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A Study on the Objects of the Patent Applications in IT Manufacturing Companies

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Abstract

With the rapid development of ICT and the market, the border in the market began to be meaningless any more, and it came to be difficult to produce products just with a single technology. Especially, with the acceleration of the convergence and integration of technologies, this phenomenon will further continue in the future, and at the point of time when the patents are more important than ever before, it is important to understand the purposes of patent applications. Thus, this study looked into related preceding studies in order to analyze the reasons or purposes that domestic IT manufacturers apply for patents and drew main factors through an expert Delphi survey. As a result of an empirical analysis of the drawn factors with executives of IT manufacturers (H/W, S/W), it turned out that there was a difference in the purposes of patent applications of the IT manufacturers.

Keywords: IT, Patent, Patent Acquisition, Patent Application

1. Introduction

How companies can secure profits exclusively from R&D costs invested in technological innovations has recently appeared as an important issue. Generally, plan for the protection of R&D results after the companies' research and development (appropriability) includes patent, secrecy and market occupation, and of these, what is of most importance is the patent.

Technological innovations can be said to be the source of the country's economic growth and the companies' competitiveness. Technological developments through these technical innovations characterize continuity and cumulativity based on the previous technologies.

A patent system reflecting the need for the protection of the right for innovative technologies is regarded as an intellectual property right. Companies protect the rights of technological developments and technical innovations and secure profitability through them, so that the companies' enthusiasm for technological innovations could be inspired.

For instance, global companies protect their core technologies as patents with the development strategies of leading products to surely guarantee their own profits, build up patent portfolios to strengthen the differentiation and recognize patents as a key element of management. Also, many hold patent strategies focused on developing leading products like smartphones by which they can obtain market advantages and strategic patents.

Although patent disputes are currently taking place throughout the world, it is difficult to emphasize the importance of patents sufficiently, and especially, as products become more complex and diverse, a time has come, when no products can be produced just with a single patent.

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Then, there is a question about the purpose of companies applying for patents. If a company obtains a patent, which is legally protected, and it has merits that it can occupy the competitive advantage of the technology, use that exclusively and obtain economic benefits. Accordingly, companies apply patents from the stage of the ideation of new products or technologies earlier than other companies and put a lot of time and money to establish rights for the technologies to be developed[1-3].

For patent registration, a technology should meet the requirements for novelty, creativity and availability in the industry and it follows a first-to-file system, so it cannot be registered as a patent if it misses the timing. For example, there was only two months difference in time for development between Kodak and Polaroid. Kodak initiated the production of instance cameras, but suffered huge losses from patents (patent thicket) owned by Polaroid[4].

Of course, there may be various reasons for companies' patent applications, and some may not apply patents due to important strategic reasons (novelty, application cost and annual cost, etc)[5]. However, at this point of time when patents are more important than ever before, it is judged that it is very important to understand the purpose of patent applications. Thus, this study will analyze the reasons or purposes for which the domestic IT manufacturers (H/W and S/W) apply for patents, look into related studies first in order to draw factors of the reasons or purposes of patent applications and conduct an analysis through a Delphi survey and a survey with experts in order to draw main factors.

2. Theoretical Background

There are almost no studies of the companies' purposes of patent applications in South Korea, but there are a few studies in progress in other countries.

Cohen et al.[6] divided the purposes of the patent application into import of license, prevention of patent infringement lawsuits, prevention of imitation, blocking of competitors' activities, performance indicator, negotiation and improvement of the level of awareness. McJohn[7] classified the purposes of the patent application into the exclusion of competitors' advance to the market, licensing, venture fund-raising, honor and displaying the superiority of the products.

Park & Kim[5] argued that seven factors, such as Enhance Reputation, Improve the technological image of your company, Prevent patent infringement suits, Prevent copying or protect own technology from imitation, Improve the situation in R&D co-operations and For use in negotiation (Cross licensing, Joint venture) are the purposes of patent applications, and Park et al.[8] conducted a comparative analysis with five factors, such as Prevent Copying, Blocking, Prevent Suits, Licensing Revenue and Using in Negotiation regarding the purposes of patent applications of large enterprises and small and medium enterprises.

3. Research Model and Design

3.1 Delphi Method

Delphi method is one of the predictive methods for future and so known as technique that can be used for any purposes if utilizing an expert group. Delphi method is known to be valid in making future goals or purposes or behavior processes closer to collective opinion.

This study would use the Delphi technique to draw factors of patent acquisition activities. It is significance as predictive study seems to be sufficient if the ultimate purpose of Delphi method is to help decision marking in the current situation and at the current point of time[2,8].

3.2 Data Collection and Analysis Method

The process of data collection and analysis is as follows. This study conducted a Delphi survey with seven experts with the factors suggested in preceding research. The Delphi survey was conducted with experts active in the related areas, including three patent value evaluation experts, two patent agents and two professors. Through the Delphi survey (two times), 10 factors of the purposes of patent applications, seven factors of not applying for patents and the five factors of activities done with the obtained patents were drawn.

The importance was estimated by conducting the survey with 35 persons in R&D in companies and executives in charge of patents. The survey was conducted by visiting the experts in the related field from July 1 through 30, 2013. The experts that participated in the survey held theoretical and operational experiences in the R&D field, who consisted of those who could influence the decision-making process. Responses to the survey were scored on a 5-point scale: from 5 points meaning "Strongly agree" to 1 point meaning "Totally disagree," and the average was analyzed.

3.3 Characteristics of the Sample

The characteristics of sample are as follows. To look their work experience, 1~5 years occupied 25%, 5~10 years 24%, 10~15 years 29%, and 15 years or more 22%. To look at the general characteristics of respondent, especially in highest level of education, college graduate occupied 35%, master's degree 65% and their average career appeared as 10.22 years. H/W occupied 51.5% and S/W companies 48.5%.

3.4 Operational Definition

The operational definitions of this study are as follows:

Table 1. Operational definition

Factor	Operational Definition
Licensing Revenue (loyalty)	As a strategy to create profits by receiving royalty from other companies, instead of directly manufacturing products by obtaining patents.
Prevent patent infringement suits	As a strategy to obtain patents in order to get ready for patent infringement suits.
Prevent copying or protect own Technology from imitation	As a strategy to obtain patents in order to prevent its own products from copying or protect its own technologies from imitation.
Blocking or prevent competitors' patenting and application activities	As a strategy to obtain patents in order to prevent competitors from producing similar products.
Measure performance	As a strategy to obtain patents for the company's measure performance.
For use in negotiation: cross licensing, joint venture	As a strategy to obtain patents for use in negotiation when a patent dispute occurs.
Enhance Reputation	As a strategy to obtain patents in order to increase the company's reputation.
Improve the technological image of your company	As a strategy to obtain patents in order to improve the company's technological image.
Improve the situation in R&D co-operations	As a strategy to obtain patents in order to improve the company's image through co-operations of R&D.
Acquire venture capital	As a strategy to obtain patents in order to raise company's funds.
Demonstrating of novelty an invention	Because it is difficult to demonstrate the relative novelty of an invention as compared to existing technologies (Because it does not have novelty, one of the three requirements of a patent).
Disclosure	Because an important fact occurring, which may influence the company's share price and trading volume, should be disclosed to investors, quickly and accurately
Application Cost	Because much application cost incurs.
Defense Cost	Because the cost consumed as defense cost in patent application cannot be borne
Ease of inventing around	Because it is difficult to demonstrate the advancement of an invention as compared to existing technologies (Because it does not have Inventive Step, one of the three requirements of a patent).
Patent Maintaining Cost	Because a lot of cost is put into maintaining patents.
Secrecy	To keep it confidential because it is a company's secret (All information should be disclosed once a patent is obtain).
Cross licensing	A strategy to obtain patents in order to conducting mutual licensing of acquired patents.
Fences[9]	A series of patents obtained by a patent owner on near substitutes for its patent, thereby blocking follow-on innovators from designing around the initial patent.
Player	A strategy to obtain patents in order to producing products and e providing services using acquired patents.
Licensing revenue	The price that a company who desires to use a certain right pays a company who has that right.
Technology transfer[10]	The process by which technology or knowledge developed in one place or for one purpose is applied.

4. Research Of Study

4.1 Purpose of Patent Application

The results of this survey are as follows. First, the purposes for which companies apply for patents were classified through an expert Delphi analysis with the contents suggested in the preceding research. As a result of an analysis of what important details are as purposes of patent applications of IT companies based on this, in H/W companies (18), it turned out that there were differences in the purposes of patent applications, but which were not great. In contrast, in S/W companies (17), there were great differences unlike in H/W companies.

4.1.1 H/W

It turned out that the first place in the purpose of a company's patent application was for use in negotiation. This result was drawn because generally, domestic IT companies are not in a large scale. In addition, source technologies are not secured, and they are second movers, so the first place was for use in negotiation. It turned out that the second place was to block or prevent competitors' patent application activities.

This is a strategy to prevent competitors from entering the related industry (production of products) by building up a patent portfolio, and its typical case is MPEG-LA patent pool. It turned out that the third place was to enhance reputation. If one holds many patents, generally, its reputation from consumers would increase, which, accordingly, brings about the effectiveness of sales.

The fourth place is to improve the technological image of the company. In general, patent activities help improve the company improve its technological image, which, ultimately, has a positive impact on its managerial performance. The fifth place is to prevent copying.

As a purpose of obtaining the result of R&D as a patent, it is very important to prevent competitors' copying the company's technologies or products at the source, and it is a strategy that companies, generally, choose. In addition, the importance turned out to be in the following order: acquiring venture capital, Prevention of patent infringement suits, improvement of situation in R&D co-operations, measure performance and licensing revenue.

4.1.2 S/W

As a purpose that a company applies for a patent, the first place was to improve the company's technological image. This result was drawn because S/W is a part in which technological elements stand out, unlike H/W. The second place was to enhance reputation. Generally, if a patent is obtained, the company's reputation rises. This is a result, same as that in H/W. The third place was to improve the situation in R&D co-operations. At this point of time when open technological innovations emerge more important than ever before, since companies strengthen their competence of technological innovations through joint R&D with other companies or they are important for the improvement of the company's competitiveness, they were drawn as the third place.

The fourth place was to block or prevent competitors' patent application activities. This is a strategy to prevent competitors from entering into the company's industry (production of products) as in H/W. The fifth place was to prevent patent infringement suits. As shown in recent cases, such as Samsung vs. Apple, Oracle vs. Google,

Table 2. Purpose of patent application

	Mean		S.D		Var.		Rank	
	H/W	S/W	H/W	S/W	H/W	S/W	H/W	S/W
LR (Licensing Revenue)	3.11	2.65	1.06	0.83	1.12	0.69	10	10
PPIS (Prevent patent infringement suits)	3.44	3.12	1.11	0.92	1.24	0.85	7	5
PC (Prevent copying or protect own technology from imitation)	3.44	2.94	1.09	0.78	1.18	0.61	5	9
Blocking	3.56	3.41	1.18	0.92	1.38	0.85	**2**	4
MP (Measure performance)	3.33	3.00	1.06	0.84	1.13	0.71	9	6
FUN (For use in negotiation)	3.56	3.00	0.94	0.98	0.88	0.97	**1**	8
ER (Enhance Reputation)	3.56	3.88	1.11	0.70	1.24	0.50.	**3**	**2**
ITMC (Improve the technological image of your company)	3.56	3.94	1.14	0.70	1.31	0.50	4	**1**
ISRD (Improve the situation in R&D co-operations)	3.39	3.41	1.12	0.61	1.26	0.37	8	**3**
AVC (Acquire venture capital)	3.44	3.00	0.94	0.86	0.88	0.73	6	7

Alcatel-Lucent vs. MS, etc., this result was drawn because patents related to S/W emerge gradually more important. In addition, the importance turned out to be in the following order: measure performance, acquire venture capital, for use in negotiation, prevent copying and licensing revenue.

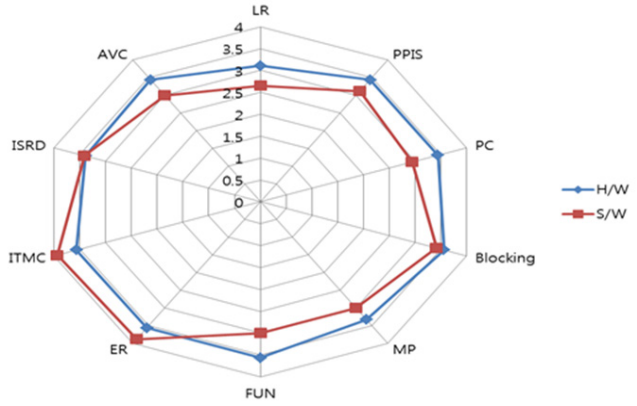

Figure 1. Patent Application Radial Chart.

4.2 Purposes of not Applying for Patents

As a result of an analysis of the reasons for not applying for patents with the results of the companies' R&D, it turned out that there was a difference between H/W companies and S/W companies.

In H/W companies, it turned out in the following order: For secrecy, not being able to prove that the invention is new, application cost and for ease of the invention. In S/W, the order was as follows: for ease of the invention, secrecy, annual cost and defense cost.

4.2.1 H/W

As a purpose of not applying for patents, it was drawn that the first place was for secrecy. Generally, this is a strategy to not apply for a patent with the result of R&D and not obtain a patent for trade secret. Patents have recently been on the rise as an important element, but the result of this study that secrecy is more important than patent is consistent with that of preceding studies.

What is important to apply a technology as a patent has novelty, and the second place was because it could not apply for a patent since the result of R&D was not newer than the existing technologies.

Since application cost is very much, companies are often reluctant to apply for a patent, and this turned out to be the reason for not applying for the patent.

In addition, the importance turned out to be in the following order: Ease of inventing around, Disclosure, Defense Cost and maintaining patents.

4.2.2 S/W

Of the requirements for a patent, creativity is also an important factor. It is common that a company cannot obtain a patent because, the result of R&D is a very easy invention; thus, it does not have creativity. Accordingly, some obtain a utility model rather than a patent. Especially, since it is more difficult to prove creativity in S/W than in H/W, it was drawn as the first place.

Traditionally, the S/W industry preferred secrecy to patent. However, since patent applications for S/W have recently been applied more advantageous to companies, they are gradually increasing. So, it was drawn as the second place.

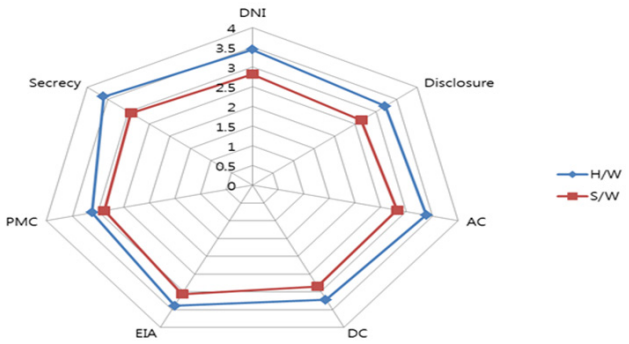

Figure 2. Not Applying for Patent Radial Chart.

Table 3. Purpose of not applying for patents

	Mean		S.D		Var.		Rank	
	H/W	S/W	H/W	S/W	H/W	S/W	H/W	S/W
DNI (Demonstrating of Novelty an Invention)	3.44	2.82	0.95	0.90	0.56	0.32	**2**	5
Disclosure	3.22	2.65	0.70	0.49	0.62	0.39	5	7
AC (Application Cost)	3.39	2.82	0.95	0.90	0.85	0.73	**3**	6
DC (Defense Cost)	3.22	2.85	0.93	0.86	0.71	0.50.	6	**4**
EIA (Ease of Inventing Around)	3.39	3.06	0.97	0.93	0.79	0.62	4	**1**
PMC (Patent Maintaining Cost)	3.11	2.88	0.93	0.86	0.71	0.50	7	**3**
Secrecy	3.61	2.94	1.03	1.06	0.84	0.70	1	**2**

Application cost is very much, but the maintenance costs more. For example, the annual fee for a U.S. patent is $ 1,150 for a patent in 3.5 years; $ 2,900 for one in 7.5 years; and $ 4,810 for one in 11.5 years. Small and medium enterprises bear $ 575, $ 1,450 and $ 2,405, respectively, and it seems that this result was drawn because, on the U.S. patent management system, foreign companies must pass through a U.S. law firm in order to register and maintain a patent in the U.S., additional costs, like patent defense cost, incur.

In addition, the importance turned out to be in the following order: Defense Cost, Demonstrating of novelty an invention, Disclosure and Application Cost.

4.3 Activities after Patent Acquisition

The results of activities conducted with the patent obtained by a company are as follows.

First, in the hardware industry, it turned out that the utilization of patents for the purpose of manufacturing (player) was the most important factor.

Table 4. Activities after patent acquisition

	Mean		S.D		Var.		Rank	
	H/W	S/W	H/W	S/W	H/W	S/W	H/W	S/W
Cross licensing	3.67	3.18	1.07	1.14	0.80	0.64	3	2
Fences	3.78	3.59	0.98	0.95	0.88	0.78	2	1
Player	4.00	3.12	0.98	0.95	0.75	0.57	1	4
Licensing revenue	3.39	3.12	1.08	1.18	1.15	1.31	5	5
Technology transfer	3.50	3.18	1.17	1.36	0.88	0.77	4	3

Generally, the strategy that companies choose mostly with the patents they obtained is manufacturing. Next, it turned out that they aim at defense, and the importance was in the following order: cross-licensing, technology transfer and royalty profit.

However, in the software industry, it turned out that the utilization of patents for the purpose of defense was the most important factor. This reflects the trend in the recent global disputes over patents, in which companies obtain patents so as to prevent other companies in the same industry from entering their own area of sales. The importance was in the following order: cross-licensing, technology transfer, manufacturing and royalty profit.

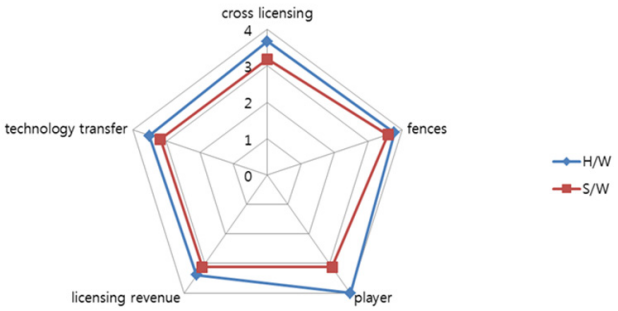

Figure 3. Activities after Patent Acquisition Radial Chart.

5. Conclusions

As globalization is accelerated, the scope of the free market expands and the border does not have a meaning anymore. Consequently, in order to survive in the keen environment of competition, companies make various efforts, and eventually, make lots of efforts to find their new growth engine industry through innovation. Especially, for innovation, how to appropriate the result is of the greatest interest. The mechanisms of appropriability include patent, secrecy and LTA, and among these, companies' interest in patent is increasing.

Thus, this study looked into the reasons or purposes for the domestic IT manufacturers (H/W and S/W) applying for patents and suggested patent business strategies appropriate for IT manufacturers through that.

The academic significance of this study includes: First, it provided an empirical study of the reasons or purposes of the companies' patent applications. It is hard to find domestic studies with IT manufacturers, so this study has contributions, e.g. It broadened the understanding of patents and revealed the purposes of patent applications reflecting the environment of the domestic companies. Second, another important contribution of this study is that it provides strategies for activities conducted with the obtained patents. Considering the situation in which it is difficult to understand companies' patent strategies and critical conditions, the value of this study is deemed to be great.

The operational significance of this study is that it provides a useful guide for administrators (persons in charge of R&D and persons in charge of patents, etc.), to which they can refer in patent business strategies operationally. Thus, the systematic classification of the

purposes of patent applications suggested by this study and the understanding of the status of patent utilizations would help establish plans for patent business strategies. Especially, it is expected that the companies that have not recognized patent business strategies importantly, would recognize patent strategies newly and take considerable interest in patent business strategies for the company-wide level, which would play an important role in responding to the rapidly-changing business environment and ensuring a sustainable competitive advantage of the companies.

However, despite these implications, it has limitations as follows: First, the number of samples studied in the survey was 35 companies, so it would be difficult to generalize the results to the entire industry. Second, there are various techniques of analysis in addition to those used in this study, but it did not consider them. It seems that future studies should expand the subjects of survey, and an analysis using AHP technique and big data would be necessary.

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