from 15% in 2001. Further, NISTEP (2022) reported that 53.7% of students who completed doctoral programs in 2018 were non-traditional students, and it was the first time that the number of non-traditional students exceeded that of traditional students since NISTEP's survey began in 2014. NISTEP (2022) points out that a paradigm shift has been occurring in doctoral education in Japan beyond simple student diversification.

This article firstly overviews the policy changes and trends of doctoral education in Japan; secondly, it analyzes the change of the breakdown of doctoral students and its reasons, and finally, it concludes with future prospects for doctoral education in Japan.

Keywords : Doctoral education, Japan, non-traditional student, diversification, recurrent education

### 1. Introduction

The Japanese government has been consistent in their policy that Japan needs high quality human resources who can produce new knowledge, innovations, and values in the age of the knowledge economy and the globalized world. Therefore, in the last three decades, doctoral education has been high on the agenda of the government's education policy and reform. During this period, the number of doctoral students steadily increased, but it has been stagnant recently. More importantly, the composition of doctoral

students has diversified, which would impact Japan's doctoral education policy.

There is a limited amount of research on Japanese doctoral education, and they tend to focus on traditional (young) doctoral students slated as an important cadre of researchers for Japan's competitiveness in science and technology (Arimoto, 2018; Huang, 2020). Other studies focus on the satisfaction and career perspectives of doctoral students or international students in STEM (science, technology, engineering, and mathematics) fields (Fukudome, 2011; Shigeta, 2008; Ryan & Hakamata,

2015). While the analyses and assessments of doctoral programs in Japan are rather sporadic, the National Institute of Science and Technology Policy (NISTEP), part of MEXT (Ministry of Education, Culture, Sports, Science and Technology), released three significant survey reports in 2015, 2018 and 2022 (NISTEP, 2015; 2018; 2022). Both are fundamental and in-depth surveys of students who graduated from Japanese doctoral programs. In 2012, 2015 and 2018, they surveyed doctoral program graduates regarding their graduate program experiences and their employment after finishing programs (with or without a doctorate).

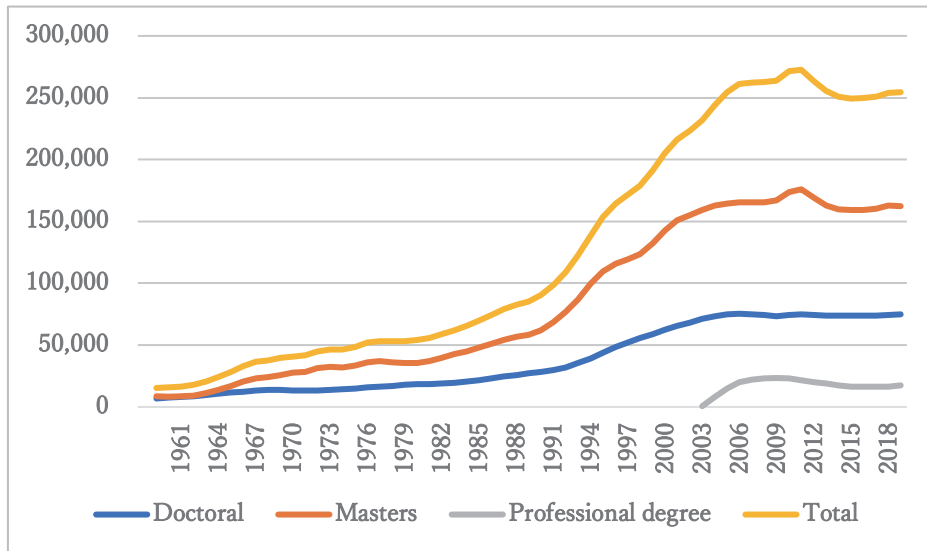
In this context, firstly, this article overviews the policy changes and trends of doctoral education in Japan; secondly, it analyzes the change of the breakdown of doctoral students and its reasons, and finally, it concludes with future prospects for doctoral education in Japan. Data was primarily retrieved from MEXT statistics, NISTEP survey reports, and other governmental information. Numbers used in the data included four categories of doctoral students: i.e., (1) entrants to doctoral programs, (2) students registered in doctoral programs, (3) students who completed doctoral programs (“graduates”), and (4) students who earned doctorates. This paper distinguishes among these four types. In addition, in this paper, “traditional student” refers to a student who directly enters to doctoral program from a master’s or bachelor’s program, and “non-traditional student” is defined by MEXT as a student who (1) holds an income earning full-time position, (2) retired from an income earning full-time position, or (3) is a professional wife or husband. In most OECD countries, there is no distinction of traditional or non-traditional because in these countries it is common to start doctoral programs at the age of 27-8 after work experience. In the United States, non-traditional students usually refer to undergraduate students above age 25, and there is no distinction of traditional or non-traditional at the graduate level.

## 2. Policies and trends of doctoral education in Japan

In Japan, doctoral education was first institutionalized at imperial universities (*teikoku daigaku*) in 1886 by importing a model directly from the United States, although the German model had a great influence on Japan during both the pre- and post-WWII periods. The current graduate school system in Japan was established in the post-WWII period under the guidance of the GHQ (General Headquarters), the American occupation forces. From the post-WWII period to the 1980’s, the number of doctoral students rose from about 1,000 to almost 10,000 in 1990. During the same period, the goal of doctoral education expanded from producing future professors to educating future corporate researchers and lifelong learners (Arimoto, 2018).

The development of doctoral education policy in the last three decades can be divided into two distinct periods (Huang, 2020). The first one is 1991-2000 with the focus on quantitative expansion, and the second is from 2005-present with emphasis on quality improvement. In 1991, the doctoral education policy had a drastic turn when the new policy took effect. The University Council, an advisory body to the Minister of Education, Science, Sports and Culture, recommended to the Minister that the capacity of graduate schools as of 1991 should be doubled by the year 2000 in order to produce talent who would serve as university faculty, researchers, and other roles (University Council, 1991). Ichikawa & Kitamura (1995) argue that this recommendation was formulated mainly to benefit universities by recruiting more graduate students for stable university management under the lowering birth rate, while neglecting the low demands of the society and private sector for graduate degrees. As a result of the new policy based on this recommendation, the quality of graduate education became diverse across universities and programs, leading to low/no recruitment of students and poor completion rates at

Figure 1: Number of all graduate students by degree program, 1959-2018



Source: MEXT (1961-2019)

some graduate schools and programs.

In 2005, the Central Council of Education proposed to the Minister of the MEXT that the policy of quantitative expansion of graduate schools with numerical targets since 1991 should be suspended, so that graduate schools could streamline, systematize, and “substantiate” their program structures for the benefits of graduate students. “Substantiate” meant that 1) learning outcomes of doctorates should be delineated in terms of knowledge, skills, and attitude, 2) doctorates should be awarded upon the completion of a doctoral program, and 3) a coursework system should be constructed for systematic knowledge base (Central Council of Education, 2005).

Nonetheless, the number of graduate students steadily increased until 2011, but in 2012 it started to decrease largely due to students’ concern over the shortage of available positions for doctoral degree holders both in academia and the private sector. To contend with this issue, MEXT has been suggesting to universities to guide students to choose careers outside academia and to develop transferrable skills for

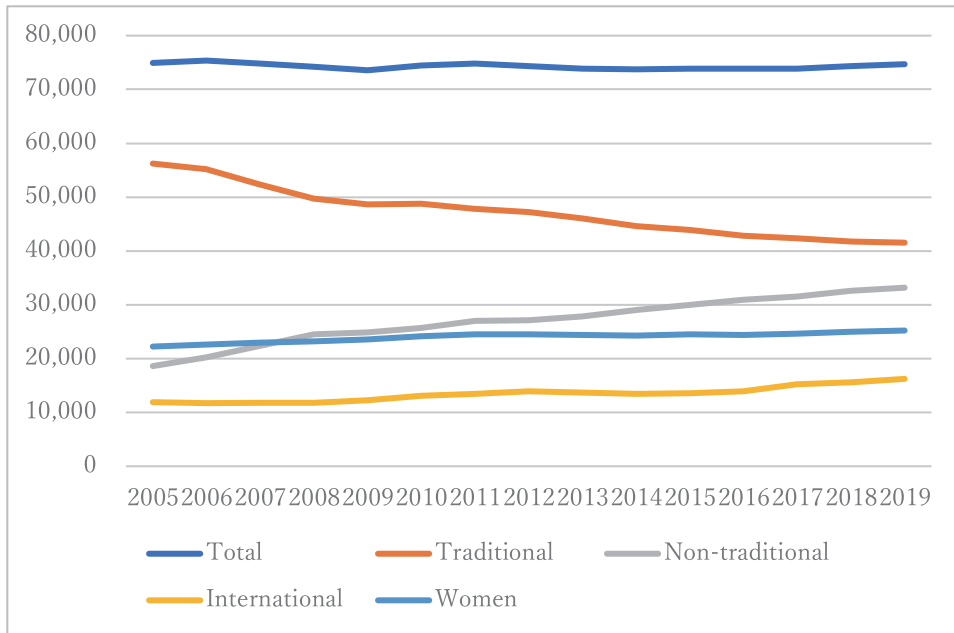
non-academic positions (Central Council of Education, 2018; Science/Technology & Academic Council 8th Talents Committee, 2017).

### 3. Trends of doctoral students

#### (1) Increase to stagnation

The government’s changing policies in doctoral education produced more or less expected outcomes. Figure 1 indicates the numerical changes of graduate students by degree level over the last 60 years. It shows a gradual increase from 1959, and that from 1991 when a new graduate school promotion policy took effect to 2018, the number of total graduate students increased by 2.6 times from 98,650 to 254,013. During this period, the number of doctoral students also rose by 2.5 times from 29,911 to 74,711, and it was stagnant between 2012 and 2018 with around 74,000 students annually. However, looking at the last decade, the numbers of master’s and professional degree students have been on the decline, while that of doctoral students has been stable

**Figure 2: Number of traditional, non-traditional, international and female doctoral students, 2005-2019**



Source: MEXT (1961-2019)

or stagnant, resulting in the downward trend of all graduate students.

As the number and the capacity of doctoral programs have increased, the number of students entering doctoral programs has also increased from 8,505 in 1991 to 18,232 in 2003 showing a 21% increase. However, since 2003 at its peak, the number has continued to drop, resulting in 14,903 doctoral students in 2019 resulting in a 16% decrease from 2003 (MEXT, 1961-2019).

## (2) Student diversification

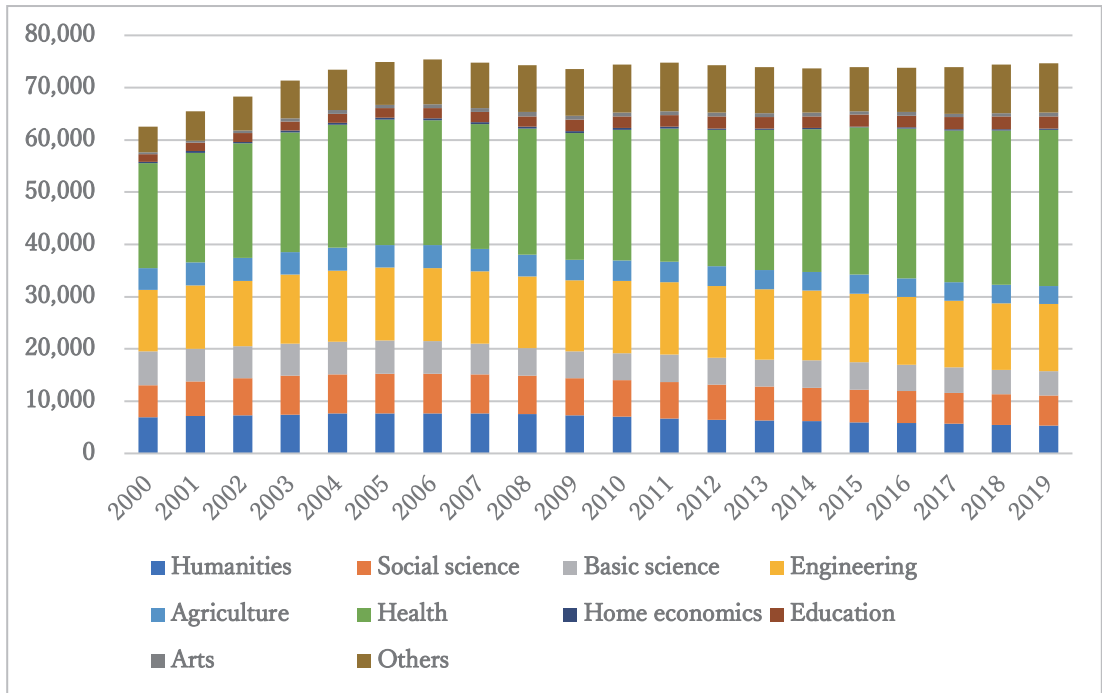
According to Figure 2, in the last 15 years, the composition of doctoral students has diversified, opening doors to non-traditional students. Only the number of traditional students has decreased among all doctoral students. The number of traditional students fell sharply by 26%, and their share among all doctoral students shifted from 75% to 56%. In contrast, the

number of non-traditional students increased by 78% and their share increased from 25% to 44% (MEXT, 2005-2019).

Regarding international students, its number has been on the rise, and its share among all doctoral students has increased from 16% to 22%. OECD (2019) states that the share of international doctoral students for degree in Japan was 17.8%, which was below 22.0% as the OECD average. Its shares in the United Kingdom and the United States were 42.1% and 25.9% respectively. In the case of women (including traditional, non-traditional, and international students), its number has been rising, and its share has increased from 30% to 33% during the same period.

According to MEXT (1961-2019), among the entrants to doctoral programs, the ratio of non-traditional students tripled to 42.3% in 2019 from 14.6% in 2000, while that of traditional students declined to 9.2% in 2019 from 15% in 2001. Further,

Figure 3: Numbers of all doctoral students by academic field, 2000-2019



Source: MEXT (1961-2019)

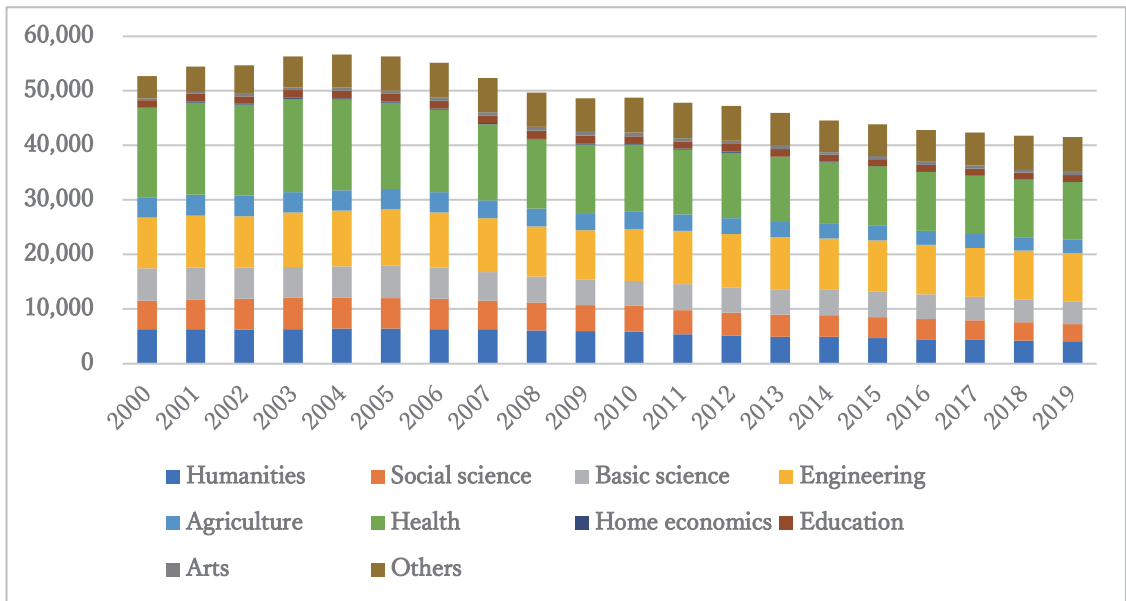
NISTEP (2022) reported that 53.7% of students who completed doctoral programs in 2018 was non-traditional students, and it was the first time that the number of non-traditional students exceeded that of traditional students since NISTEP’s survey began in 2014. NISTEP (2022) points out that a paradigm shift has been occurring in doctoral education in Japan beyond a simple student diversification.

Non-traditional students increased in number over the year, because they sought to upgrade their knowledge and skills and were attracted to flexible programs such as correspondence programs, night programs, long-term graduate programs which were specifically developed for them, as well as government scholarships which made continued study available to them. On the other hand, doctorates were found not so attractive nor useful in employment to the increasing number of traditional students. Over time, it

became more difficult for doctorates to find a position in academia. There has been a shortage of research positions at universities and research institutes, and if doctorates luckily find positions, those positions are often unstable with non-full-time status because competitive grants fund term-based positions more frequently. In addition, many traditional students find it easier to be employed with a master’s degree than a doctorate, especially in STEM fields, and students tend to think doctoral study would saddle them a huge financial burden in view of weak financial support (Arimoto, 2018; Fuang, 2020; NISTEP, 2015: 2018: 2022).

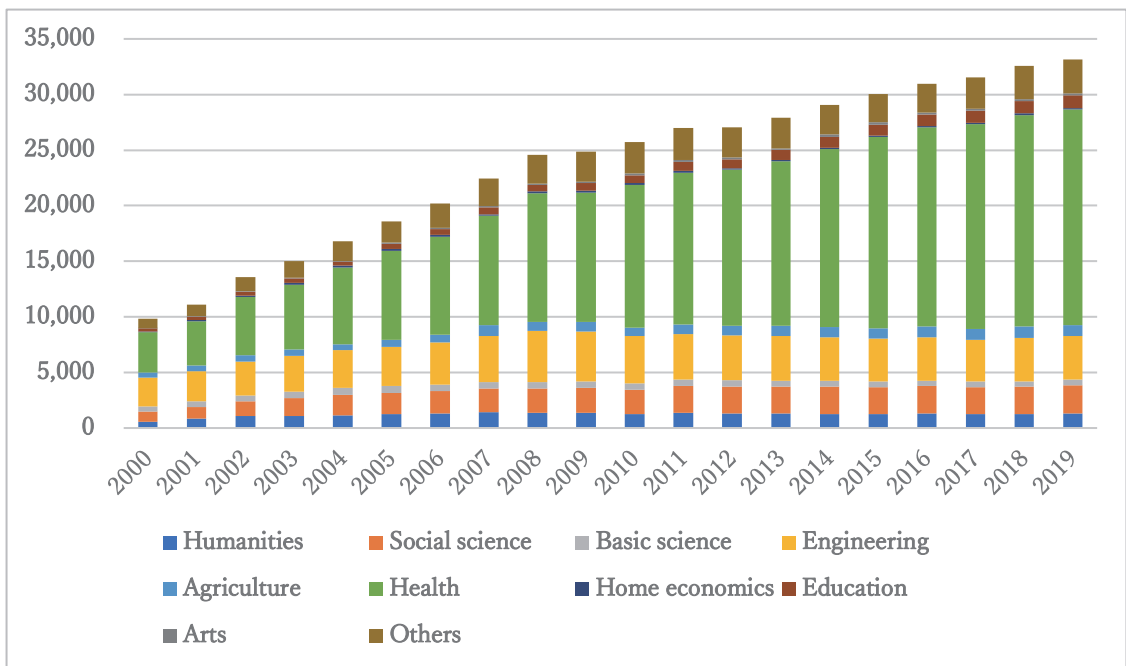
Figure 3 demonstrates that in the last two decades while the doctoral students in health fields showed a strong increase of 49%, there has been a gradual decrease in basic science, agriculture, social science, and humanities.

Figure 4: Number of traditional doctoral students by academic field



Source: MEXT (1961-2019)

Figure 5: Number of non-traditional doctoral students by academic field



Source: MEXT (1961-2019)

Data is also available to compare traditional and non-traditional students (Figures 4 and 5). Comparing traditional and non-traditional students in doctoral programs, even though the number of traditional students has been declining in health fields (medicine, dentistry, pharmacy, and health science) in particular, the number of non-traditional students has been steadily on the rise for the last 2 decades, especially in health fields.

In 2019, more than half of non-traditional students were in health fields. It is considered that this drastic increase was mainly caused by the policy change which made it possible for resident medical doctors to attend doctoral programs during residency. Doctorates in medicine are sometimes required not to become researchers, but rather to be recognized as a specialized or certified medical doctor, or to secure positions at university hospitals (NISTEP, 2022).

#### 4. Conclusions

Since 1991 the government has promoted the dramatic numerical increase of doctorates through expanding doctoral programs. Indeed, doctoral education has expanded and the number of doctorates rose in the first 20 years, but the number of doctoral students and doctorates have been declining in the last 10 years. The 1991 policy succeeded in the beginning, but a turning point came when the policy shifted from quantity to quality. It was at that time that students in doctoral programs began to become more diverse in their backgrounds.

Imazu (2020) uses the terms “linear type” student and “recurrent type” student respectively referring to traditional and non-traditional students, and points out that the current doctoral education in Japan serves both groups with almost the same share of 50%. The diversification began in 2005 and the share of traditional students is reaching less than 50%. Doctoral education policy needs to adjust to this new

reality.

MEXT recently emphasizes policies of recurrent education, re-learning, and lifelong learning, but it appears that priority is still given to young traditional students as future researchers. In fact, NISTEP (2022) illustrates voices of non-traditional doctoral students hoping to be given opportunities equal with traditional students in terms of academic advising, research grants, financial support, career support, etc. Other than NISTEP data, there is almost no literature on non-traditional doctoral students. Substantial empirical research is needed to better understand their needs including their aspirations to be researchers. It would lead to constructing new doctoral education policy to deal with the new reality.

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## 日本の博士学生の多様化と政策への意味合い

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### 要旨

日本の博士課程への入学者は、2003年度に18,232人とピークを迎えた後は2019年度には14,903人に減少してきている。その要因としては、任期付などの雇用条件の不安定さなど博士号取得後のキャリアが見通せないこと、翻って修士号取得後のキャリアの確実さ、在籍時の経済支援の不足などが指摘されている。修士課程などから博士課程に進む大学院生（「課程学生」）の割合も長期的に減少してきており、2001年の15%から2019年の9.2%になっている。一方、学校基本調査によれば、社会人が博士課程入学者に占める割合は2000年の14.6%が2019年には42.3%と3倍に急増している。文部科学省科学技術・学術政策研究所（2022）によれば、博士課程入学者に占める社会人経験者の割合が過半数を超え（53.7%）、これは同研究所が調査を始めた2014年以来初めてである。日本の博士課程には単に学生の多様化という表現では捉え切れない大きなパラダイムシフトが起きていると指摘している。在学者の割合で見ても、2005年と2019年の間で、博士課程全体に占める割合は社会人が25%から44%に増加した一方、課程学生が75%から56%に減少している。本稿では、この博士人材追跡調査を含むコロナ禍前の2019年までのデータを元に、近年の日本の博士教育の政策と実際の動向の中における在籍者の内訳の変化の要因と、これらの変化がもたらす日本の博士教育の役割への影響を探る。

キーワード：博士教育、日本、社会人、多様化、リカレント教育

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