

4 Utilization of Intellectual Property Rights in New Business Environment

This is a research study on utilization of intellectual property rights, surveying present situation and needs for the utilization. Since it is very difficult to measure activities of utilizing intellectual properties, there are no specific indicators illustrating intellectual property rights “utilization” activities, such as number of applications or registrations for intellectual property rights “obtaining” activities. Accordingly, measures of Japan Patent Office (JPO) do not properly reflect the needs of intellectual property right users. Instead, JPO has given priority to promoting utilization of “unused intellectual property rights” based on their annual statistical survey criteria of “used and unused intellectual proprietary rights”.

Since intellectual property users, such as companies or universities utilize their rights in various ways depending on their industrial categories or company sizes, etc. it is difficult to measure their activity of utilization by the simple criteria of “used” or “unused”. Therefore, in considering future policies for their utilization, it is very important to properly understand the present situation and needs for the utilization.

The research study includes a questionnaire survey and hearings with companies and universities in Japan and foreign countries. The questionnaire survey was conducted for about 3,000 samples and focused on typical activities of utilizing intellectual property rights,— enforcement of rights (direct utilization), defending proprietary products (indirect utilization), utilization of rights as technology benchmarks, and utilization of rights for introduction of outside technologies – and analyzed the activities by technology area and company size.

I Introduction

The patent system plays a role of protecting research and development achievements by companies, institutes, universities, and other entities, and the system is uniform for all technology areas. This means that in principle, procedures for acquiring patent rights or effects of these rights, such as requirements for patent infringement or patent terms) do not differ for technology areas. The uniformity derives from requirements of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs). In Japan, exception for the uniformity exists only for the extension of patent terms for drugs.

In contrast to the uniformity of patent system, business operations of companies vary depending on technology areas, corresponding to variation of profit earning mechanisms. Therefore, utilization of patents in business operations varies depending on technology areas, even though the patent system is uniform for all technology areas. The way of patent utilization differ not only in technology area but also in company size, competition environment, products and services related to business operations, or other factors, since business operations are linked to various factors as described. .

Business operations are affected by patent enforcements, such as injunctions or damages claims, and patent system’s effects on business operations are not limited to those “direct” patent utilization. For example, the mere patent existence or patent licensing of a certain company affects business operations of their rivals. In addition, information of granted patents or patent applications affects decisions or behaviors of third parties who do not directly understand relevant technologies, such as customers, banks, or investors.

Therefore, in considering utilization of intellectual property rights, which include patents, it is essential to examine not only for intellectual property right enforcements and rights-related operations, such as assigning and licensing rights, but also for overall operations of utilizing intellectual property rights for business projects. It is also important to consider utilization of other entities’ intellectual property rights by an company, in technology introduction or joint R&D projects, for example, as well as utilization of its own rights.

Until now, discussions about utilization of intellectual property rights in Japan have grown with respect to specific issues and did not cover the whole range of business operations related to

intellectual property rights. The issues include “utilizing unused intellectual property rights,” “industry-academia cooperation,” “raising damages claims,” “intellectual property trust,” or “license registration system” and the discussions do not sufficiently recognize present situation or problems regarding the whole range of business operations and intellectual property rights. The discussions also did not cover analysis of differences between Japanese and foreign situations in utilizing intellectual property rights, or analysis of effects of JPO’s measures and law revisions.

This research study analyzes present situation and needs regarding companies’ intellectual property rights from various viewpoints, aiming to serve as a basic data considered in JPO’s new policy measures for the utilization of intellectual property rights.

II Background

JPO has been claimed “intellectual property creation cycle” as ideal cycle of intellectual property creation. The “cycle” consists of three phases, “creation”, “protection”, and “utilization”. Though “utilization” of intellectual property rights is one of the three phases, present situation or needs regarding the utilization have not necessarily been well specified.

1 Statistics on intellectual property right utilization

As for statistics for “utilization”, there is a survey about numbers of “used” and “unused” intellectual property rights, titled “status of intellectual property right usage”, included in annual intellectual property activities survey by JPO. According to the survey in 2008, the survey shows that half of patents were “used” and another half was “unused”. After excluding “unused” patents for defense purposes, 20% of patents were “unused”.

2 JPO advisory panel discussions and law revisions on utilization of intellectual property rights

There were some advisory panel discussions and resultant law revisions on intellectual properties relating utilization of intellectual property. For example, there were two law revisions on license registration system. One was

about introducing omnibus registration for the licensing registration system, corresponding to cross-licensing between companies. It was discussed in JPO committee, named “subcommittee on circulation and liquidation of intellectual property”, and was legislated in amendments to the Act on Special Measures Concerning Industrial Revitalization. The other was about introducing registration for patent application which is not yet granted. It was discussed in JPO committee, named “working group for provisional non-exclusive license registration system under patent system subcommittee” and was legislated in amendments to Patent Law in 2008.

Utilization of intellectual property was also discussed in the Intellectual Property Strategy Headquarters and its annual intellectual property promotion plan has called for supporting and paving the way for the utilization of intellectual property rights. After Democratic Party of Japan (DPJ) became the ruling party, “The New Growth Strategy (Basic Policies) – Toward a Radiant Japan,” which was approved by the Cabinet in December 2009, cited the promotion of small and medium-sized companies’ intellectual property rights utilization as one of objectives.

Table 1 is an overview of major past law revisions relating to intellectual property rights law revisions. As shown in Table 1, eleven major revisions were implemented since 1993 and the revisions can be categorized into three phases. The first phase revisions, ones in 1993 and 1994, were related for application procedures mainly for according with treaties. The second phase revisions, ones between 1998 and 2006, were aimed for making the patent system more favorable for patent acquisitions and protection by patents. The third phase revision in 2008 was aimed to enhance “strategic utilization of intellectual property rights”.

Summarizing briefly, law revisions relating to intellectual property have shifted from enhancing protection of rights to promoting utilization by improving environment..

Table 1 Major Intellectual property Law Revisions

Law revision	Category	Outline
1993	Patent	Forbidding new matter addition
	Patent	Creating “demand for correction” in the procedure of invalidation trial
	Utility model	Shifting to a non-substantive examination system
1994	Patent	Changing patent right duration calculation
	Patent	Deleting the statutory unpatentable category
	Patent	Increasing countries accepting priority of application
	Patent	Creating foreign-language patent application procedure
	Patent	Easing written description requirements for patent application
	Patent	Easing time restrictions on amendments and divisional applications
	Patent	Shifting from pre-grant opposition system to post-grant opposition system
1996	Patent	Easing formal requirements of patent application
	Trademark	Allowing trademark registration with standard character
	Trademark	Easing trademark registration renewal requirements and enhancing cancellation of unused trademark registration
	Trademark	Expansion of registered trademark protection and creating group trademark system
1998	Patent	Reforming damages calculation methods
	Design	Expanding the scope of protection (partial and related designs)
	Design	Simplifying design registration application procedures
1999	Patent	Shortening the examination request period
	Patent	Expanding novelty and inventive step standard to global
	Patent	Expanding exceptions to lack of novelty procedure
	Patent	Creating accelerated disclosure procedure
	Patent	Reforming the patent term extension system
	Patent	Easing the burden of proof of patentee in infringement/damages trial
	Trademark	Conforming with the Madrid Protocol
2002	Patent	Clarifying “use” of invention related to computer programs
	Patent	Expanding applications for contributory infringement
	Trademark	Clarifying “use” of trademarks
	Patent	Separating claims and specifications in patent application document
	Patent	Creating prior-art disclosure requirement in patent application
	Patent	Withdrawing reservations on PCT (Patent Cooperation Treaty) provisions (30 months)

2003	Patent	Revising fee structure and creating examination fee refund procedure
	Patent	Abandoning post-grant opposition system
	Patent	Reforming appeal and trial system
	Patent	Revising standards for unity of invention
	Patent	Accepting overall country designation of PCT
2004	Utility model	Creating procedures of patent application from utility utility model registration
	Utility model	Extending utility model right duration
	Utility model	Expanding allowable correction in utility model correction trial
	Patent	Revising provisions of employees' invention
	Patent	Enabling invalidation argument in patent trial on the ground of right abuse
2005	Trademark	Creating local group trademark system
2006	Design	Extending design right duration
	Design	Various major revisions on design system
	Patent, etc.	Adding export to definition of "use"
	Patent, etc.	Adding possession for assignment purposes as type of infringement
	Patent	Revising time restrictions of divisional application
	Patent	Revising requirements on amendment
2008	Patent	Adding provisional non-exclusive license registration to license registration system
	Patent	Revising time restrictions of appeals for final rejection

3 “Patent licensing promotion”: measures conducted under JPO on utilization of intellectual property right

Patent licensing promotion program is a policy measure conducted under JPO since 1997, for purpose of utilizing intellectual property rights. The program offers a patent licensing database and dispatches patent licensing advisers.

The number of registrations in the patent licensing database peaked at about 58,600 at the end of fiscal year (FY) 2006 (March 2007) and decreased after then. The number of license contracts (for assignment or licensing) signed through patent licensing advisers peaked at 723 in 2005FY, and gradually decreased to about 500 in 2008FY. According to the annual survey conducted by JPO, most of the patents and unused patents (approximately 90%) are held by large companies. Although the patent licensing promotion program focused on “unused” patents, share of large companies as licensor have substantially reduced from a quarter at the start of the program. Instead, technology licensing organizations (TLOs) have expanded their share.

4 Design rights utilization

As for design rights, a law revision in 2003 was a large change, including (1) extension of design right duration to twenty years from registration, and (2) easing filing date requirements for related design application. Prior to the revision, filing date of related design application had been required to be the same day as its principal design application filing. The revision eased filing date of related design application extended to be between filing date and publication date of the principal design application. Protecting products by combining patent and design right had been utilized in various ways. The law revision made the combination more effective and corresponded to changes in industrial design.

5 Trademark rights utilization

As for trademark rights, law revision in 1996 enhanced measures against unused trademark right, by (1) easing requirements of plaintiffs for trials to cancel unused trademark rights, (2) invalidating “last-minute use refutation” against cancellation trial, (3) making trademark right cancellation date deemed to be the date that

cancellation trial registration, earlier than the cancellation trial decision date., The law revision also included (4) allowing trademark registration fees to be paid in installments. Supreme Court’s decision also enhanced measures against unused trademark right, which issued a judgment on requirements for arguments for the absence of damage, thereby barring trademark brokers from using unused trademarks for claiming damages.

III Objectives of the Research Study

1 Difference between “utilization” and “used/unused”

This research study aims to survey present situation and needs for utilization of intellectual property rights. For that purpose, it is essential to examine not only for enforcement of rights, such as injunction or damages claims, and rights-related operations, such as assigning or licensing rights, but also for overall business operations, which include business operations that user of the intellectual property right evaluates the right as functioning or that the user is exploiting their rights. In other words, in order to examine utilization of intellectual property rights and survey examine the present situation and needs, it is necessary to examine business operations of the users comprehensively.

The traditional classification of these rights as “used or unused”, which was used in annual statistics and policy measures by JPO, has not necessarily reflected the present situation and needs when examining the utilization of intellectual property rights for business operations.

For example, when a company inventories its patents and finds some patents as ineffective for blocking other companies operation, even if the patents are “used” by the company, the company would stop paying patent maintenance fee and make them abandoned, thus “unutilized”..For another example, when the company inventories its patents and evaluates some other patents effective in demonstrating its technological capacity by inflating the number of patents that the company is holding, even if the company do not “use” the patents for their business, the company would keep paying maintenance fee and keep them valid, thus “utilized”.

Therefore, status of “used / unused” of patents may not necessarily correspond to that of “utilized / unutilized”. Additionally, as there are “abandoned” patents that patentee decided to

stop paying maintenance fee, maintenance of patents through annual fee payments may imply some purposes, even for “unused” patents, that cannot be identified through the classification of patents as “used and unused.”

Another example supporting this assumption is that though it is widely recognized that licensing activity in pharmaceutical industry is different from that in the electronics industry, the annual “used / unused” statics for industry-by-industry indicates no major difference between the two industries.

Given the above, it is concluded that “used / unused” statics of intellectual property rights indicates limited aspect of the intellectual property right utilization and wider range of survey is necessary.

2 Objects of the survey

For surveying utilization of intellectual property rights, we set object of the survey as “users’ activities of acquiring intellectual property rights and utilizing them for their business operations.” Then, we classified those activities to “direct utilization”, “indirect utilization”, “utilization of other-entity-owned patents upon introduction of technologies outside the company,” and “utilization of intellectual property rights as indicator of technology capacity demonstration, business negotiation and advertisement purposes”.

The “direct utilization” activity relates to utilizing intellectual property rights for enforcement or licensing, aiming for exclusive use of patented invention or royalty income. The “indirect utilization” activity relates to utilizing intellectual property rights for protecting their proprietary businesses.

As intellectual property rights’ effects on business operations were expected to vary depending on technology area and company size, we mainly analyzed differences between industrial categories and company sizes in the questionnaire survey.

3 Design and trademark rights

In the questionnaire survey, we asked whether designs or trademarks were licensed together with patents and investigated whether there are any instances for utilizing multiple kinds of intellectual property rights, and whether there are any motivations for utilizing unused design or trademark rights.

IV Survey and Analysis

1 Questionnaire survey overview

We sent questionnaire for 3,153 companies or research institutes and received 762 responses (response collection rate: 24.6%). The correspondent of the questionnaire were chosen from patent applicants with six or more patent applications filed in 2007,

2 Questionnaire survey results

The questionnaire was focused on the utilization of intellectual property rights with multiple-choice questions and free-description ones. The result of the questionnaire was analyzed by technology area or company size of the respondents.

Though the situation of intellectual property rights utilization, especially whether licensing operations are very active, varies depending on technology area, the result shows that the situation can be explained by following factors:

- “characteristics of developed technologies,” including “technology overlaps (to what degree an company can conduct business operations without considering others’ patents, or the degree an company can get around others’ patents),” “technology development failure risks,” and “ industry’s technology maturity (shares for improved and new technologies).”

- “characteristics of products,” including “numbers of products and elemental technologies (degree that a company’s products are related to others’ technologies or patents),” “the effective strength of patents (the degree of exclusive working of patents through their acquisition),” and “ease of infringement confirmation.”

- “social restraints on patent-based monopoly (including bidding conditions and approval of drugs).”

The result also indicate that small and medium-sized companies (SMEs) conduct less licensing (cross-licensing and licensing with payments) or technology introduction than large companies, though they have similar needs for licensing or technology introduction.

3 Domestic interview survey overview

We made thirty interview surveys, chosen from the questionnaire survey respondents, about questionnaire-related matters and technology

transfers from universities.

4 Domestic interview survey results

Similar to the questionnaire survey, the interview survey found that the aggressiveness of licensing operations varies depending on technology area. The analysis is supported by companies that operate in multiple technology area. They indicated that licensing operations of companies depend on “whether licensing operations are very active in industrial categories they belong to,” rather than “whether they are familiar with licensing operations.”

The survey also indicates that attitudes toward the introduction of technologies are affected by company organizational structure as well as technology area.

For the interview on disclosing needs for technology transfer and introducing technologies outside, there are some needs of utilizing experts outside the companies.

Regarding introducing or jointly developing technologies with universities, the interview survey results indicate that companies give priority to “connections” with professors in the universities and to have deep engagement with them through joint technology development, while not viewing them in general as technology sources.

Regarding on the quality of university-held patents, the interview survey results indicate that these patents fail to satisfy companies’ qualitative requirements regarding the scope of rights meeting business needs, although qualities of specifications for these patents are not necessarily low. The results also suggest that if universities were to increase licensing with companies, they might have to learn overseas university practices and improve the qualities related to business requirements.

There were various opinions exist about university technology licensing organizations and intellectual property divisions. Complaints about financial conditions, especially compensation for universities’ non-utilizing status for co-owned inventions or patent applications, have apparently stemmed not only from licensing contract conditions, but also from differences between companies and university TLOs about technologies transfer and joint research. The differences are on whether university TLOs or IP divisions can give priority to long-term profits or understand required investments before commercialization. The survey results also

indicate that university TLOs and IP divisions are requiring for people who can communicate well with companies on those issues.

The interview results also indicate that in inventorying patents though almost all (large) companies understand importance of allocating IP division staff, storing know-hows, and cooperating with R&D divisions’ evaluation for the activities varied from company to company. Among companies subject to the interview survey, those that positioned inventorying of patents as “a review for cost cuts” doubted effects of the activity for resources input. On the other hand, those that positioned inventorying as “an opportunity to evaluate patents or survey other companies’ patent utilization” gave higher evaluation ratings to inventorying in general.

In answering questions about capabilities and consciousnesses of inventors, intellectual property division staffs, and outside patent agents, multiple respondents called for improving inventors’ skills and acknowledging importance of intellectual property rights. Multiple respondents urged intellectual property division staffs to improve their capabilities to support inventors in patent application procedure. Multiple respondents asked outside patent agents to have proposal-making and consulting capabilities, as well as understanding of relevant technology areas of the inventions.

As for the utilization of outside experts for intellectual property activities, multiple respondents said they utilized such experts for research where no in-house coordination was required. Multiple respondents also said they would like to utilize outside experts on technology transfers or negotiations, or experts specialized in both intellectual property rights and financial matters.

On dealing with BRICs (Brazil, Russia, India and China), multiple respondents said they were increasing patent applications in China and India to avoid risks accompanying the failure to make such applications, as patents in the two countries have grown more important along with their market expansion. Every respondent said the difficulties in enforcing rights could not become a reason for refraining from filing patent applications. Multiple respondents said they would obtain licenses in China when they begin relevant business operations there.

5 Overseas interview survey outline

We conducted an interview survey for

companies and university organizations, for five entities in five countries each, in the US, UK, Germany, France, and South Korea. As it was difficult to make interviews with multiple technology area entities which we did in Japan, we conducted interviews to companies, university TLOs, and official organizations on introduction of outside technologies, particularly those from universities to companies.

6 Overseas interview survey results

The U.S.: Universities conduct skillful intellectual property management. Even under limited budgets, they make early decisions on whether to implement early commercialization of inventions and conduct licensing and selection procedures, including suspension of patent application. TLOs have employed former businesspeople and utilized outside experts, to improve the quality of patents acquired for universities. Even U.S. universities have difficulties in achieving a license-based income surplus, and take a long time before reaching such surplus. TLOs' roles are taken as transferring university technologies to companies, rather than securing license-based income.

UK: As Japanese and European university researchers are less proactive than their U.S. counterparts in commercializing technologies, they thought that universities in Japan or Europe should take different approaches for technology transfer from the U.S. ones. They also pointed out that Japanese, European, and U.S. university TLOs are similar in that they need those who can both understand business operations and university procedures, such as technology marketing person in companies that university TLOs are usually working with.

France: As grandes écoles exist in addition to universities in France, financial support for universities from the government are limited in France. Therefore, the R&D environment at universities in France is not as good as in other countries. Though technology transfers from universities are less frequent, multiple universities share joint TLOs in some regions and technology transfers from universities to companies are promoted within designated clusters. Compared to other countries, central and local government provides robust support for technology transfers and develops a system for direct contacts between university researchers

and relevant company workers.

Germany: As technology transfer divisions at German universities have a short history, as seen at Japanese universities, technology transfer abilities of university differ widely in Germany. However, as universities and companies have had long relations and there are no resistances to technology transfer from universities to companies, if technology transfer divisions improve their ability, there will be major achievements in technology transfers.

South Korea: As South Korea features a handful of large companies and a large number of smaller companies, they give priority in developing infrastructure on the utilization of intellectual property rights for the smaller companies. The central government has taken leadership in utilizing intellectual property rights with several measures, such as disclosing licensing intent on official gazettes of patent grants, creating "IP-Mart," Internet-based intellectual property rights market, or developing technology exchange center.

7 Design and trademark rights utilization situation

For design and trademark rights, research was made through the questionnaire survey about design and trademark licensing conditions, and through the interview survey for some specific cases. We confirmed that there were some cases that design and patent rights were combined for multiple protections for relevant products or for simultaneous licensing. Some trademarks, though fewer than design rights, were identified as accompanying licensed patents. An apparent reason for the situation that licensing deals are more for design and patent combinations than for trademark and patent combinations may be that designs are more closely related to technologies than trademarks.

V Conclusions

1 Domestic intellectual property rights utilization situation

In the research study through questionnaire and interview, we conclude that degree of utilizing intellectual property right differs from company to company, especially by their technical areas. In business environment where "aggressive utilization" of intellectual property rights is

important, such as licenses, introduction of technologies, or their joint development, companies are thought to give priority on those activities. On the other hand, in business environment where “aggressive utilization” is less important, companies may not have to give priority to those activities and assign business resources to other areas than intellectual property right utilization.

On differences between company sizes in the utilization of intellectual property rights, the research indicates that large companies conduct more licensing, including cross-licensing and licensing with payment, or technology introduction than small and medium-sized companies. For characteristics of technologies subject to technology transfers, there are no differences by companies’ sizes.

As of technology transfers from universities to companies, companies have traditionally been focused on keeping connections between university professors and them and technology transfers from universities to companies are very low. University intellectual property divisions have played no major role in technology transfer procedures and only involved in contracting. One of the reasons of the inactive technology transfers from universities to companies is a difference in attitude and understanding of business related to the transferred technology between universities and companies. We conclude that patents of transferred technology can play a role in filling the difference.

Survey results also found that some design or trademark rights are combined with relevant patent rights for product protection or licensing. There are any situations or needs identified for the utilization of “unused design rights” or “unused trademark rights”.

2 Domestic needs for utilization of intellectual property rights

Technology transfer and utilization of intellectual property rights related to the transferred technology progress greatly when both parties go in the same direction regarding the transfers and are “organically combined”, both for technology transfers between companies and between companies and universities. In other words, there are large needs for intellectual property rights utilized to promote such organic combinations. Additionally, there are also needs for promoting utilization of intellectual property rights and technology transfers by two viewpoints

– “guiding technology seeds to meet needs” and “creating seeds based on needs.”

For the “aggressive utilization” of intellectual property rights, companies must not only acquire intellectual property rights but also conduct rights enforcement activities (including surveys on technology trends and product information of other companies, negotiations with others, and bearing of risks regarding the effectiveness of patents), and outside technology introduction activities (including decisions on what they do by themselves and what they ask others to do with regard to specific technologies, and evaluation of the technologies for introduction and evaluation of licensors). Particularly, the introduction of other companies’ technologies involves business strategies, and support by outside experts is not sufficient and involvement of in-house intellectual property divisions and other levels, including management executives, and research and business divisions, are crucial.

We described above that business decisions on whether to implement the aggressive utilization of intellectual property rights is up to companies environment, such as technology area or size of the companies. On the other hand, regardless of technology area or company size, needs may exist for information about “what in-house decisions and preparations companies should make for ‘aggressive utilization?’”, “what outside resources (including experts) they could use for ‘aggressive utilization?’”, or “what specific ‘aggressive utilization’ cases exist in relevant industrial categories?”

Regarding support for small and medium-sized companies’ technology transfer and utilization of intellectual property rights, as they do not have sufficient resources for “aggressive utilization”, there are needs for comprehensive support covering both technology transfers and commercialization. To be more specific, needs may exist for “support for qualitative knowledge improvement of technologies and intellectual properties to be transferred,” “consulting support allowing business decision-making SME managers to make business-based approaches on the utilization of technologies and intellectual property rights,” or “the expansion of SMEs’ cooperation with local governments and other regional organizations, to link utilized technologies and intellectual property rights to commercialization.”

Regarding the utilization of technologies and intellectual property rights created at universities

and other public research organizations, potential needs may exist for “the development of infrastructure where universities and other public research organizations share viewpoints with companies on the introduction of technologies and intellectual property rights,” and for “the promotion of the utilization of already-submitted and undisclosed patent applications.”

3 Overseas intellectual property rights utilization situation

The overseas interview survey focused on technology transfers from universities or companies. Though intellectual property rights utilization situation and issues for the utilization differ from country to country, those differences reflect differences in the environment of each country, such as R&D culture or business culture, rather than policy difference of patent office or other government agencies, or R&D abilities of universities.

For example, technology transfers from universities in the United States are easier to implement because university researchers in the United States are more conscious of and aggressive toward commercialization of technologies than in Japan or Europe.

As commented by a UK university TLO, Japanese and European university TLOs’ mere imitation of the U.S. TLO style may fail to achieve progress in technology transfers from universities because of background differences. When comparing Japanese and overseas situations and problems, we may have to fully understand background environmental differences.

France promotes technology transfers between companies and universities in same cluster. Cluster-based measures are not limited to technology transfers, but open to many others. Japan may learn something for regional efforts from French cluster-based support measures that cover not only technology transfers but also many other activities.

Like Japan, Germany has only a short history for university TLOs. However, based on long-lasting relations between universities and companies, German universities have built up relations with companies through TLOs instead of via individual professors. Japan may be able to learn something from German practices.

In South Korea, research organizations have paid attention to “technology transfer infrastructure development” in addition to direct technology transfers. This practice may serve as

a useful reference.

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