

Experience in TMCs in Japan

By Dr. Junichi KITAMI

Director

Manufacturing Industries Bureau, Ministry of Economy, Trade and Industry

1. Experience in TMCs in Japan

This section introduces experiences regarding TMCs in Japan. In Japan, in and after 1998, TLOs (Technology Licensing Organizations) were established as an organization to carry out technology transfer regarding inventions created in a university and has played an active role. Thereafter, triggered by the incorporation of national universities in 2004, many universities have established a “University Intellectual Property Office: IPO” (hereinafter referred to as “IPO”). IPOs perform not only a technology transfer function, but also a University-Industry Liaison function and a contracting function.

Thus, the “technology management” function of universities in Japan is carried out with close cooperation between TLOs and the IPOs. Therefore, in this section TMCs broadly include not only TLOs but also IPO.

1.1 Framework of policy, laws and regulations regarding the establishment of TMCs

It is after the mid-1990s that the significance of activities of TMCs was recognized in Japan and serious efforts toward such activities began, so this section focuses on the history after this period. The history of efforts of relevant governmental policy, laws and regulations for the establishment of TMCs in Japan can be explained in three major stages.

1.1.1 Attention to exploitation of research results of universities and support measures for development of TLOs

The first stage of the history is that after the mid-1990s increased attention has been paid to the exploitation of research results of universities, as a result of which various political measures have been taken one after another, including legislation on the support of the establishment of TLOs.

(Enactment of the Science and Technology Basic Law and growing attention to exploitation of research results of universities)

The Japanese economy suffered a prolonged stagnation in the 1990s, which caused concerns over the deterioration of industrial competitiveness. Due to such a situation, the importance of governmental measures on science and technology has come to be reemphasized. Against such a background, the Science and Technology Basic Law was enacted in 1995, and based on this law, the first Science and Technology Basic Plan (1996-2000) was developed in 1996. Through this plan, an enormous amount of public research funds has been provided to universities, national universities in particular, to contribute to the economic revitalization and strengthening in competitiveness of Japanese industry.

It has also specified as future measures promotion of the practical application of research results from national universities, etc., with expectations for protecting the research results of universities as intellectual property and exploiting them in industry.

(Promotion of development of TLOs through TLO law)

Based on the Science and Technology Basic Plan, in order to promote the transfer of research

results from universities to industry, the government enacted “The Law for Promoting University-Industry Technology Transfer (the TLO Law)” in 1998. This law aims at supporting the establishment of TLO, and TLOs approved under the TLO law may enjoy the following support measures. As of the end of March 2006, 41 TLOs are approved. (Details thereof are explained in 1.2)

1. Grants by the Ministry of Economy, Trade and Industry (hereinafter called “METI”) for the operations carried out by an approved TLO
2. Debt guarantee by an independent administrative agency¹ on approved TLOs borrowing for operation funds
3. Investment by a government-affiliated investment company² in small and medium enterprises that receive technology transfer from TLOs
4. Reduction or exemption of patent fees, etc. for the application filed by approved TLOs (“The Law on Special Measures for Industrial Revitalization” in 1999)
5. Investment by national university corporations in approved TLOs (“The National University Corporation Law” in 2003; effective from 2004)
6. Dispatch of patent licensing advisors (the National Center for Industrial Property Information and Training (INPIT))
(Specialists with ample knowledge and experience regarding intellectual property and technology transfer are dispatched to TLOs.)

As mentioned above, various public support measures are provided to approved TLOs. The Japanese government supported the establishment and operation of approved TLOs because it aimed at introducing “Technology Management” activities in universities that were successful in the U.S. and getting them off the ground as quickly as possible.

(Promotion of transfer of research results by enactment of the Japan version of the Bayh-Dole Act and the limits thereof)

In order to vitalize research activities commissioned by the national government and to promote the exploitation of results thereof, the government introduced in the Law on Special Measures for Industrial Revitalization enacted in 1999 the provision that allows patents for such research results to be owned by the commissioned institution (so called Japan version of the Bayh-Dole Act).

The law enables private universities (educational corporations) to own the results of government-commissioned research and also enables the related TLOs to handle patents, etc. However, national universities were not subject to this Act because they did not have independent legal status at that time.³ National universities TLOs could not enjoy the benefits of this Act until their incorporation in 2004.

1.1.2 Enactment of Basic Law on Intellectual Property and development of scheme for strengthen measures relating to the exploitation of research results of universities

¹ Organization for Small & Medium Enterprises and Regional Innovation, JAPAN (SMRJ) (An Independent Administrative Agency founded in accordance with the Organization for Small and Medium Enterprises and Regional Innovation, Japan Law)

² Small and Medium Business Investment & Consultation CO.,LTD. (A stock corporation founded in accordance with the Small Business Investment Company Limited Law)

³ Results of commissioned research in national universities had to continue to be owned by the national government even after the introduction of the Japan version of the Bayh-Dole Act because national universities were part of governmental agencies and did not have independent corporate status.

The second stage of the history is marked by the enactment of “The Basic Law on Intellectual Property” in 2002 which requires development and annual review of the Promotion Program for Intellectual Property, which plans intellectual property related measures to be taken by the national government.

The Law specifies that universities have responsibilities to voluntarily and positively work to disseminate their research results and that the national government should take measures such as the support for the development of a management system using personnel with specialized knowledge regarding intellectual property in universities, etc.

The Promotion Program for Intellectual Property has been developed and published annually since 2003. The Program plans measures to be taken intensively and systematically by the national government to create, protect, and exploit intellectual properties, including measures to promote, or otherwise, the creation of intellectual properties in universities.

Thus, the mechanism has been established, through the annual review of the Program that ensures enhancement of the measures of the national government to promote the exploitation of research results from universities, including TMCs’ activities.

1.1.3 Achievement of greater flexibility of management and exploitation of intellectual properties in universities as a result of incorporation of national universities

The third stage of the history is marked by the incorporation of national universities in 2004, which eliminated the restriction arising from their status as governmental agencies, so that greater flexibility was achieved to manage and exploit intellectual properties in universities. In addition, this leads to the progress of development of the principle of “attribution to organizations” of intellectual properties and development of the management and exploitation system of intellectual properties of universities.

(Enactment of the National University Corporation Law and its impact on industry-university cooperation)

The government enacted in 2003 the law to incorporate national universities, and all national universities were incorporated in April 2004. The incorporation of national universities brought about the following significant influences on industry-university cooperation and exploitation of intellectual properties.

1. The promotion of the exploitation of research results and the promotion of joint research with enterprises have been expressly stipulated in the law as services conducted by university corporations.⁴ Based on this, each university began to seriously discuss medium-term targets for its operation, the status of industry-university cooperation activities, such as technology transfer activities to industry and liaison activities toward industry, in a medium-term program.
2. Corporate status enabled university corporations to assume rights and obligations. Therefore, regarding intellectual properties, university corporations are enabled to own patents, etc. by themselves and to exploit and dispose them at their own discretion.
3. Since faculty members of university are no longer civil servants, university corporations have greater discretion on personnel affairs (recruitment, determination of salary, permission of side

⁴ Although before incorporation, the necessity of “social contribution,” including industry-university cooperation, had been pointed out as a third mission of universities following “education” and “research,” the provisions of this Law clarified that the management and exploitation of intellectual properties and research cooperation with industry fall under the responsibilities of universities.

jobs,⁵ etc.)

4. Investment by university corporations in approved TLOs is allowed.

(Shift to the principle of “attribution to organizations” in handling intellectual properties in universities)

Before the incorporation of national universities, the Ministry of Education, Culture, Sports, Science and Technology (hereinafter called “MEXT”) announced its view that it would be basically proper to handle the intellectual properties in university corporations under the “attribution to organizations” in principle.

In a national university before being incorporated, ownership of inventions made by faculty members was determined at the Patent Committee, taking into account the type of research funds, etc. Consequently, inventions deriving from research with financial donations from enterprises, school funds from the university were owned by individual faculty members (about 80% of all inventions) and inventions deriving from joint research with enterprises or commissioned research, or subsidies for scientific research funded by MEXT were owned by the national government (about 20% of all inventions).

The inventions owned by individual faculty members were subject to the technology transfer activities of the approved TLOs only if such inventions were assigned from faculty members to the TLOs. It was at the discretion of the faculty members and was dependent on the confidence to and cooperation with the TLOs as to whether or not the faculty members assign inventions to the TLOs. So TLO could not handle all inventions owned by faculty members automatically. In addition to exploitation by TLOs, there existed various ways to exploit an invention owned by an individual faculty member: assignment by the faculty member to an enterprise, assignment by the faculty member to the JST (Japan Science and Technology Agency) which is an independent administrative agency, or management by the faculty member by her/himself. (Figure 1-1-1)

Regarding the system before the incorporation of national universities, the following problems were pointed out:

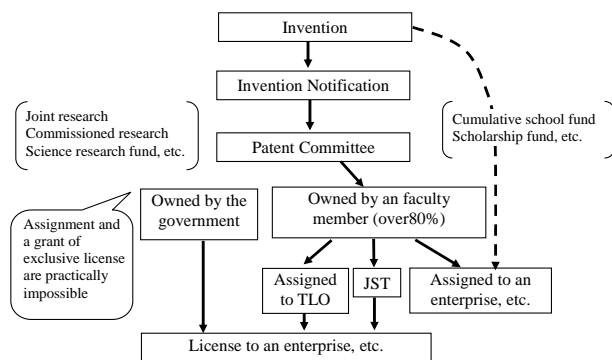
1. Inventions made by faculty members were owned either by such faculty members or by the national government, and the criterion for such distinction was obscured from the industry or other outsiders.
2. Since patents for inventions owned by the national government were treated as national property, the disposition of such patents was subject to the accounting regulations among others, and a grant of exclusive license or an assignment to an enterprise was difficult.

If a joint invention deriving from joint research project between an enterprise and a university was owned by the enterprise and the national government, the approval of the national government was necessary to grant a license to a third party, which made it difficult to include such a patent in a cross license, etc.

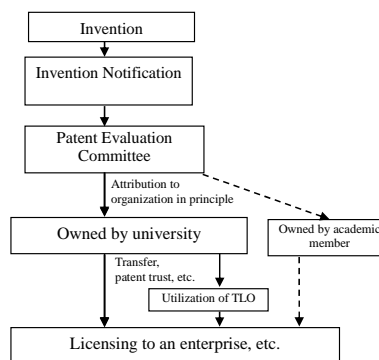
3. With respect to inventions owned by individual faculty members, it was difficult for a university to systematically provide the consultation or other support measures for filing applications, etc. In some cases, the invention owned by a faculty member was assigned to an enterprise, but the

⁵ Each university comes to determine at its discretion in accordance with its own rule as to whether the dual employment of faculty members by private companies (including start-up enterprises) and others are permissible. Before incorporation, the national public service act was applied also to faculty members, so all national universities determined the permissibility of side jobs in accordance with a uniform policy of the National Personnel Authority.

company to which the invention was assigned did not necessarily adequately obtain, maintain, or exploit the patent for such invention.



(Figure 1-1-1) Flows before incorporation of attribution of inventions made by faculty members of national universities (Outline)



(Figure 1-1-2) Flows after incorporation of attribution of inventions made by faculty members of national universities (Outline)

After the shift to the principle of “attribution to organizations,” unlike before the incorporation, all inventions made by faculty members belong to universities in principle, irrespective of the type of research funds, etc. Because of the incorporation of universities, an invention owned by university corporations is relieved of such restrictions as those on national property and may be freely disposed by the university at its own discretion, thereby enabling the university to strategically manage inventions. and exploitation of inventions are made not by individual faculty members as before the incorporation, but by An university (IPO) or TLO committed by the university arranges with enterprises. (Figure 1-1-2)

(Promotion of establishment of the “IPO”)

The MEXT pointed out the necessity of development of a system to strategically promote the systematic management and exploitation of intellectual property in universities, as well as the shift to the principle of “attribution to organizations.” The Ministry commenced in 2003 the support program for model IPOs encouraging the establishment of the “IPO” in universities that adopt the principle of “attribution to organizations.” Under that measure, 34 model cases and nine quasi-model cases were selected, and subsidies are planned to be given to them for five years ending in 2007. Since 2005, IPOs that are expected to develop the industry-university cooperation system comparable to major foreign universities are selected as the Super

Industry-Academic-Government Collaboration Office” and additional subsidies are granted to six cases.⁶

As a result of such measures, almost all national universities go through the shift to the principle of “attribution to organizations” and the establishment of functions of the IPO.⁷ (Details are

⁶ The amount of subsidies differs in different cases and is not made public, but one IPO that was selected also as a Super Industry-University-Government Cooperation Promotion Office receives more than 100 million yen per year. In the fiscal year 2005, the total budget of subsidies for IPOs and Super Industry-University-Government Cooperation Promotion Offices was 2.7 billion yen.

⁷ The name of the organization having the intellectual property management function in universities varies: for example, “Division of University Corporate Relations”, “Intellectual Property Department”, “Intellectual Property

described in 1-2-3)

1.2 Current situation of TMCs in Japan

This section explains the current situation of the establishment of TLOs and IPOs and their activity in Japan.

1.2.1 Current situation of universities in Japan

Firstly, this sub-section explains the current situation of universities in Japan. There are three types of universities in Japan: national universities, public universities, and private universities. Private universities are administered by educational corporations. Until the fiscal year 2003, national universities were national institutions as a subdivision of the MEXT, and they became national university corporations in April 2004. Public universities are universities established and administered by local governments, such as prefectural and municipal governments, and some of them are incorporated like national universities.

(Table 1-2-1) Overview of universities in Japan

	Total	National	Public	Private
Number of universities (*1)	709	87	80	542
Number of students (*1)	2,809	624	123	2,062
Number of regular researchers (Thousand) (*2)	291	134	22	135
among which are in the natural science field (Thousand) (*2)	190	104	17	70
Research funds in the natural science field (billion yen) (*2)	2,048	1,114	137	796

(*1) MEXT, “Basic Survey on Schools” (*2) Ministry of Internal Affairs and Communications, “Science and Technology Research”

Private universities hold a large portion of the number of universities and the number of students. However, regarding the number of researchers in the natural science field,⁸ national universities have 104 thousand researchers, private universities have 70 thousand researchers, and public universities have 17 thousand researchers. Regarding research funds in the natural science field, national universities spend 1,114 billion yen, private universities spend 796 billion yen, and public universities spend 137 billion yen. (Table 1-2-1). As is clear from these figures, national universities play an important role in industry-university cooperation in university research and in the transfer of university research results to industry. And the reform of national universities would significantly affect the whole system of industry-university cooperation and exploitation of intellectual properties.

1.2.2 Current situation of development of TLO

As of April 2006, 41 TLOs are approved under the TLO Law. TLOs in Japan can be roughly categorized into an “Internal TLO” that is founded within a university and an “External TLO”.

Management Center”, “Office of Industry Liaison”

⁸ Social science and human science are excluded.

(Internal TLOs)

There are two types of Internal TLOs: TLOs established within a private university (educational corporation) and TLOs established within a national university corporation. Prior to the incorporation, a national university did not have independent legal status and could not file and own patents under the name of the university, which resulted in establishing an TLO having legal status outside the university for the purpose of acquiring patents and technology transfer activities. After the incorporation of national universities, since a university can own intellectual properties, Saga University established a TLO within the university corporation in 2005.

(External TLOs)

There are two types of external TLOs: TLOs for a specific university, like internal TLOs, and TLOs for several universities located around the TLO.⁹ The latter is called a “multi-university TLO.”¹⁰ External TLOs are established as stock corporations, private limited companies, incorporated foundations, and the like.

41 approved TLOs can be categorized in accordance with the above mentioned types, all TLOs for national universities, except 1 TLO (Saga University TLO), are external TLOs (Table 1-2-2). Major private universities have internal TLOs, and some private universities do not establish TLOs of their own, but coordinate with extensive type TLOs. There exist many extensive type TLOs, however, the background of the establishment of these extended TLOs varies: initiative of a main university, joint initiative of multiple universities, or initiative of a local government.

(Table 1-2-2) Number of TLOs by type (as of April 2006)

	Private universities	National universities	Multiple universities
Internal TLO	7	1	
External TLO	0	9	
Multi-university			24

1.2.3 Current situation of development of the system for intellectual properties management in universities

(Status of development of IPO and its expected function)

As stated in 1.1.3, the MEXT pointed out prior to the incorporation of national universities that it was necessary to establish the “IPO” as an internal organization to ensure the strategic efforts by university for creating, obtaining, managing, and exploiting intellectual properties. Model supportive measures by MEXT to promote the establishment of the IPO are scheduled for five years from the fiscal year 2003. 34 model cases consisting of national universities (25 cases), a public university (one case), private universities (seven cases) and an inter-university research institute (one case), and nine quasi-model cases were selected and are granted subsidies.

Based on the policy of the MEXT, the establishment of an intellectual property management system is progressing in universities other than those of the model cases. As of March 2005, 71 out of the 94 national universities have already established the system and ten plan to do so. If

⁹ Many extensive type TLO's work for national universities near the TLO as well as national and private universities in the area surrounding the TLO: e.g., the Kansai TLO for Kyoto University, etc., the Tohoku Technoarch for Tohoku University, etc., the Hokkaido TLO for Hokkaido University.

¹⁰ Such type of extensive TLO for multiple universities can be seen in Germany.

public universities and private universities are included, 142 universities have established the system (Table 1-2-3).

(Table 1-2-3) Status of establishment of intellectual properties management system in universities (as of the end of March 2005)

	Developed		Plan to develop		No plan	
	Number of universities	ratio(%)	Number of universities	ratio(%)	Number of universities	ratio(%)
National universities (N=94)	71	76%	10	11%	13	14%
Private universities (N=505)	57	11%	66	13%	382	76%
Public universities (N=73)	14	19%	15	21%	44	60%

(Subtotal 142)

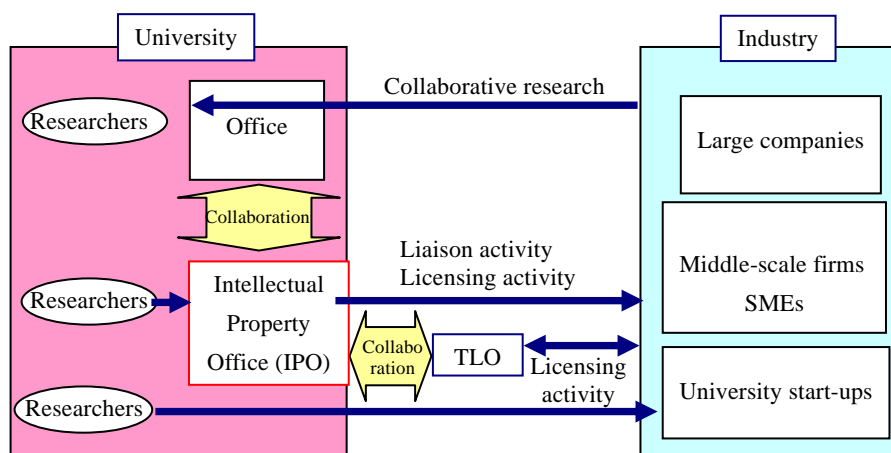
(Document from the MEXT)

The IPO is designed to promote strategic and systematic management and exploitation of intellectual properties in universities and to actively disseminate university research results to society. To this end, what is necessary is a system to adequately obtain patents for research results created in universities and to perform technology transfer while integrally managing all patents. In addition to the promotion of technology transfer, the IPO is also required to provide the following functions: (1) comprehensive support and advice regarding offers of technical instruction and consulting, (2) the coordination of joint research with enterprises or commissioned research, (3) the incubation of start-up companies originating from universities, and (4) the handling of contracts resulting from these activities.

Thus, unlike patent departments or intellectual property departments of private companies, the IPO is expected to carry out functions relating to a considerably wide range of activities.

A part of these functions, especially the function of technology transfer, have been taken in charge by TLOs. TLOs have also made efforts take charge of the aforementioned functions of an IPO as a means of enhancing the services offered by TLOs.

As a result, “technology management,” including technology transfer activities, is conducted, either shared by universities (IPOs) and TLOs, or in coordination and cooperation between them, in accordance with the circumstances of each university. (Figure 1-2-1)



(Figure 1-2-1)

One example of the type of relationship between University IPO and external TLO

(Current situation of the development of attribution rule of intellectual properties)

Prior to the incorporation of national universities, the MEXT ordered the development of the clear attribution rule of intellectual properties at each university, and encouraged the adoption of the principle of “attribution to organizations”. More than 90% of national university corporations have developed the attribution rule of intellectual properties, almost all of which have adopted the principle of “attribution to organizations.”

(Table 1-2-4) Status of the development of attribution rule of intellectual properties at universities (as of the end of March 2005)

	attribution to organizations in principle		attribution to individuals in principle		not stipulated	
	Number of universities	Ratio (%)	Number of universities	Ratio (%)	Number of universities	Ratio (%)
National universities (N=94)	87	93%	2	2%	5	5%
Private universities (N=505)	112	22%	16	3%	377	75%
Public universities (N=73)	33	45%	19	26%	21	29%

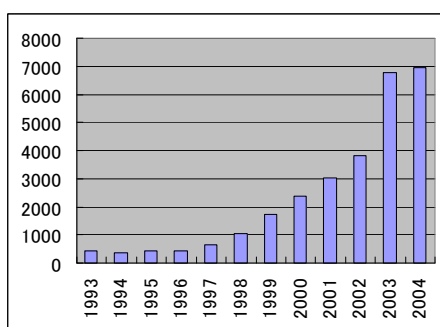
(Document from the MEXT)

In the case of private universities, 22% of them have developed rules regarding inventions, thereby specifying the inventions that are attributed to universities as employee’s inventions, but 75% of private universities have not yet established the attribution rule. Regarding public universities, the principle of attribution to organizations has been adopted by such universities that shifted from public government institutions to public university corporations.

1.2.4. Activities of TLOs and IPOs

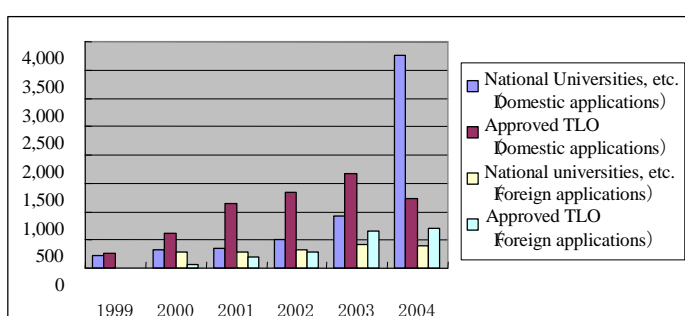
(Transition of the number of invention notifications at universities)

The submission of invention notification by faculty members is the starting point of the intellectual property management at universities. According to the transition of the number of invention notifications, the number thereof before 1996 was only about several hundred per year for all universities. This was arisen from some behaviors of the faculty members such as poor recognition for invention and ignorance of the disclosure rule to the Invention Committee. The number of invention notifications has been increasing since 1997, because the acceleration or moderation of procedures of universities has been strongly demanded in the course of establishment of TLOs at each university or because the awareness of faculty members regarding inventions or patents has been heightening due to the encouragement by the MEXT for the submission of invention notification. Thereafter, as the activities of TLOs are firmly established and the industry-university cooperation activities become active, the number of invention notifications continued increasing. (Figure 1-2-2)



(Data from MEXT)

Figure 1-2-2 Transition of the number of invention notification in universities



(Data from MEXT and METI)

Figure 1-2-3 Transition of the number of patent applications by national universities and approved TLOs

As shown above, triggered by the commencement of support of the establishment of TLO (1998), the commencement of model support measures of the establishment of IPO (2003), and the incorporation of national universities (2004) and others, the number of invention notifications increased.

(Patent applications of TLOs and IPOs)

The situation regarding patent applications of TLOs and universities shows that TLOs have constantly increased the number of domestic and foreign applications up to the fiscal year 2003, and that the TLOs have become more active over the years. (Figure 1-2-3) On the other hand, the result of the fiscal year 2004 shows that the number of domestic applications by TLOs took a downward turn. This seems to be because the number of inventions owned by faculty members that are conventionally dealt with by TLOs significantly declined due to the shift to the principle of “attribution to organizations” of intellectual properties in almost all national universities after incorporation.

Coupled with the incorporation of national universities, the number of applications by universities rapidly increased in the fiscal year 2004. Until the fiscal year 2003, inventions were principally owned by individual faculty members, so many inventions were filed after being assigned from individual faculty members to TLOs or private companies, or were filed by individual faculty member themselves.¹¹ In 2004, many universities changed their rule of ownership of inventions to the principle of “attribution to organizations”. In such universities, inventions were owned and filed by universities, and therefore the number of applications under the name of universities increased in 2004. (Figure 1-2-3)

(Revenues, such as royalty, of TLOs and IPOs)

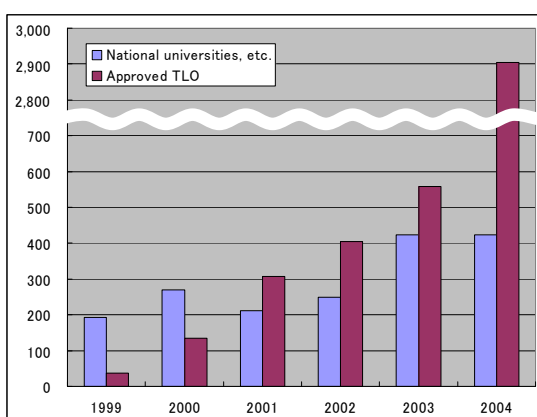
Regarding the revenues from exploitation of patents in TLOs and universities, TLOs increased their revenues until 2003 after the enforcement of the TLO Law in 1998. (Figure 1-2-4) This is a result of TLOs’ efforts to discover many promising inventions, and to license them, and it indicates the great impact both on universities and industry as real TMC activities. The revenue in 2004 includes the profit that one of the external TLOs of national universities (Tokyo University TLO) obtained from listing of equity of a biotech start-up company TLOs,¹² so the total amount rapidly

There is no survey of the number of applications so filed and therefore the number is unknown.

¹² Revenues, including equity income as well as ordinary royalty of Tokyo University TLO in the FY2004 are

increased. This is the typical success case of the licensing method using stock option and is worthy of attention as the first case of a so-called “home run patent” that gained great profit. Hereafter, in addition to lump-sum monies, option revenues and running royalties, other methods to earn revenues, such as stock options and the acquisition of equity, will be widely used.

On the other hand, the technology transfer activities in national universities before incorporation were far from adequate and systematical ones. During the period between the FY 1999 and 2003, royalty for patent licenses of national universities (i.e., revenue for patent applications filed as national property) were between 200 million to 400 million yen(Figure 1-2-4), more than 90% of which were revenues for a patent for blue light-emitting diodes by a single national university (Nagoya University). That means almost all revenues for national patents during this period were derived from one patent.¹³



(Data from MEXT and METI)

Figure 1-2-4 Transition of revenues, such as royalty, of national universities and approved TLOs (million yen)

(Other activities)

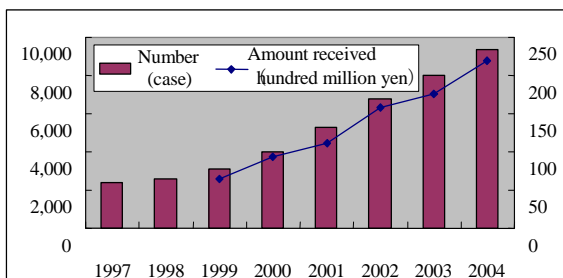
As “technology management” other than the filing of patent applications and licensing activities, the transition of the number of joint research projects between enterprises and universities and of the number of start-up companies originating from universities are both increasing. (Figures 1-2-5 and 1-2-6)

Regarding joint research, the model form of contract designated by MEXT was abolished as a result of the incorporation of national universities. It means that each university is allowed to conclude contacts in a conditions decided by the university, and their usability for enterprises is improved.

With respect to university start-ups, METI issued the “1000 University Start-ups Program” in 2001, strengthening support of the foundation of university start-ups, and thereby, universities have come to actively get involved using the incubation-related facilities of the universities.

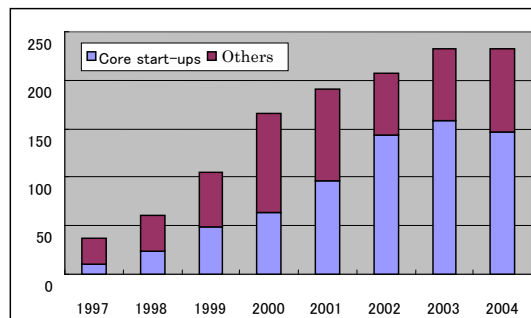
24.93 million yen.

¹³ Regarding the FY 2004 after the incorporation, no data is published on the royalty on patents of Nagoya University, so it is difficult to determine whether the incorporation caused changes in the structure of the revenue on patents of universities.



(Document of MEXT)

(Figure 1-2-5) Situation of joint research in national universities, etc.



(Document of METI)

(Figure 1-2-6) Number of university start-ups founded by year

(note) Core start-ups : start-ups founded based on the research results of universities

1.2.5 Exchanges and human resource development through University Technology Transfer Association

This sub-section refers to the activities of an association consisting of an IPO and approved TLOs. “The University Technology Transfer Association, Japan” was founded as a corporation in October 2004. This Association’s parent body is “The Japan TLO Association” which was established with its members of 14 approved TLOs in September 2000, developmentally reorganized as an organization with additional members, including an IPO (August 2003) and then incorporated (October 2004).

The University Technology Transfer Association is a non-profit organization designed to provide exchanges, enlightenment, investigation and research, proposals in order to effectively promote intellectual property management and technology transfer in universities, and it performs three major activities.

The first one is to provide opportunities for interaction among members or with industry. Specifically, it actively carries out the exchange of opinions, regarding intellectual properties or technology transfer, and contributes to building common understanding and cooperative relationships between industry, universities and TLOs.

The second one is human resource development and networking activities. It holds workshops for license associates with an emphasis on role playing and seminars focused on practical issues.

The third activity is international exchanges. This activity is carried out in coordination with international organizations, such as AUTM or LES. Especially noteworthy activity is the “Asia-Pacific Technology Licensing Seminar,” which was held twice so far (in Japan in September 2004, and in Singapore in September 2005), and the second meeting was co-hosted with AUTM.

As stated above, the University Technology Transfer Association assumes functions to collect, store and share advanced experiences and know-how regarding industry-university cooperation and intellectual property management as well as handling promotion of human resource development.

1.2.6 Current situation of TMCs in Japan (Summary)

As explained above, TMCs’ activities for universities in Japan can be summarized as follows:

1. TLO and IPO mainly assume such functions and work together to perform “technology management”
2. Before such systems were established, they were led by the government’s measures after the

mid-1990s rather than by self-efforts by universities. However, after national universities were incorporated, universities have been initiating voluntary efforts based on the awareness to the importance of “technology management”.

3. Specifically, the incorporation of national universities and the change in the rule of handling the inventions of faculty members of universities were such environmental changes that have enabled universities to voluntarily and strategically engage in “technology management” and industry-university cooperation.
4. Consequently, relevant indicators have been constantly increasing so far, such as the number of invention notifications, the number of patent applications, license revenues, the number of joint research projects, and the number of start-up companies originating from universities.

1.3 Challenges of TMCs in Japan and implications for other countries

1.3.1 Challenges of TMCs in Japan

As pointed out in 1.2.4, in developing the functions of TMCs, a system is necessary that allows comprehensive efforts, including not only filing or licensing of patents, but also activities, such as technology support or technology consulting and research cooperation. If a university works on establishing such system, it will be further necessary to organize the role sharing and cooperative relationship between TLO and IPO.

This is a Challenge revealed in the course of the incorporation of universities and the development of the IPO. Each university and related TLO will choose the role sharing and cooperation system deemed to be most efficient and effective in making intellectual property related decisions in accordance with the character, features and administrative policy of the university, and each university and related TLO will flexibly review their agreed-upon role sharing and cooperation system in accordance with (1) the changes in circumstances within or outside of the university and (2) the degree to which a university has accumulated knowledge and experience regarding intellectual property management and industry-university cooperation.

The followings are several patterns of efforts that are already made in order to share roles and to build a coordinated and cooperative relationship between TLO and the IPO.

1. Subcontracting to external TLO by national university corporation

The most common pattern is the subcontracting of one or more of the specific functions of an IPO (such as licensing, prior evaluation, marketing search, support of patent filing) to a TLO. The university may utilize experience and know-how accumulated at the TLOs. TLOs may anticipate the stabilization of the management base by assuring a regular income for activity expenses as well as revenues as contingent fees (benefit of royalty income).

2. Establishing TLO within national university corporation

After the incorporation of national universities, Saga University established their TLO in the university corporation in 2005. And some other universities plan to establish a TLO within their university corporation. The reasons for establishing a TLO in a university were as follows; (1) matching in order to manage the following from joint research to the creation and exploitation of intellectual property: (1) the preferential taxation, (2) the effective exchange and matching of technological information and the needs of a corporation, and (3) the efficiency of one organization administering joint research projects, the creation and exploitation of intellectual property.

3. Transfer of functions of external TLO to national university corporation (internalization)

There is one case so far where the functions of an existing external TLO are scheduled to be transferred to a national university corporation (Tokyo Institute of Technology). The university expects to gain the following advantages from the transfer: (1) experience and know-how from external TLOs, (2) the efficiency of one organization administering the creation and exploitation of industrial property and coordinating joint research projects.

4. Investment to external TLO by national university corporation

National university corporations are only allowed to make an investment in enterprises if they are relevant TLOs. In June 2006, Niigata University invested in their external TLO (Stock Corporation)). Investment by universities is considered to strengthen the cooperation between a TLO and the university.

1.3.2 Implication from TMC's experiences in Japan (Elements supporting the progress of TMCs' activities in Japan)

Regarding the current status of universities in Japan, while there are some challenges of further clarification of role sharing between the IPO and TLO, and of further building of a coordination system, it is possible to evaluate that efforts by universities after incorporation for the management of intellectual properties and industry-university cooperation have been making significant progress because of the following reasons.

- A university-wide, cross-sectional structure with university executives (vice president, etc) being appointed to the top administrative positions was established to promote the university's efforts regarding the creation, management and exploitation of intellectual property.
- Many universities have established fundamental internal policies and rules, such as an intellectual property policy, a conflict of interest policy and an invention regulation etc.;
- An internal system was established to decide on the attribution to organizations of invention notifications and the filing of patent applications;
- An intellectual property management system covering the procedures from filing to licensing was introduced to universities;
- Dissemination to and enlightenment of faculty members regarding awareness of the intellectual properties; and
- Active utilization of external specialists by IPO and TLO, such as members from enterprises, patent agents and lawyers were facilitated.

The following three seemed to be especially important factors that supported such progress:

1. Grant of independent legal status to universities (Incorporation of national universities);
2. Adoption of the principle of "attribution to organizations" regarding inventions of faculty members; and
3. Support of the national government for the establishment of TMCs' functions (such as support for operational funds during the launch period, support for human resource development, relaxation of regulations, etc.)

Especially, from the viewpoint of management of intellectual properties, it is important that factor 1 enabled universities to own patents and left the handling of inventions owned by universities to the discretion of the universities.

Such change in the system made the shift to the principle of "attribution to organizations" in factor 2 meaningful. Supposing that inventions owned by universities remained subject to the management and control of the national government as national assets, as they were before the incorporation, the shift to the principle of "attribution to organizations" would have rather

become an obstacle to the management and exploitation of inventions. National universities in Japan faced the incorporation of universities and the change in the rule of attribution of inventions at the same time, the combination of which brought enormous effects.

Furthermore, regarding factor 3, the fact that the two relevant government ministries of MEXT and METI cooperated to make policies and take measures to support the establishment of functions of TMCs made more significant the impact of policy messages and the effect of measures for both universities and industry.

(Importance of changes in consciousness of universities and faculty members)

Lastly, one more thing will be added. In order for the above three factors to be reflected on the actual activities, it is important to change the consciousness of universities and their faculty members. To this end, TLO activities having been initiated before the incorporation of national universities played a very important role.

Technology transfer activities by a TLO is the process where, after the TLO takes over an invention owned by individual faculty member through official and transparent procedure and obtains patent via patent filing, the TLO executes a license agreement with enterprises and then a part of the license fees are distributed to the faculty member and the university in accordance with the contract. TLOs' activities have had such process take root and have enhanced the awareness of faculty members on the importance of the transparent handling of intellectual properties. In this sense, TLOs' activities greatly contributed to the fact that there was no confusion in almost all universities in shifting to the principle of attribution of inventions of faculty members upon the incorporation of national universities.

In addition, newly developed IPOs could smoothly begin business from the very beginning, mainly because experiences in TLOs' activities, for eight years after the enactment of the TLO Law in 1998 until the incorporation of national universities, were accumulated and broadly shared by university staff.

Prior to the incorporation of national universities in 2004, there remained certain restrictions on the management of intellectual properties at universities. While the development of the TLO system that began in 1998 was initiated under such circumstances, TLOs' activities contributed to the enhancement of changes in consciousness of universities and faculty members, and constituted a basis for smoothly facilitating the efforts after the incorporation.

In considering the expansion of TMCs' activities in Japan, it is not proper to pay attention only to the efforts made after the incorporation of national universities. Attention should be also paid to the fact that the TLO activities that had been made before the incorporation significantly contributed to establish the intellectual property management system and the promotion of industry-university cooperation.

(References (in Japanese))

1. Ministry of Internal Affairs and Communications, “Survey of Research and Development” (2005)
2. Ministry of Education, Culture, Sports, Science and Technology, “Current status of University – Industry Collaborations in Japanese Universities” (2005)
3. Ministry of Economy, Trade and Industry, “Current Status of Transfer of Patents in Approved TLO” (2005)
4. Ministry of Economy, Trade and Industry, “Basic Survey on University Start-ups in Fiscal Year 2005” (2006)