12 FY2011 Analysis of Trends in Applications for Industrial Property Rights Aimed at Achieving New Growth in the Japanese Economy(*)

Attention is increasingly being paid to the role that intellectual creation activities can play in achieving new economic growth in Japan, and expectations regarding this role are growing. Accordingly, research and discussions concerning an intellectual property system that will elicit this new economic growth are flourishing. Amidst this situation, in considering future policies and measures relating to intellectual property, it is extremely important to empirically analyze the intentions of companies and other organizations both within Japan and overseas when using systems for the protection of intellectual property, as well as examining the effects that are being obtained from this.

This study incorporated the research outcomes accumulated to date, while also making use of the Survey on Intellectual Property-Related Activities conducted by the Japan Patent Office and databases such as PATSTAT and a Chinese patent database. A total of seven empirical analyses were carried out: "Statistical Analysis of Patent Applications by Japanese Applicants"; "Statistical Analysis of Design Registration Applications by Japanese Applicants"; "An Analysis of the Intellectual Property Strategies of Start-up Companies"; "Mechanisms that Cause Backlogs in Patent Examination and Determinants of Examination Efficiency"; "A Statistical Analysis of Patent Applications in the East Asia Region (Excluding Japan)"; "A Statistical Analysis of Unused Patents and Company Profitability"; and "An Empirical Analysis of the Ownership Structure of the Research Output of Universities and Small and Medium-sized Enterprises". Moreover, deliberations were conducted regarding the revision of the survey design of the Survey on Intellectual Property-Related Activities.

Ⅰ Introduction

The patent system is one of the most important parts of the infrastructure supporting innovation activities and data concerning patent applications plays a vital role as an indicator for measuring the research and development activities of companies. Due to this, research into innovation using patent data and the patent system as a whole has intensified considerably worldwide in recent years, and the patent offices of various major countries are strengthening their economic analysis.

Amidst this situation, as part of this study (Analysis of Trends in Applications for Industrial Property Rights Aimed at Achieving New Growth in the Japanese Economy) commissioned by the Japan Patent Office and conducted by the Institute of Intellectual Property, seven empirical analyses were carried out: (1) "Statistical Analysis of Patent Applications by Japanese Applicants"; (2) "Statistical Analysis of Design Registration Applications by Japanese Applicants"; (3) "An Analysis of the Intellectual Property Strategies of Start-up Companies"; (4) "Mechanisms that Cause Backlogs in Patent Examination and Determinants of Examination Efficiency"; (5) "A Statistical Analysis of Patent Applications in the East Asia Region (Excluding Japan"; (6) "A Statistical Analysis of Unused Patents and Company Profitability"; and (7) "An Empirical Analysis of the Ownership Structure of the Research Output of Universities and Small and Medium-sized Enterprises". In addition, in order to increase the benefits derived from the *Survey on Intellectual Property-Related Activities*, a further four themes were analyzed: "Deliberations Concerning Estimation Methods in General"; "Deliberations Concerning Data Cleansing"; "Revision of Techniques for the Selection of Survey Subjects amongst Small-scale Applicants"; and "Deliberations Aimed at Increasing Survey Accuracy and the Response Rate".

Even when positioned amidst the trend towards strengthening international research, this study appears to have yielded quite significant results.

In addition to the aforementioned research projects, the fact that, as part of this study, members of the committee had the opportunity to participate in an international conference at the United States Patent and Trademark Office was crucial not only to the aforementioned research

(*) This is an English translation of the summary of the report on the FY2011 research project contracted out by the Japan Patent Office, entitled "FY2011 Analysis of Trends in Applications for Industrial Property Rights Aimed at Achieving New Growth in the Japanese Economy".

projects, but also to the execution of this study, not to mention making an intellectual contribution based on Japan's own experience. It is hoped that further research based on an international perspective will be carried out in the future, making use of this kind of international academic exchange and cooperation.

(Sadao NAGAOKA)

Ⅱ Analysis of Trends in Applications for Industrial Property Rights

1 Statistical Analysis of Patent Applications by Japanese Applicants

The number of patent applications has been demonstrating a downward trend in recent years. For example, according to the *Japan Patent Office Annual Report 2011*, since 2000, the number of patent applications in Japan has been declining, with a particularly pronounced downward trend being observed since 2005.

This paper elucidates, as far as possible, the factors relating to increases and decreases in the number of patent applications by Japanese applicants in recent years, by using statistical techniques to analyze fluctuations over time in regard to the correlation between the number of patent applications in Japan by Japanese applicants and such data as indicators relating to the actual status of Japanese applicants, Japanese economic indicators such as the exchange rate and the Nikkei Stock Average, and trends in patent applications in various other countries. The main conclusions are as follows.

(i) Applicants do not submit patent applications regarding all of the inventions that they create. In recent years in particular, patent applications have been submitted after stringent selection of inventions, and it has become clear that this is what has made the biggest contribution to the reduction in applications in Japan.

(ii) Although it is a fact that a shift is taking place towards overseas applications by both Japanese and foreign applicants, no clear substitution relationship could be detected by means of statistical analysis. On the contrary, it became clear that there is a complementary relationship, in which applications are submitted within Japan at the same time as international or overseas applications. However, this is only an interim result. More rigorous analysis is anticipated in the future.

(iii) Statistically, it was possible to detect a relationship wherein an increase in invention productivity brings about an increase in applications within Japan. However, it was not possible to reach the unequivocal conclusion that there is a relationship wherein a decrease in invention productivity brings about a decrease in applications within Japan. Nevertheless, it is clear from the results of the analysis that a slight decrease in invention productivity brings about a major reduction in the number of domestic patent applications, which might suggest that there is a need to revise corporate strategies or national policy relating to research and development activities within Japan.

(iv) It is undeniable that the decrease in budgets for intellectual property-related activities has had a greater impact on patent applications within Japan than had been anticipated. In particular, as it was observed that the impact on budgets for intellectual property-related activities increased around the time of the Lehman Shock, it is possible that the reduction in budgets for intellectual property-related activities after the Lehman Shock had major implications in terms of a reduction in the number of patent applications within Japan, caused by the stringent selection effect.

(Yoichiro NISHIMURA, Kenta NAKAMURA)

2 Statistical Analysis of Design Registration Applications by Japanese Applicants

The number of applications for design registration by Japanese applicants is demonstrating a downward trend, having peaked in the mid-2000s. The fact that it has become possible to use partial design applications to protect an extensive range of rights, whilst curtailing the number of total applications, and the theory that the increase in intellectual property costs resulting from the increase in applications in other countries is being covered by the reduction in applications within Japan have been pointed out as factors behind the decline in the number of applications; however, none of this is anything more than conjecture, and there was no statistical evidence to support it. Accordingly,

in this study, three analyses were carried out in order to identify the factors behind the decline in the number of applications.

Part 3 is an exploratory analysis using individual data concerning applications for design registration. The main results are as follows: (i) at the macro level, the decline in the number of applications from 2005 onwards and the rise in the proportion of partial design applications appear to correspond with each other; (ii) the decline in the number of applications is a phenomenon that has been observed in many design classifications and one cannot necessarily say that the fact that the number of applications fell in a specific field led to a decrease in the number of applications at the macro level; and (iii) when design registration applicants were stratified by the number of applications, there was a marked decrease in the number of applications by applicants who had hitherto been large-scale applicants, and it was this fact that had an impact on the decline in the number of applications at the macro level.

Parts 4 and 5 used regression analysis to analyze the determinants of the number of applications. In particular, they focused on the propensity to use the partial design system and whether applications for design registration filed in other countries have a negative effect on applications within Japan, but neither the hypothesis regarding partial design nor that regarding applications overseas was supported in the analysis at the article field level (Part 4) or at the applicant level (Part 5). On the other hand, it became clear that research and development activity and the length of time for which design rights are maintained have significant interpretability in regard to the number of applications. This fact suggested that the factors behind the recent decline in the number of applications include the impact of stagnation in research and development activities and the refinement of applications in product fields with short life-cycles. Moreover, when a dummy variable that differentiates between the period before and after the revision of the Design Act was used in regression analysis, it was discovered that the number of applications has been decreasing since the revision of the Design Act. It is unlikely that the strengthening of design rights would cause a reduction in applications, so from the Design Act revision dummy, one can interpret the revision as more strongly supplementing the impact of the strengthening of the Unfair Competition Prevention Act, which took place the year before the revision of the Design Act. In addition, it was discovered that the effects of the revisions of the Design Act and the Unfair Competition Prevention Act are dependent on the length of the product life-cycle (average period for which rights are maintained). In fields in which the average period for which rights are maintained is short, while extending the maximum term of design rights has only a small effect in terms of increasing incentives to file applications, the benefits of design protection under the Unfair Competition Prevention Act can easily be enjoyed. This suggests that the decrease in applications in this kind of field is a factor contributing to the decline in the number of applications at the macro level.

(Kenta NAKAMURA)

3 An Analysis of the Intellectual Property Strategies of Start-up Companies

(1) The Intellectual Property Strategies of Start-up Companies under Open Innovation

This study empirically elucidates what type of intellectual property strategies start-up companies are implementing in response to the advance of open innovation that is currently taking place.

In open innovation, the role of start-up companies as new leaders of innovation is emphasized, similar to the role played by universities. For start-up companies, which lack in-house resources, such as an accumulation of technology, production equipment and business hubs, working in partnership with large corporations and universities under the open innovation framework can be described as a crucial opportunity to correct those deficiencies, and it is hoped that start-up companies will become increasingly prosperous in the future. At the same time, with regard to the question of the sort of innovation that start-up companies within Japan are actually oriented towards and active in, it cannot be said that adequate analysis using large-scale data has been carried out as yet. In this study, the status of innovation activities emerged, including trends in applications and requests for examination amongst such start-up companies, as well as the situation relating to their use of rights.

As a result of the analysis, the question of whether, in light of the progress of open innovation, patent applications and requests for examination, working of patents by the company

holding that patent, and licensing out are intensifying amongst start-up companies established less than ten years ago was analyzed empirically. In the analysis results, it became clear that compared with other companies, start-up companies submit many overseas applications and that they are also actively engaging in licensing out. Moreover, it emerged that patent applications and requests for examination demonstrate an upward trend over time.

More or less the same trend can be seen amongst companies in the pharmaceuticals industry, the electrical machinery industry and the software industry, where start-up companies are exceedingly important. In particular, the results obtained showed that the working of patents by the company holding the patent is more common amongst start-up companies in the electrical machinery industry than amongst start-ups in any other industry, whilst start-ups in the pharmaceuticals industry were more active in licensing out their patents than start-ups in other industries. These results strongly suggest that open innovation using licensing out is intensifying in the pharmaceuticals industry in Japan as well.

(Koichiro ONISHI, Shigeki HAYASHI)

(2) The Expansion of the Scope of Rights in Regard to Software Patents and the Profitability and Financing of Software Ventures

This study empirically analyzes the impact of the extension of the scope of rights in regard to software patents during the 1990s on the relationship between small and medium-sized software companies and venture capital. In 1993, it became possible to patent software integrated with hardware; following on from this, in 1997 it became possible to patent software recorded on media, such as floppy disks and CD-ROMs, and in 2002 it became possible to patent software programs themselves. Moreover, examination standards concerning business model patents were clarified after the 1998 State Street Bank ruling in the US. In the event that the extension of the scope of rights in regard to software patents could be expected to have the effect of increasing the profitability of software companies, one would anticipate that investment in this kind of industry by venture capital would increase as a result of that extension of the scope of rights. Moreover, when small and medium-sized enterprises receive investment from venture capitalists, there is a possibility that patents have a type of signaling function, demonstrating that the company in question has a level of technical ability that permits them to submit a patent application. As the extension of the scope of rights makes it feasible to submit patent applications in fields where this was not previously permitted, it becomes possible to secure more investment. In the event that these two effects were observed, one could likely say that the extension of the scope of rights in the technological field in question was promoting innovation, at least amongst small and medium-sized enterprises.

In the estimate results, it became clear that applications for software patents by small and medium-sized software companies are linked to investment by venture capitalists. This result shows that software patents have a signaling function, while at the same time demonstrating the possibility that the policy-based expansion of the scope of rights increases this kind of signaling effect.

With regard to the impact of changes in the system itself on the behavior of venture capitalists, one could see a result that supports the hypothesis that the approval of medium patents in 1997 had a positive effect on their investment activities. This result demonstrates that the expansion of the scope of patent rights has the effect of increasing the profitability of the software industry itself.

(Koichiro ONISHI, Shigeki HAYASHI, Isamu YAMAUCHI)

4 Mechanisms that Cause Backlogs in Patent Examination and Determinants of Examination Efficiency

In this study, an empirical analysis was conducted of the causes of the occurrence of backlogs and determinants of examination efficiency in Japan.

The number of inventions in regard to which applicants are requesting the swift establishment of rights is growing, so eliminating backlogs and improving examination efficiency are extremely important tasks. Defining cases in which there has been a request for examination but a final decision has not yet been reached as a backlog, when the focus was restricted to inventions in which the request for examination was made by 2005, it became clear that the backlog in Japan is demonstrating an upward trend. In particular, the rise in the examination request rate resulting

from the reduction of the examination request period greatly increased the backlog. Moreover, in addition to the fact that the number of amendments and written opinions submitted per request for examination has been demonstrating an upward trend over the long term, the fact that the reduction in the examination request period increased the number of times that amendments and written opinions were submitted is thought to have been a major factor behind the growth of the backlog.

Amidst this situation, it became clear in empirical terms that the expansion of opportunities for outsourcing prior art searches has not only considerably improved the performance of examiners in regard to the number of examinations carried out, but might also have increased the quality of examinations.

It emerged that if examiners outsource specific sections, the number of examinations that an examiner carries out per month increases considerably, as does the number of cases that reach a final decision at an early stage (within two years of the request for examination). Furthermore, it became clear that a rise in the outsourcing rate considerably reduces the communication period in the case of final refusal in particular, and it also reduces the frequency of trials against an examiner's decision to refuse an application, as well as trials for invalidation of decisions of registration. In other words, there is a possibility that being able to outsource searches has a positive effect on the quality of examinations. Consequently, one can say that outsourcing prior art searches has potentially not only made a major contribution to eliminating the backlog, but also contributed to increasing examination efficiency.

(Isamu YAMAUCHI, Sadao NAGAOKA)

5 A Statistical Analysis of Patent Applications by the East Asia Region (Excluding Japan)

In this paper, a study was conducted regarding trends in patent applications in the East Asia region, with a particular focus on patent applications in China and Chinese patent applications overseas. Accordingly, this study firstly compared data recording accuracy in the data recorded in the EPO Worldwide Patent Statistical Database (PATSTAT), which was compiled by the European Patent Office, and a database purchased from the Intellectual Property Publishing House of the Chinese State Intellectual Property Office (CNIPR). The PATSTAT database has been widely used in the statistical analysis of patents in recent years, but it has been ascertained that there are many problems with the data recorded concerning Chinese patents.

Firstly, the number of records for applications in each year does not correspond to the CNIPR data, and from 1998 onwards, PATSTAT contains more. The records were also compared with the search results obtained from the patent search service that can be used on the website of the State Intellectual Property Office, but the number of applications recorded in the three databases all differ. Secondly, the information about applicants and inventors recorded in PATSTAT, which is based on DOCDB, has many deficiencies and errors in the data when compared with CNIPR. The proportion of joint applications by multiple applicants is 7.7% in CNIPR, but only 1% in PATSTAT. Basically, only the name of the principal applicant is recorded in PATSTAT. However, with regard to information about the addresses of applicants, even CNIPR only records this for the principal applicant. Thirdly, with regard to applications through the PCT, PATSTAT contained less than 30% of the information that CNIPR recorded about the correspondence between the application numbers of the Chinese Patent Office and international application numbers. Finally, there was no major disparity between the two databases in regard to the number of applications in which priority claims were made concerning overseas patents.

With regard to trends in applications to the Chinese Patent Office, the proportion of applications by overseas residents peaked at approximately 70% in the latter half of the 1990s, falling to 45% in 2007. The number of applications by individuals resident within China is also demonstrating a downward trend, while the number of joint applications is growing. Moreover, the number of Chinese patents for which overseas applications were filed with a priority claim via the Paris Route was around 130,000, while those filed through the PCT totaled 220,000, demonstrating that these are still limited in number.

(Naotoshi TSUKADA)

6 A Statistical Analysis of Unused Patents and Company Profitability

This paper statistically analyzed (1) what

kind of relationship exists between the proportion of unused domestic patents and company profitability rates; and (2) what kind of relationship exists between the proportion of unused domestic patents and the proportion of unused overseas patents. The main conclusions are as follows.

(i) It was not possible to detect through statistical analysis a relationship in which the operating margin declined as the proportion of unused patents increased by the year. Moreover, it was not possible to perceive statistically a relationship in which the operating margin was lower, the higher the proportion of unused patents that a company had.

(ii) The hypothesis that there is an inverse relationship between the globalization of Japanese companies overseas and the proportion of unused foreign patents was broadly supported from statistical result.

(iii) The tendency for the proportion of unused overseas patents to increase in industries in which technology transfer is difficult, as technology transfer can easily fail, was verified.

(iv) It became clear that the more a company expands into countries with a strong intellectual property system, the more it exercises its exclusive rights and the more it uses overseas patents.

In this paper, the data identification process by applicant's name was carried out when consolidating various data and the results of the analysis are those obtained in light of the various constraints that exist in regard to this process. In this sense, caution is necessary, as the conclusion of this paper includes some tentative elements. Moreover, due to time constraints, it was not possible to conduct more stringent quantitative analysis. Firstly, in the analysis of the relationship between unused patents and profitability, not only profitability, but also the competitive position in the product field and the competitive position in the technological field could be explained variables, and it is possible to verify the indirect effect of the unused patent rate on the profitability of the company. Secondly, an analysis was carried out focused on the relative difference between overseas unused patent rates and unused patent rates within Japan. It is possible to conduct analysis using binary variables, for example, with the value being set at 1 if the overseas unused patent rate is considerably higher than the domestic rate, and at 0 if this is not the case, and it is likely that more robust analytical results could be obtained if this were combined with the analysis in this paper. One would like to make these matters a task for the future.

(Yoichiro NISHIMURA)

7 An Empirical Analysis of the Ownership Structure of the Research Output of Universities and Small and Medium-sized Enterprises: From the Perspective of Joint Invention and Joint Application with Large Corporations

The reasons why large corporations submit sole applications in regard to joint inventions include (a) it is more efficient to concentrate rights in the hands of large corporations, which have greater ability and potential to work those rights; (b) large corporations have stronger bargaining power than small and medium-sized enterprises and universities, so they can opportunistically increase their share of rights to the outcomes of joint research; and (c) large corporations have a high level of awareness concerning intellectual property, so they have a greater incentive to establish rights on behalf of small and medium-sized enterprises and universities, which are not motivated to establish rights, with the objective of preventing the establishment of rights by a third party. (a) and (c) have the potential to increase social welfare, but (b) will, in the long term, become a contributing factor to decreasing research and development incentives for small and medium-sized enterprises and universities, so is socially undesirable.

Accordingly, this study focuses on cases in which the transfer of rights to joint research has already taken place at the point at which the patent application is submitted, and empirically analyzes the sort of cases in which joint inventions developed by large corporations and small and medium-sized enterprises or by large corporations and universities end up becoming patent applications submitted solely by the large corporation in question. Focusing on the field of fuel cells, in which research and development has been conducted jointly by industry, academia and

government as a priority field in Japan's science and technology policy, this study conducts empirical analysis using detailed patent bibliographic information, corporate financial data, and information about the places of employment of inventors.

As a result of this analysis, it emerged that in joint research involving companies within the same corporate group, it is common for one of the companies to be the sole owner of the right, whereas in joint research with a company outside its corporate group, it is basically more common for the rights to be shared. On the other hand, in the case of joint invention with a small or medium-sized enterprise outside the corporate group, it emerged that it is common for the large corporation to submit a sole application. In particular, it was ascertained that, in cases in which there is a difference in scale between the companies conducting the joint research, the higher the value of an invention, the more likely it is that the right to it will be owned solely by the large corporation.

It became clear that, in joint research with national universities, there is a greater likelihood that rights will be distributed appropriately. Large corporations propose joint research to universities when they are finding it difficult to find an appropriate joint research partner elsewhere, so in this sense, it would seem that the bargaining power of these universities is comparatively high.

(Kazuma EDAMURA, Isamu YAMAUCHI, Koichiro ONISHI)

Ⅲ Deliberations Regarding the Revision of the Survey Design of the *Survey on Intellectual Property-Related Activities*

1 Deliberations Concerning Estimation Methods in General

This paper considered the estimation method deemed to be preferable after comparing the existing estimation method with an estimation method called resampling, while examining the estimation method best suited to each type of industrial property right. Moreover, it considered the method deemed to be preferable after comparing the numerical values obtained from estimates over time. The main conclusions are as follows.

(i) The problems with the existing estimation method have already been pointed out, but in a comparison with the resampling estimation method, it became clear that there is scope to improve precision further, even when using the existing estimation method.

(ii) If the existing estimation method is not to be changed greatly, an estimation method does exist that is an improved version of the existing estimation method discussed in this paper. The characteristics of this improved estimation method are (A) the fact that it has a different extension ratio for each type of industrial property; (B) the fact that it only stratifies at the level of the number of applications; (C) the fact that it first of all carries out an extended estimate by stratum at the five or more applications level; (D) the fact that it carries out an overall estimate based on the extension ratio in Table 12 after carrying out the extended estimate by stratum at the five or more applications level; and (E) with regard to Table 12, the fact that when conducting a study, the numerical values for the overall extension ratio can be updated using OLS estimation.

(iii) With regard to extended estimates and overall estimates concerning utility models and trademarks, it became clear that further deliberations are required in relation not only to estimation methods, but also to survey design.

(iv) With regard to extended estimates and overall estimates concerning the survey items other than the number of applications, it is not necessarily the case that application behavior and economic behavior relating to these survey items correspond, so it would seem to be preferable to confine oneself to aggregating the figures.

(Atsushi NISHIO, Yoichiro NISHIMURA, Isamu YAMAUCHI, Koichiro ONISHI)

2 Deliberations Concerning Data Cleaning

In this chapter, various logic checks were conducted, in order to examine approaches to data cleaning in the *Survey on Intellectual Property-Related Activities* (intellectual property study). The knowledge gained from logic checks using single-year data is as follows. Firstly, although the response situation in regard to the yes/no field is good, there are cases in which the

yes/no field and the numeric field are inconsistent. However, this inconsistency is infrequent, so it seems that replacing the numeric field with a blank field would be a good measure to counter this when tabulating the surveys. Secondly, in regard to many items, it was discovered that there are anomalies in the figures that make up the total. In particular, there are many cases in which the total of all the figures is greater than the overall total (superordinate concept). In this situation, it is not possible to determine whether the anomalies are in the individual figures or whether there is an anomaly in the overall figure. Accordingly, if dealing with this rigorously, the values for all of the individual figures and the overall total should be excluded from consideration, but there is a possibility that this kind of measure would greatly reduce the number of valid responses. Consequently, all that can be done is either to add a note to the questionnaire that will ensure that respondents avoid anomalies in the individual figures, or to submit a query to individual respondents when any anomalies are discovered. Thirdly, it emerged that there are frequent inconsistencies in the response situation across a number of questions. No effective measure to deal with this point has been discovered at present either, but in the future, it would seem to be preferable to avoid this kind of error by switching from a paper-based survey to one in which responses are provided via the web.

Moreover, the possibility was suggested that data suspected to have been noted incorrectly could be identified by conducting a logic check using panel data. Of course, one cannot assume that these are abnormal values just because there are large fluctuations in the data. However, with regard to some of the survey items, such as stated capital and research expenses, it was ascertained that one could identify errors of notation, such as errors in the order of magnitude, comparatively easily. In reports on intellectual property surveys, data such as stated capital are used to aggregate various intellectual property activities into groups, so it is necessary to be especially thorough in checking for anomalous values in regard to such items. Moreover, with regard to a number of survey items, it became clear that the responses were heavily dependent on the judgment of the person completing the survey, in relation to the definition of the question.

One challenge for the future is the question of how to correct any errors of notation that are detected and within what range these should be corrected. It goes without saying that, after gathering the questionnaire responses, it is necessary to identify any errors as soon as possible and query them with the respondent concerned, but in the future, it would seem to be worth considering making corrections to the data, using other government statistics (such as the Economic Census) or external corporate financial data as complementary data.

(Kenta NAKAMURA, Yoichiro NISHIMURA, Koichiro ONISHI, Naotoshi TSUKADA, Isamu YAMAUCHI)

3 Revision of Techniques for the Selection of Survey Subjects amongst Small-scale Applicants

This paper considers techniques for selecting survey subjects when conducting the *Survey on Intellectual Property-Related Activities* amongst those who have submitted between one and four applications for either a patent, utility model, design right or trademark (hereinafter referred to as "small-scale applicants"), examining whether sampling by industry type is preferable, or whether it would be more desirable to conduct sampling by prefecture or by whether the survey subject is an individual, corporation or government body. Moreover, this paper points out the problems that exist when the population of small-scale applicants is constructed on the basis of applications. The main conclusions are as follows.

(i) It became clear that in both types of survey, application behavior in regard to all four types of industrial property right actually differs more by industry type than by whether the survey subject is an individual, corporation or government body or by prefecture (however, with regard to utility models in the second survey, application behavior did not differ that greatly in the results by industry type); (ii) in both types of survey, with regard to whether or not the questionnaire was returned, it emerged that there was a greater difference by industry type than by whether the survey subject is an individual, corporation or government body or by prefecture. In other words, these analysis results suggest that it is preferable to stratify by industry type, in order to conduct a survey in keeping with the actual status of application behavior and the response rate.

(ii) With regard to the construction of an applicant base using the number of applications, which fluctuates each year, and of a population of small-scale applicants based on actual applications two years previously, it is conceivable that this could be dealt with by further improving the population construction method by means of the existing applicant base. In any case, further careful discussion and analysis is required.

(Atsushi NISHIO, Yoichiro NISHIMURA, Isamu YAMAUCHI, Koichiro ONISHI)

4 Deliberations Aimed at Increasing Survey Accuracy and the Response Rate

In order to contribute to improving the survey precision and response rate of the *Survey on Intellectual Property-Related Activities*, this study examined the extent of valid responses and the precision of those responses, focusing primarily on survey items relating to licensing. More specifically, firstly, the question of whether there was consistency between response items was analyzed by means of a logic check of the FY2010 survey. Secondly, a comparison of aggregate data was made between the basic survey on corporate activities and the science and technology research survey, in which there are similar survey items.

As a result of the analysis, in regard to survey items relating to licensing, it became clear that the valid response rate through self-reporting by respondents (the column about whether or not they engage in licensing) is very high. However, in a comparison of consistency between survey items, it emerged that there is a tendency for consistency to decline between items, in the following order: patents and utility models, trademarks, and design rights. Moreover, in the case of respondents with few cases of licensing, it became clear that there is a downward trend in regard to consistency. Furthermore, in a comparison at the aggregate value level with the *Basic Survey of Japanese Business Structures and Activities* and the *Survey of Research and Development*, which, like the *Survey on Intellectual Property-Related Activities*, have survey items relating to licensing income and expenditure, from the perspective of the coverage rate relating to the number of licenses held and the survey population, it became clear that while results that are generally consistent are obtained in regard to licensing income and expenditure within Japan relating to patents and utility models, the values relating to design rights and overseas licensing income and expenditure are far too low in the *Survey on Intellectual Property-Related Activities*.

(Koichiro ONISHI)

(Researcher: Tsuyoshi UCHIDA)