

# To Patent or Not to Patent? Case of the Korean Industry

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## Abstract

Innovation is one of the important drives for the reinforcement of companies' growth and competitiveness. With the progress of globalization, there is no meaning of the border any longer and invisible competition takes place. Companies make a lot of investment in R and D for innovation and make massive R and D results. In general, they use an appropriability mechanism to secure profits through the results of R and D. Appropriability mechanisms include patents, trade secret and lead time. However, they do not apply for a patent, a type of the appropriability mechanisms with the results of their investments of significant costs in R and D. Thus, this study looked into the reason why companies would do or would not apply for a patent based on the elements proposed in the preceding studies, and carried out a survey with 50 companies. As a result of the study, the purposes of their patent application were in the order of action for infringement of patent prevention, blocking competitors' activity off and prevention of imitation, and the purposes for their not applying for a patent were in the order of keeping a secret, difficult to prove that the invention is new and easy inventions.

**Keywords:** Innovation, Not to Patent, Patent to Patent

## 1. Introduction

The importance of a patent is increasing day by day. Many companies seeking funding from venture capitalists recognize that patent or copyright protection is essential if they are to attract financing and recoup their R and D expenditures<sup>1</sup>. Especially, in recent years, with convergence and complication, products become more complex and diverse compared to the past, and no company can manufacture products only with a single patent. For example, it is known that there are more than 78,000 patents in smart phone. Assuming that a computer manufacturer plans to develop a new microprocessor related product, it is difficult to develop a new product without violating competitor's patent because there are about 100,000 patents related to microprocessor.

Generally, to apply for a patent, there elements: novelty, progressiveness and industrial availability should be prepared. However, often companies fail in applying for a patent, in spite of their novelty and progressiveness. The patent law in the U.S. postulates four types: process, machine, manufacture and composite as the subjects of patents. However, the Supreme Court of the U.S. judges that it is not possible to apply for a patent with abstract ideas, not natural phenomena, natural laws and concrete ideas. This is because they do not have industrial availability of the above elements.

For example, various theories left by such scientists as Einstein and Newton are impossible to be patent-applied, because their basic ideas and grounds are based on natural phenomenon. In addition, Pythagoras' theorem and Fibonacci's sequence cannot be patent-applied because they are abstract ideas.

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But all the natural phenomena and abstract ideas are not patent-applied. For example, thermodynamics' law cannot be the object of patent registration because it is the law of nature, but the steam engine developed using thermodynamic principle is the object of patent application. Furthermore, the ideas of mathematics explained above cannot be the object of patent, but the calculator and computer software program developed using this can be the object of patent<sup>2,3</sup>. Do I always need a patent for my business idea? The answer is no, not always. But for some reason most people want to patent their idea<sup>4</sup>.

A question arises: For what purposes, do companies apply or not apply for a patent? If they obtain a patent, they have merits that they can hold competitive advantage of the technology, utilize it exclusively and obtain economic profits. Accordingly, from the stage of coming up with an idea about a new product or technology, it is very important for a company to apply for a patent and set up the technology to be developed by investing much time and money faster than other companies do. It is because there is a great economic ripple effect of the patent application<sup>5</sup>.

The reasons why companies do not apply for a patent include: it is difficult to prove that an invention is a new technology and there is a cost issue.

Therefore, this study attempts to analyze the purposes for which companies do and do not apply for a patent. Of course, there may be various reasons for companies' patent application. Also, they do not apply for a patent because of their own strategy. However, at this point of time when a patent is more important than ever, it is judged that it is important to understand the purposes of the patent application. This study selected and analyzed factors among those proposed in the preceding studies using the Delphi technique and with the selected factors, conducted a survey with the persons in charge of R and D and hands-on workers in charge of patents at companies.

## 2. Theoretical Background

There are almost no studies on the purposes of companies' patent application in South Korea, but some studies are in progress in foreign countries, which are carried out centering on the U.S. Cohen et al.<sup>6</sup> 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<sup>7</sup> 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 et al.<sup>8</sup> divided the purpose of patent application into prevent copying, prevent suits, licensing revenue, blocking, and use in negotiation.

### 2.1 Purpose of Applying for Patent

Generally, the purposes of companies' patent application include: prevention of patent infringement lawsuits, blocking of competitors' activities, prevention of imitation, import of license and performance indicator while the purposes of their not applying for a patent include: keeping secret, difficult to prove that the invention is new, easy invention, patent maintenance costs, patent application fees and corporate disclosure.

Licensing income refers to a reward for giving a license to other companies after applying for a patent on the result of research and development. Qualcomm, for example, acquired the original technology of CDMA as patent and is earning more than 800 million dollars for patent fee only on an annual basis.

Prevention of action for infringement of patent is a method that is generally undertaken by late movers rather than leading companies. Late movers cannot acquire original technology and so apply for patent of applied technology.

Prevention of imitation is a method that is used to prevent our company's products from being copied by other companies or individuals. To look at the recent smart phone market, the problem is that Chinese late movers are launching their products that made illegal copies of Apple or Samsung's ones to the market.

Prevention of competitor's activity is a method that is used to prevent competing companies or potential companies from producing the product lines that we are producing by establishing a patent portfolio. It is one of the strategies that are generally taken by most leading companies. Performance indicator means a result that can be drawn by companies from their research and development. In general, it is divided into qualitative indicator and quantitative indicator. For example, it includes thesis, patent application, test product manufactured, and sales.

### 2.2 Purpose of Not Applying for Patent

There are reasons why companies do not apply for a pat-

ent. First, they are difficult to prove that their invention is a new one. It is the very novelty among the patent application requirements. This is why companies cannot apply for a patent even when they did research and development because there is already a prior technology.

Second, their invention is an easy one. Easy invention means easy imitation by competitors even when there are some partial improvements because such improvements indicate that the existing patent was improved.

Patent application cost means a cost that is required for patent application. In general, the cost consumed from patent application in the United States to examination phase is known to be 6,000 ~ 8,000 dollars. In case of Korea, about 4 million won is required for patent application. Patent maintenance cost means a cost required for maintaining patent after patent application. To look at the current United States, large companies are paying 1,150 dollar in the 3-5<sup>th</sup> year, 2,900 dollar in the 7-5<sup>th</sup> year, and 4,810 dollar in the 11-5<sup>th</sup> year as annual fee per patent. Small- and medium-sized companies, of course, are paying 575 dollar in the 3-5<sup>th</sup> year, 1,450 dollar in the 7-5<sup>th</sup> year, and 2,405 dollar in the 11-5<sup>th</sup> year<sup>3</sup>. In addition, under the U.S. patent management system, for foreign companies other than United States to register and maintain patent must use the U.S. law firm and so additional cost of patent lawyer appointment fee occurs. It appears that they cannot apply for a patent because there is a big maintenance cost in addition to the patent application cost.

Furthermore, they have to disclose their corporate information. Corporate Disclosure System is a system that if an important event that may affect a company's stock price and trading volume occur, this must be disclosed to investors quickly and exactly.

The reason why a company does not apply for a patent when it comes to the result from its research and development is the very maintenance of secrets. For patent application, application content, in other words, technology must be disclosed.

### 3. Research Model and Design

#### 3.1 Delphi Method

This study would use the Delphi technique to draw factors of patent acquisition activities and counter-plans for patent disputes. To draw patent-related factors, reliable

experience and information are necessary, so this study chose a group of experienced experts in work-site operations as subjects and used the Delphi method as the one to reflect professional opinions.

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. In general, Delphi method is known to be valid in making future goals or purposes or behavior processes closer to collective opinion. If there are no previous data or if the changes in external factors that may occur in the future are determined to be more important than the factors that dominated the development so far, expert's opinion is almost the only predictive data. But, the predictive research investigated by Delphi method can be criticized for being an unscientific theory due to its limitations that it still targets uncertain situation as object of study. It is difficult to avoid such a criticism when it comes to the accuracy of delphi method itself, its significance as predictive study seems to be sufficient if the ultimate purpose of delphi method is to help decision making in the current situation and at the current point of time<sup>9,10</sup>.

#### 3.2 Data Collection and Analysis Method

The processes of data collection and analysis method are as follows. This study conducted a Delphi analysis on the factors proposed in the preceding studies with 10 experts in the relevant field. The Delphi survey was conducted with the experts in the relevant field, including six patent valuation experts, two patent attorneys and two professors. This survey was carried out with 50 persons in charge of R and D and hands-on workers in charge of patents in the companies to calculate the significance. The survey was conducted by visits to the experts in the relevant field from January 10 through 30, 2014. The experts that participated in the survey were holding theoretical and practical experience about R and D and could influence the process of decision-making Table 1. 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. The subject of our survey is 50 companies in total and among them; S/W industry occupies 27.5%, electronics industry 15.7%, automotive industry 9.8%, chemistry/mechanics/phar-

**Table 1.** Characteristics of the sample

		Frequency	Percent (%)
Career	1-5	5	10
	5-10	15	30
	10-15	19	38
	15-	11	22
Education	BA	31	62
	MA	15	30
	Ph.D.	4	8
Industry	Large	20	40
	Small and Medium	30	60

maceutical/electricity industry 5.9%, communications/defense/bio/metal/shipbuilding/textile industry 3.9%.

To look their work experience, 1 ~ 5 years occupied 10%, 5 ~ 10 years 30%, 10 ~ 15 years 38%, and 15 years or more 22%. To look at the general characteristics of respondent, especially in highest level of education, college graduate occupied 62%, Master's Degree 30%, and doctor's degree 8% and their average career appeared as 10.22 years. Large companies occupied 40% and small-and medium-sized companies 60%.

## 4. Research of Study

### 4.1 To Patent

The factors selected can be ranked as follows.

Prevention of action for infringement of patent was ranked 1<sup>st</sup>. This action for infringement of patent is recently becoming a hot issue. Companies cannot prevent action for infringement of patent with one patent only. So they are buying patents related to their core functions or applying for an improved patent. By doing so, they can make barriers, and if action for infringement of patent occurs, can confront it.

Prevention of competitor's activity was ranked 2<sup>nd</sup>. This means prevention of application activity by competitors through research and development. In other words, it prevents competitors from entering the same industry in advance and applies for a patent to establish a barrier. For example, in case of printer market, other companies, except some companies, cannot enter the market. In this case, the companies who owned printer related patent organize a sort of pool and then the companies who joined the patent pool are allowed to share patent each other. Because of this policy, other companies are blocked to enter the printer market if they do not enter into a licensing agreement.

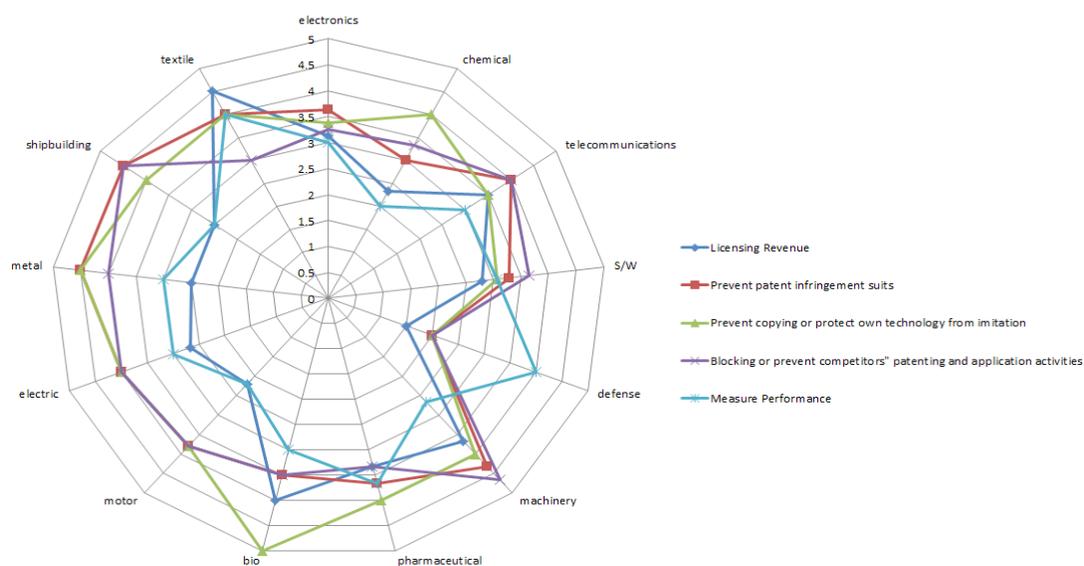
Prevention of imitation was ranked 3<sup>rd</sup>. From corporate perspective, a big problem may occur if competitors copy or imitate their own products or images without permission in a similar way. The reduction in profits due to such imitation is evident. In the recent lawsuit between Apple vs. Samsung, Samsung violated Apple's UI related patent and as a result, Apple argued that their patents were violated by Samsung. Of course, from Samsung's perspective, it might embarrass them, but from Apple's perspective, there is a possibility that they cannot enjoy advantages that they can obtain from the smart phone market and their profits can be reduced due to Samsung's patent violation. This is why companies apply for a patent to prevent any violation of their own patents by competitors who would apply for a patent.

Licensing income was ranked 4<sup>th</sup>. By allowing the use of patent, companies can maximize their profits. For example, Qualcomm obtained about 40% of their sales from licensing and their operating profits exceeded 30%, which shows a high profit creation compared to Samsung Electronics' 10%.

In the first place, performance indicator was ranked 5<sup>th</sup>. One of the reasons why the outcome from the research and development is registered as patent is the very performance indicator. Recently, companies are investing a lot of money to research and development. The reason why such outcomes are registered as patent is that such patents are their performance indicators. Many previous studies showed that patent activity had a positive impact on management performance and companies thought that the use of patent application, qualitative/quantitative indicator for the result of invested cost as performance indicator was more important than other factors.

**Table 2.** Result of to patent

	Licensing Revenue	Prevent Patent Infringement Suits	Prevent Copying or Protect Own Technology from Imitation	Blocking or Prevent Competitors Patenting and Application Activities	Measure Performance
Electronics	3.13	3.63	3.38	3.25	3
Chemical	2.33	3	4	3.333	2
Telecommunications	3.5	4	3.5	4	3
S/W	2.79	3.29	3.07	3.643	3.07
Defense	1.5	2	2	2	4
Machinery	3.67	4.33	4	4.667	2.67
Pharmaceutical	3.33	3.67	4	3.333	3.67
Bio	4	3.5	5	3.5	3
Motor	2.2	3.8	3.8	3.8	2.2
Electric	2.67	4	4	4	3
Metal	2.5	4.5	4.5	4	3
Shipbuilding	2.5	4.5	4	4.5	2.5
Textile	4.5	4	4	3	4
<b>Total</b>	<b>2.9</b>	<b>3.61</b>	<b>3.59</b>	<b>3.608</b>	<b>2.96</b>



**Figure 1.** To Patent Radial Chart.

## 4.2 Not to Patent

First, keeping secret was ranked 1<sup>st</sup>. It appeared that keeping secret is better than applying for a patent about the result from research and development and so they did not apply for a patent. This is consistent with the previous studies that in general, companies prefer protecting corporate secrets to applying for a patent in order to prevent their technologies or know-hows from being disclosed due to patent application. For example, Coca-Cola did not register their manufacturing secret as patent and instead protected it as their trading secret and so until now, they are making a lot of profits.

Difficulty in proving that invention is novel was ranked 2<sup>nd</sup>. Companies often do not investigate whether there are prior technologies properly with respect to the technologies that they intend to proceed from the initial stage of research and development. They also often do not

consider trends in competitor's technology development or lifecycle of their technology. If preliminary investigation is not made properly, the result that is studied cannot be registered as patent.

Easy invention was ranked 3<sup>rd</sup>. Easy invention refers to the technology that improved the existing patent. This belongs to creativity among the patent requirements. If a technology is not creative, it cannot be registered as patent. Patent maintenance cost was ranked 4<sup>th</sup>. Patent application cost occupies a lot, but patent maintenance cost is considerable. This is why companies often dominate market in advance through lead time or protect their trading secrets rather than applying for a patent.

Patent application cost was ranked 5<sup>th</sup>. Large companies will not have a big problem, but small-and medium-sized companies may think the cost consumed to apply for a patent is a problem. If they can register their patent without getting help from patent expert, in other

**Table 3.** Result of not to patent

	Demonstrating of Novelty an Invention	Disclosure	Application Cost	Ease of Inventing Around	Patent Maintenance Cost	Secrecy
Electronics	3.13	2.88	3.00	3.00	2.88	3.50
Chemical	3.33	3.00	3.00	3.67	2.67	3.33
Telecommunications	4.00	2.50	2.00	2.50	2.00	3.50
S/W	2.79	2.57	2.79	3.14	3.00	3.00
Defense	2.00	2.00	2.50	2.50	2.00	1.50
Machinery	3.67	3.00	3.33	3.67	3.67	3.67
Pharmaceutical	4.00	3.33	3.00	3.00	3.33	3.67
Bio	4.00	3.50	3.00	3.50	3.50	4.50
Motor	3.00	2.40	2.80	2.80	3.80	3.00
Electric	3.33	3.00	2.33	3.33	3.00	4.00
Metal	2.50	2.50	2.50	3.50	3.50	4.50
Shipbuilding	3.50	2.50	2.50	2.50	2.50	2.50
Textile	3.50	4.00	3.50	3.50	3.50	4.00
Total	3.16	2.78	2.82	3.12	3.06	3.33

words, patent attorney, it will be no problem, but at the end of the day, they will get help from expert because there are a lot of technical terms to apply for a patent by themselves and there are limitations in the information to be accessed by the public to apply for a patent.

Corporate Disclosure System was ranked 6<sup>th</sup>. This is a system that forces listed enterprises to disclose information on important corporate contents that may have a serious impact on the public's decision making on whether to invest or not into a company so that investors can identify the truth of a company and make an investment decision. It is a significant system in that it relieves asymmetry (imbalance) of information within security market and protects investors by securing equity in securities transaction and encourages them to make a reasonable investment simultaneously.

According to Jo<sup>11</sup>, companies did not disclose patent application because they thought that they did not have to disclose their patents for the reason that they acquired patent rights]. One of the reasons why they do not disclose their acquired patents is that they interpreted the law arbitrarily, specifically, for the posting regulations of the patent disclosure 7. 2. 1 the case of acquisition of patent rights should be the case that may have a serious impact on corporate management, assets, etc. For this provision, they interpreted this way: you don't have to disclose if it may not have a serious impact on assets, etc.

In general, acquisition of patent for new materials or new technology or patent litigation sued or accused must be disclosed obligatorily. But research and development contents, receiving and giving of patent right, and technical importation and transfer are controlled under autonomous disclosure. From corporate perspective, companies did not apply for a patent but instead held their results because their information might be exposed to competitors if they disclose their corporate contents.

### 5. Conclusions

Innovation is an important driver for national economic growth and corporate competitiveness. Companies are making a lot of efforts for corporate growth and competitiveness through innovation. In addition, with the rapid development of technology and globalization, boundary is meaningless any longer for the market. This is why companies are investing a lot to research and development as a way to survive in this fierce competition. This study started with a simple questioning of the reason why companies apply for a patent and the reason why they do not so. Of course, companies apply for a patent to have their technology legally protected. But, from corporate strategic perspective, they cannot apply for a patent for various reasons.

As a result of analysis, their purpose for applying for a

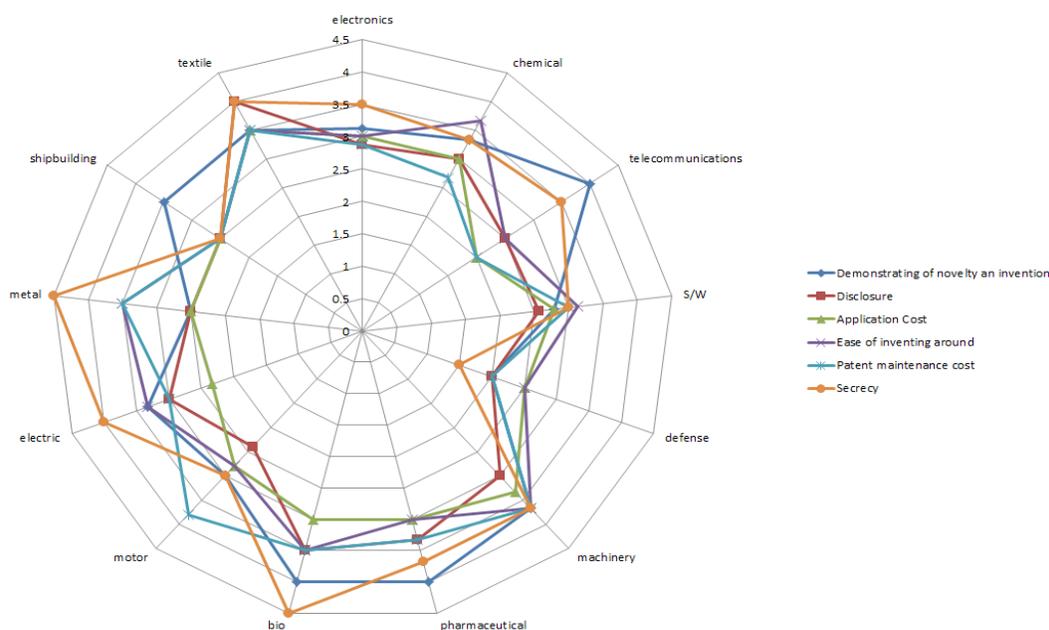


Figure 2. Not to Patent Radial Chart.

patent included prevention of action for infringement of action, prevention of competitor's activity, prevention of imitation, licensing importation, and performance indicator in order of importance and their purpose of not applying for a patent included keeping secrets, difficulty in proving that invention is novel, easy invention, patent maintenance cost, patent application cost, and corporate disclosure system in the order of importance.

The results of this study would be helpful for hands-on workers from the stage of R and D through that of application for a patent to that of establishing a knowledge property strategy. Previously, an application for a patent was considered just a defensive means, but in the future, as it should be recognized as an independent means, which would be able to provide guidelines for establishing strategic planning for the creation of profits through the patent. In addition, most existing studies focused on the purposes of the patent application while this study makes a practical contribution by figuring out the purposes of companies' application for a patent and not applying for one. However, despite these implications, the limitations of this study are as follows. This study conducted a survey centering around companies, but the number of them was relatively fewer, so it seems that it would be difficult to generalize the conclusions drawn from this study. Future research should expand the subjects of the questionnaire and add systematic methods and analysis methodologies.

## 6. Acknowledgment

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