

Intellectual Property Management of National University Corporations

Shift to Institutional Ownership and its New Challenges

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1. Introduction

The incorporation of national universities is now at its implementation stage. Japanese national universities that used to be state-owned institutions under the Ministry of Education, Culture, Sports, Science and Technology (MEXT), commence their activities as independent legal entities. Many government ordinances, e.g. accounting rules and asset management regulations are lifted, and as the scope of discretion expands for each newly established corporation, the degree of freedom for their actions becomes greater. It is clearly written in law that functions which may be preformed by national university corporations are 1) to conduct funded or cooperative researches, 2) to distribute research results to promote their utilization, and 3) to invest in organizations specializing in university technology transfer.¹ In addition to this, various systems to support the creation, ownership, management, and utilization of university-based intellectual properties are also being developed. The incorporation, at the same time, changes the patent ownership policies for faculty inventions; patenting rights that were formally held by the inventor will basically belong to the institution (i.e., the National University Corporation). Putting all these factors together — the dissemination of research results, the independence and freedom of university activity, and the changes in patenting policies — there is now more expectation towards the effective use and management of intellectual properties owned by national universities.

In this paper, an update on the situation of the management and utilization of intellectual properties at national universities will be given, and also the significance and issues of the new patent policies that are put into effect at the time of incorporation will be examined.

2. Management and Utilization of Intellectual Properties at National Universities

Before examining the shift in patent ownership, we should take a look at the recent history and situation of intellectual property management at state-owned national universities.

2.1. *Management Rules for Inventions Made at State-owned National Universities*

The patent ownership policy was based on the “Guidelines for patents on inventions made by university employees and others” — a recommendation of the Ministry of Education’s Science Council, which was submitted on June 17, 1977. At that time, in view of developing academic research and promoting efficient utilization of intellectual properties, the “individual patent ownership policy,” in which the patent rights were maintained by the inventor was thought to be the best possible measure to be taken.

In other words, the patent ownership of an invention made by a faculty member at a national university was in principle attributed to the inventor, and was to be granted to the university only on an exceptional basis. Such exceptions were inventions achieved with application researches that utilized:

- special government research funds, or
- particular large-scale government research facilities that were installed for special research purposes.

For appropriate invention management, each university stipulated invention rules and set up an invention committee. After the committee submitted their patent ownership assessments, the president of each national university made the final decisions. Once an invention was deemed to be state-related, the patent application, including all expenses, fell under the government’s responsibility and on the request of each university the

Table 1. Inventions Reported at National Universities in Recent Years

Year	Number of Invention Committee Reviews	State Related Cases				Inventor-owned Cases	
		Primary Cases	Inventor Transfer Red Cases	Total	(%)	Total	(%)
1993	417	51	17	68	16.3	349	83.7
1994	377	32	12	44	11.7	333	88.3
1995	435	34	11	45	10.3	390	89.7
1996	448	53	13	66	14.7	382	85.3
1997	650	76	33	109	16.8	541	83.2
1998	1059	189	45	234	22.1	825	77.9
1999	1725	229	52	281	16.3	1444	83.7
2000	2391	288	71	359	15.0	2032	85.0
2001	3040	318	96	414	13.6	2626	86.4
2002	3832	544	138	682	17.8	3150	82.2

Source: Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Japan Science and Technology Corporation (JST)² handled all necessary procedures.

As for the patent ownership of inventions that were achieved in cooperative researches or funded researches, the following arrangements were made between the university and cooperative or funding agents. All accomplishments of funded researches were regarded as state-related.³ This was due to the fact that the funded research expenses were regarded as the special government research funds. For cooperative researches conducted by university faculty members and company researchers, the patent ownership was divided accordingly to each individual's contribution to the invention. The faculty member's portion became national property because the research expenses fell in the category of the special government research funds, and the company researcher's portion was attached to the company as a service invention. In the event a faculty member or a corporate researcher independently makes an invention, the ownership was initially placed with the inventor and later with either the university or the company after the confirmation of the other party.

Company and faculty members sometimes refer to researches that use donation for research money as "cooperative researches." The act of promising a company in advance the transfer of intellectual property rights in return for its donation for research is a violation of the rules governing the acceptance of donations. But because the donation of research did not fall in the category of special government research expenditure, the research achievements were deemed non-state related and therefore belonged to the faculty individual, who could choose to take any course, including

the assignment of rights to any given company.

2.2. Performance of Invention Committees

Table 1 shows how national universities handled their inventions.

The general trend in the recent decisions of university invention committees can be summed up as follows:

- After 1997 there has been a sudden increase in the number of cases reviewed;
- Around the same time the number of state-related cases has grown as well;
- During the last ten years the proportion of state-related inventions was the greatest in 1998;
- The number of inventor-owned cases has increased rapidly since 1998.

Besides the increase of general awareness of intellectual property among faculty members, there are two other factors behind this trend. The growing number of state-owned patents is attributed to the budget growth of newly established or expanded funding schemes in basic research, which various government ministries and agencies have been supporting since 1995 and 1996. Research results brought about by using such funds were classified state-owned inventions. The other factor is the formation of Technology Licensing Organizations (TLOs), which is thought to have dramatically increased the number of committee reviews and inventor ownership since 1998 and/or 1999. Before acquiring the patenting rights of faculty-related inventions TLOs needed to confirm the patent ownership through the university's internal procedures.

2.3. Management and Utilization of Patents at National Universities

Keeping track of all the patents granted to university researchers is not an easy task, but in the case of state-owned patents, which were managed as national properties, there are data available for analysis. By using publicly available information on government patents we can measure the domestic performance of each national university in regard to acquired patent ownership, granted licenses, and shared co-ownership.⁴

By the end of March 2002, national universities owned 827 domestic patents (of which 121 were co-owned) and 507 foreign patents (cumulative total of which 78 were co-owned). Table 2 denotes the patents and licenses of universities that hold more than ten domestic patents. There seems apparently no fixed pattern for each university. Although some universities are quite large in size, they have relatively fewer state-owned patents.

The causes of this fluctuation among universities are 1) the ambiguous definition of patent ownership principle, and 2) the dependency on each invention com-

mittee for their management and judgments. Most universities make it mandatory for the inventor to submit all inventions to the invention committee for appraisals, but there are some cases at major universities where the inventor has the power to decide whether to report to the invention committee, thus the ownership of a patent.⁵ Such applications of the invention submission system without consistency across national universities seem to have resulted in relatively inactive acquisitions of national patents at some large universities. It was more convenient for companies to obtain patent rights (whether with or without committee appraisal) from individual faculty members rather than from the national government.

The rule applied to handling of inventions made by faculty members was actually different for each university. Without clearly defined university policies it may be said that there was a lack of transparency. For companies engaging in cooperative or funded research with national universities, the ownership of an invention may have varied depending on the university or faculty member involved. Taking this difference and

Table 2. Patents and Licenses of the 16 Major National Universities

(March 31, 2002)

	Patents Registered			Licenses Granted	
	Home	Co-owned	Abroad	Home	Co-owned
Hokkaido University	18	2	9	1	1
Tohoku University	60	3	35	2	0
University of Tokyo	73	2	64	8	2
Tokyo University of Agriculture and Technology	17	2	9	0	0
Tokyo Institute of Technology	131	25	53	10	2
Kanazawa University	17	0	25	0	0
Shizuoka University	28	1	0	2	0
Nagoya University	82	29	51	14	5
Nagoya Institute of Technology	13	5	7	0	0
Kyoto University	53	3	92	1	0
Osaka University	101	16	32	4	3
Tottori University	10	3	2	5	1
Hiroshima University	31	2	34	2	0
Kyushu University	24	3	28	3	0
Kyushu Institute of Technology	13	0	1	6	0
Saga University	21	0	25	2	0
Sub Total	692	96	467	60	14
National University Total	827	121	507	66	19

Annotations:

- 1) Statistics were compiled by using the per-item lists on national properties.
- 2) Universities on the list hold more than ten domestic patents.
- 3) Saga University and Tokyo Medical and Dental University are the only universities that have granted licenses overseas.

Source: Individual Statistics for Government Patents

(<http://www.mof.go.jp/jouhou/zaisan/tokkyob.htm>)

the fact that there was actually a uniform guideline for patent management for all universities, it might be said that fairness was compromised.

Furthermore, the system of submitting inventions to the invention committee did not function effectively because, 1) the faculty members had inadequate knowledge of the handling of university inventions, and 2) the universities did not necessarily get involved actively in the promotion of management and utilization of the submitted inventions.⁶

The number of licenses derived from state-owned domestic patents is 66 (out of which 19 are co-owned), and the ratio of licensed patents to the total registered patents is 8.0% (for the singly-owned 6.7%, and for the co-owned 15.7%).

It may be difficult to evaluate these numbers, but comparing them with the performance of the after-mentioned technology transfer activities of TLOs, the license/patent ratio is low. The reasons for this inactive utilization of state-owned patents seem as follows:

- 1) The determining factors of patent ownership were the research expenses and equipment used for the invention, with very little consideration on licensing potential;
- 2) There were little incentives for universities to utilize state-owned patents, to which JST — a far away presence to the university and inventor — was mainly responsible for patent management and IP marketing.

2.4. Utilization of Individually-owned Inventions

No systematic studies are to be found on the utilization of inventor-related inventions at national universities, but there are still some data indicating the overall trend. According to a survey conducted by JST, although many inventions resulted through faculty involvement there were very few cases in which the universities were the patent applicants. Table 3 is the

breakdown of the unexamined patent applications inventors of which are researchers in the field of natural science (1991–1998) at the main 34 universities (National & Public 27, Private 7). The ratio of corporate involvement that includes joint application was 87%, which is an overwhelmingly figure when compared to the ratios of the university, JST and other organization’s involvement (11.6%) and the individual involvement (21.4%) (Total ratios exceed 100% due to co-applications). Among these figures the ratio of university involvement is 1.7%, an extremely small cut. This reflects the faculty data of national public and private universities, but a survey of national universities alone would probably produce a similar result.

In other words, most of the university-spun inventions that are on patent applications were acquired and filed by outside companies. The important issue remained here is whether the faculty members, as inventors, are appropriately compensated or not.

3. The Establishment of TLOs and Their Activities

TLO activities represent the supportive movements in the patenting and licensing of individually owned inventions at national universities.

3.1. Establishment of TLOs

Since early 1980s in the United States, the system to promote university technology transfer has undergone constant improvement, and the resulting progress in the commercialization of technology from US research university has lead to the creation of many new industries and the strengthening of the US economy. Based on this perceived success, it was thought that Japanese universities, where many researchers and funds were allotted, should also promote technology transfers to companies, and the establishment of TLOs as universi-

Table 3. University Patent Applications and the Ratio of Corporate Involvement

Ratio of Corporate Involvement (Single/Joint Application)	Ratio of Other Institutions (Universities, JST, Foundations, etc.)		Ratio of Individual Involvement
	JST (Includes Individuals)	Universities	
87.1%	11.6%	3.2%	21.4%
Single 69% Joint 18%			

Annotations:

- 1) Data compiled by using PATORIS (Patent On-Line Information System) on unexamined patent applications (1991-1998) of natural science researchers (Prof. and Associate Prof.) at the main 34 universities (National & Public 27, Private 7)
- 2) Because of co-applications the total of Corporate Involvement Ratio, Other Institutions Ratio, and Individual Involvement Ratio will exceed 100%.

Source: Japan Science and Technology Agency (Material submitted to the Intellectual Property Task Force of the Council for Science and Technology Policy at the meeting on April 2, 2002.)

ty technology transfer institutions gained its momentum. To facilitate this movement, the “Law to Promote the Transferring of Technology from the Universities” (Technology Transfer Promotion Law) was enacted in 1998.

There was no legal restriction in helping faculty members find licensees in Japan. The purpose of the Technology Transfer Promotion Law was to grant government subsidy and give supportive measures such as patent fee reductions towards organizations that fulfilled certain conditions (i.e., organizations approved according to the guidelines set by both MEXT and the Ministry of Economy, Trade and Industry (METI)). These subsidies are administered at the startup period of the TLOs in order to cover some of the differences made by the large patent obtaining costs and the small initial revenues. As of January 2004 there are 36 organizations that have been approved. The organizational forms taken were stock companies (17), internal university departments (7, all private universities), divisions of existing non-profit organizations (9), and limited private companies (3).

3.2. *Activities and Challenges of TLOs*

A TLO firstly evaluates the information on the invention provided by a university researcher. Then after evaluating the potential for commercialization it acquires the patenting rights from the researcher to file for the patent and attains its rights. At the same time the TLO starts marketing the invention to companies that show interest and negotiates a license agreement. Compared to the former company-faculty member negotiations, the new negotiation style, being held between two organizations, would surely be more advantageous to the faculty inventor. Royalty revenue generated through the licensing of TLO-owned patents is normally divided among the inventor, university and the TLO after the deduction of necessary expenses by the TLO.

TLOs were established outside the university framework, usually in the form of stock companies (with equity held by voluntary faculty members), except for private universities, where they are placed within the university organization. Because most research universities in Japan are national universities, and because TLOs were profit-seeking organizations, they were set up outside the university either as stock companies invested by faculty members or as part of existing non-profit organizations. Even in the successful TLO cases of major US research universities it is reported that it took more than ten years to cover all the costs with their income.⁷ Although government subsidies are

available, the length of period until sufficient license revenues are generated is a serious issue for most TLOs that are corporate entities. Because the length of this period differs with each research result and is quite unpredictable, it is necessary to keep a long-range view when managing a TLO. Therefore, with some exceptions of non-profit organizations, there is a basic potential problem of how to keep the necessary long-range views of TLOs consistent with their short-term profit-seeking corporate forms. In view of this the new policy that enables national university corporations to invest in TLOs is highly appreciated, as this may consolidate the TLO’s financial foundation and allow its long-range management.

The annual performance figures of the approved TLOs in FY 2002, including the numbers of intellectual properties of private universities, were 1,335 domestic patent applications, 284 overseas patent applications, 349 license cases, and ¥410million in royalty revenues.⁸ The licensing rates (licensing cases/filed patents) of external and internal TLOs were 29% and 18%, respectively,⁹ which show that TLO patents are licensed out more frequently than the state-owned patents at national universities. By achieving higher licensing rates than the state-owned patents, TLOs seem to have proven their effectiveness in filing, maintaining, and managing the acquired faculty-owned intellectual properties. Therefore, it is necessary to make good use of this ability and the accumulated knowledge and experience of the TLO even after the incorporation of national universities. However, the fact should be beard in mind that TLO activities are partly sustained by the budget and physical support of the government including subsidies and temporary staffing that does not appear in the TLO accounting books.

4. **Changes in Intellectual Property Management and Utilization after the Incorporation of National Universities**

How exactly are the changes in the management and utilization of intellectual properties going to take place after the incorporation of national universities? There is no uniform answer to this question because the key to incorporation was to bring out the individuality of each university. But it is still possible to outline in general terms of the changes that will occur if national universities employ their vigorous policies in industry-academia collaboration.

4.1. *Shift to Institutional Ownership*

In various government committee reports and plans it is recommended that there should be a policy to place the patenting rights of faculty inventions in the hands of the National University Corporation.¹⁰

According to the summary of a report of a committee of the MEXT's Council of Science and Technology held in April 2003, the reasons to change the patent ownership policies were listed as follows:

- Today there is a stronger expectation towards the social contribution of the university;
- It is necessary to increase the understanding of citizens and taxpayers;
- Universities are now more equipped to handle technology transfers.

Furthermore, in view of the progress of academic research and the efficient use of intellectual properties, it goes on to state that under such circumstances, if we were to choose the best road today, it would be to assign the ownership of the patenting rights to the institution, in this case the national university corporation.

The MEXT report indicated that the problems that would arise in attaching the patenting rights to individual inventors would be as follows:

- It is difficult for the university to address the issue as an organization;
- The inventor would have to bear the costs of acquiring and maintaining the patents;
- For an individual to find an end user is quite difficult;
- Most intellectual property would thus become dead storage and the research achievements would not be returned to society.

The institutional ownership, on the other hand, would make improvements on these problems brought about by individual ownership and would help realize the effective utilization of intellectual properties and the return of profits to society.

When setting up the corporations the universities will each issue an "Intellectual Property Policy" (Some may call it Industry-Academia Collaboration Policy or Technology Transfer Policy). In this Intellectual Property Policy, along with the basic strategy for returning the research fruits to society, the criterion of judgment for handling the intellectual properties will be articulated in accordance with the individuality and characteristics of each university. By presenting such concrete criteria it is hoped that the handling of university inventions will become more transparent compared to previous practices. In line with each Intellectual Property Policy, the actual "service inven-

tion rules" and related regulations will be formulated. The scope of such service inventions may differ for each university.

4.2. *The Relationship between University and Industry*

As is mentioned, the act of promising a company in advance the transfer of intellectual property rights in return for its donation for research was a violation of the rules governing the acceptance of donations. However, as the donations of research did not fall in the category of special government research expenditures, in reality, it was possible for the companies to receive the rights from faculty individuals. This practice is not allowed after the incorporation of the institutional ownership. If a company wishes to obtain the intellectual properties invented by faculty members with certainty, it would have to sign an official contract with the university. For this reason the emphasis of the relationship of company and faculty members will shift its weight to the relationship of company and university, to which the faculty member belongs.

So far, due to the lack of experience in institutional ownership, there are very few convincing supportive data showing whether or not this new patent policy will effectively promote the utilization of university-based intellectual properties. However, it seems true that society will no longer allow the utilization of taxpayers' money to create inventions that will mostly belong to inventors for their own disposal. In light of this situation, it would seem to be appropriate to use the university as a filter when utilizing the university-based intellectual properties for society. Here, the conflicts of interest in industry-academia collaborations are attracting more attention in this regard. This conflict arises when a faculty member's obligations or interests toward a collaborating company clash with his/her original duties at the university. The fact that appropriate management of this issue is being discussed at the same level of importance as the change to institutional ownership suggests that society is calling for a convincing way to properly use and manage intellectual properties.

4.3. *System Development for Intellectual Property Management and Utilization*

To this day many efforts have been made to utilize the national university-based intellectual properties, e.g. the founding of cooperative research centers and the installation of research cooperation divisions within university secretariats. Improvements for industry-academia collaboration and intellectual property man-

agement are under way and university intellectual property departments are also being set up for the first time. Starting from FY 2003, MEXT has started their "University Intellectual Property Department Program," in which they selected the 34 approved cases (56 universities and institutions) out of the 83 nationwide applications from national/public/private universities, colleges and inter-university research institutes. Among the approved, 26 cases (42 universities and institutions) were from national universities and inter-university research institutes.

National university corporations may now set their own terms and conditions when licensing university-owned patents. Not only nonexclusive licenses and exclusive licenses, but also registered exclusive licenses and assignments of patents become possible. Of course it was allowed in the past to assign patents, but because university authorities in charge had little incentive in doing so and were faced with the difficulties of upholding fairness and setting fair prices, there were hardly any cases of assignments to be seen up to this day. From now on, however, under the leadership of presidents, the universities are expected to make and act upon their own decisions.

Consequently, the incorporation of national universities has prompted the improvement of the grounds and systems of the university to efficiently and effectively manage and utilize intellectual properties. At the same time, by securing its transparency the system is becoming suitable for an institution that is using taxpayers' money.

5. Tasks Following the Incorporation of National Universities

The incorporation of national universities is indeed a great chance to promote the effective management and utilization of intellectual properties. There are, however, many tasks to be overcome in order to make the process more substantial. In the following sections, the major issues at hand will be explored.

5.1. *Balancing Corporate and University Cultures*

What is important to industries when utilizing the university-based intellectual properties is not just the licensing procedures, but also the close cooperative relationship between industry and university, which is reflected in such activities as additional cooperative researches and technical assistance. Such cooperation between two completely different kinds of organizations should involve the coordination of their goals,

philosophy, and organizational behaviors.

Companies basically seek profits. So under fierce competition they try hard to maintain confidentiality and to secure exclusive intellectual properties or know-how to keep their competitive edge. On the other hand, the main goals of universities are education and research. To pursue these goals it is extremely important to maintain an open atmosphere and to give priority to the publication of research papers. With the change to institutional ownership, university organizations have to engage in issues that were once settled through the relationship of faculty individuals and companies. In cooperating with industry, universities are required to decide how to balance their founding philosophies, goals, and values with whatever the companies hope for.

5.2. *Ensuring the Costs of Patent Applications/Maintenance and the Criteria for Institutional Ownership*

After the patent ownership shifts from individual to institutional, universities start managing their intellectual properties independently. They have to face the problem of raising patent attorney's fees for their patent applications, and because the former state-owned patents are turned over to the newly established national university corporations the costs for maintenance and management of these patents also become necessary. Some think that these patent application and maintenance fees should be paid out with university expenditures such as operational cost subsidies, direct/overhead expenses of competitive government research funds, or overhead/ common expenses of corporate funded or cooperative researches. At the same time many other options, including the use of royalty revenue, are also being sought at each university. Whichever road is taken, each university's choice will reflect its philosophy, intellectual property policy, and the situation it is in, but whether it can make that choice in an attempt to raise necessary expenses will depend on the leadership of the president or director of that national university corporation.

Another task the incorporated universities will face is the screening process of the inventions that are in line for patenting. Because there is a limit to the budget, not all inventions will be approved for patenting by the university. This is just the kind of situation in which the accumulated experience and expert knowledge of TLOs should be effectively employed. There are concerns, however, about whether an appropriate decision can be made with constant pressure from the inventor, especially when patent numbers are being

used as an index to evaluate the performances of the researchers and university departments.¹¹

5.3. *Strategic Management of Intellectual Properties*

Considering the vast international market in which Japanese companies are doing business, university-based intellectual properties, when filing for patents, should also go global. Another strategic management issue to keep in mind is how to terminate costly patent procedures in the event the cost-benefit performances become unacceptable; it does not matter if the subject is midway into the application stage or at the maintenance phase. For national university corporations that no longer enjoy the protective wings of the government, patent infringement suits might also become serious issues, and to pursue the effective utilization of university intellectual properties such risks should be minimized by strategic management measures.

5.4. *Building a New Relationship between National University Corporations and TLOs*

Major research universities that have great potential for inventions and patent applications usually have some kind of ties with existing TLOs. Such ties can be classified into two types: the one-university type, and the several-university type. TLOs doing business with national universities have been acquiring the patenting rights of faculty individuals. But since there will be no more individually owned patents, such conventional operations will be difficult. Building new relationship is becoming an important agenda for both TLOs and national university corporations. The key to this problem is to find ways to effectively utilize the knowledge, experience, and efficiency of TLOs.

5.5. *Efficient and Swift Management of University Clerical Work*

The paperwork processing time of TLOs and universities should correspond to the business tempo of companies, especially if their licensing efforts of intellectual properties are aimed at such companies. Even if a national university corporation adopts an internal TLO system its responses should always be efficient and swift. To achieve this goal they should review and reform the mentality of university employees and the processes of accounting and contract making.

5.6. *Recruiting Experienced Technology Transfer Personnel*

When implementing the university's intellectual property management and technology transfer service, one cannot stress too much the importance of using outside

personnel who are capable of evaluating certain technologies and have experience in corporate activities. Although compensation and benefit programs for this type of staff can become a big issue in itself, national university corporations should also consider giving the new work force the authority to join in on important business decisions, and with executive and clerical support, if they want things to work properly.

5.7. *Tackling the Issues Arising with the Institutional Ownership*

Problems that were not so obvious when individual ownership was patent policy gradually came to light with the shift to institutional ownership. Ways to handle inventions of inbound and outbound researchers, how to deal with faculty member's dual jobs at venture companies - there are many problems that now need to be tackled. During the transition period, companies will have two sources from which to obtain their licenses: patents already belonging to TLOs; and patents newly owned by national university corporations under the institutional ownership policy. For most companies, negotiating with both parties simultaneously will be cumbersome, but even in such cases everything should be handled in an appropriate manner. To carry through the institutional ownership policies, universities should make responsible decisions for matters that were formally handled by individual faculty members and were not their concern. In view of these heavy responsibilities, the presidents of national university corporations must now take the lead in promoting the management and utilization of intellectual properties.

- 1 Law of National University Corporations (2003), Article 22
- 2 Currently the Japan Science and Technology Agency. JST only undertook the paperwork related to state patents, and does not file patents in their own name. Before JST, the Japan Society for the Promotion of Science (JSPS) was in charge of this operation.
- 3 Under the Research Exchange Promotion Act of 1986, up to 1/2 of the state-owned rights was transferable to the outsourcing company.
- 4 A quantitative analysis of the overseas patents was not conducted, because one domestic patent may become inflated when filed in numerous countries.
- 5 Kneller, Robert.
- 6 MEXT. *Intellectual Property Working Group Report*.
- 7 Tsukamoto, Yoshiaki.
- 8 *Ten Proposals for Further Advancement of Academia-Industry Cooperation*. p. 4.

- 9 Idem. p. 5. Although the licensing ratios of TLOs are lower in Japan than they are in the US, it is unpractical to simply compare the two countries as each adopts different patent policies, i.e., the first-to-invent system for the US and the first-to-file system for Japan.
- 10 Cabinet Office, Intellectual Property Policy Headquarters. *Strategic Program for the Creation, Protection and Exploitation of Intellectual Property*. July 2003.
- 11 The evaluation indicators may be the numbers for filed patents, approved patents, or granted licenses, or the royalty revenues. However, considering the lead-time necessary for the approval and licensing of a patent, the main indicator would tend to be the number of patents that are filed. If this is so, the pressure towards patent filing will become even greater.

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