

The Fifth Report of the Japan Doctoral Human Resource Profiling Project
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Abstract

In the context of rapidly evolving social and economic conditions, strengthening scientific and technological capacity and innovation, which underpin sustainable economic growth, has become an urgent policy challenge for advanced economies. In particular, the development of doctoral-level human resources who lead research and development is widely recognized as one of the most critical policy issues. Japan's Seventh Science, Technology, and Innovation Basic Plan also sets forth objectives such as fostering an environment in which early-career researchers can pursue active careers across a wide range of sectors, including academia, industry, and government, and promoting initiatives to support diverse career paths for doctoral human resources.

Despite these policy efforts, the number of entrants to doctoral programs in Japan has continued to decline over an extended period, having peaked at 18,232 in fiscal year 2003. Contributing factors identified include insufficient financial support during doctoral studies, uncertainty regarding career prospects after degree completion, and unstable employment conditions for doctoral graduates. Furthermore, the proportion of students advancing from master's programs and other pathways to doctoral programs has also declined steadily, falling below 10 percent overall by 2019. Of particular concern is the observation that high-achieving master's students are increasingly reluctant to pursue doctoral studies.

In response to these challenges, the government has been advancing comprehensive reforms to doctoral human resource development based on the "Comprehensive Package for Strengthening Research Capacity and Supporting Early-Career Researchers," formulated in January 2020. Since 2021, specific support measures targeting early-career researchers have been implemented, including the "University Fellowship Program for the Creation of Science, Technology and Innovation" and the "Support for Pioneering Research Initiated by the Next Generation (SPRING)."

The National Institute of Science and Technology Policy (NISTEP) conducts a range of empirical studies on doctoral human resources in order to provide evidence to inform policymaking. Since 2014, the "Japan Doctoral Human Resource Profiling" survey (JD-Pro) has continuously tracked the career trajectories of doctoral degree holders. The survey aims to contribute to evidence-based policy formulation and evaluation by collecting comprehensive data on individuals' circumstances prior to doctoral enrollment, experiences during doctoral study, employment outcomes after degree completion, and research activities. To date, cohort surveys have been conducted for individuals who completed doctoral programs at Japanese universities in fiscal years 2012, 2015, and 2018 (hereafter referred to as the "2018 cohort"). This report presents the results of a new survey conducted in 2023,

which examines the status of individuals 1.5 years after completing doctoral programs in fiscal year 2021.

The main findings of this report are summarized as follows:

- The proportion of respondents who reported having prior full-time work experience before entering a doctoral program increased to nearly 60%, and the share of students enrolling in doctoral programs while remaining employed also rose.
- Overall, 54.7% of respondents indicated that they did not receive a tuition waiver during their doctoral studies, constituting a majority.
- The proportion of respondents whose tuition was fully waived during their doctoral studies was 16.0% overall.
- At the time of doctoral completion, 76.3% of respondents reported outstanding loans of ¥500,000 or less, while 15.4% reported loans of ¥3,000,000 or more. In particular, students enrolled in full doctoral programs exhibited a higher incidence of substantial borrowing.
- The proportion of respondents who reported having internship experience during their doctoral studies was 11.3%, remaining at approximately one-tenth. This figure showed little change from the 2012 cohort at 1.5 years after completion (10.9%).
- The overall rate of doctoral degree attainment at the point of program completion was 78.7%, or approximately 80%.
- At 1.5 years after completion of the doctoral program, the overall doctoral degree attainment rate rose to 89.3%, approaching 90%. However, in the humanities and social sciences, the rate remained at around 70%.
- The primary sources of financial support during doctoral enrollment were parental support and self-financing (including personal savings), accounting for approximately 60% of respondents. Fellowships and scholarships without repayment obligations accounted for roughly one-quarter.
- Compared with ten years earlier, the proportion of doctoral degree holders entering industry increased in the fields of science and engineering.
- Among doctoral graduates employed in industry, more than 90% of those in the sciences and engineering were employed in full-time, regular positions.
- In contrast, among humanities graduates employed in industry, the proportion in full-time, regular employment remained below 60%.
- At 1.5 years after doctoral completion, the most common income range was ¥4,000,000–¥5,000,000.
- By field of study, the health sciences recorded the highest income levels, with more than 30% earning ¥10,000,000 or more.

- Conversely, in the humanities, social sciences, and agricultural sciences, approximately 10% reported annual incomes of ¥1,000,000 or less, indicating marked disparities in income distribution by field.

- Regarding effective measures to enhance Japan's scientific and technological capabilities, the most frequently selected response was the expansion of core (baseline) research funding.