

論文の内容の要旨

論文題目 Research on University Patenting -Studies on drug receptor patents-
(大学の特許出願に関する研究 -医薬レセプター特許を事例として-)

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1. Background and Objectives

The growing emphasis on patent issues and the financial straits of public research funds have gradually altered the incentives for academic scientists, and have forced them to face increasing pressure to patent [1,2]. On these grounds, an unignorable concern is that related to the possible shift of academic resources toward more application-oriented research [3,4], and the patenting of inventions with lower technological and economic significance [5,6,7]. Thus, many scholars have studied patent quality issues by scrutinizing their determinants and changes over time [8,9,10]. The typical measures of university patent used in the literature are generally external metrics e.g. number of forward citations [11,12]. This dissertation aims to develop a quantitative method that is capable of evaluating university patent, using novel inner metrics generated from the contents of the academic patent applications.

The author addressed three research questions in the dissertation as follows:

1. Whether there is difference between the patent quality in legal aspect of US university and that of Japanese university, in terms of sufficiency of disclosure?

2. Whether there is difference in patent quality between companies and universities from technological perspective?

3. Whether there is difference in patent

quality from technological perspective between US universities and Japanese universities ?

With these research questions in mind, the objectives of this thesis are stated as follows.

The first objective is to develop a quantitative method to evaluate university patent quality using novel indicators which is generated from unstructured information in the claim and embodiment by using text mining principles.

The second objective is to compare Japanese university patents and Japanese pharmaceutical company patents using the above mentioned method.

The third objective is to compare Japanese university patents and selected U.S. university patents using the above mentioned method.

2. Methodologies

Two parameters have been designed for evaluating the patent application, as follows:

- (1) Appliedness (APP) is defined as the extent of which the claims of patent applications encompass the outcome, from basic research to practical use.

- (2) Concreteness (CON) is defined as the extent to which the claims are evidenced by the experiments in the corresponding embodiment part in the patent application.

A point table has been designed to quantitatively measure the APP and CON by counting certain keywords in the claims or in the embodiment part of patent applications.

Then two assumptions are stated to build up a model, as follows:

(1) According to the definition of sufficiency of disclosure, patent applications located above a certain CON/APP-ratio threshold, named the grantability threshold (as shown in Fig 1), are more likely to fulfill the sufficiency of disclosure requirement and, thus, obtain the grant.

(2) The experiments for applied research are often capital-intensive and primarily funded by companies, meaning that universities could only afford a small portion of applied research, due to resource limitation. Thus, we could assume that a limitation of CON for a university patent exists (as shown in Fig 1), since only a limited number of applied-research experiments can be conducted within a university.

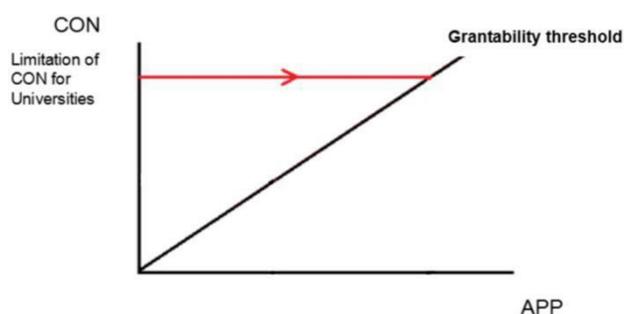


Fig 1. The model

3. Results

Using the above mentioned model, the author analyzed all Japanese universities receptor patent applications, all Japanese company receptor patent applications as well as selected U.S. university receptor patent applications, respectively. The patent applications on receptor protein/DNA are nice fit to our study, in that

receptors are usually involved in similar development routines as clinical use. Thus, the scope of the claimed subject matter and protection have high uniformity. Grantability threshold could be observed from all 3 groups. Afterward the author compared the receptor patent applications from all Japanese universities and that from all Japanese pharmaceutical companies. The result suggested that the limitation of research capacity of universities exists. Then the author compared the receptor patent applications from all Japanese universities and that from selected US universities. No obvious difference could be observed.

The results are shown in Fig 2 Fig 3 and Fig 4. An overview of total samples is shown in Fig5.

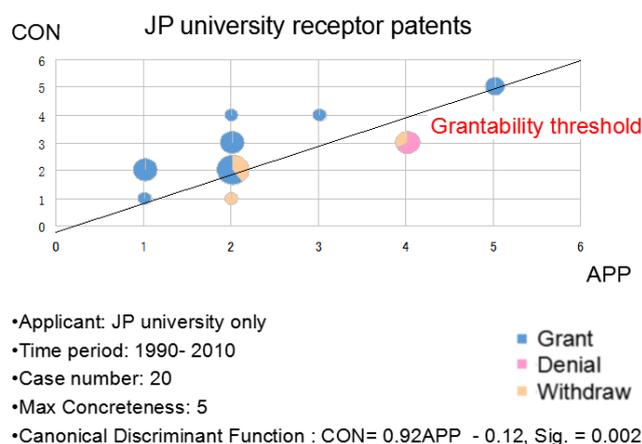


Fig 2. Results of JP university cases

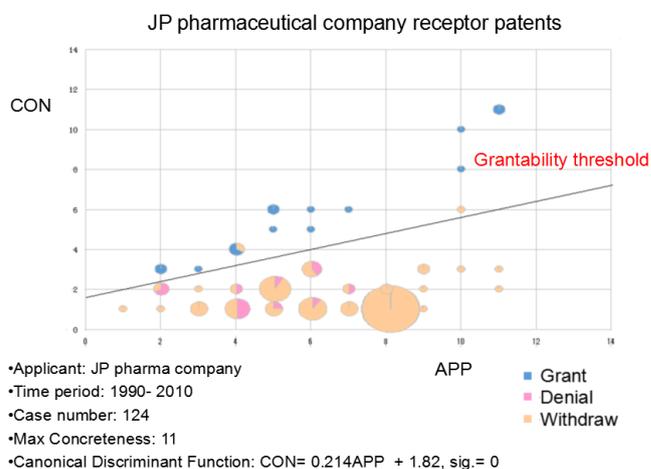


Fig 3. Results of JP Pharma cases

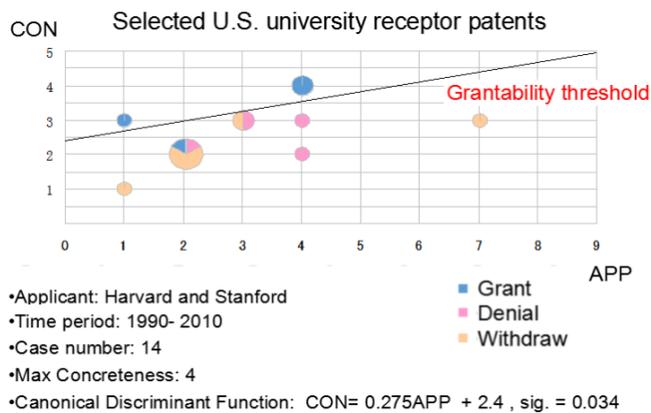


Fig 4. Results of US university cases

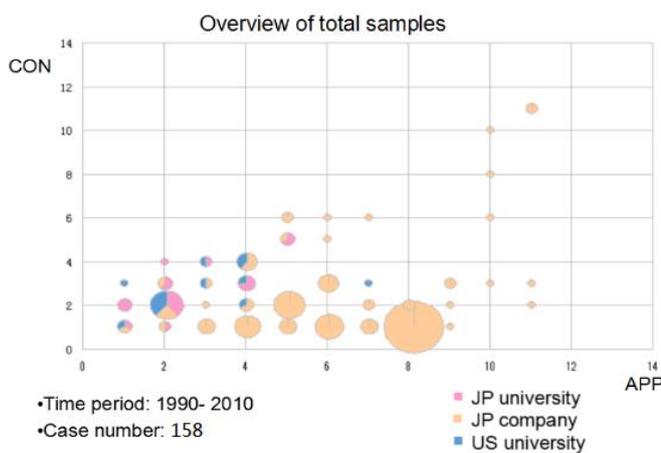


Fig 5. Overview of total samples

4. Discussion and Conclusions

To the first research question “whether there is difference between the patent quality of US university and that of Japanese university in legal perspective, in light of sufficiency of disclosure requirement?” the US universities show no obvious difference in patent quality in legal aspect in terms of average CON/APP ratio. And both groups have cases susceptible with the over-claiming and under-claiming problems, and the latter one shows that the higher CON/APP ratio is not necessarily to be more beneficial to the applicant. Rather a balance between claims and

embodiment would be desired in consideration of grantability threshold.

To the second research question “whether there is difference in patent quality from technological perspective between companies and universities?”, there is obvious difference in maximal CON between Japanese company receptor patents and Japanese university receptor patents, which confirms the limitation of university in applied research, while the average CON of Japanese company receptor patents is lower than that of Japanese university cases, indicating that Japanese company receptor patents have lower average patent quality in technological perspective. In contrast to over-claiming issue, the possible reason is that lots of Japanese company receptor patents with low CON/APP ratio could be a result from defensive patenting strategy adopted by companies.

To the third research question “whether there is difference in patent quality from technological perspective between US university and Japanese universities?”, there is neither obvious difference in maximal CON between US university receptor patents and Japanese university receptor patents, suggesting no great difference in research limitation could be detected; nor obvious difference in average CON between US university receptor patents and Japanese university receptor patents, indicating no obvious difference in patent quality in technological aspect. A detailed study on the embodiment provided by each group shows a difference in the examples for relevance to disease. And such difference might contribute to the difference in license income between US and Japanese university patent.

Based on this study, several policy implications could be made. Over-claiming and under-claiming

are the two most obvious issues of Japanese university patenting. The government should provide proper training for university patenting activity. Due to the limitation of university research capacity, the collaboration between the universities and companies should be enhanced. The university researchers should undertake not only the academic research, but only to find out a "joint point" which linked the basic research outcome with the practical utilization, thereafter it would be sensible to transfer them to an outside companies for further development. The government should encourage this kind of academic research and help transferring its outcome to the industry.

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