A Study on Patent Information-Use Behaviors of Medical Researchers

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Abstract Medical researchers belonging to the fundamental or theoretical research filed generally think there is little patent information that can be used for their research. When medical researchers are divided into two categories, fundamental researchers and clinical researchers, the former has superior skills of patent application and patent literature information search to the latter. Fundamental researchers tend to interpret patent literature information from more theoretical viewpoint, while clinical researchers tend to put more importance to the information with regard to applied research. It was discovered that approximate 50% of both groups feel it difficult to search patent literature information.
Key words Intellectual property; Patent information; Patent gazette; Patent map; Research management

1 Introduction

It is desirable that the literature for university researchers to use for enhancement of their research abilities should include not only patent information but also research papers. This is because for the research and development that a corporation carries out, the disclosure timing as well as the advisability of disclosure is controlled by the logic different from that of the academic world, which usually pursues the priority[1]. However, when I take a general view of utilization of patent information by university researchers[2], I notice all of them haven't achieved as good skills as those when they use for retrieval, sorting or assessment of search papers. In order to discover the causes, I conducted hearings and questionnaire surveys for the researchers in the fields of medicine, engineering, science and agriculture. The conclusion derived from this research is reflected on the functions of the patent search system developed by Yamaguchi University[3] [4]. This report focused on the utilization of patent information by the medical researchers[5] by extracting the related data from findings so far.

2 Method and Data Used for Study

Though significance of using patent information for study in science is accepted, in fact the patent information has not been utilized so frequently. Probable causes of this include "the importance of patent information is not noticed", "the system to use patent information is not well prepared in a laboratory", "researchers are not proficient in searching patent information", "the contents of patent information have some factors for hesitation of using it", "researchers are not sufficiently trained to interpret patent information" and others. I carried out investigations below to examine these probable causes; (1) hearings with science researchers belonging to Yamaguchi University and other universities in Japan (2006 and 2007), and (2) a questionnaire survey with science researchers belonging to Yamaguchi University and other universities in Japan (2006).

This report examines the data obtained from medical researchers by extracting them from the mentioned investigation results. Medical researchers in Japanese universities are usually classified into two categories; those of fundamental research and those of clinical study. Then, I report on the differences in utilizing patent information between the researchers of both categories. The number of respondents to the questionnaire among the science researchers was 71. I consider the number of samples for the questionnaire survey can satisfy the minimum requirement for identifying certain trends of the medical researchers who belong to the limited job area. However, in order to compensate the small number of samples, it is considered effective to scrutinize the questionnaire result of the whole science researchers comprehensively. For that matter, please refer to the previous report[6].

3 Hearings of Researchers

I conducted hearings with science researchers belonging to Yamaguchi University and other universities in Japan from August to the beginning of November in 2006. I also conducted hearings in a smaller scale in 2007 as supplement. The survey results showed common tendencies among science researchers including medical researchers. I summarized the survey result by placing researchers in the chart with the horizontal axis indicating the research phases from “fundamental and theoretical study” to “product development” and with the vertical axis representing the career (increasing from A to C). I also

found that all the interviewed researchers pointed out that systematic education and training including patent information search, interpretation and mapping with the viewpoint of R&D should be provided to undergraduate students as well as graduate students.

All the researchers with the careers (A to C) conducted sufficient search, sorting and examination of research papers. The researchers in the category C with the longest career utilized information of research papers and patents accumulated based on their past experiences. The researchers in this category remarked at the beginning of interview that they did not use patent information. However, as I asked more questions I realized they had already established the patent map of their research field and made use of it for their study either unconsciously or consciously. The researchers both in the categories B and C mentioned that there was little useful patent information available for the phases of fundamental and theoretical studies. In other words, because the studies on these phases are advanced as well as basic, they are not appropriate to patent application. For example, it was pointed out that studying failure cases is significant on these phases but they do not lead to patent application with an aim of commercialization. The researchers in the category A with shorter career review research papers but they frequently neglect patent information search following their usual practice. However, it was discovered that they had a certain level of recognition that "not conducting patent information search" may accompany a risk for their study. The researchers in this category have an optimistic expectation, though it is vague, that patent information in any technological field can be generally utilized for study on any study phase. In addition, they hope to be trained about patent information search, interpretation and utilization for studies in some rational way because they are always busy in teaching and studying.

4 Results of Questionnaire Survey

4.1 Overview of the survey

I conducted questionnaire survey with science researchers belonging to Yamaguchi University and other universities in Japan (2006). The number of respondents to the questionnaire was 294 in total, including 179 (engineering), 19 (science), 25 (agriculture) and 71 (medical). The medical researchers were analyzed after they were divided into fundamental researchers (24) and clinical researchers (43). It should be noted that four respondents of medical researchers did not provide the information to classify them between fundamental and clinical categories. So, I used their data only for the whole group of medical researchers. For the entire survey data, refer to the report*6 submitted to Japan Patent Office.

I describe typical findings obtained from the questionnaire survey of medical researchers as follows.

4.2 Basic attributes of medical researchers covered by the questionnaire survey

First, I explain the attribute of the medical researchers which replied to the questionnaire.

The proportion of the medical graduate students who work on fundamental research is extremely small. It is only 4% among all the fundamental researchers even when the students of doctorial programs are included. It turned out that fundamental researches are carried out by teachers who are readers/instructors or higher posts, and such teachers occupy 80% of the fundamental researchers. On the other hand, 60% of the clinical researchers are teachers who are readers/instructors or higher posts and 33% are graduate students; so it is assumed that graduate students play a certain role in research. Reflecting this fact, the average age of fundamental researchers among respondents is approximate 10 years older. The career (years of research) of respondents has a similarly tendency. I will analyze the survey results in the following sections based on the divisions of fundamental and clinical researchers. It is necessary to draw a conclusion while taking the basic differences mentioned above into consideration.

4.3 Reasons for not applying patent for the past three years

When I asked medical researchers about the experience of patent application for the past three years, 10% of fundamental researchers (24 respondents) applied two or more patents, 11% of them applied one, and 79% of them applied none. 7% of clinical researchers applied two or more patents, 9% of them applied one and 84% of them applied none. When I asked the same question about a whole laboratory, the answer tended to be similar. Against my original expectation, the proportion of fundamental researchers who applied patent(s) was twice as large as that of clinical researchers.

In order to determine the reason for this, for example, whether the fact that there are many researches to be conducted with collaboration with corporations prompted positive patent application at the early stages, or the difference in post or career as described in the preceding section just influenced the result, further investigation is required. The table 1 shows the question I asked the researchers both in the fundamental and clinical fields who did not applied patent to make out why they did not do so.

Table 1 Why Did You Apply no Patent for the Past Three Years? (The Respondents May Mark All that Apply)

	fundamental researchers (17 respondents)	clinical researchers (39 respondents)
I have no interest in patent application	12%	18%
I have no time for patent application	12%	13%
Patent application has a complex procedure	0%	5%
Patent application requires complex preliminary survey	0%	0%
I consider an article is more important than patent	17%	10%
My research contains no invention for patent application	41%	21%
My research is not directly related to a specific invention	12%	33%
Though an invention is completed, there is little possibility to recover the cost by commercialization.	0%	0%
I want to give priority to disclosing my invention to the society for free over patent application	0%	0%
other	6%	0%

More fundamental researchers tend to put writing articles above patent application. However, as mentioned above, more fundamental researchers actually apply patents. Considering comprehensively the survey results, 41% of the fundamental researchers and 21% of clinical researchers think "my research contains no invention for patent application", and 12% of the fundamental researchers and 33% of clinical researchers think "my research is not directly related to a specific invention", I assume that fundamental researchers are superior in ability to detect inventive concepts in their researches as well as in ability to interpret or assess implications of their research contents compared to clinical researchers, though they tend to attach more importance to writing articles. Nonetheless, as I mentioned before, further investigation is required to define how the difference in post or career of the respondents influenced the results. It should be noted that if clinical researchers are trained to improve their abilities to detect inventive concepts or to interpret implications about their research contents, it will facilitate their actions of patent application.

4.4 Experiences of searching patent information and reasons for not searching it at all

When I asked medical researchers about experiences of searching patent information, 29% of fundamental researchers (24 respondents) had experiences of doing it by themselves, 8% of them asked someone responsible for it in the laboratory to do so, and 63% of them had no experiences at all. In case of clinical researchers (respondents: 45, including 2 who marked two options), 9% of them searched it by themselves, 15% of them asked someone responsible for it in the laboratory to do it, and 76% of them had no experiences at all. A little less than one-third of fundamental researchers had experiences of searching patent information by themselves; this is consistent with the tendency of patent application behavior described in the preceding paragraph. Generally, it is considered that fundamental researchers have better skills about patent related information and system than clinical researchers. Then, to the question asking them why they had no experiences of searching patent information, 18% of fundamental researchers (respondents: 17; they may mark all that apply) answered they do not know how to make patent literature search, 29% of them feel search of academic papers is sufficient, and 12% of them have no time to do it. In case of clinical researchers (respondents: 14; they may mark all that apply), 37% of them do not know how to make patent literature search, 20% of them feel search of academic papers is sufficient, and 27% of them have no time to do it. These findings suggest fundamental researchers have more difficulties in skills to search patent literature information, and that it is necessary to develop some training system of patent information search for the researchers with no experiences, regardless of being fundamental or clinical researchers.

4.5 "Factors of Complexity" pointed out by the researchers who think patent literature information search is difficult

To the question regarding problems that researchers would have when they search patent literature information, 20% of fundamental researchers (respondents: 20) answered "there is no problem" and 55% of them answered complexity of how to make such a search. In case of clinical researchers

(respondents: 32), 19% of them answered "there is no problem" and 50% of them answered complexity of how to make such a search. In summary approximate 50% of both groups pointed out complexity of how to make such a search. Table 2 indicates the answers of the researchers who pointed out the complexity to the question of what factors make such a search complex.

Table 2 Factors of Complexity of Patent Literature Search (the Respondents May Mark All that Apply)

	fundamental researchers (23)	clinical researchers (25 respondents)
Diffcult to comprehend IPC search, FI and F terms	22%	12%
Diffcult to detect necessary classification(e.g.IPC,FI and F term)	30%	12%
Search results of a term often vary	9%	12%
Not readily reach the expected search result	22%	12%
It takes time to display the results or to print them	4%	12%
Search response is not satisfactory(takes long)	9%	12%
It requires expenses to use it	4%	12%
others	0%	12%

For the proportions of researchers who think "search results of a term vary", in other words, "text search does not result in unified search results that follow constant directionality", 9% of fundamental researchers (respondents: 23) and 16% of clinical researchers (respondents: 25) think that way. This finding indicates the limitations of text search because some corporations intentionally disperse technical terms used for patent applications. In addition, for the proportion of researchers who feel it difficult to comprehend how to make a search by using class symbols such as IPC or F terms, fundamental researchers outnumbered clinical researchers. At any rate, complexity factors are dispersed in both text search and search by class symbols.

4.6 Which part do you read carefully when you read patent literature information

Table 3 shows the question inquiring which part researchers read carefully when they read patent literature information. For the parts of the bibliography (including applicant and inventor) as well as patent claim, almost the same proportion of both fundamental and clinical researchers answered they would read them carefully.

Table 3 Which Part Do You Read Carefully when You Read Patent Literature Information? (the Respondents May Mark All that Apply)

	fundamental researchers (30 respondents)	clinical researchers (31 respondents)
Bibiographic part including applicant, inventor and others	6%	7%
Abstract	27%	52%
Patent claim	23%	19%
Technical field	7%	0%
Background art	7%	0%
Problems to be resolved by the invention	7%	3%
Effects of the invention to practical use (examples)	13%	3%
Best mode to put the invention to practical use (examples)	0%	3%
Industrial applicability	0%	3%
Brief description of the drawings	0%	3%
Drawings	10%	7%

However, for the other parts they showed different tendencies. Fundamental researchers tend to read technical field, background art and effect of the invention carefully; which suggests they interpret patent literature information form more theoretical viewpoint. On the contrary, clinical researchers tend to put more importance to applied research and others including operation modes of invention and industrial applicability. This assumption is supported by the fact that the proportion of clinical researchers who read carefully the abstract (describing only the outline of the invention within 400

characters) is twice as large as that of fundamental researchers.

5 Conclusion

In this report I introduced only the results of typical hearings and questionnaire survey conducted to medical researchers. In conclusion, researchers belonging to the fundamental or theoretical research filed generally think there is little patent information that can be used for their research. When medical researchers are divided into two categories, fundamental researchers and clinical researchers, the former has superior skills of patent application and patent literature information search to the latter. Fundamental researchers tend to interpret patent literature information from more theoretical viewpoint, while clinical researchers tend to put more importance to the information with regard to applied research. It was discovered that approximate 50% of both groups feel it difficult to search patent literature information. Note that the influence of the fact that fundamental researchers are approximate 10 years older than clinical researchers, which I pointed out in the basic attributes of respondents, remains for further investigation.

References

[1] Tomohisa Kimura et al. (2007). Development and Verification of a Model to Utilize Patent Information Database for Researchers in the University[R]. Report on Findings of an Intellectual Property Rights Research Project in the University, Japan Patent Office Research Project in FY2006: 9-34

[2] "The University Researchers" Subject to This Study are Limited to Researchers who Belongs to Universities and Other Higher Education Institutions and whose Research Areas are Science, Engineering, Agriculture, and Medicine (Including Dentistry and Pharmacy).

[3] Tomohisa Kimura et al. (2008). Development and Verification of a Model to Utilize Patent Information Database for Researchers in the University[R]. Report on Findings of an Intellectual Property Rights Research Project in the University, Japan Patent Office Research Project in FY2007: 1-75, 102-128

[4] http://t-kimura03.mot.yamaguchi-u.ac.jp//domescon/howto_useyupass.pdf

[5] This report summarizes the data of individual researchers. The review of the questionnaire survey conducted on each laboratory should be summarized in another report

[6] Tomohisa Kimura et al. (2007). Development and Verification of a Model to Utilize Patent Information Database for Researchers in the University[R]. Report on Findings of an Intellectual Property Rights Research Project in the University, Japan Patent Office Research Project in FY2006:1-148, 185-198