

Patent Valuation by Crowdsourcing

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Abstract

There is a growing need to assess the value of patents, which represents intellectual properties in the age of knowledge economy. For instance, invigorating IP Finance assumes the assessment of patent values. Likewise, when business entities map out patent strategies, it is essential to assess the value of patents. In this context, this paper reviews a range of established methods of assessing the value of patents and proposes a method of assessing patent values using crowdsourcing taking the advantage of the internet era.

Keywords: Crowdsourcing, Patent, Patent Litigation, Patent Valuation

1. Introduction

In an age of knowledge-based economy, the importance of intellectual property utilization and management as a critical factor for the survival and competitiveness of businesses is increasing. Advanced countries and global firms are strengthening to have the initiatives on the basis of preoccupation and protection of competitive intellectual property. That is, patents play an important role in the management strategy establishment creating the wealth of nations and corporations.

Academics are paying attention to patent, which concludes business competitive power and studies on patent value have been done. Since the patent war between Glenn Curtiss and the Wright brothers, patent value evaluation has been on the rise. In 1906, the Wright brothers obtained a US patent (No. 821393) for wing-warping, which is part of flight control technology. The Wright brothers sued Glenn Curtiss's firm over the production and sales of aircraft using aileron technology in 1909. This case was the beginning of the patent dispute. The U.S. government intervened and closed the case in 1917 when this conflict was unresolved, at that time, the government gathered core patents in the patent pool and Manufacturers Aircraft Association (MAA) was formed. As long as aircraft manufacturers who belonged to MAA

paid a certain amount in royalties, they could use all patents in the patent pool.

Therefore, manufacturers gained the right to produce aircraft after they paid \$200 per aircraft. Before the government took measures, the Wright brothers asked manufacturers for 1,000 dollars (5% of production cost in those days) per aircraft. It was the biggest barrier to the development of the aircraft industry in the U.S. The royalty was divided among the Wright brothers (67.5 percent), Glenn Curtiss (20 percent), and MAA (12.5 percent). This distribution ratio of royalty was decided by evaluating the value of patents in the patent pool. In other words, reasonable evaluation of patent value is very important for a successful implementation of the patent pool^{1,2}.

Crowdsourcing is highlighted against the backdrop of increasing importance of IP-related patent value assessment. Crowdsourcing refers to partly opening corporate activities to the public so that consumers can get involved in the whole process of corporate activities, and sharing profits with participants once participants' contribution serves to raise corporate performance.

Crowdsourcing is a way of achieving innovation by sharing knowledge, which used to be accessible only by experts or insiders in certain industries, with the external world, and opening the process of product and service

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development to laymen or external experts so as to induce their participation for innovation. Internal experts or field specialists share and open their own resources and outcomes to collaborate with other experts in different fields or the public for research and development³.

This approach is beneficial for businesses in that they can get help from many external human resources without depending solely on limited internal resources. In the same vein, the approach is conducive to laymen participants because they can use better products and services or share profits through participation. In overseas countries, crowd-sourcing is used for patent proceedings or other patent-related cases. Currently, in Korea, such cases are hard to find with scholarly research being in its infancy.

In this study, we explored various patent value evaluation methods and proposed a patent value evaluation method using crowdsourcing appropriate to the Internet age⁴.

2. Patent Valuation

Assessing the value of a patent is challenging. In the same vein, objective assessment of absolute monetary values of patents is demanding. Still, assessment of patent values is dispensable in the era of knowledge economy. Therefore, however challenging it may be, the efforts to seek solutions cannot be discontinued. It should be noted that fairly objective assessment of patent values is viable in some ways. A few methods of patent value assessment are discussed below⁵.

2.1 Cost-based Method

This method estimates the value of a patent based on the cost spent on developing the given patented technology. It is used for tax accounting in practice but hardly used for rational decision making because it does not take into account any potential future returns. This method draws on market prices to estimate the value of a patent, mainly from two aspects.

First, the value of a patent is calculated considering the prices of comparable patents on the market. In June 2011, Nortel sold off about 6,000 patents Apple consortium (Apple, EMC, Ericsson, Microsoft, and Sony) at 4.5 billion dollars by auction. Their patents were different kinds of ICT (wireless, 4G, optical network, voice internet, and semiconductor). Apple consortium invested 2.6 billion dollars in their patents. Although Google had been interested in their patents, they failed to get them.

Apparently encouraged by their rival Apple's investments, Google acquired Motorola Mobility Holdings Inc. at 12.5 billion dollars in August 2011. At that time, Motorola was failing to respond to the smart phone boom and was insufficiently competitive in the cellular phone manufacturer's market. Nevertheless, Google acquired Motorola at 40 dollars per share, including 60% premium of a stock price. Google tried to brace for the patent war through 17,000 patents of Motorola. Surprisingly, the patent price of both Nortel and Motorola were the same. The price was 70 million dollars per patent in the case of Nortel, 73.5 million dollars in the case of Motorola. The difference in price was only 2 percent.

2.2 Market-based Method

The value of corporate IP is calculated. To be specific, the values of intangible assets are yielded by subtracting tangible assets from corporate market capitalization. An intangible asset is comprised of IP (Intellectual Property) and good will of customers. When we take IP (trademark right, copyright, and trade secret) and financial value of good will from the value of the intangible asset, we can calculate the whole value of patents. This is the market-based method. But the biggest problem with this method is that it is hard to work out the value of IP.

Also, the total market value can fluctuate quite sharply. It can be lifted from 25 dollars to 40 dollars (about 60% increase) in one day. Considering this, many people may raise a question whether the total market value reflects the real value of IP. In spite of these problems, given that we can calculate the value of IP approximately on the basis of stock price formed in the market, reflecting the wisdom of crowds, this method has a high level of objectivity.

2.3 Crowdsourcing-based Method

Crowdsourcing is "to gather and utilize information and ideas from much of the public over the internet". In 2004, the concept was introduced in the book "The Wisdom of Crowds: Why the Many are Smarter than the Few and How Collective Wisdom Shapes Businesses, Economies, Societies, and Nations", which was written by James Surowiecki.

It is not easy to find scholarly research on the assessment of patent values based on crowd-sourcing. To the best of my knowledge, there are not confirmed cases of using crowd-sourcing to assess the value of a patent. The case of Article One Partners shows crowd-sourcing serves multiple purposes including patent validation⁶. In that whether a patent is valid or not exerts critical

effects on its value, current crowd-sourcing has already but indirectly played significant roles in patent value assessment. Furthermore, it seems highly feasible to broaden and advance services to the extent that patent-related crowd-sourcing sites can directly assess the value of patents.

The reason crowdsourcing is appropriate to the evaluation of patent value is as follows. First of all, it is impossible that a few of experts in their field evaluate countless patents offline. Second, it can be done relatively cheaply, quickly, and correctly by many of experts through crowdsourcing.

3. The Case of Crowdsourcing

The Internet diffusion makes crowdsourcing easier, and crowdsourcing is being used actually against a patent attack. For example, Philips is using the website “Article One Partners” to resist the attacks of patent trolls⁶.

3.1 Patent Litigation

More than three thousands of people (as of July 2015) pick holes in related patent and verify its validity. If a firm is sued for the infringement of the patent, it brings a case

to the website. A member of Article One Partners found another LED related patent ahead of the patent in 2012 when Philips was under threat of legal conflict because of LED patent. They produced it in evidence and successfully repelled the attack from patent trolls. The price paid for the service did not exceed 10 thousand dollars. Given that the usual patent suit costs several million dollars, this expense came at a very cheap price³.

Until now, Article One Partners gave a total of 6,558,832 dollars to researchers (among 30,000 researchers) for their ideas. Firms such as Sony, Philips, Microsoft, Application Developers Alliance, and Fox Rothschild are their customers⁶.

IT companies set aside a large budget (at least, 2 million dollars) to prepare for patent attacks. Also, the number of patent lawsuits is greatly increasing. In the U.S., the number of patent lawsuits increased threefold from 1991 to 2011 and exceeded 1,000 cases. In this situation, Article One Partners seized a good business opportunity. People who belong to this group are engineered, scientists, and retired patent attorneys and their reward for success ranges from three thousand dollars to five thousand dollars. Philips asked the site to verify just 33 patents in 2012 and these figures increased about three times compared to 2011.



Figure 1. Crowdsourcing sites (Article One Partners).

3.2 Patent Verification

Microsoft and Sony are using Article One, Patexia, and Ask Patent as patent validity verification websites. Their purpose of use is to prepare for patent attacks and search whether new products they have created has a probability to infringing a patent or not, and verify patents of their competitors before they make the license contract and so on.

At first, Article One Partners filter out the data that hundreds of members submitted to verify the validity of patents by the automation algorithm. Then, staff members filter out the remainder by hand. It is time-consuming work that members distinguish hundreds of verification results by hand. Thus, the process of automation using algorithm is essential to the reduction of time and cost.

3.3 Patent Acquisition

The crowdsourcing helped to provide the client with several companies to contact for growing their patent assets. A company in the technology sector came to Article One for guidance with their patent portfolio. For years, the company had not been focused on their patent assets. While the company already had a few patents in their existing portfolio, they were now looking to grow aggressively their assets. They were specifically searching for patents within a particular technology area, instead of conducting research on a defined patent; the submissions were limited to accept only patent literature.

Over the course of the five-week, researchers from the Article One crowd submitted a variety of patent literature references. Researchers identified new key words for the search, in addition to seeking unobvious patents and locating previously undiscovered patent references. The Article One crowd helped the company to filter the submissions, selecting the highest quality results to pursue.

That was very successful. From the submissions, the client was able to determine 70 clients that had not been previously identified. Once the patent submissions were assessed, some patents were found to be on point with what the company was looking to acquire for their portfolio growth. They are now communicating with a short list of five companies. They are negotiating possible acquisitions for the patents uncovered by Article One's researchers and are moving forward to successfully strengthen the assets in their patent portfolio.

3.4 Outbound Licence

The crowdsourcing helps to provide the client with a

better understanding of their patents before entering into licensing negotiations. A company in the healthcare and consumer goods area was seeking to monetize some their patents via licensing to third parties. To develop clear insight and confidence in the quality of the subject patents, the company sought to examine them through a examination of prior art. The company wanted to ensure that the prior art research on their IP was conducted privately and confidentially.

The research was only displayed to a few select experts from the Article One crowd who had proven their skill in the subject technology area. The company requested that the research be run as a typical invalidation study with the goal of uncovering as much information as possible. The company would be better prepared to address any potential arguments that licensees could use as they engaged in negotiations over the patents.

The research uncovered some references, each of which was assessed by the experts in terms of its relevance to the patent claims as they understood them. As a result, they were able to use the information to help create their own internal ranking of patent strength. Because of the confidence developed from the prior art references uncovered by Article One Partners, the company was able to successfully negotiate a multi-billion dollar deal.

3.5 Pre-litigation

A patent assertion is filed against a company in the electronics area. An entire family of patents, including a number of claims and pending applications, is directed at a specific product of them. In a pre-litigation setting, they partnered with Article One Partners to launch a crowdsourcing-based research.

The collection grew as researchers around the world submitted references and translated the relevant sections of non-English documents into English.

As a result, the value of the asserted patents, originally a worrisome threat to the company, began to significantly diminish. The Article One Partners collection of prior art included over 100 relevant non-patent literature references, more than 50 relevant non-English references, and five novelty-destroying references.

4. Patent Valuation using Crowdsourcing

There are many methodologies for patent value evaluation. We explored some kinds of methodologies for value

evaluation of patent as described above. The necessity of it is persistently increasing. Precise calculation and evaluation of a patent is not easy. Depending on whether patents are separate from each other or patent belong to the patent portfolio even if patents are the same, patent value can be evaluated differently.

Also, depending on the date of value evaluation and competitive composition in the industry, patent value varies considerably. Given this, value evaluation of patent is very difficult and delicate. However, because patent value evaluation is inevitable in an age of knowledge-based economy, we should try to solve these problems consistently.

We thought that crowdsourcing is the most reasonable option among various methodologies for evaluation of patent value. First, we can use the wisdom of many experts in the patent industry. Next, it will save time and cost over the Internet. In reality, it is impossible to bring a lot of experts in one place at the same time. But once the system has been established, it is possible to gather experts into the system.

reasonable license fee in case of CDMA patent No. 1) and then provide the person who estimated the value closest to the average with financial incentives⁴.

As above, crowdsourcing is the most realistic method to assemble the competencies of many experts in one place. There are prerequisites for a successful implementation of patent value evaluation on the basis of the crowdsourcing method.

First, a filtering algorithm is very important to the crowdsourcing system. For example, it is impossible to investigate all opinions suggested by 3,000 experts. An algorithm to filter out the initial 3,000 ideas is needed.

Second, templates to suggest ideas should be agreed upon. If anybody can suggest ideas without a mutually agreed template, the system is utterly useless. The novelty (is there any prior arts or is it published in an academic paper?) and the inventive step (is this patent invalid?) should be described in the template asking experts to suggest a solution through the system.

Third, the proper incentive is very important to the system. If the experts cannot receive a proper reward, they

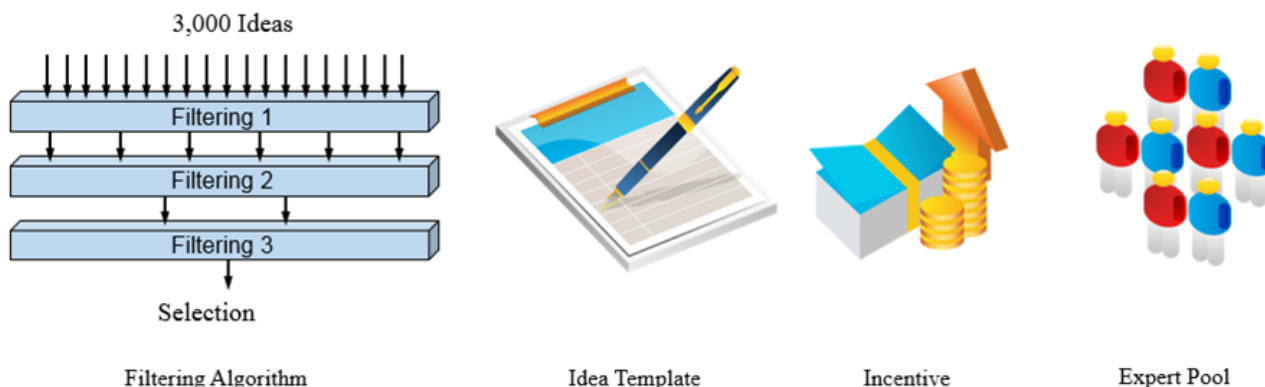


Figure 2. Crowdsourcing Activation Plan.

Practical ways to utilize crowdsourcing for patent value evaluation are as follows.

First, drive experts to estimate a reasonable price on a patent and then provide the person who estimated the value closest to the average with financial incentives. Second, drive experts to investigate the patent infringement, prior art, and patent invalidation when facing a patent lawsuit, then provide the person who critically contributed to the investigation with financial incentives. Third, when licensing a patent, drive experts to estimate a reasonable license fee (for example, one can estimate 5.25\$ as a

may not provide good ideas for the system. For instance, if an expert offered the critical idea to invalidate the related patent in the lawsuit, and the firm won the case, thanks to the idea, the firm can provide the expert with 1 percent of the average cost needed for normal patent litigation.

Fourth, of course composition of the expert pool is also important. It is essential to seek the proper way to assemble many experts into one pool. The criterion to fragment patent related field researcher (scholar, developer, and graduate student), patent attorney, and specialist in patent value evaluation, industry expert, and the lawyer needs to be established.

5. Conclusion

This paper examined the established assessment methods and suggested crowdsourcing could be a very viable and effective approach to the assessment of patent values because in crowd-sourcing the insights of patent experts in a range of fields are available whilst at the same time its internet-based operation helps save time and cost. As in the patent disputes between Apple and Samsung, patents have incremental influence on corporate and national competitiveness.

Thus, business entities should set up relevant patent strategies, while governments should support enterprises with policies conducive to enhancing corporate competitiveness. For national economic growth, resources and investment should be properly distributed among enterprises producing innovative products with high potential for market success. To that end, IP finance need be vitalized.

However, IP finance is not feasible without a well-formulated assessment of patent values. Crowd-sourcing seems to be a viable approach nurturing the convergence of multiple experts' competencies at the assessment of patent values. To ensure a crowd-sourcing system proves to be successful in assessing patent values, extensive research on filtering algorithms and incentive structures is required.

As is the case with Article One Partners, Microsoft, and Sony, crowdsourcing has been used for various purposes including patent validity verification. These cases will increase. Although crowdsourcing is still not a general method, its probability is good enough. It is a useful means to collect the wisdom of many experts and has the potential to expand its realm to patent value evaluation.

Recently in the U.S., GE, and Red Hat have been investing in academic pilot projects to evaluate a quality of patent by using crowdsourcing. The group comprised of 27,000 patent experts connected with Article One Partners is the competitive advantage of Article One Partners. Also, it is America's competitiveness in an age of knowledge-based economy. It is expected that South Korea, including China, Japan, and Europe, will bring up IP expert groups through crowdsourcing against a patent dispute.

The implications of this paper are as follows. First, the patent value evaluation method using crowdsourcing can be utilized to secure national competitiveness and protect its companies at the national level, not firm level. In particular, South Korea is vulnerable to the patent attack because they do not have source technology. Patent value evaluation may play an important role for them.

Second, the patent value evaluation utilizing crowdsourcing can boost IP Finance at the national level and help to create a guideline for patent management strategy at the company level. Apart from patent litigation, the patent value evaluation contributes to making the strategy of defense against patent trolls and patent trade, license.

The present study has two limitations. First, expert investigation and statistical analysis on the necessity and importance of methodology for the patent value evaluation are still not carried out. Second, an empirical verification of the patent value evaluation method utilizing crowdsourcing presented in this study is needed.

In future studies, we will investigate the importance of methodologies for the patent value evaluation and determine weighted value of its factors through in-depth interviews and statistical analysis.

6. Acknowledgment

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