

tentative translation

Research Integrity Investigation and Analysis Report (English Version)



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PricewaterhouseCoopers Aarata LLC

This is a report on the outcome of the Research Integrity Investigation and Analysis carried out by PricewaterhouseCoopers Aarata LLC in a project commissioned by the Cabinet Office.

This report contains proposals from "Research Integrity Investigation Committee". We do not express any opinion on the content of the proposals.

This report is made in Japanese and translated into English. The Japanese text is the original and the English text is for reference purposes. If there is any conflict or inconsistency between these two texts, the Japanese text shall prevail.

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Chapter 1 Background and Purpose

1. Background

In recent years, against the backdrop of the progress in science and technology as such and accelerating globalization and digitalization, science and technology activities are increasingly transcending borders. At the same time, international research networks and international joint research projects are also expanding along with fierce global competition in R&D and innovation.

In fact, as the increase in co-written international papers suggests, most of the researchers at the forefront of cutting-edge fields are carrying out their research activities efficiently and effectively while building networks cutting across national and regional boundaries. Moreover, a country alone cannot carry out major projects or construction of large-scale R&D facilities and international cooperation is becoming indispensable. Under such circumstances, Japan's science and technology have achieved numerous successes that contributed to the development of not only Japan but also the world and have been highly acclaimed globally. This has resulted in growing expectations on the country's research community, made up of researchers and research organizations, as a stable, high-quality player in international cooperation.

Meanwhile, it has been reported that trend in the international status of Japan's research capability in both number and quality of academic papers is continuously declining. A research environment that nurtures knowledge must foster human resources who shoulder that responsibility, develop research infrastructure, and build a culture that encourages researchers to take on the challenge of diverse research. This cannot be achieved in a day and the country has to ensure continuous improvement of its research environment. Furthermore, active exchange of diverse knowledge is necessary for raising research excellence. Individual researchers securing sufficient time to concentrate on their research and being exposed to influences by engaging in intellectual interaction with various entities without constraining themselves to a specialized field will enable the creation of exceptional and unique research results. One of the factors behind the decline in the research capabilities of Japan is that it is far from international research networks, and as a result, the number of internationally co-authored papers is not increasing. To this end, it is vital that Japan continues to promote international exchange of knowledge and enhance global brain circulation to strengthen research and innovation capabilities.

Thus, amid calls for a more global and open research in Japan and across the world, various issues have surfaced, along with the trends of open science and open data, such as the impact of the intensifying tussle for worldwide technological hegemony on science and technology activities as well as the way of handling the ownership of research results and data. In the past, it has been pointed out that Japan's industry lost top-class engineers from its electronics manufacturers, etc. to countries in Asia and related industries faced extremely difficult situations. In research also, it goes without saying that it is necessary for the country to build a more attractive research environment and win the competition for talent, and as mentioned earlier, given its characteristics and the fact that the country's international status continues to decline, it is indispensable that Japan produce excellent and original research results through intellectual exchange with diverse entities. For this reason, Japan faces the difficult challenge of achieving a balance with creation of

science and technology innovation in response to these issues. It is also necessary to pay attention to the fact that researchers and students from various countries are playing important roles in research in Japan.

In such a situation, it is necessary to develop a research environment that is trusted internationally while fulfilling social responsibility by ensuring “research integrity” (to be described in detail later in 2. Purpose of Study and Investigation, Scope of Study and Investigation, and Definition and Compilation of Terms) as an autonomous code of conduct to be adhered by research community including researchers and research organizations to cope with rising global concerns over the undue influence of foreign countries caused by the globalization of science and technology.

In other words, as it becomes vital to further globalize and open researches to maintain and strengthen Japan’s research capabilities, it is important for researchers and research organizations to recognize that, unless Japan can internationally present a situation where “research integrity” is ensured as an autonomous code of conduct to be adhered by research community including researchers and research organizations, it may hurt the reliability of Japan’s researchers and research organizations among the international research community and may make it difficult for Japanese researchers and research organizations to participate in international joint research with countries and organizations requiring a certain level of transparency.

2. Purpose of study and investigation, scope of study and investigation, and definition and compilation of terms

While the international network for R&D activities is being strengthened, international issues are surfacing, such as conflicts of interest and commitment and leakages of scientific and technological information.

Under such circumstances and based on the aforementioned backgrounds, the investigation project studied “research integrity” and appropriate measures for ensuring “research integrity”. “Research integrity” is an autonomous code of conduct that shall be adhered to by Japanese researchers and research organizations and includes assurance of transparency in research activities and accountability in order to maintain the premise of scientific research of sharing research results and securing reciprocity in basic and generic research, etc.¹ conducted based on the assumption that the results will be published. The project also established Research Integrity Investigation Committee comprising expert members to obtain their opinions. The report puts together the investigation result of the project and proposals from the committee (Chapters 3 to 5).

“Research integrity” to be addressed in the investigation below is the part where new responses have to be promoted because it cannot always be dealt with the specific measures implemented to address issues including misconduct in research activities and conflicts of interest and commitment in industry-academia collaboration. As newly surfacing issues and risks caused by increasing internationalization and openness of research are also related to the issue of how to handle ownership of results of research funded by public research funds, in the investigation, we considered “research integrity” as a response to new risks that

¹Basic and generic research is described “etc.” because the boundary between ‘basic and generic technology’ and ‘applied and development technology’ has blurred as research fields become conjugated and advanced technology such as AI, quantum technology, and biotechnology are made into products and commercialized, and in some cases, it is necessary to treat research categorized as applied research similarly to basic research.

individual researchers will have to face following the trend of increasing internationalization and openness of research, rather than a simple extension of ‘research integrity’ that has been sought as a response to inappropriate conduct or situations such as research misconduct and conflicts of interest.

For this reason, the “research integrity” discussed in the investigation is, as described in the figure below, the part that is sought to ensure the above code by strengthening measures in response to new risks resulting from changes in the situation surrounding research activities such as increasing internationalization and openness of research, and it is described as “research integrity” in this report.



Fig. Scope of the investigation across “research integrity” as a whole

The study and investigation deals with autonomous code of conduct to be adhered to by researchers and research organizations upon building a research environment in Japan and it is meant for taking measures so as not to end up in a serious situation amid increasing internationalization and openness. For this reason, matters requiring individual responses beyond wide-ranged autonomous response by the research communities such as security trade control based on the Foreign Exchange and Foreign Trade Act from the perspective of sensitive technology management mentioned by Integrated Innovation Strategy 2020², which puts together initiatives to be considered and promoted by the government, are not discussed in this investigation.

(Terms)

Terms used in this report are described below.

- Integrity

Means social trust and dignity³.

² Cabinet Office, 2020. “Integrated Innovation Strategy 2020.” p. 140, 141.

³ Conflict of Interest Working Group, Committee on Promotion of Industry-Academia-Government Collaboration, Technology and Research Foundations Section, Council for Science and Technology, Ministry of Education, Culture, Sports, Science and Technology, 2002. “Report of the Conflict of Interest Working Group.” See Note 2.

Review Committee for Risk Management in Industry-Academia-Government Collaboration at Universities, Etc., Industry-Academia Collaboration and Regional Support Section, Council for Science and Technology, Ministry of Education, Culture, Sports, Science and Technology, 2015. “Direction of Consideration Regarding Appropriate Risk Management in Promoting Industry-Academia-Government Collaboration at Universities, Etc.” p. 1.

- Research integrity

There is no fixed definition of the above term and it had been used ambiguously in the past. Definitions include (1) entire “integrity” of a research (same scope as what “research integrity” refers to in English), and (2) avoidance of ideas for research misconduct (fabrication, falsification, plagiarism, etc.) and conflict of interest. In this report, ‘research integrity’ (using single quotation marks) refers to (2) and “research integrity” (using double quotes marks) refers to (1). Specifically, it is regarded as an autonomous code of conduct to be adhered by research community including researchers and research organizations, and its scope is defined as described above.

- Research misconduct

Misconduct violates researcher ethics, distorts the essence or purpose of the research and the announcement of research results, and interferes with the normal scientific communication among the scientific community. The act of fabrication, falsification, and plagiarism falls under misconduct. In addition, duplicate posts and inappropriate authorship may also be a violation of researcher ethics⁴.

- Conflicts of interest and commitment

“Conflicts of interest in a narrow sense” refer to conflicts and contradictions between benefits that faculty members or universities have gained from the industry-academia-government collaboration (royalty income, subsidiary compensation, private equity, etc.) and responsibilities at universities, such as education and research. In addition, “conflicts of commitment” involve a situation, in which faculty members who are given the responsibility for the execution of duties for companies through concurrent business activities cannot achieve a balance between the commitment for the execution of duties for companies and universities. The concept that includes both these conflicts is called “conflicts of interest in a broader sense.”⁵

- Competitive funds

The R&D funds that are allocated to researchers by resource allocation entities broadly seeking R&D topics for topics that should be implemented, which are selected based on evaluation by several experts primarily from the scientific and technological perspective.⁶

- Competitive research funds

⁴ For example, Ministry of Education, Culture, Sports, Science and Technology, 2014. “Guidelines for Responding to Misconduct in Research.” p.4.

⁵ Conflict of Interest Working Group, Committee on Promotion of Industry-Academia-Government Collaboration, Technology and Research Foundations Section, Council for Science and Technology, Ministry of Education, Culture, Sports, Science and Technology, 2012. “Report of the Conflict of Interest Working Group.” See “3. Organization of Concepts in this Report.”

⁶ Cabinet Office, “Competitive Research Expense System.” Accessed on February 12, 2021. <https://www8.cao.go.jp/cstp/compefund/>.

Of the costs and expenses acquired by universities and research entities⁷ competitively through solicitation of ministries, those related to research (including “competitive funds” above)⁸.

- Effort

The proportion (percentage) of time required to conduct the concerned research with respect to the researcher’s total work hours⁹.

- Basic and generic research, etc. based on the premise of sharing research results

In Japan, “basic research” is “theoretical or experimental research conducted to form hypotheses and theories or to obtain new knowledge about phenomena and observable facts without directly considering special applications”; “applied research” is “research to establish specific goals and ascertain the possibility of practical application, or research to explore new application methods with regard to already practical methods”; and “development research” is “research aimed at creating new products, services, systems, equipment, materials, processes, etc. or improving existing products by utilizing knowledge obtained from basic research, applied research, and actual experience and creating additional knowledge.”¹⁰ In the U.S., fundamental research is regarded as “‘basic research’ and ‘applied research’ conducted at universities, as well as concepts showing research that is disclosed and shared in the research community without confidentiality of the results.”¹¹ In this report, basic and generic research, etc. based on the premise of sharing research results, including basic research and applied research as well as generic research which supports those research types, corresponds to fundamental research.

The English translation of the titles of Japanese literature is tentative translation unless otherwise noted.

⁷ Research entities in this sentence mean National Research and Development Agencies.

⁸ Cabinet Office, “Competitive Research Expense System.” Accessed on February 12, 2021. <https://www8.cao.go.jp/cstp/compefund/>.

⁹ Research funding agencies and relevant ministries, 2020. “Unification of Effort Management.” p. 1.

¹⁰ Statistics Bureau, Ministry of Internal Affairs and Communications. “Report on the Survey of Research and Development.” Accessed on February 19, 2021. https://www.stat.go.jp/data/kagaku/kekka/kekkgai/pdf/2020ke_gai.pdf p.72.

¹¹ Okamura, Koichiro, 2016. “*Beikoku no daigaku ni okeru kokubo kenkyu –kokubo kenkyuhi ni yoru daigaku kenkyu shien no wakugumi–* (National Defense Research at U.S. Universities: Framework of University Research Support with National Defense Research Funds).” p. 117.

Chapter 2 Domestic and Overseas Trends

1. Investigation

Objectives of investigation

In order to identify what risks may arise from the internationalization and openness of research and what concerns Japan may face, this report assesses the views of the risks of researchers, people involved in research, research institutes, research funding agencies, and the government, and how these risks are handled. Furthermore, in order to confirm transparency in foreign countries, it tries to determine the extent to which foreign research funding agencies and universities require the disclosure of information.

Investigation method

The investigation has examined reports and guidelines on how each country deals with the risks involved in the internationalization and openness of research. The countries or regions covered in this investigation are the United States, the United Kingdom, Australia, Germany, France, the EU, and Singapore. English or Japanese information published on the websites of the relevant organizations of each country was examined. In addition, Internet searches were carried out with the name of the country and keywords to acquire relevant information.

Regarding the situation in Japan, recent trends were examined based on public information. The current laws and guidelines related to dealing with the risks in the internationalization and openness of research and relationships between them were carefully investigated.

Regarding how the government and research funding agencies are handling the situation, an Internet survey was conducted on representative research funding agencies in foreign countries (the United States, United Kingdom, Australia, Germany, France, the EU, and Singapore) and ministries involved in research funding allocation, with respect to five topics: (1) information disclosure recipients; (2) information disclosure requirements (i.e. researchers' background information and current and pending support); (3) reasons for information disclosure; (4) sharing of disclosure contents with other agencies; and (5) response related to security trade control.

For the United States, four agencies were covered: the U.S. Department of Energy (DOE), the National Science Foundation (NSF), the National Institutes of Health (NIH), and the Defense Advanced Research Projects Agency (DARPA).

For the UK, the UK Research and Innovation (UKRI), for Australia, the Australian Research Council (ARC), for Germany, the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG), for France, the French National Research Agency (Agence Nationale de la Recherche, ANR), and for the EU, the European Research Council (ERC), one of the research funding agencies of Horizon 2020, were examined. For Singapore, the Agency for Science, Technology and Research (A*STAR) was investigated. For Japan, the actual situation was investigated regarding the above five items on competitive funding programs by research funding agencies.

In addition, for universities in the U.S. (Massachusetts Institute of Technology, MIT, the University of

California Los Angeles, UCLA, and Harvard University), four Internet surveys were conducted on: (1) targeted individuals for disclosure of information; (2) scope of information disclosure requirements (researchers' background information and information other than background information); (3) sharing of contents of disclosure with other organizations; and (4) response to security trade control.

2. Trends in the United States of America

Approach on risks

In recent years, concerns over foreign threats targeting scientific and technological results have been raised. This has become widely discussed in the U.S. as “foreign influence.”¹² Such risks are also perceived as threats to integrity. In April 2019, with the intention of confirming and sharing each other's experiences, the Association of American Universities (AAU) and the Association of Public Land-Grant Universities (APLU) published “Actions Taken by Universities to Address Growing Concerns about Security Threats and Undue Foreign Influence on Campus,” stating that its aim was “to increase awareness of systematic programs of foreign influence and how such programs pose risks to core scientific and academic values and threaten research integrity.”¹³ In November 2019, the U.S. Senate Permanent Subcommittee on Investigations released the staff report, “Threats to the U.S. Research Enterprise: China's Talent Recruitment Plans,” which states that “the federal government's grant-making agencies did little to prevent this from happening, nor did the FBI and other federal agencies develop a coordinated response to mitigate the threat. These failures continue to undermine the integrity of the American research enterprise and endanger our national security.”¹⁴ In addition, it is regarded as problematic that research results of public grants are being used to expand the influence of foreign countries.¹⁵ Under these circumstances, in a report prepared by the expert group, JASON, in December 2019 and entitled “Fundamental Research Security” (commonly known as the “JASON Report”), it was concluded that “many of the problems of foreign influence that have been identified are ones that can be addressed within the framework of research integrity, and that the benefits of openness in research and of the inclusion of talented foreign researchers dictate against measures that would wall off particular areas of fundamental research.”¹⁶ The report emphasized the importance of protecting integrity.

At the same time, investigators are increasingly preventing the outflow of critical technologies and

¹² As an example, the NIH has initially acknowledged the fraud during the process of peer reviewing, based on the influence of foreign countries. Violations to the peer review process include compromising the confidentiality of peer review by sharing information and/or applications and altering priority scores in an attempt to influence review results based on elements unrelated to scientific merit and the normal and appropriate NIH funding decision process. cf. NIH Advisory Committee to the Director, 2018. “December 2018 Report.” Accessed January 7, 2021. https://acd.od.nih.gov/documents/presentations/12132018ForeignInfluences_report.pdf. p.5.

¹³ Association of American Universities and Association of Public Land-Grant Universities, 2019. “Actions Taken by Universities to Address Growing Concerns about Security Threats and Undue Foreign Influence on Campus” Accessed January 7, 2021. <https://www.aau.edu/sites/default/files/Blind-Links/Effective-Science-Security-Practices.pdf>. p.1.

¹⁴ U.S. Senate Permanent Subcommittee on Investigations, 2019. “Threats to the U.S. Research Enterprise: China's Talent Recruitment Plans.” p.1.

¹⁵ Same as the above. p.1, 56, 95.

¹⁶ National Science Foundation, 2019. “Fundamental Research Security.” p.39.

information from U.S. universities, and there has been a series of prosecutions on the grounds that researchers do not disclose information appropriately.¹⁷ Various reasons were given for this. For example, researchers reported that, even though they had a relationship with a foreign university, there was no official relationship,¹⁸ that even though they were officially participating in a foreign recruitment program,¹⁹ they were not actually participating,²⁰ or that they did not declare grants from foreign countries or grants for research even though they had actually received them.²¹

How it is handled

(1) Background confirmation by the government and Congress

The United States is led by the government, Congress, and government agencies regarding information disclosure. For the purpose of dealing with problems while maintaining the openness of research, research-related government institutes have become thorough regarding the disclosure of information from researchers on conflicts of interest and conflicts of commitment of their research institutes.²² In May 2019, the U.S. Office of Science and Technology Policy (OSTP) established the Joint Committee on the Research Environment (JCORE) to address various issues surrounding the U.S. research environment and methods of improving it. In September 2019, the OSTP publicly disclosed a letter under the name of Director Droegemeier to the research community,²³ stating that it was unacceptable that some foreign government-funded recruitment programs made use of U.S. research activities.²⁴

In February 2019, the U.S. Senate Permanent Subcommittee on Investigations held a hearing session and published a bipartisan report on the impact of China on U.S. education.²⁵ In November 2019, the U.S. Senate Permanent Subcommittee on Investigations continuously examined China's talent recruitment

¹⁷ cf. Center for Research and Development Strategy, JST, 2020. "Integrity in open and internationalized research." p.31.

¹⁸ Department of Justice, 2020. "Harvard University Professor and Two Chinese Nationals Charged in Three Separate China Related Cases." Accessed January 7, 2021. <https://www.justice.gov/opa/pr/harvard-university-professor-and-two-chinese-nationals-charged-three-separate-china-related>.

¹⁹ For example, explanation of a foreign recruitment program in "Presidential Memorandum on United States Government-Supported Research and Development National Security Policy" (to be described later in the text) is "an effort directly or indirectly organized, managed, or funded by a foreign government or institution to recruit S&T professionals or students (regardless of citizenship or national origin, and whether having a full-time or part-time position). . . Compensation could take many forms including cash, research funding, complimentary foreign travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation."

²⁰ Department of Justice, 2020. "Harvard University Professor and Two Chinese Nationals Charged in Three Separate China Related Cases." Accessed January 7, 2021. <https://www.justice.gov/opa/pr/harvard-university-professor-and-two-chinese-nationals-charged-three-separate-china-related>.

²¹ Department of Justice, 2019. "Department Of Justice Reaches \$5.5 Million Settlement With Van Andel Research Institute To Resolve Allegations Of Undisclosed Chinese Grants To Two Researchers." Accessed January 7, 2021. https://www.justice.gov/usao-wdmi/pr/2019_1219_VARI.

²² Same as the above.

White House Office of Science and Technology Policy, 2020. "Enhancing the Security and Integrity of America's Research Enterprise." Accessed January 7, 2021. <https://www.whitehouse.gov/wp-content/uploads/2020/06/Enhancing-the-Security-and-Integrity-of-Americas-Research-Enterprise.pdf>.

Center for Research and Development Strategy, JST, 2020. "Integrity in open and internationalized research."

²³ White House Office of Science and Technology Policy, 2019. "Letter to the US research community." Accessed January 7, 2021. <https://www.whitehouse.gov/wp-content/uploads/2019/09/OSTP-letter-to-the-US-research-community-september-2019.pdf>.

²⁴ Center for Research and Development Strategy, JST, 2020. "Integrity in open and internationalized research.]].

²⁵ U.S. Senate Permanent Subcommittee on Investigations, 2019. "China's Impact on the U.S. Education System."

programs with particular attention to the Thousand Talents Plan and published “Threats to the U.S. Research Enterprise: China’s Talent Recruitment Plans,” which included actual cases of harmed integrity in U.S. research projects due to the China’s Talent Recruitment Plans.²⁶ Specifically, in the research community, regarding interference with discussions on topics where specific countries are politically sensitive and in contracts for recruitment programs, it mentions imposing the obligation not to disclose the research and employment relationship with institutes of other countries which should normally be disclosed.

In view of the situation that there are foreign governments that do not support value judgements such as “openness”, “transparency” and “reciprocal collaboration,” which are necessary to advance the forefront of knowledge, yet try to benefit from the research ecosystem, in the summer of 2019, the NSF entrusted the independent science advisory group, JASON, to investigate the value of openness and the risks related to fundamental research in general. This commission was also intended to secure the opinions of experts about the discussion of open science and the security of science, and to develop a better understanding of the threat caused by foreign governments which act against the doctrine of scientific ethics and research integrity.²⁷ At the same time, the NSF is seeking outstanding initiatives which could be practiced by academic researchers and fund allocators like the NSF in order to balance the open environment of fundamental research with the need for national security and economic security.²⁸

In December 2019, JASON published the JASON Report, which summarized the results of the investigation.²⁹ While it is necessary to secure foreign researchers, the report pointed out that the conduct of foreign countries has raised concerns about the impact on U.S. academia. It recommended the inclusion in research integrity of the disclosure of any research-related conflicts of interest or commitment and that strict measures should be taken when they are not disclosed.³⁰ The JASON Report emphasized response from the viewpoint of risk management, recommending that “NSF should adopt, and promulgate to all stakeholders, project assessment tools that facilitate an evaluation of risks to research integrity for research collaborations and for all non-federal grants and research agreements.”³¹ In addition, a catechism for fundamental research was indicated,³² stating that “These questions can be thought of as an assessment tool meant to develop a fuller understanding of the engagement before a decision is made.”³³ The report also stated that “a representative of a university or laboratory may consider a similar set of questions, modified

²⁶ U.S. Senate Permanent Subcommittee on Investigations, 2019. “Threats to the U.S. Research Enterprise: China’s Talent Recruitment Plans.” p.6, 8.

²⁷ National Science Foundation, 2019. “Statement on NSF’s commitment to secure, open international research collaboration.” Accessed January 14, 2021. https://www.nsf.gov/news/news_summ.jsp?cntn_id=298852&org=NSF.

National Science Foundation, 2019. “NSF releases JASON report on research security.” Accessed January 14, 2021. https://www.nsf.gov/news/news_summ.jsp?cntn_id=299700.

National Science Foundation, 2020. “National Science Foundation Response to the JASON Report ‘Fundamental Science and Security’.” Accessed January 7, 2021. https://nsf.gov/news/special_reports/jasonsecurity/NSF_response_JASON.pdf. p.1.

²⁸ Same as the above. p.1.

²⁹ National Science Foundation, 2019. “Fundamental Research Security.”

³⁰ Same as the above. p.40.

³¹ National Science Foundation, 2019. “Fundamental Research Security.” p.41.

³² Same as the above. p.34.

³³ Same as the above. p.35.

to reflect the risks such institutions face.”³⁴

In March 2020, the NSF released its response to the JASON Report.³⁵ The response included a policy of recognizing the importance of disclosing information, updating the application format of research proposals of the NSF, clarifying the disclosure requirements, and taking necessary measures to cope with breaches. These measures are designed to enable a research institution to determine potential conflicts of interest or commitment and to enable the NSF to determine any potential capacity or overlap issues.³⁶ Accordingly, the NSF introduced the revised version of “Proposal and Award Policies and Procedures Guide (PAPPG),” effective from June 1, 2020.³⁷ In November 2020, the DOE announced that it would seek to use the NSF application format.³⁸

In June 2020, the OSTP published a report entitled “Enhancing the Security and Integrity of America’s Research Enterprise,”³⁹ which gives specific examples of risks to research security and research integrity, and risks associated with foreign government-sponsored talent recruitment programs, as well as related U.S. government activities.

The “Presidential Memorandum on United States Government-Supported Research and Development National Security Policy,” published in January 2021, has taken direct action “to strengthen protections of United States Government-supported Research and Development (R&D)” against “foreign government interference and exploitation.” To protect R&D, it called for “steps to ensure that participants with significant influence on the United States R&D enterprise fully disclose information that can reveal potential conflicts of interest and conflicts of commitment.”⁴⁰ Specifically, it instructs executive departments and agencies that fund R&D activities (funding agencies) to require appropriate information from researchers and research institutes that makes it possible to determine whether there are conflicts of interest and commitment, and to “cooperate with organizations receiving Federal funds to ensure that the organizations have established and administer policies and processes to identify and manage risks to research security and integrity.” Furthermore, it points out that “some foreign governments, including the People’s Republic of China, have not demonstrated a reciprocal dedication to open scientific exchange, and seek to exploit open United States and international research environments . . . thereby increasing their economic and military competitiveness,” and it states that United States will take steps, “[w]hile maintaining an open environment to foster research discoveries and innovation.”

³⁴ Same as the above.

³⁵ National Science Foundation, 2020. “National Science Foundation Response to the JASON Report ‘Fundamental Science and Security’.” Accessed January 7, 2021. https://nsf.gov/news/special_reports/jasonsecurity/NSF_response_JASON.pdf.

³⁶ Same as the above. p.3.

³⁷ National Science Foundation, 2020. “Proposal & Award Policies & Procedures Guide (PAPPG), June 2020.” Accessed January 7, 2021. https://www.nsf.gov/pubs/policydocs/pappg20_1/nsf20_1.pdf.

³⁸ The University of Tennessee, Knoxville, 2020. “DoE Office of Science Announces Changes to Proposal Formats.” Accessed March 1, 2021. <https://research.utk.edu/doe-science-announces-changes-to-proposal-formats/>

³⁹ White House Office of Science and Technology Policy, 2020. “Enhancing the Security and Integrity of America’s Research Enterprise.” Accessed January 7, 2021. <https://www.whitehouse.gov/wp-content/uploads/2020/06/Enhancing-the-Security-and-Integrity-of-Americas-Research-Enterprise.pdf>.

⁴⁰ The White House, 2021. “Presidential Memorandum on United States Government-Supported Research and Development National Security Policy.” Accessed February 2, 2021. <https://trumpwhitehouse.archives.gov/presidential-actions/presidential-memorandum-united-states-government-supported-research-development-national-security-policy/>.

(2) Response to information disclosure by research funding agencies

The NSF has requested for some time the details of background information (biographical sketch) including the past career and “current and pending support” when disclosing information related to a solicitation. In addition, as a response to the JASON Report as mentioned above, the PAPPG was revised for applicants to clarify positions without remuneration such as honorary professorships, and information on in-kind grants.⁴¹ The NSF has requested for some time “current and pending support”, but not requested previous support information.

The DOE and NIH also require similar information. There were no detailed instructions on how to complete DARPA background information, but there were detailed instructions on “current and pending support.”

The following is an overview of the measures taken by research funding agencies for information disclosure.

● Subjects of disclosure

Principal Investigator (PI) and senior personnel in charge of external funding.

● Scope of information disclosure requirements

- Background information of researchers

A distinctive feature is that they require information, including past career histories, regardless of whether they were rewarded or not, or whether the position was part-time or honorary. For example, application formats for the DOE and NSF consist of four sections: “Professional Preparation,” “Appointments,” “Products,” and “Synergistic Activities.” In the “Appointments” section, it requires a list of all positions held in universities and research institutes until now (regardless of whether they were remunerated, or whether they were part-time, visiting, or honorary). Regarding the reason for requiring the disclosure of career information, the DOE and NIH cite assessment of researchers’ ability.⁴²

- Information on current and pending support

In the application forms of the DOE and NSF, it is explained that, “the PI and each senior/key person at

⁴¹ For example, description of positions was revised as follows.

PAPPG introduced in February 2019:

A list, in reverse chronological order, of all the individual’s academic/professional appointments beginning with the current appointment.

PAPPG revised in June 2020:

A list, in reverse chronological order by start date of all the individual’s academic, professional, or institutional appointments, beginning with the current appointment. Appointments include any titled academic, professional, or institutional position whether or not remuneration is received, and whether full-time, part-time, or voluntary (including adjunct, visiting, or honorary).

National Science Foundation, 2019. “Proposal & Award Policies & Procedures Guide (PAPPG), February 2019.” Accessed March 1, 2021. https://www.nsf.gov/pubs/policydocs/pappg19_1/nsf19_1.pdf.

National Science Foundation, 2020. “Proposal & Award Policies & Procedures Guide (PAPPG), June 2020.” Accessed March 1, 2021. https://www.nsf.gov/pubs/policydocs/pappg20_1/nsf20_1.pdf.

National Science Foundation, 2020. “Significant Changes and Clarifications to the PAPPG.” Accessed January 7, 2021. https://www.nsf.gov/pubs/policydocs/pappg20_1/sigchanges.jsp.

National Science Foundation, 2020. “NSF Proposal and Award Policies and Procedures Guide (PAPPG) (NSF 20-1) Significant Changes & Clarifications Training for the External Community.” Accessed March 1, 2021.

https://www.nsf.gov/bfa/dias/policy/outreach/nsfupdate_pappgtrainingfeb20.pdf.

⁴² Department of Energy, 2020. “MATERIALS AND CHEMICAL SCIENCES RESEARCH FOR QUANTUM INFORMATIN SCIENCE.” Accessed March 1, 2021. https://science.osti.gov/-/media/grants/pdf/foas/2021/SC_FOA_0002449.pdf. p.44.

the prime applicant and any proposed subaward must provide a list of all sponsored activities, awards, and appointments, whether paid or unpaid; provided as a gift with terms or conditions or provided as a gift without terms or conditions; full-time, part-time, or voluntary; faculty, visiting, adjunct, or honorary; cash or in-kind; foreign or domestic; governmental or private-sector; directly supporting the individual's research or indirectly supporting the individual by supporting students, research staff, space, equipment, or other research expenses."⁴³ Regarding the reason for requiring disclosure for current and pending support, the NSF cites assessment of the capacity of the individual to carry out the research as proposed as well as to help assess any potential overlap/duplication with the project being proposed,⁴⁴ and the NIH cites confirmation of effort, duplication (scientific duplication, budget duplication, or duplication of commitment), and budget necessity.⁴⁵

Regarding in-kind grants, in the PAPPG "current and pending support FAQ,"⁴⁶ the NSF defines donations (gifts) as "given without expectation of anything in return", stating that they do not need to be reported. On the other hand, it explains that "An item or service given with the expectation of an associated time commitment is not a gift and is instead an in-kind contribution and must be reported to NSF." It continues, "If the in-kind contribution is intended for use on the project/proposal being proposed to NSF, the information must be included as part of the Facilities, Equipment and Other Resources section of the proposal." Therefore, information disclosure is required for in-kind grants, including facilities and equipment, when a time commitment is expected to occur or when it is intended to be used for a proposal.

In the PAPPG "current and pending support FAQ,"⁴⁷ the NSF states that information on funding classified as "confidential" per the client shall also be disclosed. At the same time, it states, "to the extent allowed by law, NSF does not publicly disclose any information regarding pending proposals" and that "NSF typically does not disclose information in proposals regarding current and pending support from non-U.S. government sources."

DARPA requires "a list of all projects currently being worked on by individuals, irrespective of the recipient, in addition to future grants applied for to be received by individuals," "titles and objectives of other research projects," "percent of effort allocated to other projects per year," "sum of grants received by individuals or if other proposals are adopted for each of the other research projects," "names and addresses of institutions and other parties supporting other research projects," and "duration of other

⁴³ Department of Energy Office of Science Fusion Energy Sciences, 2020. "COLLABORATIVE RESEARCH IN MAGNETIC FUSION ENERGY SCIENCES ON LONG-PULSE INTERNATIONAL STELLARATOR FACILITIES." Accessed January 7, 2021. https://science.osti.gov/-/media/grants/pdf/foas/2021/SC_FOA_0002429.pdf.

⁴⁴ National Science Foundation, 2021. "Frequently Asked Questions on Current and Pending Support PAPPG (NSF 20-1)." Accessed February 19, 2021. https://www.nsf.gov/bfa/dias/policy/papp/pappg20_1/faqs_cps20_1.pdf.

⁴⁵ National Institute of Health, 2019. "NIH GRANTS POLICY STATEMENT 2.5.1 Just-in-Time Procedures." Accessed March 1, 2021. https://grants.nih.gov/grants/policy/nihgps/HTML5/section_2/2.5.1_just-in-time_procedures.htm?Highlight=other%20support.

⁴⁶ National Science Foundation, 2021. "Frequently Asked Questions on Current and Pending Support PAPPG (NSF 20-1)." Accessed February 19, 2021. https://www.nsf.gov/bfa/dias/policy/papp/pappg20_1/faqs_cps20_1.pdf.

⁴⁷ National Science Foundation, 2021. "Frequently Asked Questions on Current and Pending Support PAPPG (NSF 20-1)." Accessed February 19, 2021. https://www.nsf.gov/bfa/dias/policy/papp/pappg20_1/faqs_cps20_1.pdf.

research projects.”⁴⁸ There were no statements requesting information on in-kind payments in the application forms of either the DOE or the NSF.

● Sharing the contents of disclosure with other organizations

There is no change in the handling of sharing disclosed information with other organizations. Grant information can be shared when necessary from the viewpoint of managing grant information and compliance, and almost all information related to application for grants is treated as open information. The NIH, for example, states, “Except for certain types of information that may be considered proprietary or private information that cannot be released, most grant-related information submitted to NIH is considered public information and, once an award is made, is subject to possible release to individuals or organizations outside NIH.”⁴⁹ The reason given for this is that “The statutes and policies that require this information to be made public are intended to foster an open system of government and accountability for governmental programs and expenditures.”⁵⁰ The same explanation is given by the NSF.⁵¹

Proprietary information and the protection of personal information are separately stipulated. For example, the NIH states, “if the application contains information that the applicant organization considers to be trade secrets, information that is commercial or financial, or information that is privileged or confidential, the pages containing that information should be identified as specified in the application instructions” and “[W]hen such information is included in the application, it is furnished to the Federal government in confidence, with the understanding that the information will be used or disclosed only for evaluation of the application.”⁵² Proprietary information is used here as patentable ideas, trade secrets, etc.⁵³ An example of information that the NIH will refrain from disclosing even when requested to disclose information under the Freedom of Information Act (FOIA) is “information pertaining to an individual, the disclosure of which would constitute a clearly unwarranted invasion of personal privacy.”⁵⁴ Similar provisions have been made by the NSF.⁵⁵

● Response to security trade control (managing technology leaks to foreign countries)

The DOE noted that “All entities submitting applications to this FOA must recognize the moral and legal obligations to comply with export controls and policies that limit the transfer of technologies with

⁴⁸ DARPA, 2020. “Broad Agency Announcement Defense Sciences Office Office-wide.” Accessed January 7, 2021. https://beta.sam.gov/api/prod/opps/v3/opportunities/resources/files/1ea1b7612f98463b8f0c71c8bcf22e3d/download?api_key=null&token=

⁴⁹ National Institutes of Health, “2.3.11 Availability and Confidentiality of Information.” Accessed January 7, 2021. https://grants.nih.gov/grants/policy/nihgps/HTML5/section_2/2.3.11_availability_and_confidentiality_of_information.htm.

⁵⁰ Same as the above.

⁵¹ National Science Foundation, 2020. “Chapter III - NSF Proposal Processing and Review.” Accessed January 7, 2021. https://www.nsf.gov/pubs/policydocs/pappg20_1/pappg_3.jsp.

⁵² National Institutes of Health, “2.3.11 Availability and Confidentiality of Information.” Accessed January 7, 2021. https://grants.nih.gov/grants/policy/nihgps/HTML5/section_2/2.3.11_availability_and_confidentiality_of_information.htm.

⁵³ National Institutes of Health, “GENERAL INSTRUCTIONS FOR NIH AND OTHER PHS AGENCIES.” Accessed January 7, 2021. <https://grants.nih.gov/grants/how-to-apply-application-guide/forms-e/general-forms-e.pdf>.

⁵⁴ National Institutes of Health, “GENERAL INSTRUCTIONS FOR NIH AND OTHER PHS AGENCIES.” Accessed January 7, 2021. https://grants.nih.gov/grants/policy/nihgps/HTML5/section_2/2.3.11_availability_and_confidentiality_of_information.htm.

⁵⁵ National Science Foundation, 2020. “Chapter III - NSF Proposal Processing and Review.” Accessed January 7, 2021. https://www.nsf.gov/pubs/policydocs/pappg20_1/pappg_3.jsp.

potential dual use.”⁵⁶

● Other points to note

When there is a false report, it should be dealt with as the policy of the institutes rather than as application guidelines for federal agencies and ministries involved in the allocation of research funds. Specifically, it is stated that those who have noticed a false report must promptly notify the agency and there are explanations that suggest which laws may be violated by a false report.⁵⁷ The laws which are provided are for criminal prosecution regarding such False Claims (18 U.S.C. § 287 False Claims) and False Statements (18 U.S.C. § 1001 False Statements). The prosecution of Dr. Charles Lieber of Harvard University for a false statement is cited as an example case.⁵⁸

Regarding deficiencies in application information, the NSF revised the grant general conditions for undisclosed current support and in-kind contribution information in October 2020. A new requirement added, “if an organization discovers that a PI or co-PI on an active NSF award failed to disclose current support or in-kind contribution information as part of the proposal submission process, the AOR must submit the information outlined in the article within 30 calendar days of the identification of the undisclosed current support or in-kind contribution.”⁵⁹ This can be seen as a relief measure regarding incomplete forms.

(3) How universities handle the situation

Regarding universities in the United States, this investigation has examined private universities such as the Massachusetts Institute of Technology (MIT), Harvard University, and the State University of California, Los Angeles (UCLA). These universities ask for relevant information at various times after recruitment. For example, for annual reports of professional activities outside the university, a large amount of information from the perspective of conflicts of interest and commitment is gathered, such as professors’ personal information, career history, and the effect on foreign countries, as outlined below.

● Subjects of disclosure

At MIT, all professors and staff have to submit an annual report on external professional activities.⁶⁰

⁵⁶ Department of Energy Office of Science Fusion Energy Sciences, 2020. “COLLABORATIVE RESEARCH IN MAGNETIC FUSION ENERGY SCIENCES ON LONG-PULSE INTERNATIONAL STELLARATOR FACILITIES.” Accessed January 7, 2021. https://science.osti.gov/-/media/grants/pdf/foas/2021/SC_FOA_0002429.pdf. p.5. [Editor’s note: FOA stands for Funding Opportunity Announcement].

⁵⁷ National Science Foundation, “Civil/Criminal Investigations.” Accessed January 7, 2021. https://www.nsf.gov/oig/_pdf/brochures/crim.pdf.

National Institutes of Health, “2.3.10 Fraud, Waste and Abuse of NIH Grant Funds.” Accessed January 7, 2021. https://grants.nih.gov/grants/policy/nihgps/html5/section_2/2.3.10_fraud_waste_and_abuse_of_nih_grant_funds.htm.

⁵⁸ Department of Justice, 2020. “Harvard University Professor and Two Chinese Nationals Charged in Three Separate China Related Cases.” Accessed January 7, 2021. <https://www.justice.gov/opa/pr/harvard-university-professor-and-two-chinese-nationals-charged-three-separate-china-related>.

⁵⁹ National Science Foundation, 2020. “REVISION OF THE NATIONAL SCIENCE FOUNDATION (NSF) GRANT GENERAL CONDITIONS (GC-1).” Accessed January 7, 2021. https://www.nsf.gov/bfa/dias/policy/gc1/sigchg_oct20.pdf. [Editor’s note: AOR stands for Authorized Organizational Representative.]

⁶⁰ Massachusetts Institute of Technology, 2017. “Conflict of Interest policy for download.” Accessed November 27, 2020. <https://coi.mit.edu/sites/default/files/uploads/coi-policy-2017-02-23.pdf> p.6.

Also at Harvard University and the UCLA, annual reports on professional activities outside the university (external professional activities) must be submitted by professors.⁶¹ In addition, MIT requires pre-approval for all external professional activities including those that involve a potential conflict of commitment.⁶² UCLA requests a Principal Investigator (PI) to provide additional information on conflicts of interest.⁶³ These measures have been implemented for some time.

● **Scope of information disclosure requirements**

- **Background information of researchers**

At the time of recruitment, researchers are required to provide their name, contact information, and career history, but information on “honorary professorship in foreign countries” is not explicitly requested. At MIT, a request was made to show consideration, such as “not asking questions that could be considered discriminatory,” but it also states that “in some circumstances, a criminal record check may be done for finalists,” if necessary.⁶⁴

- **Information other than background information**

As mentioned above, all universities require the submission of self-reported external expert activities. In addition, each university determines the target group and requests the submission of information based on conflicts of interest and commitment policies.

● **Sharing the contents of disclosure with other organizations**

MIT and UCLA stated that they are able to share and disclose information in order to comply with rules imposed by sponsors (including research funding agencies).⁶⁵

● **Response to security trade control (managing technology leaks to foreign countries)**

Export control divisions have published information on export control, but the MIT in particular has been alerted by the Export Control Division to the possibility that participation in human resources programs may lead to a loss of entitlement to research funds from the federal government.⁶⁶

● **Other points to note**

At all these universities, warnings have been given regarding foreign human resources programs. In

⁶¹ UCLA, 2014, “ANNUAL REPORTING FORM FOR CATEGORY I & II OUTSIDE ACTIVITIES AND ADDITIONAL TEACHING ACTIVITIES.” Accessed January 7, 2021. <https://ucla.app.box.com/s/ee8abr4a24c4hldryxbyhzm0j5ppoxm8>. Harvard University, 2019. “Guidance for Researchers in Addressing Faculty Disclosure & Intellectual Property Protection.” Accessed January 7, 2021. <https://vpr.harvard.edu/disclosure-requirements>.

⁶² Massachusetts Institute of Technology, “4.3 Full-Time Service.” Accessed January 7, 2021. <https://policies.mit.edu/policies-procedures/40-faculty-rights-and-responsibilities/43-full-time-service>.

⁶³ UCLA Research Policy and Compliance, “Foreign Engagement.” Accessed January 7, 2021. <https://rpc.research.ucla.edu/foreign-engagement/>.

⁶⁴ Massachusetts Institute of Technology, “2.5 Interviewing Policies and Procedures.” Accessed January 7, 2021. <https://policies.mit.edu/employment-policy-manual/20-hiring-policies/25-interviewing-policies-and-procedures>.

⁶⁵ Massachusetts Institute of Technology Financial Conflicts of Interest in Research, “Disclosure to Third Parties.” Accessed January 7, 2021. <https://coi.mit.edu/policy/disclosure-third-parties>.

UCLA Research Policy and Compliance, “Foreign Engagement.” Accessed January 7, 2021. <https://rpc.research.ucla.edu/foreign-engagement/>.

⁶⁶ MIT Export Control, 2019. “Talents’ Programs.” Accessed January 7, 2021.

<https://research.mit.edu/sites/default/files/uploads/mit-export-control-guidance-foreign-talents-2019-12-19.pdf>.

addition to the MIT example described above, Harvard University described participation in human resources programs as a high-risk activity.⁶⁷ UCLA stated, based on its Personnel Policies, that professors must report the efforts of their human resources programs annually.⁶⁸

(4) Protection of intellectual property in industry-academia collaboration

Protection of intellectual properties resulting from industry-academia collaboration initiatives has been addressed originally using the patent system and non-disclosure agreement.

JASON Report states “Universities and the U.S. government already have the means of protecting intellectual property through the patent process and non-disclosure agreements. They should be used as needed to protect information and modified if more protection is needed”⁶⁹ and no additional measures are taken at research funding agencies such as NSF.

Meanwhile, as for the information sought by research funding agencies from applicants regarding grants and supply of goods they are currently receiving, the agencies are requesting submission of information including information regarding joint research, etc. in which non-disclosure agreements have been signed.

3. Trends in the United Kingdom

Approach on risks

The Centre for the Protection of National Infrastructure (CPNI) and the National Cyber Security Centre (NCSC) published the “Trusted Research Guidance for Academics” in September 2019. The introductory section demonstrates that foreign funds and human resources account for a great proportion of research in the United Kingdom, emphasizing the importance of international joint research and also “the importance the UK places on the protection of academic freedom, something which is enshrined in law.”⁷⁰

Acknowledging this, it states that “joint research is vulnerable to misuse by organisations and institutions who operate in nations whose democratic and ethical values are different from our own.” Moreover, “it provides those with hostile intent overt access to expertise, IT networks and research,” adding that “these activities may undermine the system of international research collaboration in the UK.”⁷¹

In October 2020, Universities UK (UUK) released “Managing risks in Internationalisation: Security related issues” based on the government’s approach and stated that “collaborations with international partners continue to be vital to the continued success of the UK’s research and innovation sector.”

However, they pointed out that “the risks are increasingly dynamic and growing in complexity. In this

⁶⁷ Harvard University Harvard Medical School, “Talent Programs.” Accessed January 7, 2021. <https://ari.hms.harvard.edu/research-influence/high-risk-activities/talent-programs>.

⁶⁸ UCLA Research Policy and Compliance, “Foreign Engagement.” Accessed January 7, 2021. <https://rpc.research.ucla.edu/foreign-engagement/>.

⁶⁹ National Science Foundation, 2019. “Fundamental Research Security.” p.34.

⁷⁰ Centre for the Protection of National Infrastructure and National Cyber Security Centre, 2020. “Trusted Research Guidance for Academics.” Accessed January 7, 2021. <https://www.cpni.gov.uk/system/files/Trusted%20Research%20Guidance%20for%20Academia.pdf>. p.8.

⁷¹ Same as the above. p.11.

context, institutions will need to review and adapt their risk management processes.”⁷² They also stated, “the governing body and executive leadership of the institution are responsible and accountable for protecting the institution against the threats and risks.”⁷³

How it is handled

The “Trusted Research Guidance for Academics” (September 2019) requires academia to conduct risk assessments in collaboration with new research partners, to take into account ethical, legal and security issues, and the implementation by each research institution of its own security measures. As “How to protect your research,” it states that it is necessary to balance the magnitude of risk and the countermeasures in order to ensure the interests of international research collaboration. This guidance provides a checklist for academia to evaluate new research proposals.

“Managing risks in Internationalisation: Security related issues,” is a guideline published for universities in October 2020, aiming to support universities in protecting faculty members and scholars on their own and to manage the risks associated with internationalisation by themselves. It states that all universities confront such risks, and each university must develop a plan to protect the society they are part of, their reputations and concept of values, the people in the university and its campuses, and the partnerships of which they are members.⁷⁴ Although there is no mention of research funding agencies, in the section, “Conduct due diligence on all international research partnerships”, it states that “In some cases, these processes will be audited by funding organisations, such as United Kingdom Research and Innovation (UKRI).”⁷⁵ It provides a viewpoint on the aspect of decreasing risks by stating, “We strongly recommend that the governing body of the institution receives an annual report on how the institution is managing security-related risks associated with internationalisation, describing the risks faced by the institution and how the risks are being mitigated.”⁷⁶ In addition, in the process of achieving the long-term goals set by the UUK, it aims to improve the awareness and understanding of professors and students regarding security-related issues and to strengthen practical systems, procedures, and actions. Moreover, this is expected to broadly change the resilience of the ecosystems and systems of collaboration between universities and the government.⁷⁷ This guideline provides a checklist for due diligence on international collaborative research.

The UKRI is a research funding agency that does not clearly mention the improper influence of foreign countries on information disclosure related to solicitations. However, it requires information on effort management, duplication, the skills and expertise of the entire project, the costs required for the project, and conflicts of interest. For example, for the purpose of confirming the overall skills and expertise of the project and identifying the costs required, the project partners were instructed that, “all partner

⁷² Universities UK, 2020. “Managing risks in Internationalisation: Security related issues.” p.4.

⁷³ Same as the above. p.6.

⁷⁴ Same as the above. p.4.

⁷⁵ Same as the above. p.42.

⁷⁶ Same as the above. p.10.

⁷⁷ Same as the above. p.10.

contributions, whether in cash or in-kind, should be explained in detail, including the equivalent value of any in-kind contributions. In-kind contributions can include staff time, access to equipment, sites or facilities, the provision of data, software or materials.”⁷⁸ In addition, with the aim of confirming conflicts of interest, the Conflict of Interest section states, “applicants should declare any interests which anyone named on the application (or a senior member of the lead organisation who may be involved in the management of the grant) has with any individual, organisation, project partner or supplier involved in the research, or any interest that might be perceived to influence the applicant’s objectivity in conducting the research.”⁷⁹ The United Kingdom’s response to information disclosure is outlined below.⁸⁰

● **Subjects of disclosure**

Principal Investigator (PI) and Co-Investigator (CoI) in charge of external funding.

● **Scope of information disclosure requirements**

- **Background information of researchers**

The academic curriculum vitae (CV) require a list and explanation of previous positions in addition to the current positions and their funding sources.⁸¹ As noted above, from the perspective of conflicts of interest, this means disclosure of information on any unpaid involvements with organizations that might benefit from it (including advisory positions, officers, and other authorized positions).

- **Information on current and pending support**

Information is sought from the perspective of conflicts of interest in addition to duplication. For instance, in the context of grants, request the inclusion of any research support (financial support and in-kind support) from commercial organizations that may benefit from the outcome of the research, that are not included in the application.

● **Reasons for information disclosure**

Information is required from various aspects such as effort management, duplication, the skills and expertise of the entire project, the costs required for the project, and conflicts of interest.

● **Sharing of the contents of disclosure with other organizations**

No particular instructions.

● **Response to security trade control (managing technology leaks to foreign countries)**

It states their position on dual use research of concern and research misuse.⁸²

⁷⁸ UKRI Medical Research Council, 2020. “Guidance for Applicants 2020.” Accessed January 7, 2021. <https://mrc.ukri.org/documents/pdf/guidance-for-applicants/>.

⁷⁹ UKRI Medical Research Council, “1. Who can apply and how to apply.” Accessed January 7, 2021. <https://mrc.ukri.org/funding/guidance-for-applicants/1-who-can-apply-and-how-to-apply/>.

UKRI Engineering and Physical Sciences Research Council, “Introduction to research grant funding.” Accessed January 7, 2021. <https://epsrc.ukri.org/funding/applicationprocess/fundingguide/introduction/>.

⁸⁰ UKRI Medical Research Council, 2020. “Guidance for Applicants 2020.” Accessed January 7, 2021. <https://mrc.ukri.org/documents/pdf/guidance-for-applicants/>.

⁸¹ Same as the above. p.14.

⁸² UKRI Biotechnology and Biological Sciences Research Council, “MANAGING RISKS OF RESEARCH MISUSE.” Accessed January 7, 2021. <https://bbsrc.ukri.org/documents/misuse-of-research-pdf/>.

4. Trends in Australia

Approach on risks

In recent years, concerns about foreign threats for universities have been hotly debated in Australia as “foreign interference.” The event triggering the debate was information leaks resulting from external hacking of the National University of Australia (Canberra).⁸³ There are concerns that research results and technologies of Australia are leaking to foreign countries due to cyberattacks and other interference in national universities by foreign countries, and it is pointed out that freedom of research and the autonomy of universities are secretly and fraudulently threatened by foreign governments and organizations.⁸⁴

How it is handled

In Australia, governments and universities have developed guidelines together. In August 2019, under the initiative of the Minister for Education and Training, a task force was established and managed by Australian government agencies (the Department of Education and Training, the Australian Security Intelligence Organisation (ASIO), the Department of Home Affairs, the Department of Defence) and the universities. In November 2019, a guideline entitled “Guidelines to Counter Foreign Interference in the Australian University Sector” was published for universities. It explained the risks of intervention by foreign countries and how to deal with them. It does not include any penalties, and its aim is to support the philosophy of university autonomy and to aid the activities of universities. In the era of internationalization of research, collaboration with foreign countries is inevitable. Therefore, rather than dealing with such collaboration in a way that narrows collaboration with foreign countries, risk management that reduces the probability of problems occurring is necessary on the premise of collaborating with foreign countries. As one of the measures, disclosure of information is mentioned. Regarding the implementation of risk management, the following five key themes are indicated: “Framework of Governance and Risk,” “Due Diligence,” “Communication and Education,” “Sharing of Knowledge,” and “Cybersecurity.” These guidelines provide inquiries and best practices for decision-making so that universities can respond based on their own circumstances.

In September 2020, ARC, a research funding agency, revised its “Conflict of Interest and Confidentiality Policy” to require broad disclosure of information on foreign relations.⁸⁵ The following topics were added to the section on disclosure regarding personal interests: “Foreign financial support (cash or in-kind) for research related activities,” “current or past associations or affiliations with a foreign sponsored talent

⁸³ University Foreign Interference Taskforce, 2019. “Guidelines to Counter Foreign Interference in the Australian University Sector.” Accessed January 7, 2021. <https://www.dese.gov.au/uncategorised/resources/guidelines-counter-foreign-interference-australian-university-sector>.

⁸⁴ Center for Research and Development Strategy, JST, 2020. “Integrity in open and internationalized research” p.13.

⁸⁵ ARC, 2020. “ARC Conflict of Interest and Confidentiality Policy Version 2020.1.” Accessed January 7, 2021. <https://www.arc.gov.au/policies-strategies/policy/arc-conflict-interest-and-confidentiality-policy/arc-conflict-interest-and-confidentiality-policy>.

program,” and “current associations or affiliations with a foreign government, foreign political party, foreign state-owned enterprise, foreign military and/or foreign policy organisations.”⁸⁶ Regarding the declaration of interests form for committee members, assessors, and peer reviewers, the following statement was added: “Committee members are required to complete a declaration of interests form upon engagement, including information relating to foreign financial support, foreign affiliations and foreign honorary positions. The obligation to disclose interests is ongoing.”⁸⁷ Regarding information disclosure, the statement that “the ARC may disclose interests to other government agencies for the purposes of grant administration and legislative compliance” was added.⁸⁸ Compared with other countries, this is distinctive in that, in terms of information disclosure of solicitations, detailed descriptions of relationships with other nations are required as a result of the anticipation of improper influence from foreign countries. Australia’s response to information disclosure is summarized below.⁸⁹

● **Subjects of disclosure**

Persons in charge of research (Chief Investigator, Partner Investigator)

● **Scope of information disclosure requirements**

- **Background information of researchers**

Employment records and appointments of the past decade are required. However, there are no clear instructions requesting descriptions of appointments to any jobs that are assumed to involve no financial rewards or efforts, such as honorary professorships. On the other hand, indication of current and past involvement in foreign recruitment programs is required. Descriptions of engagement with current foreign political groups, state-owned enterprises, military organizations, and policy groups are also required.

- **Information on current and pending support**

Only an indication of funding is required, with effort management given as the reason.⁹⁰ However, regarding support from a foreign country, one of the columns requires a description of all the items currently accepted, not only monetary payments but also goods.

● **Reasons for information disclosure**

For the reasons of effort management and foreign influence, the disclosure of financial and non-financial relationships is required.

● **Sharing disclosed information with other agencies**

⁸⁶ Same as the above. 3.1 What to disclose?

⁸⁷ Same as the above. 3.2 ARC committee members, assessors and peer reviewers.

⁸⁸ Same as the above. 4.1 Identifying and evaluating interests.

⁸⁹ ARC, “Discovery Projects For funding commencing in 2019 Instructions.” Accessed January 7, 2021. <https://www.arc.gov.au/grants/grant-application/instructions-and-frequently-asked-questions>.

ARC, “Discovery Projects Application for Funding Commencing in 2022.” Accessed January 7, 2021.

https://www.deakin.edu.au/__data/assets/pdf_file/0003/1852122/DP22-Sample-Application-Form.pdf.

⁹⁰ ARC, “Discovery Projects Application for Funding Commencing in 2022.” Accessed January 7, 2021.

https://www.deakin.edu.au/__data/assets/pdf_file/0003/1852122/DP22-Sample-Application-Form.pdf. p.10.

“Data may be shared with other federal agencies.”⁹¹

● **Response to security trade control (managing technology leaks to foreign countries)**

Including the laws related to the export control, it is stated that, “The Administering Organisation agrees to comply with all Legislation applicable to the performance of this Agreement.”⁹²

5. Trends in Germany

Approach on risks

In Germany, what universities should do is considered to be very important for receiving the full benefits of the internationalization of research. In the written reports related to research integrity, such as Expertenkommission Forschung und Innovation (EFI’s annual report),⁹³ and the Guidelines of the German Rectors Conference (HRK: Hochschulrektorenkonferenz),⁹⁴ the benefits of the internationalization of research are described, as well as how to continue receiving the aforementioned benefits. In October 2020, the EU research ministers held a meeting in Bonn, Germany, to deliberate on the current status of the freedom of European Research Area (ERA) and scientific research. The “Bonn Declaration” was presented and signed to enforce freedom of science and research. Federal Research Minister Anja Karliczek explained that this declaration clearly signaled their adherence to the values that form the foundation of the European Research Area.⁹⁵

On the other hand, German universities are facing the issue of increasing legal requirements and increasing organizational hurdles on the Chinese side when collaborating with Chinese universities and academic institutions. It was pointed out by HRK that China is also trying to exert its influence over the international scientific discourse and higher education overseas, including Germany.⁹⁶ There is also a concern that exchange of knowledge and technology could lead to unilateral outflows of technical know-how, which would weaken Germany’s scientific and economic performance.⁹⁷

How it is handled

⁹¹ ARC, 2020. “ARC Conflict of Interest and Confidentiality Policy Version 2020.1.” Accessed January 7, 2021. <https://www.arc.gov.au/policies-strategies/policy/arc-conflict-interest-and-confidentiality-policy/arc-conflict-interest-and-confidentiality-policy>.

⁹² ARC, “Funding Agreement for funding commencing in 2019.” Accessed January 7, 2021. <https://www.arc.gov.au/grants/grant-application/fundinggrant-agreements/discovery-program-fundinggrant-agreements>.

⁹³ EFI - Commission of Experts for Research and Innovation, 2020. “Report on research, innovation and technological performance in Germany 2020.” Accessed January 7, 2021. https://www.e-fi.de/fileadmin/Gutachten_2020/EFI_Report_2020.pdf.

⁹⁴ HRK, 2020. “Guidelines and standards in international university cooperation.” Accessed January 7, 2021. <https://www.hrk.de/resolutions-publications/resolutions/beschluss/detail/guidelines-and-standards-in-international-university-cooperation/>.

⁹⁵ DWIH Tokyo, 2020. “KARLICZEK: EUROPEAN RESEARCH AREA MUST GUARANTEE THE FREEDOM OF RESEARCH.” Accessed January 7, 2021 <https://www.dwih-tokyo.org/ja/2020/11/24/forschungsfreiheit/>.

⁹⁶ HRK, 2020. “HRK guiding questions on university cooperation with the People’s Republic of China Future-proofing German-Chinese partnerships.” Accessed January 7, 2021. <https://www.hrk.de/press/press-releases/press-release/meldung/hrk-guiding-questions-on-university-cooperation-with-the-peoples-republic-of-china-future-proofing/>.

⁹⁷ EFI - Commission of Experts for Research and Innovation, 2020. “Report on research, innovation and technological performance in Germany 2020.” (Same as the above).

In Germany, the universities are responsible for creating guidelines. In October 2020, HRK issued the “Guidelines and standards in international university cooperation,”⁹⁸ designed to clarify measures from the viewpoint of university governance. The guidelines explain how to deal with overall issues related to research internationalization. Alongside the explanation of the strategies and governance through the published guidelines, HRK released a separate document to explain the guiding questions (questions to encourage discussion),⁹⁹ they ask universities, individual researchers and related groups about the requirements for joint research, objective assessment of the research goals and contents, clarification of the challenges of joint research, and the establishment of research that has potential. When a case is judged unable to follow the guidelines in the periodic review using guiding questions, the university requests a disclosure of information from its partner in the international collaboration. However, as a last resort, universities are required to retain the right to terminate the collaboration in the event that the above-mentioned method does not work.¹⁰⁰

Regarding information disclosure related to solicitations, one research funding agency, DFG, requires an academic resume, surname, first name, and employment conditions (term of the contract, the funding organization in the case of a fixed-term contract). Among the countries investigated, Germany requires the second briefest information after France (see below). In addition, there is no reference to grant applications related to the improper influence of foreign countries.¹⁰¹ Germany’s response to information disclosure is summarized below.

● **Subjects of disclosure**

Individually

● **Scope of information disclosure requirements**

- **Background information of researchers**

For academic CV, there are no clear instructions to describe career records, appointments from which it can be assumed that there was no financial reward or effort, such as honorary professorships.

- **Information on current and pending support**

A specific column is not provided. There is only a column for indicating employment status (term of the contract, the funding organization in the case of a fixed-term contract).

● **Reasons for information disclosure**

None in particular

● **Sharing disclosed information with other agencies**

No particular instructions

⁹⁸ HRK, 2020. “Guidelines and standards in international university cooperation.” (Same as the above).

⁹⁹ HRK, 2020. “HRK guiding questions on university cooperation with the People’s Republic of China Future-proofing German-Chinese partnerships.” (Same as the above).

¹⁰⁰ HRK, 2020. “Guidelines and standards in international university cooperation.” (Same as the above).

¹⁰¹ DFG, 2020. “Proposal Preparation Instructions.” Accessed January 7, 2021. https://www.dfg.de/formulare/54_01/54_01_en.pdf.

- Response to security trade control (managing technology leaks to foreign countries)

There is a column asking applicants whether there is a possibility for the research to become dual-use research or a violation of foreign trade regulations.

6. Trends in France

Approach on risks

No reports or guidelines were found in English at the time of the survey (as of January 7, 2021) which dealt extensively with influence from foreign countries due to the internationalization of research in recent years.

On the other hand, in a Dutch report,¹⁰² there was the following comment:

“In spite of reports about risks and about cases of Chinese espionage and influence in French universities, made by both government organizations and an investigative journalist, there are few indications that there have been wide discussions within or between universities. There is a consensus among universities that a more careful approach is called for, but no guidelines have been brought to the attention of this report’s authors.”¹⁰³

How it is handled

As noted above, there was no significant response.

The Appel à projets générique (AAPG), the main grant program of a research funding agencies, ANR, only request academic resumes as information disclosure related to solicitations, and among all the countries investigated, this was the simplest requirement. In addition, there is no reference to grant applications related to the improper influence of foreign countries.¹⁰⁴ France’s response to information disclosure is outlined below.

- Subjects of disclosure

Responsible research coordinators and research leaders

- Scope of information disclosure requirements

- Background information of researchers

In academic CVs, there are no clear instructions to describe career records, appointments from which it can be assumed that there was no financial reward or effort, such as honorary professorships.

- Information on current and pending support

None in particular

- Reasons for information disclosure

¹⁰² D’Hooghe, I. and Lammertink, J., 2020. “Towards Sustainable Europe-China Collaboration in Higher Education in Research.” Accessed January 7, 2021. <https://leidenasiacentre.nl/wp-content/uploads/2020/10/Towards-Sustainable-Europe-China-Collaboration-in-Higher-Education-and-Research.pdf>.

¹⁰³ Same as the above. p.31.

¹⁰⁴ ANR, 2020. “2021 AAPG Guide.” Accessed January 7, 2021. <https://anr.fr/fileadmin/aap/2021/aapg-2021-guide-v1.0-en.pdf>.

None in particular

● Sharing disclosed information with other agencies

No particular instructions

● Response to the security trade control (managing technology leaks to foreign countries)

None in particular

7. Trends in the European Union

Approach on risks

The European Commission considers the promotion of international collaboration in research and innovation to be a strategic priority. It emphasizes the importance of such collaboration in a variety of respects, including access to the latest knowledge and technology worldwide, and to tackle global social challenges effectively.¹⁰⁵ On the other hand, it states that in order to enable researchers to work together smoothly internationally, a fair and equitable framework must be ensured. Moreover, to avoid any obstacles, efficient international collaboration between nations must be promoted.¹⁰⁶

The European Commission cites the issues of internationalization of research which arise from differences in circumstances between nations in terms of reciprocal access to programs, co-financing mechanisms for co-funding, mutual access to research resources, and efficient and fair intellectual property rights systems.¹⁰⁷

In the EU as a whole, there is a higher level of awareness of the challenges and pressures of collaboration with China. The number of public reports on Chinese interventions is increasing, and the main issues are the securing of academic freedom, unwanted technology transfer, political interference, management of dual-use technology, and research ethics.¹⁰⁸ The EU is developing new guidelines, and it is believed that the finalized version “may provide important input and encouragement for EU member states that have less capacity or a lower sense of urgency to develop national guidelines by themselves.”¹⁰⁹

How it is handled

The European Union has drafted guidelines on “Tackling Foreign Interference in Higher Education Institutions and Research Organisations.” While Dr. Ingrid d’Hooghe¹¹⁰, a senior research fellow at the

¹⁰⁵ European Commission, “International cooperation.” Accessed January 7, 2021. https://ec.europa.eu/info/research-and-innovation/strategy/international-cooperation_en.

¹⁰⁶ the Agency for the Promotion of European Research, “Policy Framework.” Accessed January 7, 2021. <https://www.apre.it/en/international-cooperation/policy-framework/>.

¹⁰⁷ Same as the above.

¹⁰⁸ D’Hooghe, I. and Lammertink, J., 2020. “Towards Sustainable Europe-China Collaboration in Higher Education in Research.” Accessed January 7, 2021. <https://leidenasiacentre.nl/wp-content/uploads/2020/10/Towards-Sustainable-Europe-China-Collaboration-in-Higher-Education-and-Research.pdf>. p.36.

¹⁰⁹ Same as the above. p.40.

¹¹⁰ The author of “Towards Sustainable Europe-China Collaboration in Higher Education in Research” above.

Leiden Asia Centre, emphasized that the EU has no jurisdiction over higher education, she explained that, “The EU is still working on their guidelines, expected in early 2021, and these will probably be guidelines for the member states with suggestions of how they can help universities and other knowledge institutions to better safeguard academic integrity.”¹¹¹

The ERC, one of the research funding agencies of Horizon 2020, requires information disclosure on solicitations to include academic CVs and, although this is limited to research grants, require information on “current and pending support.” However, there were no requests for information on grants received in the past.¹¹² The EU’s response to information disclosure is outlined below.

● **Subject of disclosure**

Principal Investigator (PI)

● **Scope of information disclosure requirements**

- **Background information of researchers**

The academic resume instructs researchers to provide as much information as possible, including their career record. However, there are no clear instructions for descriptions of appointments from which it can be assumed that there was no financial reward or effort, such as honorary professorships.

- **Information on current and pending support**

Only research grants are required to be indicated. However, there is no particular reference to the basis for this requirement.

● **Reasons for information disclosure**

None in particular

● **Sharing disclosed information with other agencies**

There is a statement that “the Commission will treat your proposal confidentially, as well as any related information, data and documents received.”¹¹³

● **Response to security trade control (managing to technology leaks to foreign countries)**

There is a section for providing information on “dual use” or “exports and imports of non-European region.”

8. Trends in Singapore

¹¹¹ University World News, 2000. “Europe sets out what are ‘safe’ research links with China.” Accessed January 7, 2021. <https://www.universityworldnews.com/post.php?story=20201106110010775>.

¹¹² European Research Council, 2019. “Proposal template for ERC Consolidator Grants 2020.” Accessed January 7, 2021. https://ec.europa.eu/research/participants/data/ref/h2020/call_ptef/pt/2018-2020/h2020-call-pt-erc-cog-2020_en.pdf.

European Research Council, 2019. “Information for Applicants to the Starting and Consolidator Grant 2020 Calls.” Accessed January 7, 2021. https://ec.europa.eu/research/participants/data/ref/h2020/other/guides_for_applicants/h2020-guide20-erc-stg-cog_en.pdf.

¹¹³ European Union, “Submit a proposal.” Accessed January 7, 2021. https://ec.europa.eu/research/participants/docs/h2020-funding-guide/grants/applying-for-funding/submit-proposals_en.htm.

Approach on risks

Singapore's leading universities, National University of Singapore (NUS) and Nanyang Technological University (NTU), have published reports and articles on malign foreign influence.¹¹⁴

In particular, NTU issued a report entitled "Countermeasures Against Foreign Interference"¹¹⁵ in which the following three examples of foreign intervention are indicated: "covert funding or coercion," "cyberattacks," and "hostile information campaigns including the spreading of disinformation or biased information." In this report, academics and educational institutions are cited as the targets of "covert funding or coercion."

How it is handled

The NTU report mentions public criticism through media coverage and legislation in response to "covert funding or coercion." However, it also points out that if funding and coercion were done in secret, it would be difficult to identify and track them. The report states that it is vital to study the publicly available cases and to learn from each other's experiences through information exchanges with other like-minded countries, and to gain a deeper understanding of the tactics hostile countries may employ.

One of the Singapore's major research funding agencies, A*STAR, requires information disclosure regarding "current and pending support," although this is limited to grants, in addition to academic resumes. Singapore's response to information disclosure is summarized below.

●Subjects of disclosure

Individuals (Lead PI/Team PI/Co-I/Collaborators)

●Scope of information disclosure requirements

- Background information of researchers

In the academic resume section, current positions, not only the principal position but also other positions including those outside Singapore, are required. Applicants are also instructed to include their employment history.¹¹⁶

- Information on current and pending support

Only research grants are required.¹¹⁷

●Reasons for information disclosure

None in particular

¹¹⁴ NUS, 2020. "Is Singapore ready for malign foreign influence?" Accessed February 12, 2021. <https://fass.nus.edu.sg/srn/2020/01/22/is-singapore-ready-for-malign-foreign-influence/>.

¹¹⁵ NTU, 2020. "Countermeasures Against Foreign Interference" Accessed February 12, 2021. https://www.rsis.edu.sg/wp-content/uploads/2020/04/PR200417_Countermeasures-Against-Foreign-Interference_V2.pdf.

¹¹⁶ A*STAR, 2021. "LOW-CARBON ENERGY RESEARCH FUNDING INITIATIVE (LCER FI) FIRST GRANT CALL 2021." Accessed February 12, 2021. https://www.a-star.edu.sg/docs/librariesprovider1/default-document-library/research/funding-opportunities/lcer-fi-grant-call/annex-a---full-proposal-template.docx?sfvrsn=5ca798d7_0.

¹¹⁷ Same as the above.

- Sharing of disclosed information with other agencies

It is clearly stated that “all information is treated in confidence” and “the information is furnished to A*STAR with the understanding that it shall be used or disclosed for evaluation, reference, and reporting purposes.”¹¹⁸

- Response to security trade control (managing technology leaks to foreign countries)

None in particular

9. Definition of terms in foreign countries

Foreign influence and foreign interference

Australia’s University Foreign Interference Taskforce (UFIT) distinguishes between them and defines them as follows.¹¹⁹

- Foreign interference

Foreign interference occurs when activities are carried out by, or on behalf of a foreign actor, which are coercive, covert, deceptive or corrupting and are contrary to Australia’s sovereignty, values and national interests.

- Foreign influence

All governments, including Australia’s, try to influence deliberations on issues of importance to them. These activities, when conducted in an open and transparent manner, are a normal aspect of international relations and diplomacy and can contribute positively to public debate.

Research integrity

The JASON Report¹²⁰ explains the changes in the concepts of “research integrity” in the history of research at the National Academy of Sciences (NAS) as follows.

Research integrity is a set of ethical standards that undergirds the U.S. research enterprise. Historically the primary focus of research integrity concerns has been on scientific misconduct. In 1992, the National Academy of Sciences (NAS) stated “Misconduct in science is defined as fabrication, falsification, or plagiarism, in proposing, performing, or reporting research.” This definition specifically excluded research errors, differences of opinion, and misconduct unrelated to research. In addition, the NAS definition excluded questionable research practices defined as “. . . actions that violate traditional values of the research enterprise and that may be detrimental to the research process.” The NAS concluded that, at that time, there was not agreement or consensus on the seriousness of such actions.

¹¹⁸ Same as the above.

¹¹⁹ University Foreign Interference Taskforce, 2019. “Guidelines to Counter Foreign Interference in the Australian University Sector.” p.17 Accessed January 7, 2021. <https://www.dese.gov.au/uncategorised/resources/guidelines-counter-foreign-interference-australian-university-sector>.

¹²⁰ National Science Foundation, 2019. “Fundamental Research Security.” p.17.

In 2000, a unified federal policy on research misconduct was promulgated, largely drawing from the 1992 NAS report, and concerned with fabrication, falsification and plagiarism. The reporting policies of the National Science Foundation and Department of Health and Human Services (including NIH) on research integrity have focused on these same topics. In 2017, NAS returned to these issues in the report *Fostering Integrity in Research*. After reaffirming the 1992 recommendations on scientific misconduct, this report noted that research integrity depends on a much broader set of practices by individuals and institutions, including dishonesty and avarice, both pertinent to the topic of this JASON study. The report concluded by urging research institutions, publishers, professional societies, and public and private funding agencies to support a broader landscape of research integrity.

The 2017 *Fostering Integrity in Research* report defined six core values that underlie research integrity: objectivity, honesty, openness, accountability, fairness and stewardship. It also stated that “practicing integrity in research means planning, proposing, performing, reporting, and reviewing research in accordance with the [core] values . . .” These core values are the foundation of what is referred to as the “responsible conduct of research.” We note that many training tools are available to help practitioners adhere to these values in the conduct of their research.

Research security

The OSTP’s report¹²¹ outlines the risks to research security and research integrity and explains the risks to national security and economic security involved in research, which are defined as follows:

- Risk to national security

hidden diversions of research and/or resources that threaten U.S. leadership in emerging science and technology

- Risk to economic security

hidden diversions of research and/or resources that weaken the innovation base and threaten economic competitiveness

10. Domestic trends

Approach to Risks

In Japan, interest in the risks associated with internationalization and openness of research is growing, and an investigation with “research integrity” as its key word is being carried out. The *Integrated Innovation Strategy 2020*, approved by the Cabinet in July 2020, stated that “in view of the concerns of the research community that undue foreign influence may undermine outstanding research activities in Japan and

¹²¹ White House Office of Science and Technology Policy, 2020. “Enhancing the Security and Integrity of America’s Research Enterprise.” Accessed January 7, 2021. <https://www.whitehouse.gov/wp-content/uploads/2020/06/Enhancing-the-Security-and-Integrity-of-Americas-Research-Enterprise.pdf>.

fundamental values of the research environment such as openness and transparency, efforts to autonomously secure soundness and fairness (research integrity) will be vital.”¹²²

How it is handled

In order to understand the extent of risk countermeasures in Japan, the major relevant national laws/regulations and guidelines that relate to risks associated with the internationalization and openness of research are summarized below.

The laws and regulations relevant to security trade control consist of the Foreign Exchange and Foreign Trade Act and the government ordinances based on this law. These laws and regulations are aimed at preventing the proliferation of weapons of mass destruction and the excessive accumulation of conventional weapons, and also at implementing treaties and other international agreements. They also respond to the risks of technology outflows and information leaks. Also, the Unfair Competition Prevention Act is relevant to protection of trade secrets. This aim of this law is to ensure fair competition between businesses and appropriate implementation of international promises. The law responds to risks of technology outflows and information leaks, including technologies not applicable to export trade control.

In February 2006, the Council for Science and Technology Policy (CSTP) came up with the “Appropriate Response to Research Improprieties”¹²³ in response to misconduct in research and the unauthorized use of research expenses. In August 2006, the “Measures to Prevent the Misuse of Public Research Funds (Common Guidelines)”¹²⁴ were determined, and the relevant ministries and agencies were instructed to take action. In order to address these issues, the Liaison Committee of Ministries and Agencies Concerned with Competitive Funding first agreed on the “Guidelines on the Proper Implementation of Competitive Funds” (first issued in September 2005 and revised thereafter). These guidelines cover the rules on Competitive Fund Enterprises concerning the elimination of irrational overlap and excessive concentration of competitive funds, illegal receipt and use of funds, and research misconduct in research papers.¹²⁵ The guidelines and guidance formulated after these developments, as described later, clearly stipulate the implementation of education on research ethics and compliance and are expected to reduce risks by raising researchers’ awareness.

Examples of guidelines regarding misconduct in research include the “Guidelines for Responding to Misconduct in Research” (August 2014) of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the “Guidelines for Responding to Misconduct in Research in the Health and Labor Fields” (January 2015, revised thereafter)¹²⁶ of the Ministry of Health, Labour and Welfare (MHLW). The Ministry of Economy, Trade and Industry (METI) has also formulated the “Guidance for

¹²² Cabinet Office, 2020. “Integrated Innovation Strategy 2020.” p.141.

¹²³ CSTP, 2006. “Appropriate Response to Research Improprieties.”

¹²⁴ CSTP, 2006. “Measures to Prevent the Misuse of Public Research Funds (Common Guidelines).”

¹²⁵ The Liaison Committee of Ministries and Agencies Concerned with Competitive Funding, 2012. “Guidelines on the Proper Implementation of Competitive Funds.”

¹²⁶ MHLW, 2015. “Guidelines for Responding to Misconduct in Research in the Health and Labor Fields.”

Responding to Misconduct in Research”, which proposes countermeasures against misconduct such as fabrication, falsification, and plagiarism.¹²⁷ The MEXT’s and MHLW’s Guidelines list fabrication, falsification, and plagiarism as specific research misconduct, and if such misconduct is confirmed, countermeasures are taken in accordance with the above-mentioned “Guidelines on the Proper Implementation of Competitive Funds.”

Guidelines relating to the misuse of research funds include MEXT’s “Guidelines for Supervision and Auditing of Public Research Funds at Research Institutions (Performance Standards)” (February 2007, revised thereafter),¹²⁸ MHLW’s “Guidelines for Management and Supervision of Competitive Funds at Research Institutions (Performance Standards)” (March 2014, revised thereafter),¹²⁹ and METI’s “Guidance for Responding to Improper Use of Public Research Funds.”¹³⁰ The MEXT’s and MHLW’s Guidelines define misuse as “the use of competitive funds for other purposes either intentionally or by gross negligence, or use in violation of the content of the decision to grant competitive funds or of the conditions attached thereto.” The two above-mentioned guidelines also stipulate that measures in response will be taken if any impropriety regarding competitive funds is confirmed, in accordance with the “Guidelines on the Proper Implementation of Competitive Funds.” In March 2015, the Liaison Committee of Ministries and Agencies Concerned with Competitive Funding agreed on the “Unification of Usage Rules for Competitive Funds.”¹³¹ By unifying various rules, such as the structure of application forms, it is expected that researchers will make appropriate use of research funds.

Guidelines for international collaboration in research include the Cabinet Office’s “Guidelines for Collaboration between Universities and National R&D Corporations with Foreign Companies - Promotion of Collaboration Based on a Proper Approach (Interim Report)” (June 2019)¹³² and the MEXT and METI “Guidelines for Enhancing Industry-Academia-Government Collaboration” (November 2016).¹³³ These guidelines deal with the risks of technology leaks, information leaks, and conflicts of interest and commitment. However, it should be noted that industry-academia collaboration or industry-academia-government collaboration are the main focuses.

While there are various laws, regulations, and guidelines as mentioned above, these have not been formulated due to new risks that are becoming obvious in foreign countries due to the internationalization and openness of research, and they do not necessarily cover the responses to current risks. Specifically, the kinds of risk assumed to be new risks in Japan will be outlined in Chapter 3, “The Current Situation, Issues,

¹²⁷ METI, 2007. “Guidance for Responding to Misconduct in Research.” Ministry of Internal Affairs and Communications, 2015. “Guidance for Responding to Misconduct in Research in the information and communication field(third edition3).”

¹²⁸ MEXT, 2007. “Guidelines for Supervision and Auditing of Public Research Funds at Research Institutions (Performance Standards).”

¹²⁹ MHLW, 2014. “Guidelines for Management and Supervision of Competitive Funds at Research Institutions (Performance Standards).”

¹³⁰ For example: METI, 2008. “Guidance for Responding to Improper Use of Public Research Funds.” Acquisition, Technology & Logistics Agency, 2015. “Guidance for Responding to Misconduct in Research with Competitive Funding.”

¹³¹ The Liaison Committee of Ministries and Agencies Concerned with Competitive Funding, 2017. “Unification of Usage Rules for Competitive Funds.”

¹³² Cabinet Office, 2019. “Guidelines for Collaboration between Universities and National R&D Corporations with Foreign Companies - Promotion of Collaboration Based on a Proper Approach” (Interim Report).”

¹³³ MEXT and METI, 2016. “Guidelines for Enhancing Industry-Academia-Government Collaboration.”

and Direction of Response in Japan.”

With respect to competitive funding programs undertaken by research funding agencies in Japan, and regarding the disclosure of information pertaining to solicitations, measures are taken in accordance with the “Guidelines on the Proper Implementation of Competitive Funds”¹³⁴ and the “Unification of Usage Rules for Competitive Funds.”¹³⁵ Japan’s response to information disclosure is outlined below.

●Subjects disclosure

Researcher representatives and research assignees

●Scope of information disclosure requirements

- Background information of researchers

As for basic information on researchers, the use of the form “Unification of Usage Rules for Competitive Funds” is required. The format requires various information such as the research institute, department, job title, current expertise, degree (final education completed), division of roles, and effort. There are no clear instructions to describe career record or appointments from which it can be assumed that there was no financial reward or effort, such as honorary professorships.

- Information on current or pending support

When applying, the applicant must state some common factors (name of grant, research subject, support entities, budget amount, effort, etc.) concerning the status of application and acceptance of other competitive funds also by other ministries and agencies.

●Reasons for information disclosure

It is intended to eliminate irrational duplication and excessive concentration, to deal with fraudulent receipt and misuse, and also to take measures against research misconduct in papers.¹³⁶

●Sharing disclosed information with other agencies

By using a common system, it is possible to share information on the research subjects to be adopted among the divisions in charge of competitive funding and to confirm the unreasonable duplication or excessive concentration of funds. Shared information involves the support entities, name of researcher, organization to which the researcher belongs, research subject, research outline, and amount of budget. When sharing information, the extent must be minimized, for example by limiting persons who have access to such information.¹³⁷

●Response to security trade control (managing technology leaks to foreign countries)

¹³⁴ The Liaison Committee of Ministries and Agencies Concerned with Competitive Funding, 2012. “Guidelines on the Proper Implementation of Competitive Funds.”

¹³⁵ The Liaison Committee of Ministries and Agencies Concerned with Competitive Funding, 2017. “Unification of Usage Rules for Competitive Funds.”

¹³⁶ The Liaison Committee of Ministries and Agencies Concerned with Competitive Funding, 2012. “Guidelines on the Proper Implementation of Competitive Funds.”

¹³⁷ Same as the above.

The application guidelines state that when research institutions carry out their various research activities, including the relevant contract research, they are required to take organizational measures to ensure that research results that could be used for military purposes do not fall into the hands of people who could carry out fearful activities such as developers of weapons of mass destruction or terrorist groups.

Chapter 3 Current Situation, Issues, and Direction of Response in Japan

1. Cases assumed to be new risks

We sorted out new risks, concerns for which have been growing along with increasing internationalization and openness of research, by referring to measures taken and cases observed overseas and taking conceivable cases into consideration.

As for new risks, we consider only the primary risks caused by undue impact exerted by foreign countries and do not include secondary risks such as the risk of manufacturing or other markets being taken over due to the spreading of a problem or the risk of industry-academia collaborations and international collaborations becoming inactive in response to excessive self-imposed control. We also referred to the cases in foreign countries identified in 2. Domestic and Overseas Trends. As a result, we listed the following new risks.

- Risk of inappropriate management of conflicts of interest and commitment
- Risk of research interference
- Risk that leads to technology and information leaks
- Risk of impact on research and education
- Risk of deterioration of trust

Reference Material 1 shows the cases of above risks that may occur in Japan.

Reference Material 1 Anticipated cases

Anticipated Cases (1)	
Risk	Anticipated cases in Japan
	<p>Researcher A, working at a Japanese university, is receiving <u>grant from a research funding agency in Japan</u>. Researcher A <u>participated in a recruitment program of a foreign government</u> and was holding <u>a post in the same field at a foreign university</u>, but failed to disclose that information when applying for the grant in Japan, which <u>revealed that conflicts of interest and commitment were not managed appropriately</u>.</p> <p>Researcher B, working at a Japanese university, is receiving <u>grant from a research funding agency in Japan</u>. Researcher B <u>upon receiving grant from abroad, had established a laboratory abroad that carries out the same research as the laboratory which the said researcher belongs to in Japan</u>, but had failed to disclose these details when applying for grant in Japan, which <u>revealed that conflicts of interest and commitment were not managed appropriately</u>.</p> <p>Laboratory O of a Japanese university is receiving <u>grant from a research funding agency in Japan</u>. <u>A professor at Laboratory O is participating in a recruitment program of a foreign government</u> and the contract requires the professor to <u>accept students from that country every year</u>. When <u>the foreign students</u> who conducted research at Laboratory O returns to his/her home country, <u>the research results could become the property of that country</u>, making the ownership of the research results ambiguous for the country which is providing public funds.</p> <p>Laboratory P of a Japanese university is carrying out <u>joint research with a foreign research center</u>. A joint research agreement was signed, according to which any results pertaining to the joint research shall be announced after obtaining prior confirmation from the opposite party. However, a student at the foreign laboratory <u>announced the latest results</u> at an academic conference <u>without prior confirmation</u>. As a result of that, a third party who saw that announcement expedited its own research based on the announced results, and <u>Laboratory P lost its superior advantage</u>.</p>
Risk of inappropriate management of conflicts of interest and commitment	<p>Researcher at University of California San Diego, who received \$10 million a year from NIH for 11 years, had failed to disclose that he was the founder and major shareholder of a biotech company in China that specializes in the said researcher's research field, and that he was participating in a recruitment program of a foreign government, and resigned because of conflicts of interest and commitment. ^a</p> <p>A member of China's Thousand Talents Plan signs a legally binding contract with a university, research institution, etc. in China. Such a contract could motivate members to provide false details when applying for grants from U.S. organizations, set up shadow labs that carry out the same research work as they are doing in the U.S., or even transferring the intellectual capital gained with great difficulty by U.S. scientists. ^b</p> <p>There are contracts that explicitly ask members of China's Thousand Talents Plan to recruit more students for training or for hiring. These students will work under these members in the U.S. This method enables Chinese authorities to place additional members of the recruitment program under the management of members who are already in the U.S. ^c</p>
Risk of research interference	<p>If the research is hindered (or suffers a loss), the individual researcher will be constricted in his or her ability to announce the results first or to gain acclaim for the intellectual property which is the result of his or her research. This could potentially have an adverse effect on the researcher's reputation and the impact of his or her research. ^d</p>
	<p>a. White House Office of Science and Technology Policy, 2020. "Enhancing the Security and Integrity of America's Research Enterprise." Accessed January 7, 2021. https://www.whitehouse.gov/wp-content/uploads/2020/06/Enhancing-the-Security-and-Integrity-of-Americas-Research-Enterprise.pdf, p.12.</p> <p>b. U.S. Senate Permanent Subcommittee on Investigations, 2019. "Threats to the U.S. Research Enterprise: China's Talent Recruitment Plans," p.2.</p> <p>c. Same as the above, p.28.</p> <p>d. Centre for the Protection of National Infrastructure and National Cyber Security Centre, 2020. "Trusted Research Guidance for Academics." Accessed January 19, 2021. https://www.cpni.gov.uk/system/files/Trusted%20Research%20Guidance%20for%20Academia.pdf, p.13.</p>
	<p>Similar cases (including anticipated cases in various reports)</p>

Anticipated Cases (2)

Risk	Anticipated cases in Japan	Similar cases (including anticipated cases in various reports)
<p>Risk that leads to technology and information leaks</p>	<p>Researcher C, working at a Japanese university, is receiving grant from a research funding agency in Japan, but newly joined a foreign recruitment program and started receiving grant from overseas institution based on that agreement. Researcher C was instructed to hand over research information in return, and Researcher C sent the data from research being conducted with Japanese grant to the foreign institution. This data was pertaining to fundamental research being conducted on the premise of the disclosure of those results. The Japanese university and the research funding agency were not aware that Researcher C decided to participate in a foreign country's foreign recruitment program.</p> <p>Laboratory Q of a Japanese university is engaged in joint research with Japanese businesses and venture businesses which started at universities. Without Laboratory Q's knowledge, these businesses were collaborating with and leaking research information to foreign organizations.</p>	<p>The U.S. Department of Justice indicted Dr. Charles Lieber, Chair of the Department of Chemistry and Chemical Biology Department at Harvard University, on counts of false statements. Dr. Lieber received more than \$15 million in grant from U.S. NIH and DOD. At the same time, he participated in China's Thousand Talents Program and received \$50,000 a month from Wuhan University of Technology under the contract and in return was sought to publish papers under the name of Wuhan University of Technology. He made false statements and caused Harvard University to deny his involvement in the Thousand Talents Program and affiliation with Wuhan University of Technology in the investigation of Harvard University conducted by NIH.^e</p> <p>A postdoctoral researcher working for the National Laboratory of DOE in the U.S. was selected for China's Thousand Talents Program and soon after gained a professional position in China. An investigation by DOE revealed that the researcher took a large amount of data that was not specified as confidential in the form of electronic files before departing for China. Information such as presentations, technical papers, research, and charts were uploaded to a cloud storage with a personal account from the network of the National Laboratory.^f</p>

e. Department of Justice, 2020. "Harvard University Professor Indicted on False Statement Charges." Accessed January 7, 2021. <https://www.justice.gov/opa/pr/harvard-university-professor-indicted-false-statement-charges>.

f. U.S. Senate Permanent Subcommittee on Investigations, 2019. "Threats to the U.S. Research Enterprise: China's Talent Recruitment Plans." p.74.

Anticipated Cases (3)

Risk	Anticipated cases in Japan	Similar cases (including anticipated cases in various reports)
Risk of impact on research and education	<p>In a review of a solicitation for research by a Japanese research funding agency, a reviewer with strong ties with a certain foreign country gave high marks to an international project involving a university of the country and tried to discourage the selection of proposals from research fields in which the country is focusing so as to give advantage to the country in the review.</p> <p>At a Japanese university, a professor with authority over research management adopts research theme composition conforming to priority matters of a certain foreign country and gives priority to supporting exchange and cooperation with a certain country.</p> <p>A foreign professor at a Japanese university is engaged in education and research activities based on the idea of the professor's native country. As a result, Japanese students acquired knowledge and ideas that are different from Japanese education policies and basic plans.</p>	<p>Professor Steven X Ding belonging to Tianjin University, when serving as the vice president of a German university, commented that, "I manage scientific research at the university . . . I can introduce advanced technologies to China, assist communication, exchange and cooperation . . ." ^g</p>
Risk of deterioration of trust	<p>Researcher D working for a university in Japan was participating in a recruitment program outside Japan, but the researcher did not report the fact when applying for a solicitation for research by a research funding agency in Japan because he thought it would be disadvantageous in review. As a result, it was pointed out that the researcher made false statements and led to a decline of trust in the person.</p> <p>Researcher E working for a university in Japan was a professor emeritus at a foreign university, but he did not disclose that information when applying for a solicitation for research by a research funding agency because he was not receiving compensation from the foreign country and did not have related efforts. He did not have any special intentions but was suspected of conflict of interest and the incident led to a decline of trust in the person.</p>	<p>The U.S. Department of Justice indicted University of Kansas Associate Professor Feng Tao for the fraud of failing to disclose conflict of interest. Tao was receiving research grants from U.S. DOE and NSF while under a contract to work full-time for Fuzhou University in China, but he concealed the contract with China from the U.S. university and organizations. ^h</p>

g. Australian Strategic Policy Institute, 2020. "Hunting the Phoenix." Accessed January 7, 2021. <https://www.aspi.org.au/report/hunting-phoenix>.

h. Department of Justice, 2019. "University of Kansas Researcher Indicted for Failing to Disclose Conflict of Interest with Chinese University." Accessed January 7, 2021. <https://www.justice.gov/opa/pr/university-kansas-researcher-indicted-failing-disclose-conflict-interest-chinese>.

2. Suggestions from cases and measures in other countries

New risks, concerns for which are growing, could occur when promoting international collaboration and it is not possible to uniformly eliminate these risks. Therefore, it is important to take risk management approach to reduce and control risks while highlighting the increasing importance of research internationalization and openness, instead of aiming to achieve zero risk.

Japan has been working on this risk management approach to address conflicts of interest and commitment in industry-academia collaborative activities. In addition to autonomy of researchers, research organizations have been implementing independent management through measures such as monitoring and assurance of transparency through information disclosure. In other words, along with promotion of industry-academia collaborative activities, Japan has been implementing appropriate measures against conflicts of interest and commitment by carrying out risk management; promotion of activities and implementation of measures are two halves of the same whole. Moreover, Japan has been taking risk management approach with respect to risks related to collaboration with foreign businesses.

University associations and government organizations in various foreign countries have presented anticipated cases and check items to help research organizations and research funding agencies respond to new risks associated with increasing internationalization and openness of research, and they are believed to have been generating a certain level of effect in promoting risk awareness, etc.

Examples:

JASON report: A catechism for fundamental research¹³⁸

Australian guidelines: Questions to guide decision-making (as part of due diligence)¹³⁹

Universities UK reports: checklists (Due diligence on international research partnerships)¹⁴⁰

UK CPNI, NCSC guidance: Checklist: Evaluating research proposals¹⁴¹

3. Direction of response

Taking into consideration the aforementioned new risks and the responses by other countries, first of all, it is important that researchers and research organizations in the research community share the understanding that there are risks that could hinder smooth research activities in international collaboration and taking action against them is indispensable for protecting the values that form the foundation of research environment such as openness and transparency. Subsequently, it is necessary to aim for the creation of internationally trusted research environment through promotion of international collaboration with assured transparency and accountability based on “research integrity” as an autonomous code of conduct to be

¹³⁸ National Science Foundation, 2019. “Fundamental Research Security.” p.34-36.

¹³⁹ University Foreign Interference Taskforce, 2019. “Guidelines to Counter Foreign Interference in the Australian University Sector.” Accessed January 7, 2021. <https://www.dese.gov.au/uncategorised/resources/guidelines-counter-foreign-interference-australian-university-sector>. p. 14-19.

¹⁴⁰ Universities UK, 2020. “Managing risks in Internationalisation: Security related issues.” p.56.

¹⁴¹ Centre for the Protection of National Infrastructure and National Cyber Security Centre, 2020. “Trusted Research Checklist for Academia.” Accessed January 18, 2021. https://www.cpni.gov.uk/system/files/Trusted%20Research%20Checklist%20for%20Academia_0.pdf.

adhered by researchers and research organizations in the research community. Therefore, premised on the risk management approach and based on discipline of researchers and autonomy of the research community, the basic direction of response to new risks is to strengthen responses by ensuring transparency through declaration, reporting, and update of information on one's own research activities to the organization to which one belongs to, having research organizations and research funding agencies play appropriate roles, implement management with a sense of responsibility, and getting involved in prevention.

Further, it is also important that the government presents the necessity of addressing risks as a policy request so as to enable Japan to continue research activities in the international research community, and it is also necessary for the government to develop and review relevant guidelines by referring to the measures taken by various countries.

Taking into consideration the above, we sort out the concrete measures for ensuring transparency in Chapter 4.

Chapter 4 Concrete Measures for Ensuring Transparency

- The appropriate response to new risks discussed earlier is indispensable for removing doubts that researchers and research organizations may not be taking social responsibilities adequately and as a result preventing obstructions to promotion of research internationalization and openness. It is important to ensure transparency of research activities as an autonomous code of conduct to be followed by the research community made up of researchers and research organizations. In that sense, researchers and research organizations who are receiving public support, such as public research funds and tax incentives, must be mindful that they are broadly accountable to the public for appropriately carrying out their research.
- There are concerns that the values forming the foundation of research environment such as openness and transparency would be damaged or danger that researchers may unintentionally commit conflicts of interest or commitment, due to new risks associated with increasing internationalization and openness of research. Under such circumstances, it is important that researchers and research organizations in the research community take initiative in appropriately managing new risks, continue to autonomously protect the values that form the foundation of research environment, and protect themselves from ending up in unintended, inappropriate situations. This also leads to prevention of stagnation of industry-academia and international collaboration stemming from implementation of excessive responses such as self-imposed control.
- International joint research with diverse partners is indispensable for strengthening Japan's science, technology, and innovation. As we discussed in Chapter 1, given the international trend of requiring improvement in transparency of research activities, it is becoming even more important that Japan presents its situation of ensuring transparency of researchers and research organizations to the world, also from the perspective of enabling the country to continue implementing necessary joint research with other countries.
- Currently, researchers disclose necessary information to universities and research institutions (organizations to which researchers belong to including universities, joint-university research institute collaborations, national institutions, and businesses) which are their employers and submit necessary information for application to research funding agencies when applying for research funds. It is necessary to appropriately disclose information regarding new risks and perform risk management from the perspective of ensuring transparency of research activities and coping with doubts and situations arising without malicious or other intent. As we sorted out in the previous chapter and similar to industry-academic collaborative activities, internationalization and openness can be promoted while responding to risks that they may entail if research organizations implement management, ensure transparency, and manage risks based on information disclosed by researchers, instead of eliminating activities across the board.
- Therefore, it is a premise that researchers ensure transparency of their activities with their own

discipline and self-responsibility. Based on the idea that information associated with researchers' research activities should first be grasped and managed autonomously by the institutions they belong to, the different responses expected of researchers, institutions they belong to, and research funding agencies and the responses expected of the government to promote these responses are sorted as follows. From the perspective of avoiding a serious situation and fulfilling accountability to the society, everyone involved in research, rather than just some fields, universities, or research institutions, should deepen their awareness and take necessary measures in their respective roles amid increasing internationalization and openness. Moreover, it is necessary to appropriately handle and manage information at organizations which researchers belong to and research funding agencies based on laws and contracts related to the protection of personal and other information. It is also important to appropriately strengthen information security.

1. Response from researchers (appropriate information disclosure)

- Researchers should recognize new risks associated with increasing internationalization and openness of research and understand the importance of ensuring transparency of their own activities and ensuring accountability. Upon recognizing the rising necessity of protecting themselves from new risks as part of external environment, it is important that researchers know the opposite party or participants well and make cautious judgment by utilizing the checklist to be described later and consultation services provided by the organization they belong to, especially when carrying out collaboration with foreign organizations and universities.
- When engaging in concurrent positions or carrying out joint research or contract-based research, researchers are required to appropriately declare, report, and update the content of operations and research they will engage in, information of the other party and participants, funds granted by other institutions, and content and information of support such as facilities and equipment to the organization they belong to in accordance with the organization's regulations.
- In addition, upon applying for public research funds, researchers are expected to appropriately enter and register such information in application documents and various systems including the Cross-Ministerial R&D Management System (e-Rad).
- Researchers are required to proactively participate in public awareness initiatives developed by various entities to be described later so that they also recognize it as their own issues and respond to them. To promote the development of awareness among researchers, it is also thought to be important to consider ways to handle new risks and countermeasures pointed out in this report in e-learning on research ethics, etc.

[Response from the government]

- The government needs to create templates of checklists for researchers and administrative divisions of organizations they belong to, publish and distribute them, and promote development of understanding through briefings and seminars.

2. Response from organizations which researchers belong to (management by universities and research institutions)

- Currently, when universities and research institutions recruit and hire staff, they require applicants to submit a resume based on internal regulations. In addition, the researchers are also required to declare in advance if they wish to gain permission for holding concurrent positions and also when holding joint or contract-based research with private enterprises by accepting research funds. The organizations check the content of the resume and declaration. However, the scope of information the researchers are required to submit and declare is not necessarily clear.
- Amid concerns for new risks resulting from increasing internationalization and openness of research, it is important for universities and research institutions to appropriately grasp and manage the information listed below as part of human resource management of staff belonging to the institutions and organizational risk management from the perspectives of preventing their researchers and themselves from finding themselves in a serious situation, complying with laws and regulations related to managing conflicts of interest, including security trade control, and ensuring accountability to the society.
 - Information regarding career and research history
 - Information regarding organizations and public offices they belong to (including concurrent positions, participation in a foreign recruitment program, position of professor emeritus without employment contract)
 - Information regarding funds and other support from external organization (funds such as subsidies, grants, consigned research funds, joint research funds, donations, travel expense, facilities, equipment, etc.) and content, contracts, participants, collaborators, etc. regarding such activities
- For this reason, universities and research institutions are required to develop rules and management structure related to conflicts of interest and commitment, etc. (including establishment of new rules and structures and necessary reviews of existing rules and structures), request researchers they employ to submit and declare (and upgrade) information clearly, and as an organization, confirm and manage the information submitted and declared by researchers in a similar manner as the case of conflicts of interest and commitment in industry-academia collaborative activities. Based on the information, universities and research institutions are also required to manage related risks including appropriateness of research activities. Moreover, they are required to build a structure necessary for

making appropriate responses when a situation that is factually different is confirmed or when required information is not declared.

- It is also important to develop risk awareness among their staff and encourage them to submit and declare appropriate information. For example, universities and research institutions may familiarize their staff with risks and anticipated cases through training, etc. and prepare and publicize checklists by referring to the templates expected from the government in the future. In this process, universities and research institutions are expected to take efficient and effective responses pursuant to the characteristics and situation of the organization by coordinating with various training initiatives regarding existing research ethics and security trade control and related consultation functions. For example, when confirming career histories, they shall pay attention to researchers' stints at businesses and organizations that have possible involvement in the development of weapons of mass destruction which are on a list compiled and announced by the Ministry of Economy, Trade and Industry (the End User List) or the CHASER Data for Universities provided by CISTEC.

[Response from the government]

- It is necessary to develop an understanding by holding briefings and seminars to exchange opinions with research community and administrative organizations at universities and research institutions and promote initiatives to share gained knowledge and good practices.
- It is necessary to notify and communicate with universities and research institutions about checklist templates and the formulation of rules and structures.

3. Response from research funding agencies (confirmation upon application)

- Currently, in various competitive funding programs, research funding agencies require submission of information regarding application and acceptance of other research funds (including efforts) at the time of application based on the Guidelines for Appropriate Execution of Competitive Funds (agreement by the Inter-Ministry/Agency Liaison Group Regarding Competitive Research Funds) from the perspective of eliminating irrational duplication and excessive concentration of competitive funds.
- Regarding this, the Grants-in-Aid for Scientific Research has been requesting researchers to describe the status of other research funds being received in their applications. However, the handling of such funds from overseas was unclear, and therefore, starting from the Call for Proposals for FY2021 that began in September 2020, it has been made clear that applicants have to describe the status of all

research funds they receive both in Japan and abroad¹⁴². Such initiatives are considered effective also from the perspective of addressing the new risks. Similarly in other public research fund projects, it is necessary to promote appropriate submission of information regarding status of application and acceptance (including efforts) of all research funds, including those from overseas, upon submission of application or signing of a contract.

- However, if a non-disclosure agreement has been signed between universities, national research and development corporations and private enterprises or for joint and contract-based research between existing private enterprises, it is necessary to properly protect trade secrets and rights of the other party. Therefore, it is necessary for research funding agencies to take responses considering such situations.
- From the perspective of confirming whether participants can properly guarantee efforts for the research topic, it is also necessary to request researchers to describe information regarding the organization they belong to and their position (including concurrent positions, participation in a foreign recruitment program, position of professor emeritus without employment contract) irrespective of receiving compensation.
- Moreover, from the perspectives of fulfilling accountability about research and development conducted by public funds, researchers may be required to pledge upon application to research funds that they have appropriately reported and declared the status of accepting support not limited to funds (e.g. facilities and equipment) from outside organizations and information regarding conflicts of interest and commitment such as the details of the other party and participants to the organizations they belong to, based on “research integrity” as autonomous code of conduct. Furthermore, research institutions are required to swiftly report to the funding agency when a question arises about reported or declared contents.
- As for information regarding support not limited to funds (e.g. facilities, equipment and donation) from outside organizations, researchers have already been requested to describe facilities and equipment used in the concerned topic as part of research plan. From the perspective of confirming whether the research topic can be sufficiently executed without irrational duplication and excessive concentration, the government needs to fully study whether or not to seek researchers to submit information regarding facilities and equipment¹⁴³ which require time commitment that are not used for the concerned topic to research funding agencies similar to research funds and clarify the scope of

¹⁴²For other research funding projects, Japan Science and Technology Agency (JST) and Japan Agency for Medical Research and Development (AMED) require applicants to submit information regarding not only competitive funds but also funds from organizations overseas and private foundations as part of the status of accepting other research funds.

¹⁴³ For example research equipment (such as microscopes and analysing devices) provided by private enterprises for a different research collaboration which requires several tens percent of effort, apart from the concerned research topic.

information that needs to be submitted.

- On the premise that researchers appropriately describe these required information upon application, it is necessary that research funding agencies confirm the research topic based on the described information and from the perspectives of legal compliance and whether the research topic for which the application was made can be sufficiently executed without causing irrational duplication or excessive concentration of research funds. It is also necessary that research funding agencies are enabled to verify the information with the organizations to which the researchers belong to as necessary. Upon doing so, research funding agencies should confirm research organizations' status of grasping and managing information and formulation of regulations regarding conflicts of interest and commitment.
- If a factually different situation is confirmed or it becomes clear that required information has not been disclosed after accepting the application, the research funding agency, as the entity allocating research funds, should take appropriate responses separately from the organization to which the researcher belongs to.

[Response from the government]

- It is necessary to revise the Guidelines for Appropriate Execution of Competitive Funds (agreement by the Inter-Ministry/Agency Liaison Group Regarding Competitive Research Funds) and clarify the following points so that they will be reflected in application guidelines by research funding agencies and develop understanding regarding the revision of the guidelines among researchers, universities, and research institutions.
 - (1) In all competitive research fund¹⁴⁴ projects, information currently required from principal investigators and co-investigators at the time of application shall include information regarding all research funds which the researcher is applying for or receiving, including not only competitive funds in Japan but also funds such as subsidies, research grants, joint research funds, and consigned research funds, as well as information regarding the organization they belong to and their position (including concurrent positions, participation in a foreign recruitment program, the position of professor emeritus without employment contract) from the perspective of eliminating irrational duplication and excessive concentration.
 - (2) The information acquired in (1) shall be shared appropriately among ministries, agencies, and research funding agencies involved in the competitive research fund project by utilizing Cross-ministerial R&D Management System (e-Rad), etc.
 - (3) Researchers shall pledge that the researcher has appropriately reported and declared information

¹⁴⁴As explained in Terms, it is “the costs and expenses related to research acquired competitively through solicitation of ministries” and includes “competitive funds.”

regarding all research activities he or she is involved in, including support such as facilities and equipment other than donations and funds as well as research funds and concurrently held positions in (1), to the organization he or she belongs to.

Implementing above would enable research funding agencies to confirm whether the research topic for which the application was made would not cause irrational duplication or excessive concentration of research funds and enable efficient execution of the research topic. If it is confirmed that there is irrational duplication or excessive concentration of funds or there is a description that is factually different in the application documents, necessary measures will be appropriately taken as before.

- When this happens, for projects applied not by an individual researcher but by the organization he or she belongs to, it is necessary to sort out and clarify the concrete scope of subject for which information disclosure is sought.
- Moreover, it is expected that concrete policies, including the following perspectives, will be developed and clarified so that requiring researchers to submit information regarding joint research with a non-disclosure agreement to research funding agencies would not constrain the activities of industry-academia collaborative activities.
 - (1) Research funding agencies shall request researchers to only submit information necessary for confirming whether the research topic for which the application was made can be sufficiently executed without causing irrational duplication and excessive concentration of research funds.
 - (2) Staff and reviewers of research funding agencies shall handle the submitted information only for selection and evaluation of the research topic for which the application was made and have confidentiality obligation.
 - (3) Information may be shared among the research funding agency, involved ministries and agencies responsible for the competitive research funds, and the organization to which the applicant belongs to, if there are unclear points in the information submitted. Those whom the information are shared with shall promise confidentiality.
- Further, it is hoped that the concept of utilization of Cross-ministerial R&D Management System (e-Rad) is studied promptly under the leadership of the Cabinet Office, also from the perspective of reducing burden on researchers and the organizations they belong to, and that the function of e-Rad will be strengthened.
- As for the response from the organizations which researchers belong to, described in number 2, while keeping in mind the international discussion on research integrity, it is necessary for the government to encourage and support the organizations. The reason is for the organizations to develop rules and management structure related to issues including conflicts of interest and commitment. In addition, to

request hired researchers to submit and declare (including updating) information clearly, then confirm and manage the information as an organization and manage related risks including appropriateness of research activities.

Chapter 5 Summary

In this report, taking into consideration the trends in Japan and abroad along with increasing internationalization and openness of research, we sorted out responses that are currently conceivable regarding “research integrity” as an autonomous code of conduct to be adhered to by researchers and research organizations in the research community and improvement of transparency of information regarding research activities to ensure “research integrity”. In particular, we indicated the necessity of strengthening responses as an autonomous code of conduct for researchers and research organizations such as ensuring transparency of research activities and accountability amid increasing internationalization and openness in addition to the responses related to research misconduct, conflicts of interest and commitment in industry-academia collaborative activities, and legal compliance such as security trade control, for which actions have been made. Moreover, under the concept that it is necessary to appropriately disclose information related to newly emerging risks and implement risk management from the perspective of ensuring transparency of research activities and coping with doubts and situations arising without malicious or other intent, we sorted out details which research funding agencies shall confirm as the entity that allocates public funds provided that researchers disclose information appropriately themselves and organization the researchers belong to handles management.

Going forward, we would like to urge the government to establish concrete measures early on, taking into consideration this proposal, by continuously holding dialogue with research community and industry through briefings and seminars for universities, research institutions and private enterprises, and sharing information regarding actual measures taken by research institutions and research funding agencies of the countries with which Japan shares values (including U.S., Europe, and neighboring countries in Asia, etc.) and the cases of undue impact of foreign countries, while also paying attention to the objectives and characteristics of organizations and projects. In doing so, it is important to give consideration to the burden on the research community from the perspective of research power, whereas a new response is expected in the research community amid growing hopes from the society. The government, universities and research institutions, and funding agencies are required to give consideration to the research environment where researchers are able to concentrate on their research and development activities, in conjunction with gaining the confidence by taking measures for further promoting internationalization and openness in research. Furthermore, it is also important to carry out necessary studies and reviews while following up on the status of response through questionnaire surveys to universities and research institutions.

It is important to ensure “research integrity” that is in harmony with that of other countries so that Japanese researchers and research institutions can implement necessary international joint research by respecting the principle of open science and maintain and strengthen their international competitiveness. It is essential for the government to mutually share the status of initiatives and issues with the governments of other countries with which we share values and continue to engage in necessary investigation in the future.

Reference Material 2 Checklist for new risks associated with increasing internationalization and openness of research (model)

1. Overall

- Does your organization have a system for paying attention to the risks of conflicts of interest and commitment, deteriorating trust, and technology and information leaks resulting from joint research with foreign organizations and universities, human resource exchange, and information sharing, and taking appropriate responses as needed?
 - When you feel that you are facing the above risks, is there a help desk for consultation in your organization?
 - Does your organization provide you with opportunities for education and training regarding the abovementioned risks?
 - Does your organization have a system for grasping cases which could have an impact and responding to them?

- Upon recognizing the above risks, does your organization receive disclosure of background information of its researchers and staff (nationality, career history, research history, all organizations they belong to and all positions including concurrently held positions [including the position of professor emeritus regardless of compensation], all the support they receive from outside organizations)?

2. Collaboration and agreement with foreign organizations and universities, compensations and goods from foreign countries

- Does your organization carry out some sort of confirmation or assessment when exchanging documents for entering into collaboration (e.g., MOU) or contract with foreign organizations and universities?
 - Are you requested to present documents for such confirmation?
 - Upon confirmation, are you requested to present the members (from your organization and the other party) of the collaboration or contract?
 - Does your organization have a help desk where its researchers and staff can seek advice before exchanging documents?

- When receiving compensation* and goods from foreign organizations and universities, is there a system or consultation service to inform it in advance to the head of the organization and involved parties?
 - Does your organization have a system for grasping the above risks and impact when there are

concerns over it regarding receiving compensation?

* Compensation: research grant, personal grant (scholarship, salary for holding a concurrent position, etc.), one-time grant (prize money, gifts, donation, travel expense, lecturer's fee, fee for writing, commendation, etc.)

- If there is a long-standing collaboration or contract with a foreign organization or university, is there a system for receiving information disclosed by researchers as to whether there are any changes in the members of the opposite party or details of the joint research?
 - Is there a help desk for consultation when there are concerns over the above risks regarding collaboration and contracts with foreign organizations and universities?
- Is there a system that enhances awareness of the above risks among your researchers, staff, and the organizations they belong to also in cases of informal collaboration with foreign organizations and universities or collaboration without the giving and receiving of compensations?
- If researchers or staff members that belong to your organization go on a business trip abroad over a long period of time or frequently, is there a system that allows the organization to appropriately grasp the content and aim of the trip?
- Does your organization have a system to deepen awareness among the organization's researchers to appropriately understand what kind of deliverables are expected in joint research with foreign organizations and universities?
 - Are the organization's researchers and staff in joint research with foreign organizations and universities able to realize the risks of unintended use that could affect the country's national security, economy, or society?

3. Foreign researchers and foreign collaboration partners

- When entering into collaboration or contract with foreign organizations and universities, do you confirm the information regarding the members of the opposite party and the purpose of the collaboration or contract?
- Do you confirm information regarding researchers and staff belonging to the organization with direct authority regarding research such as allocation of research expenses?
- Is there a system for confirming information in advance if a foreign member discloses research content to those other than the members of the other party?

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Project members

PricewaterhouseCoopers Aarata LLC (trustee)

Research Integrity Investigation Committee

The Cabinet Office (entruster)

Investigation and report

Produced by PricewaterhouseCoopers Aarata LLC

Commissioned by the Cabinet Office

List of members of the Research Integrity Investigation Committee

In this study and investigation, we established the Research Integrity Investigation Committee composed of the following members and received opinions.

[Committee members] (in Japanese alphabetical order except for the chair)

Takashi Shiraishi	Chancellor, Prefectural University of Kumamoto (Chair)
Setsuko Aoki	Professor, Keio University Law School
Makoto Asashima	Chairperson, Association for the Promotion of Research Integrity; Academic Advisor and Research Professor, Teikyo University
Hiroaki Ishizuka	Chairman, New Energy and Industrial Technology Development Organization (NEDO)
Takahiro Ueyama	Executive Member, Council for Science, Technology and Innovation
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