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Patent Registration Deferral System and Compensation in the Context of Security
The Issue of the "Secret Patent System"

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Abstract

If a so-called "secret patent system" is to be introduced to prevent the leakage of technology information out of Japan, what are the points of question that should be thoroughly addressed? This paper discusses this question from the perspective of bridging the debate on security trade control and the intellectual property system. As a result, we are making three recommendations. First, the secret patent system should cover only a limited range of sensitive technologies. Second, from the perspective of the purpose of the patent system, a system that grants patents in secrecy is not compatible with the purpose of the patent system and, therefore, should be considered mainly in the form of a registration deferral system. Third, sufficient compensation should be provided in order to provide incentives for secrecy and to mitigate the impact of the disadvantage of the secret patent system on technological development as revealed by empirical studies on the equivalent system in the U.S.

1. Issues raised

Recently, there have been a number of arguments that a secret patent system should be introduced to prevent the leakage of technology information out of Japan.[1][2][3] Presently, the content of patent applications is, in principle, made public after one year and six months. On the other hand, other countries prevent the outflow of sensitive technology with a secret patent system that, based on examinations, restricts the disclosure of patent applications for technologies that can be used for military purposes. The aforementioned argument in favor of the introduction of a secret patent system is based on the idea that Japan does not have such a system and hence that there is a loophole that leads to the outflow of sensitive technologies. This argument stresses the need to establish a secret patent system to manage information concerning

[1] Segawa, Natsuko. 2020. "*Anpo gijutsu koukai kinshi ruuru fujou—himitsu tokkyo de nukeana fusege: kigyou eno hoshou-nado kadai* [Security Technology, Proposed Rules to Prohibit Public Disclosure—Prevent Loopholes with Secret Patents: Compensation for Companies and Other Issues]," Nihon Keizai Shimbun, April 2, page 2.

[2] "*Keizai anpo: interijensu amai nihon, Kokubun Toshifumi Shi* [Economic Security Intelligence Lax in Japan, Toshifumi Kokubun:]," Nihon Keizai Shimbun, electronic edition, September 7. (https://www.nikkei.com/article/DGXMZO63318360R00C20A9EA8000/, last viewed July 7, 2021)

[3] "*Ikase! chizai bijinesu: himitsu tokkyo seido, boeisho no kyouryoku fukaketsu* [Leverage! IP Business: Secret Patent System Requires Defense Ministry's Cooperation]," SankeiBiz, April 7, 2021 (https://www.sankeibiz.jp/macro/news/210407/mca2104070609003-n1.htm, last viewed July 7, 2021).

security-critical technologies in order to prevent the loophole. In fact, G20 member-countries other than Japan and Mexico have a secret patent system or equivalent, which is a major reason for calling for the introduction of a similar system.

If the purpose of the introduction of the secret patent system is to prevent the disclosure of technology information that could be used for military purposes for security reasons, there are several issues that must be considered. The first is whether or not to require the introduction of the first-country application system (a system in which an applicant must first file an application in a country for an invention born in that country), which has been established in the countries that have an introduced secret patent system. Japan presently does not impose the first-country application obligation. Consequently, even if a secret patent system is introduced in Japan, that would not restrict disclosure because applications can be filed directly in other countries. Concerning this loophole, some argue that a first country application system should be also introduced.

Considering this point more deeply, comprehensive management of sensitive technology disclosures would lead to restricting the disclosure of information on the development of sensitive technologies in the private sector because the patent system is not the only means of disclosure. It often happens that technology information is disclosed prior to the filing of a patent application, or even without a patent application filed. Typical methods of disclosure are international conferences and academic papers. There are also cases where technologies are disclosed in the international standardization processes or as part of an open-and-closed innovation strategy. Thus, the introduction of a secret patent system from the perspective of examining the disclosure of all technology information is inseparable from the question of whether the government should impose disclosure restrictions on research and technology information in the private sector in general.

However, conducting a censorship-like screening of all the myriad of technology information that is made public is not appropriate, practically feasible or effective in terms of security control. It is, therefore, not worth considering.

How does the security export control system handle this issue? The list-based control, etc., places restrictions on technology information on the design, manufacture and use of specific goods that are listed on the control list of an international treaty or international export control regime. However, transactions in which the technology is provided in order to make the technology publicly known, and the provision of technology for research in the field of basic science, which is not considered to be technology associated with a particular product, are not subject to the control.[4]

In regards to the former, transactions in which the technology is provided in order to make the technology publicly known, a duty of care is recommended to prevent the use of information by terrorists, etc., as mentioned in the Guidance for the Control of Sensitive Technologies for Security Export for Academic and Research Institutions.[5] This is the same as the duty of care in

[4] The same applies not only to Japan but also to the U.S. (Export Administration Regulations, Part 734.8)

[5] The Guidance states: "Some research findings may contain potential diversion to development, etc., of WMD or other weapons and depending on the content of publishing could lead to consequences that promote proliferation of such weapons...Accordingly, though it is not a legal obligation, it is also important to incorporate provisions based on scientist ethics into compliance with self-directive code of conduct as a scientist and internal compliance procedure as an organization, so the social aspects in light of preventing proliferation of WMD or other weapons as well as based on scientist ethics can be considered." Thus, basically, although academic papers and conference presentations are exempted from the restrictions under the Foreign Exchange and Foreign Trade Law, the a duty of care is

the field of basic science, which will be discussed later. In addition, transactions to provide the minimum technology necessary for filing or registering an industrial property right are also excluded.

The latter, the research activity in the field of basic science, refers to the investigation of principles related to phenomena in the field of natural science that is conducted with theoretical or experimental approaches without the purpose of designing or manufacturing a specific product. However, in practice, it is often difficult to make such distinctions in research activities.

One of the reasons why the regulations on public disclosure appear to be less stringent than those on disclosure to specific parties lies in the difference in the implications of disclosure. Whereas the act of providing confidential information to a specific third party could disrupt the security balance by possibly benefiting the specific country of security concern and cause a serious problem, the information disclosed to the public is disclosed equally to all countries including security allies and friends as well as specific countries of concern.[6] Export control generally calls for control with the former, disclosure to a specific third party, in mind and does not anticipate exhaustive regulation of private-sector disclosure of technology information in general.

In the first place, if the country of concern possesses or has access to the same technology information, there is no point in keeping it confidential. It is important to note that the emerging technology control in the U.S., which has recently become an issue, applies the idea that if the technology can be accessed through other channels, no regulations will be imposed (judgment based on foreign availability). It is meaningless to conceal the information unnecessarily.[7] Furthermore, the patent system encourages the disclosure of inventions because it benefits society as a whole to get technology disclosed at a stage of high uncertainty in order to create innovation, reducing the uncertainty of technology from many different perspectives and having the technology lead to innovation.[8] Unnecessary secrecy of highly uncertain technologies is not desirable from a security point of view, as it may hinder the progress of the technology.

On the other hand, it is obvious that the impact of R&D aimed at the development of highly sophisticated and sensitive technologies should be fully considered before disclosure. The same perspective is shared in the interim report of the Subcommittee on Security Trade Control of the Trade and Commerce Subcommittee of the Industrial Structure Council, released on October 8, 2019, which states: "Regarding the disclosure of R&D results, the United States, as already mentioned, has established restrictions on the disclosure of R&D results as a means of technology management according to R&D categories. On the other hand, there is no such system in Japan that restricts the publication of research results. While there are various media for publication of results, such as papers, academic conferences, and patent applications, it is necessary to consider how the results should be disclosed according to the R&D category from the viewpoint of sensitive technology management, taking into account the balance with the promotion of innovation. At the same time, a mechanism to ensure that those who are restricted from publishing their R&D results are not unfairly disadvantaged should also be considered."

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recommended.

[6] In regards to this point, MITI has not provided any opinion or guidance.

[7] Watanabe, Toshiya. 2019. "*Beikoku kokubou kengenhou 2019 no emaajingu tekunorojii towa nanika—yushutsu kanri gyoumu no kakudai to gijutu seisaku eno eikyou* [What is Emerging Technology under the U.S. National Defense Authorization Act of 2019: The Expansion of Export Control Operations and Its Impact on Technology Policy]," CISTEC Journal, No. 183, pp. 115-214.

[8] Watanabe, Toshiya. 2012. *Inobeta no Chizai Manejimento* [Innovators' Intellectual Property Management], Hakuto Shobo

No disagreement is anticipated that initiatives should be considered from this perspective.

Based on this perspective, this paper discusses what kinds of technology disclosures with significant security risks should be subject to the secret patent system, and what effective measures should be considered.

2. What are the facts in question in the first place?

Although there have long been arguments for the introduction of a secret patent system on the ground that, in general terms, there is no secret patent system as in the cases of other countries.[9] What needs to be clarified first is what legislative facts suffice the amendment of the patent system, i.e., what kind of patents should have not been disclosed. A patent search will reveal that there are many patent applications for weapons, arms, and many other categories that could be used for military purposes. These patents have been disclosed not only in Japan but in many other countries as well, including the United States. Especially, there is a strong argument that the absence of a secret patent system is a problem, citing specific published patents for nuclear development, which is highly sensitive in terms of security export control, as will be discussed later. On the other hand, there is no opinion that all patents for weapons and arms should be restricted from disclosure.

A case that has been cited in relation to nuclear development is the case of the Patent Gazette on Laser Enrichment Technology Developed by the Laser Atomic Separation Engineering Research Association of Japan. When the International Atomic Energy Agency inspected the uranium enrichment experimental facility of the Korea Atomic Energy Research Institute in the summer of 2004, it found the Patent Gazette on Laser Enrichment Technology Developed by the Laser Atomic Separation Engineering Research Association of Japan and reportedly confirmed the actual equipment using this patented technology.[10] The said Association was established by nine electric power companies, Japan Atomic Power Company, Japan Nuclear Fuel Limited, and Central Research Institute of Electric Power Industry for the purpose of conducting research on uranium enrichment technology using the atomic laser method. It was established in April 1987 in accordance with the then Mining and Industrial Technology Research Association Law (the current Technology Research Association Law), with the then Science and Technology Agency (now the Ministry of Education, Culture, Sports, Science and Technology) and the Ministry of International Trade and Industry (now the Ministry of Economy, Trade and Industry) as the supervising authorities. There are 61 published patents filed by the Laser Atomic Separation Engineering Research Association of Japan, mainly for laser devices.

Regarding this issue, there is an argument that Japan should introduce a secret patent system and impose restrictions on patent disclosure because of a "concern that the disclosure of detailed technology information may lead to the spread of sensitive technology outside Japan and its use in the development of weapons of mass destruction."[11]

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[9] Morimoto, Masataka "*Anzenhoshoujou no shiten kara mita gijutsu ryuushutu boushi no tame no houkisei—genjou to kadai* [Laws and Regulations for the Prevention of Outflow of Technologies from the Perspective of Security: Current Status and Issues]," Tokkyo Kenkyu [Patent Studies], Vol. 56, pp. 39-50; and other literature

[10] Aikawa, Haruyuki. 2015. "*Nihon no kaku gijutsu ryuushutu: hatsu kakunin; 04 nen sasatsu, kankoku de shiryo oushuu* (Japan's Nuclear Technology Leakage: First Case Confirmed through 2004 Inspection in South Korea with Materials Seized)," Mainichi Shimbun, November 4, Page 1.

[11] Yagi, Masahiro. 2016. "*Kankoku no mishinkoku reizaa uran noushuku jikken to waga kuni tokkyo housei-jou no mondai—yahari kakusan shiteita wagakuni tokkyo shutsugan koukai jouhou* (South Korea's Undeclared Laser

In this particular case, however, it was a government-approved technical research association that filed the application for an invention for the purpose of developing uranium enrichment technology. It would have been possible to enforce administrative guidance not to disclose technology information unnecessarily and not to apply for a patent. In fact, according to the same article, the organization in charge of uranium enrichment development, then Power Reactor and Nuclear Fuel Development Corporation (PNC), included in its contracts the provisions prohibiting centrifugal separator makers from publishing related papers and requiring them to have prior consultation with PNC when applying for patents, as well as provisions for special control of enrichment-related materials." It is said that, although PNC provided relevant guidance, it eventually allowed the patent application because of the involved companies' objection based on the "necessity of establishing the rights to the developed technology" and the "amount of patent rights contributing to the company's evaluation." In this case, therefore, it would have been possible to disallow the patent application through administrative guidance regardless of the existence of a secret patent system. The question that needs to be asked is whether the final decision to allow the patent application was appropriate or not.

Still, as the author of the said article points out, there remains the problem of decreased motivation of researchers caused by not being allowed to apply for a patent. In this regard, a secret patent system can mitigate the loss of motivation of researchers involved in the development of sensitive technologies due to the lack of opportunity to apply for patents.

In summary, although there is no opinion that patent applications related to weapons, arms, and sensitive technologies should be restricted across the board, there are cases of highly sensitive nuclear development where disclosure of patent applications is problematic. As nuclear development is usually placed under the government's security trade control, related problems should be solved through administrative guidance. From the perspectives of maintaining researchers' motivation and the avoidance of the loss of opportunities to apply for patents, we deem it meaningful to consider introducing a secret patent system.

The said article expresses an opinion that restrictions on publication in academic journals should be considered, but this will be discussed separately in Section 5.

3. Systems and trends in other countries

In this section, we will review the secret patent systems in other countries. There are largely two types of secrete patent systems: (1) registration deferral system (introduced in the U.S. in 1952; also used in France); and (2) provision of patent right in secrecy (introduced in China in 2009; Germany, prior to 1976; and South Korea in 1961).[12] However, the details of the actual operation of these systems have not been disclosed.
In the case of the U.S., relevant patents are designated by a defense-related agency after the formulation of the Patent Security Category Review List (PSCL) by the defense-related agency and screening based on the List of Secret Patents by the specialized staff in the Patent and Trade

Uranium Enrichment Experiment and Japan's Patent Legislative Issues: Confirmed Diffusion of Japan's Disclosed Patent Application Information)," CISTEC Journal, No. 161, pp. 56-64.

[12] Sugimitsu, Kazunari and Ito, Toshiyuki. 2019. "*Tokkyo kara no sentan jouhou ryuushutu, anzen hoshoujou no shinsa sonzai sezu* (Leakage of Advanced Technology through Patents: Absence of Security Review)" (Economics Classroom), Nihon Keizai Shimbun, November 4, page 14.

Mark Office.[13] So far, approximately five thousand patents have been designated.[14] It is believed that, in the past, the main field of the designation was the nuclear development-related field. In fact, the patents on which the restrictions have been recently lifted include a laser-tracking system, a warhead-production method, and a radar jamming apparatus. The applicants for these patents are mostly companies in the military industry. Furthermore, analyses of these patents on which the restrictions have been lifted are conducted, including those questioning the appropriateness of the designation of technology and those criticizing the abuse of the secret patent system.[15]

In Germany, after the Ministry of Defense designates fields related to national defense according to the International Patent Classification, and the Patent Office assigns a patent classification to all applications and screens the patent fields, patent examiners in the relevant fields screen the applications. As a result, approx. a hundred patents have been presumably designated. The U.S. and Germany both seem to conduct limited scope searches narrowed down by fields and based on lists (presumably weapons, nuclear power, cryptography, etc.).

In regards to companies and universities in the U.S. and Germany, it appears that no restriction through patent examination is expected to be placed on the disclosure of research other than that designated as military-related development. Both Germany and the U.S. apply restrictions only to the limited fields on the list. With respect to Japanese companies' patent applications in the U.S., we have found no case that has been subjected to restrictions on patent disclosure. Furthermore, in the field of emerging technologies, where the U.S. has recently been considering restrictions, there seems to be no argument at present that this assumption should be changed though some exceptional cases might be subjected to designated for restrictions.[16]

On the other hand, in China, it is believed that major research institutes have a system to conduct defense patent examination with a considerable number of personnel. Therefore, it is possible that the examination is comprehensive though the details are unknown.[17] However, there is no known example of a patent involving a Japanese company or university of which status has been changed to a secret patent in the past.

The trends in these foreign countries indicate that, among the countries that have a secret patent system, the U.S. and Germany do not exhaustively apply the system to all applicants, but rather to the limited patents filed by applicants mainly in the military industry. In the first place, the secret patent systems in other countries were established before the development of the internet. At that time, the restriction of technology information disclosure was largely achieved by restricting the disclosure of patents. The circumstances differ today. Today, a secret patent system would not effectively function to restrict the disclosure of many pieces of information of unspecified fields. From this perspective, with respect to the effect of a secret patent system, we believe that the emphasis should be placed on the aspect of its functions as a remedy for the

[13] De Rassenfosse, Gaétan; Pellegrino, Gabriele; and Raiteri, Emilio. 2020. "Do patents enable disclosure? Evidence from the Invention Secrecy Act." EPFL Innovation and Intellectual Policy Working Paper Series No. 9, available at http://cdm-it.epfl.ch/RePEc/iip-wpaper/WP9.pdf

[14] Most of these patents were designated in or before 1992. Afterwards, only around ten patents per year have been designated. (Footnote 13: de Rassenfosse et. al.)

[15] Dilawar, Arvind. 2018. "The U.S. Government's Secret Inventions, Secrecy orders allow U.S. defense agencies to control patents, including those that are privately developed." Slate, May 09. (https://slate.com/technology/2018/05/the-thousands-of-secret-patents-that-the-u-s-government-refuses-to-make-public.html).

[16] Interview with a compliance officer at Harvard University.

[17] A (non-disclosed) research on the patent application system in China

disadvantage caused by restrictions on patent applications.

In any case, granting a patent in a secret state is problematic in many senses in light of the purpose of the patent system. If Japan introduces a secret patent system, it would be appropriate to consider adopting a deferred registration system, the system used in the U.S. and France, or a compensation system for inventions that are kept secret in the form of a business secret due to their high sensitivity because, even in cases where it is difficult to determine the feasibility and military applicability at the time of application, it is often the case that disclosure restrictions become unnecessary with the passage of time.

4. Appropriateness and effectiveness of a secret patent system

As a summary so far, in light of the examples that should be considered as legislative facts, the operation of other countries' systems, and the context of Article 9, Paragraph 2 of the Ministerial Ordinance on Trade and Related Invisible Trade, it is not appropriate to adopt a secret patent system that restricts the disclosure of technology information in a wide range of unspecified fields and applicants. It would be more appropriate to consider a system that provides a remedy to organizations that are engaged in research and development in highly sensitive technological fields and addresses such issues as researchers' motivation when a patent application is deemed unacceptable due to the risk associated with the disclosure of the technology.

As has been discussed in this paper, a secret patent system would be neither practical nor effective if it is to restrict disclosure by examining all cases of technology disclosure by an unspecified large number of applicants. In relation to this point, there is an argument that the adoption of a secret patent system would be meaningless without a first-country application obligation. However, organizations that are aware of the necessity to restrict the disclosure of their technology are unlikely to apply for a patent in a foreign country. From this perspective, a secret patent system can work without a first-country application obligation. On the other hand, a secret patent system without a first-country application obligation could cause a serious problem in terms of security trade control if an organization applies for a secret patent for possibly sensitive technology in a foreign country that operates a secret patent system.[18] To avoid such a problem, it is worth considering a limited first-country application obligation[19] for a limited scope of sensitive technology. Even with the limited first-country application obligation, it would be necessary to explicitly define in ordinances, etc. the relevant fields of technologies so that the applicants would be able to recognize the scope of the first-country obligation.

If a secret patent system were to be introduced, what would be its significance in terms of its relations with the patent system? In the first place, the purpose of the patent system is to grant

[18] Basically, it is anticipated that inventions other than those developed in the country would not be considered for a secret patent. However, some complex cases might occur, including the country's relations with the local corporation and actual applications filed anyway. In the first place, it would not be appropriate to apply for a patent for possibly sensitive technology in a foreign country where such technology could be subject to secret patent examination.

[19] For example, in U.K., Article 22 of Patents Act imposes a first-country application obligation only on technologies relating to national security. Furthermore, the applicable fields of technologies are explicitly listed in an ordinance. (Ref.: https://www.gov.uk/government/publications/technology-prejudicial-to-national-security-or-public-safety) Similarly, in Germany, Article 52 of Patents Act imposes a first-country application obligation only on cases involving technologies deemed to be state secrets. For other countries' information, see: https://www.wipo.int/pct/en/texts/nat_sec.html

rights in exchange for public disclosure.[20] In other words, the patent system was established to encourage the disclosure of technology information that would have been kept secret as trade secrets without the incentive of a patent. On the other hand, it is not desirable to encourage disclosure of technologies at least if their disclosure is inappropriate for security reasons. For such cases, it would be reasonable to introduce a secret patent system in order to limit the patent system's function to encourage disclosure. In other words, it would be appropriate to make it a legal objective of the secret patent system to reduce patent disclosure in specific cases in exchange for granting exclusivity, rather than a system intended to restrict disclosure in general. Therefore, a registration deferral system, rather than granting patents in secret, should be considered. With the registration deferral system, the state would force the patent applicant to manage its invention for which the patent is applied as a trade secret.[21] This approach is consistent with the purpose of the law.

Besides, introducing a registration deferral system or a similar system might necessitate amending Article 9, Paragraph 2, Item 11 of the Ministerial Ordinance on Foreign Trade that currently provides as exceptions "transactions, for the purpose of filing an application or a registration for industrial property rights, through which the minimum technology necessary for such application or registration is provided" though it depends on the interpretation of the term "minimum."

It should be noted, however, an empirical study by Gaetan de Rassenfosse and his colleagues, which examined the effects of the recent U.S. secret patent system (registration deferral system), found that the secrete patent system has contributed to hindering the development of the whole technical field of the patented invention which has been designated for secrecy.[22] The reason for this is presumably that the system discourages not only the applicants but also other private-sector companies against inventions in the relevant technology fields, for the system would prevent them from obtaining strategic benefits such as the implementation of broad patented inventions with the protection of patent rights, excess profits based on the patent rights' exclusivity, and the development of strategic partnerships based on the patent rights. The said study indicates, therefore, that although the system is effective in temporarily preventing the proliferation of technology, it may increase security concerns by reducing the incentive to get sensitive technologies developed in the country if the country is in a competitive relationship with a country of security concern in the development of sensitive technologies.

In order to resolve such negative aspects, a sufficient compensation mechanism to compensate

[20] Yoshifuji, Kosaku, supplement by Kumagai, Ken'ichi. 1998. *Tokkyo-hou Gaisetsu* [Introduction to Patents Law] (13rd ed.) Yuhikaku.

[21] Footnote 13, de Rassenfosse et. al.

[22] De Rassenfosse et. al. (Footnote 13) examined whether there was a difference in the diffusion of the technology for each of the 2,542 U.S. patents designated for secrecy between 1982 and 2000 that were cited by 2,121 U.S. applicants, i.e. the 16,146 patents on which the designated secret patents were based and the patents on which patents similar to the designated secret patents were based. The measurement was conducted based on the degree of similarity in the citations by subsequent patents and in the textual information of the subsequent patents. They found that the diffusion of the patented technology, which became the basis of the patent designated for secrecy, was relatively slow. Especially, the diffusion of the technology to applicants in distant locations and to organizations other than public research institutions declined. Therefore, they argue that the secret patent system contributes to hindering the diffusion of the technology through patent documents. On the other hand, there is a study that shows that there is no difference in the speed of diffusion of technology between military and non-military technologies, based on an examination comparing patents on military technologies and other patents of the thirty-five applicants who had applied for the largest number of patents on military technologies. (Danial P. Gross, "The Consequences of Invention Secrecy: Evidence from the USPTO Patent Secrecy Program in World War II," National Bureau of Economic Research, NBER Working Paper Series No. w25545 (2019))

for the disadvantages of registration deferral is imperative. In other countries, in fact, the secret patent system is paired with a compensation mechanism. This is in response to the concern that, besides the above-mentioned disadvantages, if compensation is not sufficient, the technology owner might deem it better to disclose the technology instead of applying for a patent. In light of the empirical study of the operation of the U.S. system, the provision of compensation that is equivalent to or more generous than the compensation provided by the U.S. government would be desirable.

5. Publication of Academic Results

There are also opinions that the publication of technology information in academic journals and on the internet is equally problematic as disclosure through the patent system. Opinions include arguments that rules should be established for sensitive papers, such as allowing only the title to be disclosed, and that researchers themselves should be cautious about publishing papers as their own achievements on the internet. However, since most of the journals and international conferences in science and engineering are submitted to European and U.S. journals, a domestic system alone would not be able to deal with this issue. In addition, it is difficult to impose an obligation on individuals who are not employed by an institution, such as graduate students and independent researchers[23] to maintain the confidentiality of the content of their research. Therefore, it is not appropriate for the government to control and restrict the content of what researchers publish.

On the other hand, there has been a case in the past that should be referred to when considering restrictions on the publication of research results in academic journals that could be abused. In this case, the U.S. scientific journal Science withheld publication of a research paper by an international team, including Japanese researchers, on the highly virulent H5N1 avian influenza virus, due to concerns that the paper might be abused by terrorists.[24] This action was implemented in response to a recommendation by the U.S. Biosafety Committee not to publish the experimental data of the said study in the paper. In response, thirty-nine researchers including Professor Kawaoka at the University of Tokyo declared a 60-day voluntary suspension of their research. At the same time, they expressed an opinion that studies on avian influenza must continue in the view of preventing pandemics. World Health Organization's expert committee and other forums have recommended the publication of the full text of the paper because of the significant benefit of its disclosure. This recommendation is based on the judgment that the disclosure of the paper would contribute to vaccine development. In the future, too, it is possible that publication in academic journals gets considered for possible restrictions. The above-described case, where disclosure was discussed by international organizations and alliances specializing in the field, is a precedent that should be referred to if similar cases occur. Furthermore, this case can also be referred to in addressing similar concerns in the field of

[23] Especially, it is expected that, as open science progresses, so-called citizen scientists, those who conduct scientific research while having other jobs, will increase. (Hayash, Kazuhiro. 2018. "*Oupun saiensu no shinten to sichizun saiensu kara kyousei-gata kenkyuu eno hatten* [Development of Open Science and Citizen Science to Co-creation-type Research]," Gakujutu no Doukou [Trends in Science], Vol. 23, No. 11, pp. 12-29.)

[24] Watanabe, Toshiya. 2019. "*Seisaku teigen beikoku daigaku ga okonau hai risuku paatonaringu kanri no jittai to Nihon no daigaku eno shisa (zanteiban*) [Policy Proposal: The Actual State of High-Risk Partnering Management Conducted by U.S. Universities and Implications for Japanese Universities (Provisional Version)]," Institute for Future Initiatives, the University of Tokyo. https://pari.ifi.u-tokyo.ac.jp/publications/policy190227_uiusp.html

emerging technologies.[25]

An effective approach to addressing the above-mentioned concerns is a technology assessment framework that assesses the broad social impacts of science and technology as in the cases of the U.S., U.K., EU and other countries where the government has established an independent technology assessment organization.[26] At the same time, however, the priority should be placed on educating individual researchers, for it would be difficult for the technology assessment organization alone to discuss all concerns.

6. Proposal

In light of the above discussion, besides the need to communicate how technology information not desirable for security reasons should be treated, a possible policy would be to establish, as part of the patent system compensating for disclosure, a mechanism to delay the examination of technology information that could cause a security risk. In addition, a system to compensate for the disadvantages caused by this delay should be established to discourage unnecessary disclosure. At the same time, inventions that are kept secret as trade secrets due to the risk of disclosure under security trade control should be considered for compensation, too. Specifically, the following measures should be considered:

1. Establish a patent registration deferral system and a compensation system from the perspective of security. Specifically, it is proposed that a system be established, similar to the U.S. and France, to delay examination of applications that are deemed, based on examinations by the Japan Patent Office and related organizations (e.g., the Ministry of Defense), to need to be kept secret for a certain period for security reasons. (A system to grant a patent while keeping the technology information in secrecy should not be established in light of the purpose of the patent system.) In addition, the payment of compensation at the time of patent registration after the delayed examination should be considered to compensate for the disadvantages associated with the delay. It should be also considered whether to apply this compensation to inventions that have been kept secret as trade secrets due to the security risk associated with the disclosure. Besides, the introduction of this system will not include an exhaustive first-country application obligation. On the other hand, introducing a limited first-country application obligation that specifically specifies sensitive technologies could provide an advantage.

2. In terms of the operation of screening at the time of application under the above-mentioned system, the government organizations concerned with defense technology should make a judgment on whether or not the technology is an important technology in view of the international trends in defense technologies that the government is aware of at the time as well as from the perspective of foreign availability based on information from the relevant organizations. Furthermore, the question of whether or not the novelty and inventive steps of the technology should be examined concurrently with the screening should be considered taking into account the examination's cost and

[25] Watanabe. Footnote 7.

[26] Shiroyama, Hideaki, Yoshizaki, Go, and Matsuo, Makiko. 2011. *"TA (tekunorojii asesumento) no seido sekkai ni okeru sentakushi to jisshijou no kadai—oubei ni okeru keiken karano chuushutsu* [TA (Technology Assessment) Institutional Design Opinions and Implementation Issues: Extracting from Experience in Europe and the United States]," Shakaigijutsu kenkyu ronbunshuu [Collection of Research Essays in Social Technology], Vol. 8, pp. 204-216. Shiroyama, Hideaki. 2018. *Kagaku gijutsu to seiji [Scientific Technologies and Politics]*, Minerva Publishing.

effectiveness.[27] In addition, the screening should be conducted taking into consideration information provided by the applicants, including whether or not the applicant conducts research and development of security-related technologies and the case where the applicant deems it appropriate to keep the technology secrete due to security risks associated with the disclosure. In doing so, it is important to weigh the cost of disclosure against the cost of sacrificing technological progress.

3. Inform defense-related industries about the patent registration deferral system and the compensation system, warning them not to unnecessarily disclose technologies that could pose security risks if disclosed. The same applies to government R&D projects and projects that require government approval including research associations and warn them not to unnecessarily disclose technologies that could pose security risks if disclosed.

4. Educate academic journals and academic societies about the precautions against inadvertent disclosure of sensitive technologies that may pose security risks and the process for deciding whether to disclose them citing examples and referring to such cases as the publication of the above-mentioned article on avian influenza virus.

7. Challenges

If a patent registration deferral system is introduced, it is imperative to enable the applicants to foresee in which cases the registration will be deferred. In terms of operation, it is necessary to make it clear that the system is limited to applications related to defense technology. On the other hand, disclosing the details of the screening and examination processes is undesirable due to the security trade control implications of such disclosure.

This paper is written with a focus on a system that discourages patent applications for inventions that may pose a security concern if publicly disclosed. However, many companies organizationally keep their research results secret as trade secrets for strategic reasons with the same emphasis as patent applications.[28] Also, there are companies that apply employee incentive systems equivalent to invention rewards to trade secret protection. Therefore, in terms of operation, it is necessary to have in-depth consultations with the industry, including discussing whether the government should use national tax to compensate for deferred patent registration.

[27] A possibility cannot be denied that disclosing technology information lacking novelty and inventive steps cause concern. On the other hand, regarding compensation payment, an idea could be that applications that are not patentable should be excluded.

[28] Watanabe, Toshiya, and Hirai, Yuri. 2016. "*Nihon kigyou no gijutsu nouhau no hoyuu joukyou to ryushutsu jittai ni kansuru shitsumonhyou chousa* [Questionnaire Survey on the State of Possession and Outflow of Technological Know-How in Japanese Companies]," RIETI Discussion Paper 16-J-014.