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**DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
COMMITTEE FOR SCIENTIFIC AND TECHNOLOGICAL POLICY**

Working Party of National Experts on Science and Technology Indicators

**ANALYSIS OF JAPANESE PhD HOLDERS' OCCUPATIONS AND DEVELOPMENT OF POLICIES
TO DIVERSIFY THEIR CAREER PATHS**

**WORKSHOP ON USER NEEDS FOR INDICATORS ON CAREERS OF DOCTORATE HOLDERS
OECD, Paris La-Défense, 27 September 2004**

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I. Japan's HRST-related policy and its impacts

1. HRST are the basis of science and technology activities. The First and Second Science and Technology Basic Plan (1996-'00/'01-'05) have recognized the importance of fostering HRST and encouraging their active performance in society.

2. Since the early 1990s, Ministry of Education, Culture, Sports, and Science and Technology (MEXT) has been placing emphasis on education at graduate-school level in order to foster the intelligentsia. This policy aims at enhancing and reforming graduate-level education programs in quality and quantitatively by recognizing the graduate-level course, rather than undergraduate-level courses, as the leading player in higher education. This policy has provided graduate schools with better research environments and a larger amount of research funds, and has also improved their capacity to accept more students in doctoral courses.

3. With those policies, the number of PhD holders increased. On the other hand, *Basic Survey on School Education* indicates that only a small percentage of new graduates who have just completed their doctoral courses successfully have found employment. Therefore, it is necessary to grasp the actual conditions of new PhD recipients as well as those who earned their PhD in the past.

II. Existing surveys on PhD holders

1. Existing statistics on PhD holders

4. Among Japan's existing statistics, some data on PhD holders are available in *Survey of Research and Development* and *Basic Survey on School Education*.

5. *Survey of Research and Development* indicates the number of PhD holders in comparison with the total researchers in science and technology fields, while *Basic Survey on School Education* provides data on new graduates of doctoral courses who have got a job, such as their gender, major field of study, industrial sector and occupation (Table 1). However, the 2003 *Basic Survey on School Education* provides no information on career paths for 6,451 new graduates (44%) out of the total 14,512. These graduates with unknown career paths mainly consist of postdoctoral fellows and other researchers who have only temporary positions. Currently, there is no available information on PhD holders who have changed or left their jobs.

Table 1. Statistics related to PhD holders in Japan

Name of Statistics	Data type	Available PhD holder related data
<i>Survey of Research and Development</i>	Stock	Number of researchers holding PhD
<i>Basic Survey on School Education</i>	Inflows	Number of new graduates of doctoral courses (by field, industrial sector, occupation and gender)

2. Recent survey on PhD holders in Japan

(1) Outline of the survey

6. Commissioned by MEXT, the Japan Research Institute Limited (JRI) conducted "Comparative Research on Actual Conditions of Doctorate Recipients between Japan and U.S." for about a year. The survey aimed at clarifying Japan's characteristics by comparing with the United States in terms of

employment sector and occupation for PhD holders. In the process of the survey, JRI collected Japan's stock data to compare with *Survey of Doctorate Recipients* published by the National Science Foundation in the United States.

7. There has been no survey covering PhD holders so far in Japan. As there are some organizations consisting of university alumni, JRI has examined whether it is possible for these organizations to provide any information on their members holding PhD. After JRI explained the survey purposes to the alumni associations that would provide information, two alumni associations (Gauche Kai¹ and Alumni Association of Kyushu University) cooperated in the survey.

8. JRI sent their questionnaire forms to the total 12,658 members of these two associations (i.e., 8,947 members of Gauche Kai and 3,711 members of Alumni Association of Kyushu University) in order to gather the following information in a multiple-choice-type format: the year they obtained their PhD; the major field of study in which they earned their PhD; their employment sector; their occupation; and the reason for their earning a PhD. JRI conducted the survey from January 30 to March 29, 2004. 4,611 respondents sent back effective responses (36.4% of the total target respondents).

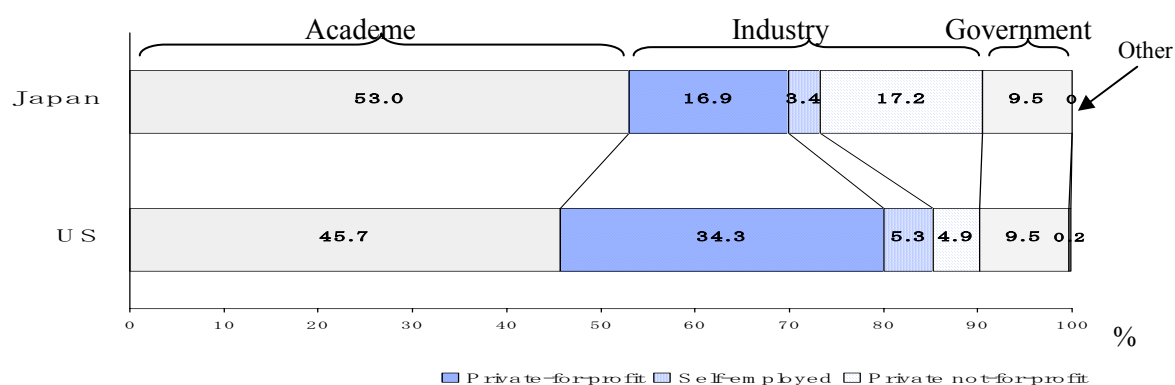
(2) Trend in employment for Japan's PhD holders

9. Although Japan has seen a gradual increase in PhD holders recently, the survey respondents who earned their PhD in the 1970s account for the largest percentage. On the other hand, the respondents who gained their PhD after the 1990s occupy a relatively low percentage. This is partly because the average age for Gauche Kai members is relatively high. The members of the Alumni Association of Kyushu University accounted for a relatively higher percentage in the respondents belonging to younger generations.

i) Employment sector

10. In the United States, PhD holders working in academe account for almost an equal percentage to those working in industry. On the other hand, in Japan, PhD holders in academe occupy a much higher percentage than those in industry. In terms of industry, PhD holders in private-for-profit only occupy a small percentage in Japan and account for a half of the corresponding percentage in the United States (Fig. 1). These represent the trend for employment sector of Japan's PhD holders.

Figure 1. Ratio of PhD holders by employment sector in Japan and the United States



1. Gauche Kai consists of university graduates of seven national universities (i.e., Hokkaido University, Tohoku University, University of Tokyo, Nagoya University, Kyoto University, Osaka University and Kyushu University) who join on a voluntary basis. Gauche Kai was established in 1886.

ii) Occupation

11. In Japan's academe, a relatively high percentage (more than 70%) of PhD holders are working in research fields (Table 2). This is mainly because Japan does not clearly distinguish between university staff mainly giving lectures and those mainly working in research fields. In the non-research occupations, Japan also has a larger percentage for healthcare, probably because most medical doctors have the degree in Japan.

12. In private-for-profit, a high percentage of PhD holders are working in non-research fields, and most of them are working as managers. This is probably because our survey respondents tend to belong to relatively older generations.

Table 2. Ratio of PhD holders by occupation in Japan

	Academe	Private-for-profit
The number of PhD holders working in research fields	1,759 (74.2%)	355 (43.0%)
The number of PhD holders working in non-research fields	611 (25.8%) Managers, etc.: 45.1% Healthcare-related: 31.6% Instructor: 21.1% Other: 2.2%	444(57.0%) Managers, etc.: 90.1% Marketing-related: 4.7% Technicians: 0.9% Other: 4.3%

(3) Conclusion

13. Because Japan had no live data available on PhD holders, trend in Employment for Japan's PhD holders clarified with our survey suggests important points for diversifying the future career paths of PhD holders. Since many PhD holders in private-for-profit are working as managers, outside the academic community, working as manager in private-for-profit is one of the major career paths for PhD holders in Japan.

III. Future policy initiatives to diversify career paths for PhD holders

14. Graduate schools are expected to provide a greater variety of education and research programs so that PhD holders in Japan will be able to play a vital role in achieving scientific and technological creativity not only in academe, but also in various fields such as industry and government. Reformation of human resources system for graduate schools should have highest priority in the Third Science and Technology Basic Plan ('06-).

15. In addition, since Japan's PhD holders tend to work in academe, the government should provide PhD holders with a proper incentive to expand their career paths. The industry also needs to provide more employment opportunities for PhD holders.

16. For more concrete policy initiatives to diversify career paths for PhD holders, it is necessary to correctly grasp the actual conditions of PhD holders in Japan.