7 Application Behavior for Industrial Property Rights toward Acceleration of Technological Innovation in Japan

The intellectual property system is one of the most important institutional infrastructures that support innovation activities. There is thus a request for consistent efforts to improve the system for the purpose of promoting innovation. In addition, data on intellectual property activities, such as patent data, are indispensable in analyzing the research and development and innovation activities of companies, etc.

In this research, six kinds of empirical analyses were conducted by taking advantage of patent databases and the "Survey on Intellectual Property-Related Activities," etc. implemented by the JPO based on previous studies. Specifically, these analyses concern the effects of a change to the unity of invention requirement in Japan, the effects of the provisions on exceptions to lack of novelty in Japan, the relationship between an increase in the grant rate of patent applications and reasons for refusal in Japan, the complementary relationship between the design system and the trademark system, the condition of distribution of patent documents in major countries by technical field, and trial-related information in the East Asian Region. Furthermore, the sampling method that is used in the Survey on Intellectual Property-Related Activities, which serves as the basis for the empirical analyses, was examined, and a trend survey was conducted on the empirical analyses of intellectual property systems overseas.

Ⅰ Introduction

This research empirically analyses the intellectual property system, and improvement of the "Survey on Intellectual Property-Related Activities," which is also one of the unique statistics from a global perspective.

This report has six analyses in Part II. Of these analyses, three concern the Japanese patent system ("analysis of effects of a change to the unity of invention requirement on the number of applications in Japan," "analysis of correlation between an increase in the grant rate of patent applications and reasons for refusal in Japan," and "analysis of exceptions to lack of novelty in Japan"), two study the international patent system ("analysis of distribution of patent documents in major countries by technical field and efficiency of prior art document search" and "statistical analysis of trial-related information in the East Asian Region (except Japan)"), and one is the analysis of the design patent system and the trademark system ("analysis of the complementary use of the design patent system and the trademark system"). All of them are highly original empirical analyses.

In addition, Chapter 7 ("Case Study of Economic Analysis Methods Concerning Industrial Property Rights in Foreign Countries") reports the outlines of the "Patent Statistics for Decision Makers" conference (co-hosted by the OECD, WIPO, the EPO, and other major patent offices) and "The PATSTAT user day," both of which were held in Rio de Janeiro, Brazil in November 2013. At the end, in Part III, the "Survey on Intellectual Property-Related Activities" implemented by the JPO is specifically examined toward introducing an online survey therein, and the effects of changing the method of conducting the Otsu survey to a stratified random sampling method (Neyman allocation method) are analyzed.

(Sadao NAGAOKA)

Ⅱ Research on Application Behavior, etc. for Industrial Property Rights

1 Analysis of Effects of a Change to the Unity of Invention Requirement on the Number of Applications in Japan

In this analysis, the effects of a change to the unity of invention requirement in the FY2003 revision and the FY2006 revision on the patent application behavior, etc. of companies, etc. were statistically analyzed. The provisions on the unity of invention are set in order to limit the scope of inventions for which rights can be claimed as one patent to technically-relevant inventions. Through the FY2003 revision, existence of a "special technical feature (STF)" that is common to all the

(*) This is an English summary by Institute of Intellectual Property based on the FY2013 JPO-commissioned research study report on the issues related to the industrial property rights system.

claims has become one of the conditions for satisfying the unity of invention requirement. In addition, shift amendment, which is to change an STF after a notice of reasons for refusal is given, was prohibited through the FY2006 revision. Both of these revisions are considered as having made the unity of invention requirement stricter. According to the analysis results, both revisions have had no effect on the number of patent applications, but the FY2006 revision has produced effects such as a decrease in the number of claims and the number of incidences of making an amendment and an increase in the number of divisional applications.

(Koichiro ONISHI)

2 Analysis of Correlation between an Increase in the Grant Rate of Patent Applications and Reasons for Refusal in Japan

In this analysis, the factors of an increase in the grant rate of patent applications in Japan were analyzed with a focus on the expediting of the start of examination by the JPO and applicants' careful selection of applications for which they file a request for examination. The effects of expediting the start of examination were analyzed on the basis of the effects of the shortening of the time limit for filing a request for examination from within seven years to within three years in 2001 and of the recent shortening of the period from the filing of a patent application to the first action. In addition, the effect of applicants' careful selection of applications for which they file a request for examination was analyzed on the basis of changes in the quality of patent applications that were measured based on the number of inventors, the number of IPCs assigned, the rate of international applications, etc.

The results revealed that the shortening of the initiation lag of examination shifts the cited prior art in the examination of an application to older ones, starting on the application date, while it also increases the number of notices of reasons for refusal based only on the lack of novelty. On the other hand, the analysis suggested that such a change in the composition of reasons for refusal is unlikely to serve as a factor in an increase in the grant rate of patent applications in terms of a time-series change though it was confirmed to have the effect of increasing the grant rate in terms of difference by technical field.

The possible factors of prolongation of the citation lag arising from the shortening of the period before the start of examination include a decline in document searchability due to the shortening of the period before the start of examination (the following conditions are likely to have an effect: (1) there is a time lag before a translation of a PCT application is submitted and becomes searchable on a search database in Japanese; (2) a certain amount of time is also required to gather non-patent literature; and (3) a certain amount of time is also required before the results of searches conducted by other examiners are accumulated in a database). In addition, this analysis indicated the decrease in opportunity to use the search results of other offices is also one of the factors in prolongation of the citation lag. However, this analysis also suggested that its effect is basically based on the shortening of the start lag.

Furthermore, according to the analysis results, applicants' careful selection of applications for which they file a request for examination also contributes to an increase in the grant rate. In particular, an increase in the number of inventors and in the number of IPCs assigned and a raise in the rate of PCT applications were confirmed to have the effect of significantly raising the eventual grant rate. However, such effect arising from applicants' careful selection is presumed to be relatively very small.

The results suggest that there is a trade-off between response to applicants' need for early protection and appropriate search. In expediting the start of examination, it is necessary to simultaneously take measures for mitigating adverse effects on the quality of search, such as improvement of searchability (for example, shortening of the time limit for the submission of a translation of a PCT application) and an increase in the number of examiners. It is worth considering that setting a priority for examination based on the applicant's need for early protection.

However, this study leaves some problems. Specifically, more detailed analyses are necessary concerning the direct relationship between a time-series change in the composition of reasons for refusal/a change in document searchability and an increase in the grant rate.

(Isamu YAMAUCHI and Sadao NAGAOKA)

3 Analysis of Distribution of Patent Documents in Major Countries by Technical Field and Efficiency of Prior Art Document Search

In order to compare the comprehensiveness of patent document searches conducted by the Trilateral Patent Offices, the JPO, the USPTO, and the EPO, the "rate of patent documents found in advance in the International Search Report (ISR)" by WIPO's technical field was defined by the following formula: the number of families of patent documents cited in the ISR divided by the total number of families of patent documents cited by the JPO, the USPTO, or the EPO. In more detail, an indicator, the rate of the number of patent documents cited in the ISR to all of the patent documents that were subsequently presented as citations by the JPO, the USPTO, or the EPO concerning PCT applications that were filed with all the Trilateral Patent Offices based on an application filed with the JPO, the USPTO, or the EPO, is calculated in units of citations between international patent families. The rate was calculated by eliciting PCT applications that were filed based on an application filed with the JPO, the USPTO, or the EPO for which the date of the first priority claim is between 2002 and 2005, from the October 2013 edition of PATSTAT. By comparing this result with the share of PCT applications that were filed based on an application filed with the JPO, the USPTO, or the EPO by WIPO's technical classification, it is possible to examine whether the regions superior in terms of the number of applications are also superior in the rate of patent documents found in advance in the ISR. In fact, the rate of patent documents found in advance in the ISR prepared by the EPO serving as an International Searching Authority (ISA) is high in the fields where many PCT international applications are filed from Europe such as biotechnology and pharmaceuticals. The rate of patent documents found in advance in the ISR prepared by the JPO exceeds that prepared by the EPO in the communication and machine fields. The rate is thus consistent with the technical superiority of the region. However, the rate for the USPTO is lower than those for the JPO and the EPO in general. Incidentally, applicants from Japan or the United States can choose the EPO as an ISA. The EPO is designated as the ISA for more than a half of the PCT applications filed from the United States based on an application filed with the JPO, the USPTO, or the EPO while the EPO is designated as the ISA for over 10% of such applications filed from Japan. In considerably many fields, the rate of patent documents found in advance in the ISR prepared by the EPO in the cases where the EPO is designated as the ISA for an application from Japan exceeds the rate of patent documents found in advance in the ISR prepared by the EPO as a whole. This suggests a difference in the ability of applicants and the fact that such applications are those filed after careful consideration by incurring preparatory costs. The rate of patent documents found in advance in the ISR directly indicates the comprehensiveness of search for preparing the ISR and the efficiency of the search. It is possible to presume that not only the ability of the office in charge and geographical and technical conditions but also the ability of the applicant, the content of the individual application, and applicant's behavior affect the rate.

(Tetsuo WADA)

4 Analysis of Exceptions to Lack of Novelty in Japan

In this analysis, the actual conditions of use of exceptions to lack of novelty in Japan and the effects thereof were analyzed. In analyzing the actual conditions of use, the types of applicants were specified by linking to the information on applicants provided in the Survey on Intellectual Property-Related Activities, and channels for publishing research results in advance, such as academic meetings, the Internet, and exhibitions, were specified to the extent possible. In addition, analysis was conducted on the effects of expansion of international applications on the use of the provisions on exceptions to lack of novelty.

As a result of the analysis, the following results were confirmed. The rate of applications for which the applicant has applied for exceptions to lack of novelty was high for applications filed by universities and public research institutes, 14% and 11%, respectively. However, applications for exceptions to lack of novelty filed by companies accounts for 60% of all such applications. In addition, in terms of channels for publishing research results, academic meetings account for over 60% and serve as the most important channel. However, research results published via the Internet are significantly increasing owing to the relaxation of the regulations of the provisions on exceptions to lack of novelty.

The econometric analysis of factors for applicants to decide whether to apply for

exceptions to lack of novelty revealed the following: (1) In terms of technical fields, exceptions to lack of novelty are likely to be used in the fields that are closely related to scientific progress, such as medicines, bio, genetic engineering, and organic chemistry; (2) In terms of characteristics of inventions, exceptions to lack of novelty are likely to be used when the number of inventors is large, the number of cases where the invention is cited is large, and the possibility of being patented is high; (3) Exceptions to lack of novelty are little likely to be used in the fields in which an international application tends to be filed for an invention.

(Sadao Nagaoka and Yoichiro NISHIMURA)

5 Statistical Analysis of Trial-Related Information in the East Asian Region (Except Japan)

This study analyses the characteristics of patents subject to a request for a trial for patent invalidation in China was analyzed by gathering information on decisions on invalidation trials from the website of SIPO's Patent Review Board and by using patent indexes prepared based on the CNIPR, the EPO PATSTAT database and other patent databases.

The number of trials for patent invalidation filed in the past is 2,260 in terms of the number of such trials for which a decision has been disclosed. It has been rapidly increasing since the first half of the 2000s. For patents subject to such trials, patents for which the first applicant resides in China account for 60% of the total. The share of such patents has been increasing, particularly, in recent years, compared to the share of patents for which the applicant resides outside China. Moreover, patents based on a PCT application and those based on an application claiming a priority outside China have a relatively low probability of becoming subject to a trial for patent invalidation. By technical field, a relatively large number of requests for a trial for patent invalidation are filed in such fields as pharmaceuticals, materials, machine tools, textile, and civil engineering.

A regression analysis was conducted by preparing a sample for Chinese patents as a whole, a sample for patents for which an application has also been filed in Japan, a sample for patents for which an application has also been filed in the United States, and a sample for patents for which an application has been filed in Japan, the United States, and Europe and by controlling the trend by technical field and by application year using a dummy variable of whether a request for a trial for patent invalidation has been filed as an explained variable. This regression analysis revealed the following: (1) The probability of a request for a trial for patent invalidation being filed is significantly low for patents for which an application has been filed by an applicant residing outside China in terms of the relationship of priority claim; (2) Patents whose technical value is higher as measured on the basis of the number of times of being cited in examination of subsequent applications are more likely to be subject to a request for a trial for patent invalidation; (3) Patents to which an opposition has been filed at the EPO are also highly likely to be subject to a trial for patent invalidation in China.

(Naotoshi TSUKADA)

6 Analysis of the Complementary Use of the Design Patent System and the Trademark System

Under such slogans as "mixing of intellectual property rights" and "IP bundle," emphasis has recently been placed on the importance of securing competitive advantage through the combined use of several types of intellectual property rights, namely, patent rights, design patent rights and trademark rights. In this Chapter, analysis was conducted on the complementary use of the design system and the trademark system, which has been hardly examined in the past, as one type of the mixing of IP.

Major results are as follows. The analysis revealed that there have been approximately 7,000 applicants for design registration and approximately 40,000 to 50,000 applicants for trademark registration annually but that the number of persons who apply for design patent and trademark registration has been relatively small, approximately 2,500. Designs can be protected as three-dimensional trademarks after the expiration of the term of design patent rights, and a survey on the number of applications for registration of three-dimensional trademarks and the rate of registration revealed that only about 150 applications have been filed for registration of three-dimensional trademarks annually and that the rate of registration of such trademarks has been relatively low, approximately 55%. Furthermore, a survey on the goods subject to applications for three-dimensional trademarks filed by those who frequently file such applications revealed that most of the goods are the applicants' regular products. These findings

suggest that although there is an intellectual property strategy of making up for the loss of the design patent right by the right for a three-dimensional trademark, filing an application for design patent is still a basic means to protect the shape of an article, and it is common that an application for a three-dimensional trademark is filed after the product has become popular during the term of protection based on the design right and its shape has acquired the capability of distinguishing the trademark holder's product from others.

Moreover, the effect of the complementary use of the design system and the trademark system on corporate performance (operating income margin was adopted) was analyzed quantitatively by (mainly) using manufacturing companies in the "FY2012 Survey on Intellectual Property-Related Activities" as a sample. The analysis method is the estimation of the Average effect of Treatment on the Treated (ATT) by propensity score matching (PSM). The ATT was estimated by regarding the companies which engage in the complementary use of the design patent system and the trademark system as "the treatment groups" and those which do not engage in such complementary use (mainly those which file applications for registration of trademark) as "control groups." There was no significant difference in terms of corporate performance between the treatment groups and the control groups, which suggested that there is no effect of the complementary use of the design patent system and the trademark system on corporate performance.

(Kenta NAKAMURA)

7 Case Study of Economic Analysis Methods Concerning Industrial Property Rights in Foreign Countries

Analyses using patent data have become increasingly important in terms of evaluation and planning of patent system-related policies, consideration of science and technology innovation policies, formulation of corporate IP strategies, etc. Under such circumstances, an international conference concerning patent statistics, "Patent Statistics for Decision Makers," marked the ninth conference this year. Many studies reported at the conference are particularly related to PATSTAT. However, studies on innovation using patent data and policy-oriented studies are also included. This chapter gathers information concerning studies that were reported at the "Patent Statistics for Decision Makers" conference held in Rio de Janeiro and economic analyses concerning industrial property rights that were reported at "The PATSTAT user day" held prior to the conference, and summarizes the case examples of economic analysis methods.

Concerning the trends of OECD patent statistics meetings in recent years, many reports that suggest the trends and possibility of use in studies of PATSTAT have been made at "The PATSTAT user day." PATSTAT provides precious data for conducting the economic analysis of patents. It is an outcome obtained by accumulating and processing an enormous quantity of data supplied from the intellectual property offices of many countries. Therefore, defects and mistakes, etc. are often found in PATSTAT. In addition, as changes of data structure and additions of new items are frequent, gathering of information at this workshop has a significant meaning for the purpose of planning and implementing studies using PATSTAT. Under such circumstances, in this fiscal year, there were many reports on the use of patent data for analysis in connection with corporate data and concerning connection between PATSTAT's non-patent document citation information and document database. At present, attempts to connect patent data and non-patent data to use them for analysis are becoming increasingly active, and these reports are in line with such trend.

On the other hand, reports under more wide-ranging themes are made at the "Patent Statistics for Decision Makers" conference. As the conference was held in Brazil in this fiscal year, reports were made on the status of development of patent data in Brazil and on multiple studies using said data. Moreover, development of inventor data is now ongoing; mainly in European countries. The analysis of the movement of human resources by using the result thereof also drew strong attention from the participants of the conference. In addition, other characteristics of the conference this year are that analyses concerning IP bundles (mixing of IP) whereby other intellectual property rights, such as designs and trademarks, are concurrently used in addition to patents were reported at multiple sessions and there were sessions concerning environmental technology- or environment-related patents.

(Kenta NAKAMURA and Naotoshi TSUKADA)

Ⅲ Review of Design of the Survey on Intellectual Property-Related Activities

1 Consideration on Online Survey

In this study, interviews were conducted on the implementation status of online survey, etc., targeting persons in charge of such survey for the "Basic Survey of Japanese Business Structure and Activities" implemented by the Ministry of Economy, Trade and Industry, the "Survey on Science and Technology Research" implemented by the Ministry of Internal Affairs and Communications, and the "Survey on Research Activities of Private Corporations" implemented by the National Institute of Science and Technology Policy, all of which are relatively similar to the Survey on Intellectual Property-Related Activities in terms of the object and content of the survey and have already been conducted online, in part. Then, the problems supposed to occur in implementing the "Survey on Intellectual Property-Related Activities" online were organized, and the possibility of transition to an online survey was considered. The following matters were revealed through the interviews: (1) Paper and online surveys are concurrently used for all of those surveys; (2) One of the advantages of implementing an online survey is an increase in the accuracy of responses through logic check, etc.; (3) It is possible for respondents to adopt a variety of response methods and it is also possible for those who implement the surveys to promptly make inquiries about doubts and conduct reminders, which is expected to increase the collection rate to a certain extent. On the other hand, (4) the burden of those who implement the surveys is reduced in some parts and is newly increased in other parts, and this strongly relies on matters such as the method of conducting the surveys and the status of changes of the survey sheet.

(Koichiro ONISHI, Isamu YAMAUCHI, and Hideki TAKAHASHI)

2 Consideration of Changing the Method of Conducting the Otsu Survey to the Stratified Random Sampling Method (Neyman Allocation Method)

In the Survey on Intellectual Property-Related Activities, the Otsu survey is conducted once every three years. The Otsu survey covers applicants who have filed four or less applications under all of the four intellectual property laws. The Otsu survey is a sample survey, and the sample is chosen by a stratified sampling method. This study considers whether it is appropriate to use Neyman allocation as a method of deciding the size of a sample allocated to each stratum in place of proportional allocation. However, proportional allocation means a method whereby a sample of a larger size is allocated to a stratum with more applicants in the parent population. The Neyman allocation is a method whereby a sample of a larger size is allocated to a stratum with more applicants in the parent population whose standard deviation of a variable is larger.

First of all, Neyman allocation by using the number of applications under any one of the four intellectual property laws while using the prefecture as a stratification variable showed a tendency of the error being smaller for a variable used for the allocation compared to proportional allocation. However, the error is larger as a whole for other variables. By allocating a sample of a size that is the average of the sizes of samples allocated by Neyman allocations conducted based on the number of applications under the four intellectual property laws, it was possible to make the error equivalent to or smaller than that for proportional allocation in relation to all variables. However, the reduction in the error compared to proportional allocation was very small. Furthermore, the accuracy of Neyman allocation was almost equivalent to that of proportional allocation when we use the data with different fiscal year from the target year of the survey.

Next, comparison of proportional allocation and Neyman allocation by using type of industry as a stratification variable showed the same tendency as that shown by Neyman allocation conducted by using the prefecture as a stratification variable. That is, a significant improvement in the accuracy was not recognized compared to proportional allocation, and the error was larger for some variables. Putting together all of the above, it was impossible to find the advantages of adopting Neyman allocation in place of proportional allocation from the results of this analysis.

At last, which is a desirable stratification variable: prefecture or industry, was considered. Neither could be regarded as particularly desirable from the perspective of the standard error of the estimate.

(Takahiro TSUCHIYA)

(Senior Reseacher: Hideki TAKAHASHI)
(Senior Reseacher: Hidehiko NAKAJIMA)