文部科学省

Get a PhD—Doctoral human resources action plan

Ministry of Education, Culture, Sports, Science and Technology - JAPAN
March 26, 2024

1. Message from MEXT Minister

Doctoral human resources have a very important role to play in creating new knowledge and bringing innovation to society. In other countries, these resources are active in diverse fields, and in Japan as well, their importance and the expectations for them are increasing. We at MEXT want to ensure that those who wish to obtain a doctoral degree can pursue their studies in an environment with peace of mind, and I want to encourage doctoral students to play active roles as human resources with highly specialized knowledge as well as very versatile abilities. Based on these ideas, we have compiled the "Doctoral Human Resources Action Plan."

MEXT will do its utmost to support students aiming to obtain doctoral degrees.

We at MEXT promise to ensure an environment where you can devote yourself to your studies with a positive and calm state of mind. Our aim is to help you settle down and be fully engaged in your research. The experience of exploring the truths obtained through your research and presenting new value to society for its appraisal will become a great source of strength for your successful activities in various fields in the future.

To the university side, I would like to say that it used to be that the most promising career path for doctoral candidates was to become a university researcher, but I ask you to proceed with initiatives for graduate school reform, including support for enriching graduate school education and expanding career paths so that doctoral human resources can demonstrate their advanced expertise and wide-ranging abilities in diverse settings.

To the industry side, I would like to stress that it is extremely important for the development of society that doctoral human resources play a vital role in many different ways, and that your cooperation and efforts for expanding the recruitment and improving the employment conditions of doctoral degree holders and supporting your employees to obtain doctoral degrees are essential. I ask that you continue to take proactive measures for this.

MEXT will work together with universities and industry to achieve these aims. Let’s strive together to create a movement that will see doctoral human resources change Japanese society.

Moriyama Masahito,
Minister of Education, Culture, Sports, Science and Technology

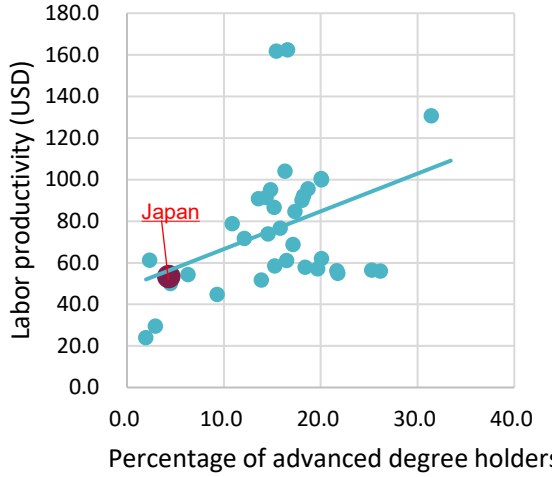
Ph. D. in Law,
Ph. D. in Commerce

2. Purpose and Significance

With their deep expertise and overall ability, for example, to identify and solve problems, doctoral human resources (DHR) can lead the transformation of society, develop academic fields, and build international networks by creating and utilizing new knowledge. They are an invaluable resource for driving the growth and development of society as a whole.

The opportunities for DHR to give full play to their abilities in global society, including in the United States and Europe, are not limited to research fields. Trusted for their expertise in specific fields and their wide-ranging abilities, DHR are active as leaders in diverse fields, including as presidents and CEOs of major companies.

● **Positive correlation between the proportion of advanced degree holders in the labor force and labor productivity**



Y-axis: GDP per hour for individual countries (in USD)
X-axis: Percentage of people aged 25 to 64 with an advanced degree (Master's or PhD)

Source: Compiled by MEXT from OECD Statistics (2022)
※ Reference to "Survey Report on matching corporate human needs and graduate school education" (May 2021), Kansai Productivity Center.
※ Japan's values estimated by MEXT by calculating the ratio of graduate schools (graduates) to population aged 25-64 from the 2020 Employment Structure Basic Survey.

However, in Japan, the generally held image is that "PhDs = researchers." But a doctoral degree is an international certification of ability awarded to those who can present solutions to complex problems not limited to only those of their specialized field. Global standards, which are the "starting line" for taking on the challenge of identifying and solving social problems, are not necessarily sufficiently shared by society, universities, and students. Within this context, the number of doctoral degree holders by population ratio is relatively small compared with other advanced countries. Some commentators contend that DHR are not playing an active role within the wider society and that this is a factor causing stagnation in Japan.

From now, society will grow more advanced and complex. Sharing the principle of the value of a doctoral degree, MEXT supports each and every doctoral student in being able to freely develop their ideas and challenge new opportunities throughout society, in addition to ensuring that DHR can acquire the necessary skills in graduate school education. It is necessary to increase the number of DHR by creating an environment where they can play active and leading roles in various fields both domestically and internationally.

3. VISION

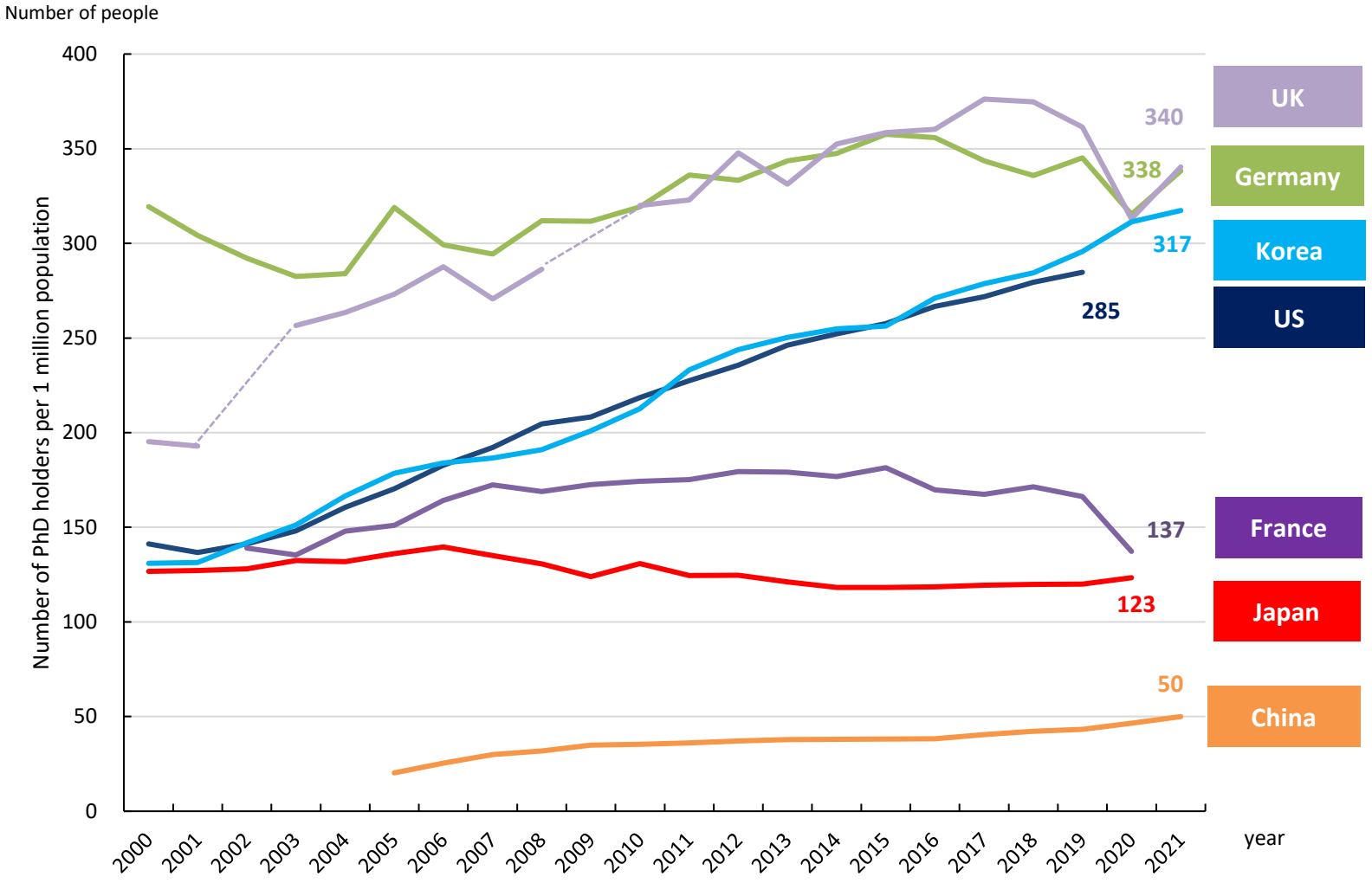
Realizing a society where DHR play an active role in not only academia but in diverse fields.

MEXT will support the building of an environment where anyone with the desire and the ability can go on to graduate school at any time and dedicate themselves to research while receiving a high-quality education as well as an environment where DHR are justly evaluated by society, can take on challenges not only in academia but in a wide variety of fields, and play more active roles in society. By doing so, MEXT aims to increase the number of people pursuing doctoral degrees, produce many excellent DHR, help realize fruitful lives for each and every DHR, and contribute to the sustainable development of society as a whole.

4. Current situation, issues

Comparison with other countries -Comparison of number of PhD holders per 1 million population-

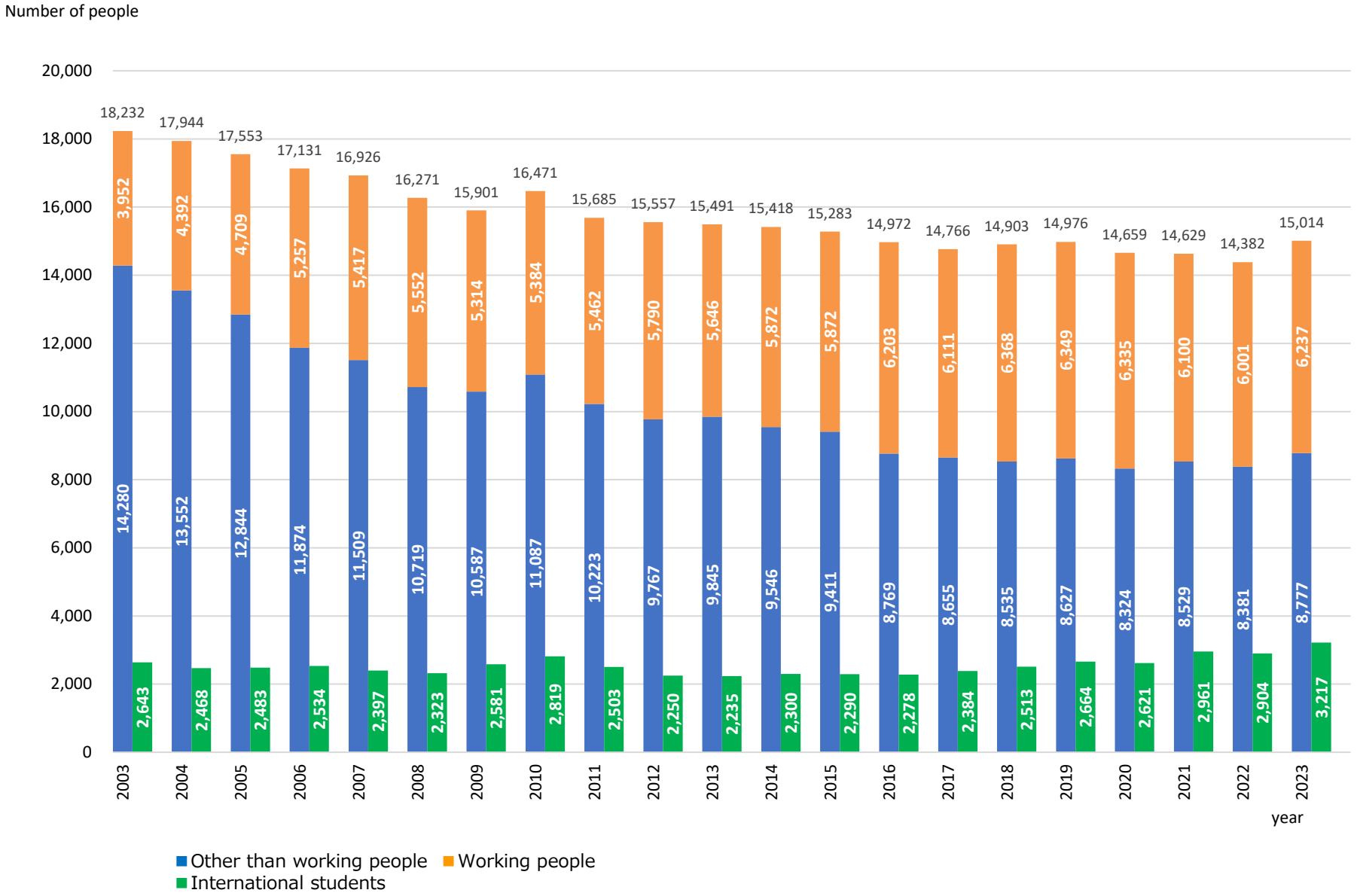
- Among major countries, Japan is the only one with a continuing decline in the number of doctoral degree holders per 1 million people.



Source: "Science and Technology Indicators, 2023," National Institute of Science and Technology Policy

Changes in the number of students entering PhD programs

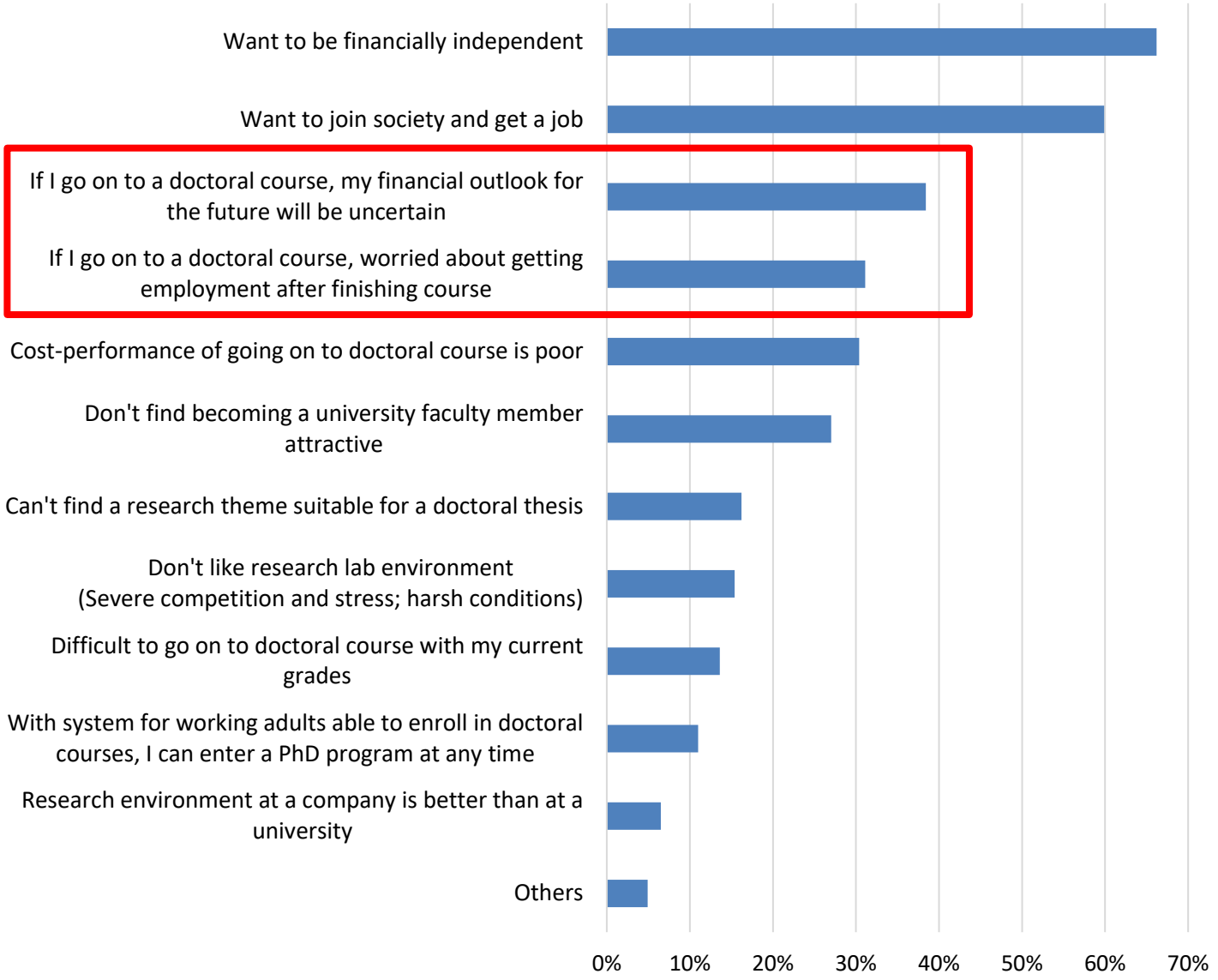
- Enrollment in doctoral programs in on the decline. In particular, the number of students advancing directly from master's programs has decreased by approximately 40% since 2003.



Source: "Basic School Survey," MEXT

Reasons for choosing to get a job rather than pursuing a PhD degree

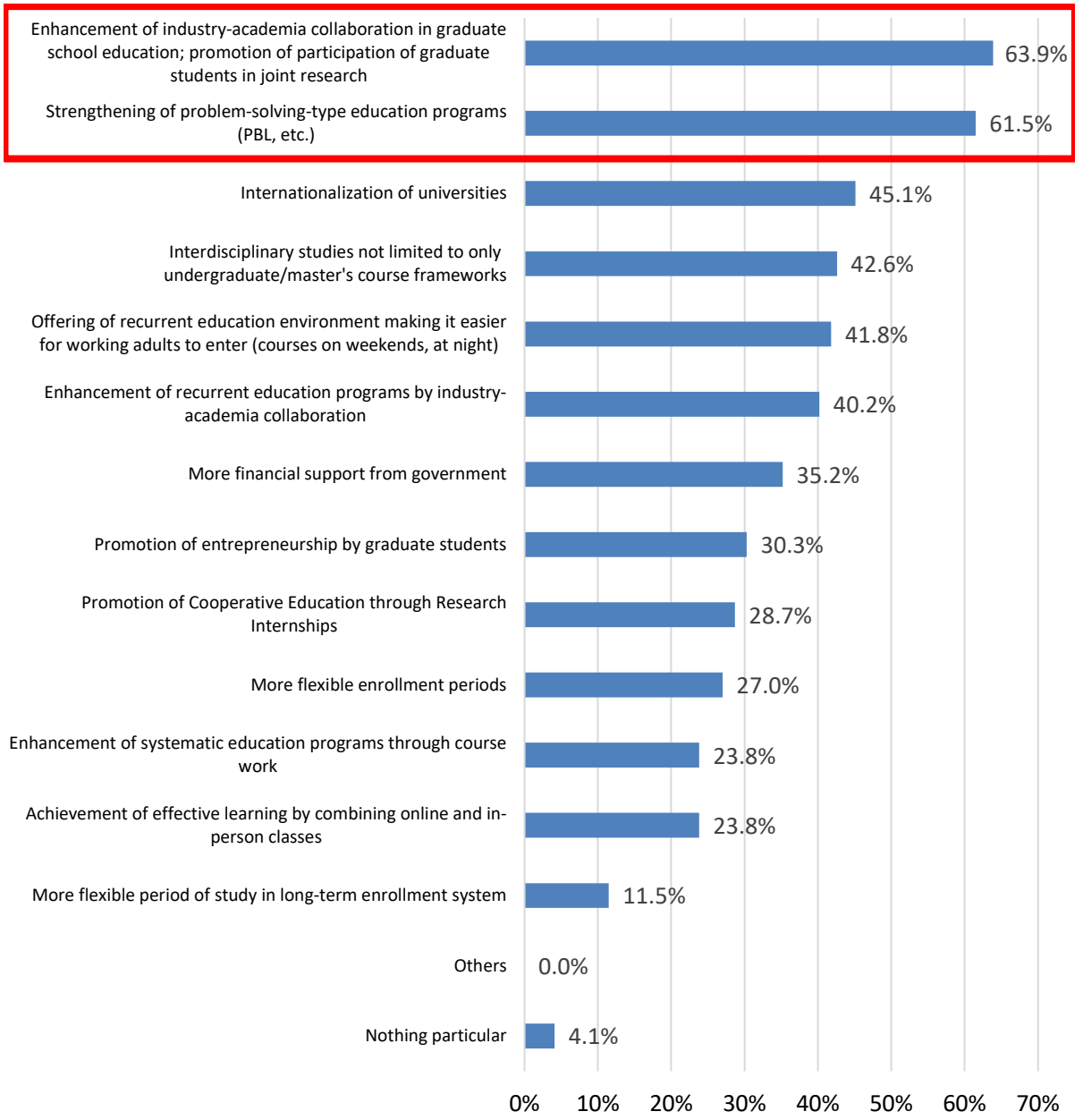
- Over 30% of students responded: “If you go on to a doctoral program, your financial outlook for the future will be uncertain” and “I worry about finding a job after completing a PhD program.”



Source: “Follow-up survey of students enrolled in master’s programs (including 6-year programs), research materials 323,” National Institute of Science and Technology Policy, 2023

Graduate school reform measures that should be prioritized

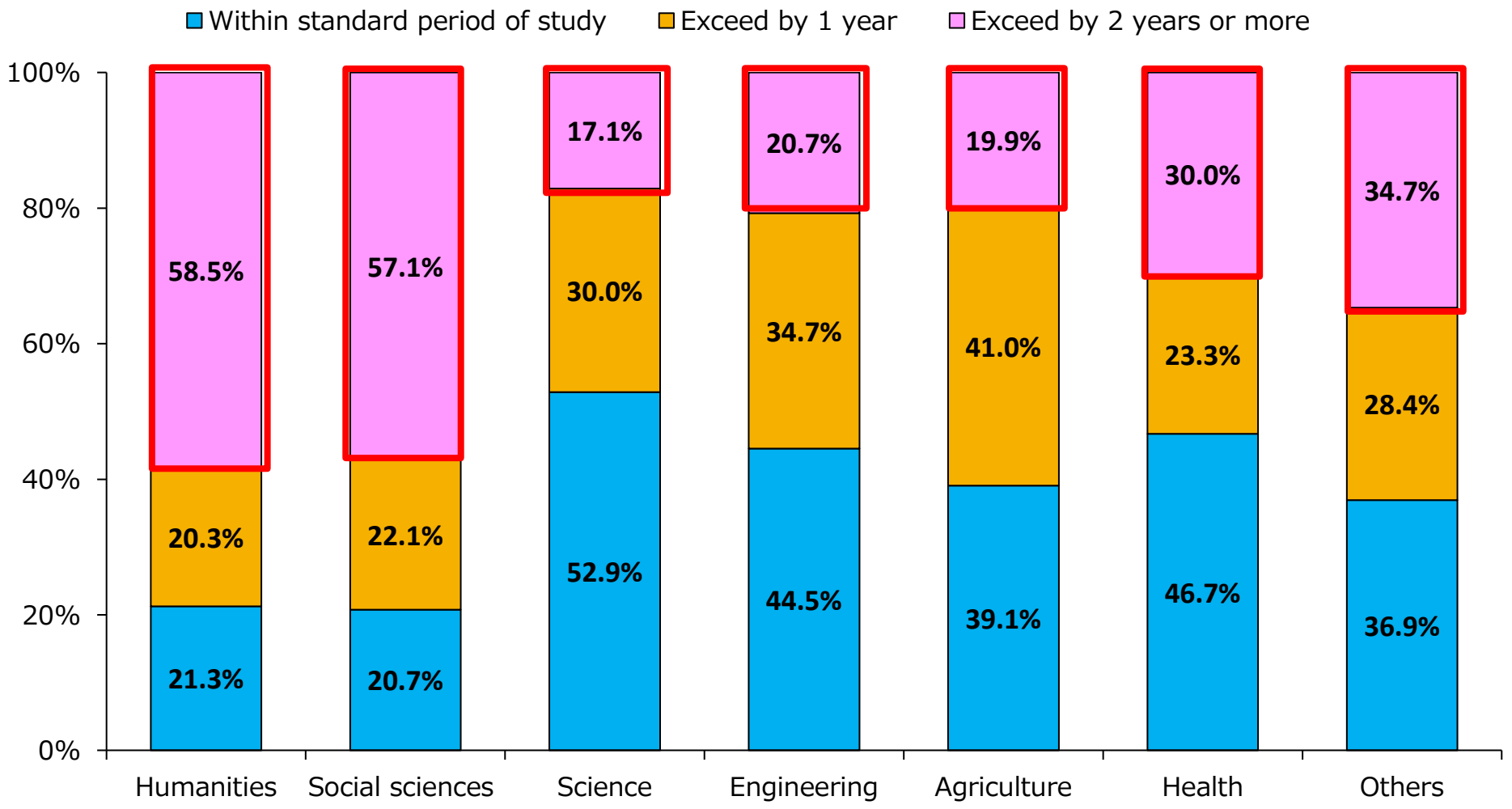
- Industry is voicing a strong demand for industry-academia collaboration and problem-solving-oriented education, and expressing concerns about a gap between graduate school curriculum and the expectations of industry.



Source: Results of questionnaire on fostering and utilization of doctoral human resources and female science-related personnel" (2024), Keidanren.

Proportion of students completing PhD programs who exceed the standard period of study

- Around 60% of graduates of humanities/social studies PhD programs and around 20% of graduates of science/engineering/agriculture PhD programs took over 2 years the standard period of study. Particularly in the humanities and social sciences, progress is not being made in conferring degrees smoothly within the standard course period.



Source: “Basic School Survey,2023” MEXT

5. POLICY

MEXT is taking the following measures.

- Promoting the opening up of a wide range of career paths for DHR in collaboration with industry
- Enhancing graduate school education by promoting quality assurance, internationalization, etc.
- Realizing an environment so that doctoral course students can devote themselves to their research with peace of mind
- Continuously implementing initiatives for increasing motivation to pursue a doctoral degree from primary and secondary education to higher education stages

6. Concrete Plans

1. Building diverse career paths for DHR in society

- In collaboration with other relevant ministries and agencies, MEXT is promoting the successful utilization of DHR in industry by promoting internships that lead to more practical and diverse careers, providing materials and contents for career development, compiling handbooks for private companies and universities in this area, supporting start-up creation and the supply of human resources, etc.
- MEXT is implementing measures for enabling DHR to play active roles in various fields of society in addition to academia, including international organizations and public institutions such as central ministries and local governments, and as schoolteachers, university research administrators (URA)*, etc.

(1) Encouraging active roles in industry, supporting matching by promoting:

- Promotion of efforts to make the minimum period for “Cooperative Education through Research Internships” more flexible and improvement of matching mechanisms
- Initiatives to support career paths, such as providing materials and contents for career development, including the “Support for Pioneering Research Initiated by the Next Generation Program (SPRING)”
- In collaboration with METI, creation of manuals and guidelines on measures for encouraging private companies, universities, etc. to take initiatives for matching DHR with private companies and establishment and holding of a joint study committee between the two ministries for this purpose
- Promotion of active utilization of the R&D tax credit system (“open innovation” type), which allows companies to deduct a portion of personnel expenses at a high rate when employing doctoral degree holders
- Promotion of initiatives by companies in anticipation of certification as an excellent company employing PhDs
- Enhancement of support for start-up creation by students and entrepreneurship education
- Support for creation and utilization of Chief human resources Officer banks
- Studying the use of “researchmap” platform in matching support

※URA (University Research Administrator):
Personnel engaged in work that supports researchers in the activation of their R&D activities and the strengthening of R&D management by assisting researchers in planning and managing their research activities and promoting their research results.

(2) Promotion of active roles by DHR in public organizations by:

- Promoting DHR activities at MEXT (P16)
- Requesting the Cabinet Personnel Bureau to encourage the active recruitment and utilization of DHR by ministries and agencies (showing successful examples) and to promote PR activities directed at students
- Supporting the National Personnel Authority in having ministries and agencies utilize the hiring/recruitment-promotion measures and steadily implement training systems for supporting employees in obtaining PhDs, and requesting the NPA to conduct PR activities directed at students
- Spread of MEXT's initiatives to other ministries and agencies
- In collaboration with Ministry of Internal Affairs and Communications, conducting surveys on actual utilization of DHR by local governments

(3) Boosting of active roles by DHR in various social sectors by promoting:

- Human resources development in national strategic fields such as the Next Generation AI Human Resources Development Program (BOOST)
- Improvement of treatment and career path support for postdoctoral fellows and young researchers in academia
- Joint research between universities and companies and utilization of cross-appointment systems and supplementary jobs
- Training, support to, utilization of R&D management human resources such as URAs
- Active recruitment of DHR for "Super Science High Schools" (SSH) and utilization as "doctoral teachers"
- Utilization of female DHR
- Enhancement of overseas research and study opportunities for young DHR and students (including undergraduate students)

2. Graduate school reform and student support

- Promotion of initiatives to improve education, including establishing bases for the provision of world-class graduate school education, ensuring the quality of graduate school education, and facilitating the smooth awarding of degrees
- Internationalization of graduate school education and research and enhancement of opportunities for overseas research and study
- Support to excellent doctoral students

(1) Promoting graduate school reform by:

- Establishment of bases providing world-class graduate school education
- Promotion of initiatives for improving education, eg, ensuring quality of graduate school education and facilitating smooth awarding of degrees
- Preparation of top-level research environment in Japan where DHR can play an active role
- Preparation of measures and facilities to support the education and research activities of diverse DHR, such as increasing the number of working students and female students, promoting globalization, and supporting people with disabilities

(2) Clarifying necessary qualifications for obtaining a doctoral degree and publicizing information on graduate school education by:

- Consideration of revisions to standards for establishment of graduate schools, etc. in order to clarify the importance of acquiring not only specialized knowledge and research skills but also general capabilities such as logical thinking skills in doctoral programs
- Consideration of revisions to the School Education Act Enforcement Regulations in order to publicize educational information such as career paths after completing a doctoral program, the standard period of study, the percentage of doctoral students who finish their course within the standard study period, the percentage who extend their period of study, the dropout rate, etc.

(3) Promoting collaboration between universities and private companies by:

- Promotion of graduate school education for working adults based on HR needs of industry
- Promotion of efforts to make the minimum period for “Cooperative Education through Research Internships” more flexible and improvement of matching mechanisms (reposting)
- Development of facilities to promote co-creation activities with local communities and industry

(4) Promoting internationalization of graduate school education and research and expansion of students’ overseas experience by:

- Promotion of collaboration with overseas universities and the internationalization of universities as the foundation for the creation of networks, with the aim of building human networks leading to international joint research in the future
- Enhancement (reposting) of overseas research and study opportunities for young DHR and students (including undergraduate students)

(5) Providing support to students by:

- Support to “Special Researchers of the Japan Society for the Promotion of Science” in order to foster top-class Japanese researchers
- Living expenses support and tuition fee reduction/exemption for doctoral students
- Support for research expenses for doctoral students by cloud funding, etc.

(6) Promoting initiatives responding to issues in each field by:

- Enhancement of attractiveness of obtaining a doctoral degree in the medical field through support to medical graduate students participating in education and research as TAs or RAs
- Promotion of collaboration among graduate schools and international collaboration among graduate schools in the humanities and social sciences
- Expansion of opportunities for interdisciplinary education and research centering on the humanities and social sciences
- Consideration of revisions to the School Education Act Enforcement Regulations in order publicize educational information such as career paths after completing a doctoral program, the standard period of study, the percentage of doctoral students who finish their course within the standard study period, the percentage who extend their period of study, the dropout rate, etc.

TA (Teaching Assistant): Aim is to give excellent doctoral students opportunities for educational training by having them perform educational support tasks such as tutoring, conducting experiments, practical training, and exercises for undergraduate students, as well as support for the improvement of the treatment of graduate students by providing allowances for these tasks.
RA (Research Assistant): With educational considerations, graduate students invited to participate as research assistants in research projects conducted by universities, etc. in order to develop their research capabilities and enhance research systems, as well as to improve the treatment of graduate students by providing them with allowances for their participation.

3. Motivating students

- Communicating the appeal of playing an active role in society as a DHR through the “Future PhD Festival,” role model PR, etc.
- Raising young people’s motivation at an early stage to enter doctoral courses through enhancement of inquiry-based learning and career education in primary and secondary education, career support for undergraduate students, etc.

(1) Communicating the appeal of becoming a DHR to the outside world by promoting:

- Regular holding of “Future PhD Festival,” which encourages friendly competition among students and contributes to network building
- Active recruitment of DHR for “Super Science High Schools” (SSH) and their utilization (reposting) as “doctoral teachers”
- Collection, publicizing of examples of DHRs as role models active in society and as world-class researchers

(2) Taking initiatives from an early stage by:

- Promotion of initiatives to further develop the abilities of children and students who have excellent motivation and ability in specific areas
- Promotion of advanced science and mathematics education at the high school level
- Enhancement of inquiry-based learning fostering problem-finding and problem-solving skills (including learning how to use a wide variety of materials and data from the natural sciences and humanities and social sciences)
- Promotion of systematic career education at the primary and secondary education levels
- Promotion of career support for undergraduate students to advance to doctoral programs
- Promotion of initiatives allowing students to learn about graduate school from the undergraduate level
- Enhancement of university applicant selection based on 3 policies (administration policy, curriculum policy, diploma policy)

7. Starting from MEXT

At MEXT, many DHR (117 officers, 5% of total full-time staff) are playing active roles by making the most of their capabilities. MEXT is:

- Setting DHR recruitment goals for administrative officers at MEXT
- Analyzing and verifying strengths of DHR and developing career paths that leverage their capabilities
- Implementing measures to speed up the promotion of excellent DHR
- Further promoting the use of the support systems for MEXT personnel to obtain master's and doctoral degrees
- Accepting doctoral course students, including those in the humanities and social sciences fields, for Cooperative Education through Research Internships offered by MEXT and greatly expanding work experience opportunities in all departments within MEXT

※ In conjunction with the above, MEXT aims to increase the number of master's and doctoral degree holders by 2035 for executive positions.

→ **Dissemination of MEXT's initiatives to other ministries/agencies**

8. Key Performance Indicators (KPI)

Outputs

Enhancement of graduate school education

- Providing education for general all-purpose skills (transferable skills) that can be widely used in society
  39% (2020)→80% (2030)
- Developing curriculum through collaboration with parties outside of school
  27% (2020)→50% (2030)
- Providing opportunities for education, research at overseas universities, etc.
  29% (2020)→60% (2030)

✓ Towards these targets, MEXT will promote the preparation of bases providing world-class graduate school education

Support to PhD students

3-fold increase (by FY2025) over FY2018 levels

✓ Including grant-type scholarships from universities and private organizations

✓ Provision of amount equivalent to living expenses to students other than those who are working adults and have a salary equivalent to or more than living expenses

Support for career development

- Number of students registered for Cooperative Education through Research Internships
  483 (2022)→5,000 (2030)
- Utilization of Cooperative Education through Research Internships at SPRING-selected schools
  15% (2022)→100% (2030)

Increase in number of people entering PhD programs, fostering awareness of diverse career paths

Outcomes

Percentage of PhDs to bachelor's degree holders

2.7%（2020） → 5%（2030）
→ 8%（2040）

Employment rate for doctoral students

70%（2023） → 75%（2030）
→ 80%（2040）

※Employment rate in the health sector, which has the highest employment rate of all fields, is around 80%; the employment rate for SPRING-supported persons is also about 80%. Aim is to raise the overall employment rate to a similar level.

Percentage of persons completing PhD courses among all regular employees hired by MEXT (3-year average)

10.8% (average in 2022～2024)
→Aiming for further increase from now

*In the Basic School Survey, those not counted as employed include: persons who are studying abroad or have gone on to further education after completing the doctoral course, persons who are preparing for further education or employment, persons whose employment contracts are for less than one year or who are part-time workers, persons whose status after completing PhD course cannot be determined, etc.

In addition to fostering awareness of diverse career paths, universities are also required to accurately keep track of PhD program graduates.

Overall goal

Increase the number of PhDs per 1 million population to top ranks worldwide by 2040
(3-fold increase over 2020 level)

9. Message to industry

We are asking the heads of economic and industry organizations to cooperate in promoting the active utilization of DHR. MEXT will steadily implement these policies in collaboration with private industry.

※Notification by separate official document

To: Heads of Economic and Industrial Organizations

Request for cooperation of private companies in promoting utilization of doctoral human resources

Doctoral human resources are highly trained human resources who possess general-purpose and versatile abilities such as a high degree of specialized knowledge, an international sense, and problem-identification and problem-solving skills; since they contribute to the creation of innovation, they are expected to play an active role not only in academia but also in industry. MEXT is implementing initiatives to make manifest the strengths and appeal of doctoral human resources and to boost their participation in various fields in society.

However, there is a strong tendency for those who have completed a doctoral course to pursue a career in academia as a university faculty member, etc.; moreover, it is difficult to suggest that that industrial sector has an adequate awareness of the abilities and strengths of doctoral human resources.

Hence, MEXT will steadily work to promote graduate school education reform, provide financial support to doctoral students, and promote the diversification of career paths. In addition, we have compiled our "Request for cooperation of private companies in promoting utilization of doctoral human resources," and we ask for the cooperation of all companies, beginning with member companies, to be aware of, and cooperate for the realization of, the following matters.

1. Expansion of the employment of DHR and the improvement of their employment conditions
2. Consideration of overseas study experience in the recruitment process of DHR
3. Promotion of internships for doctoral students in the latter period of their doctoral program
4. Utilization of tax credits for corporate taxes allowable in the employment of DHR
5. Utilization of proxy repayment system by companies for the repayment of loan-type scholarships
6. Support for employees to obtain doctoral degrees.
7. Selection of DHR role models playing an active role at companies and provision of information regarding them

MEXT will steadily implement measures in cooperation with companies in order to promote the utilization of doctoral human resources in industry, and in turn, achieve the sustainable development of Japan's economy and society. We thank you for your understanding and cooperation.

26 March 2024

Moriyama Masahito
Minister of Education, Culture, Sports, Science and Technology

Task Force for Promoting the Role of PhDs in Society

1. Purpose

In order to support DHR to play a more active role in various fields of society and not only in academia, to make clear the strengths and advantages of DHR, as well as to see that the abilities of DHR will be duly evaluated by society, MEXT established its Task Force for Promoting the Role of Doctoral Human Resources in Society. The Task Force will intensively consider measures that MEXT should take in this area.

2. Members

Chair: MEXT Minister

Acting chairs: MEXT State Minister (in charge of education)
MEXT State Minister (in charge of science/technology and academia)

Members:

Director, Office for Disaster Prevention, Department of Facilities Planning and Administration, Minister's Secretariat
Director-General, Education Policy Bureau
Director-General, Elementary and Secondary Education Bureau
Director-General, Higher Education Bureau
Director-General, Science and Technology Policy Bureau
Director-General, Research Promotion Bureau

(Observer) Director-General, National Institute of Science and Technology Policy

3. Main considerations

- Policies for promoting activities of DHR in society
- Enhancement of graduate school education and support measures for students

Task Force activities

Nov. 30, 2023 **1st meeting**: Hearing of views from private companies/start-ups

Ueda Teruhisa, President, Shimadzu Corp.

Ogawachi Naoko, CEO, ideafund Co., Inc.

Mizuguchi Yoshinori, CFO, Metagen, Inc.

Dec. 25 **2nd meeting**: Hearing of views from Japan Business Federation (Keidanren)

Koji Akiyoshi, Vice Chairman, Keidanren; Chair, Keidanren Committee on Education Reform

Hasegawa Tomoko, Keidanren Managing Director

Jan. 12, 2024 Inspection of Waseda University, Tokyo University of Agriculture and Technology, discussion with doctoral students

Feb. 16 Exchange of views with Kansai Economic Federation (Kankeiren), Osaka University

Feb. 21 **3rd meeting**: Hearing of views from university representatives

Nishimura Norihiro, Prof. Mie University, Vice President for Special Mission, Utsunomiya University

Yamamoto, Fumihiko, Executive Director, Vice President, Hokkaido University

Taguchi Shigeru, Director, Center for Human Nature, Artificial Intelligence, and Neuroscience, Hokkaido University

Mar. 15 Exchange of views with PhD staff members of MEXT

Mar. 26 **4th meeting**: Task Force wrap-up