Patent Law Design in the "Open Innovation" Era

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1. Introduction

Recently, there have been discussions within both industry and academic circles that the traditional view of patent rights as exclusive rights needs to be modified in light of the newly recognized phenomenon of "open innovation". In this article, I discuss what is meant by the term "open innovation" by employing industry examples and examining whether and how the patent system is able to accommodate open innovation.

The term "open innovation" became well-known following the publication of a book by Henry Chesbrough, a famous business management scholar, who defined it as the situation where "companies ... make much greater use of external ideas and technologies in their own business, while letting their unused ideas be used by other companies".[1] In contrast, the term "closed innovation" refers to the situation where companies and individuals only make use of their own internal ideas and technologies, and do not allow others to use them.

While it is generally recognized that both types of innovations, *i.e.* closed innovation and open innovation, are utilized by industry and are necessary for technological development, some advocate the need for a general shift in intellectual property policy "from pro-patent to pro-innovation".[2] Previously, under the policy for an IP-oriented country,

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[1] HENRY CHESBROUGH, OPEN BUSINESS MODELS xiii (Harvard Business Press 2006).

[2] *See* Nobuhiro Nakayama, *Chitekizaisanrikkoku no saranaru Hatten wo mezashite*, 1405 JURIST 11 (2010).

also known as the "pro-patent policy", or even before the implementation of this policy, it was thought that a pro-patent regime was necessary to strengthen the Japanese intellectual property system.[3] On the other hand, the new "pro-innovation" theory suggests that, in some cases, patent rights should be strengthened but in others, weakened to encourage innovation.

For example, some suggest that as companies often collaborate with third parties in the development of new inventions (as it is typically seen in business-academia partnerships), it would be better, in some cases, to limit the right to claim injunctions in cases of patent infringement in order to promote such collaboration. In terms of the Japanese patent system which is based on the idea of "closed innovation", they also suggest that the system needs to become more flexible in order to accommodate the possibility of joint ownership of patents with third parties.[4]

Under the current system, if a patent right is owned jointly, each owner is allowed to work the patented invention without consent of the other joint owners pursuant to Article 73 (2) of the Japanese Patent Act. This provision provides that if a patent right is owned jointly by a group of companies, each company may work the patented invention without permission from the other group companies. On the other hand, Article 72 (3) of the Patent Act stipulates that if a patent is jointly owned, no joint owner is allowed to grant an exclusive or non-exclusive license of the patent right. Accordingly, consent of the other joint owners is required for a specific joint owner to grant third parties a license to work the patented invention. This demonstrates that the Japanese system is oriented toward closed innovation. For the sake of open innovation, it is conventionally proposed that the system should be modified to cover cases of joint ownership either by allowing each joint owner to have third parties work the patented inventions without the consent of other joint

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[3] *See* Hisamitsu Arai, *Chizairikkoku wo zehi Zitsugen shiyou*, *in* CHIZAIRIKKOKU NO MICHI 6–7 (Naikakukanbou Chitekizaisansenryaku Suishinjimukyoku ed., Gyousei 2003).

[4] *See* Ichiro Nakayama and Yuko Harayama, *Open Innovation to Chitekizaisan*, 46 TOKKYO KENKYU 12 (2008).

owners or by limiting each joint owner's exclusive right under Article 73 (3) of the Patent Act to the right to receive license fees.

Although this proposal has some merits, it is only a very superficial solution to an otherwise, complex problem. Open innovation is a multifarious phenomenon. It takes different forms depending upon the industry in which it occurs. In this Article, I will identify and discuss the main forms or types of "open innovation" in light of industry examples. Then, I will consider whether the patent system is able, in its current form, to accommodate open innovation and if not, how it can be reformed so that it can do so.

2. Three Types of Open Innovation

1) Overview

Open innovation takes different forms depending upon the industry in which it is found. Open innovation can be divided into three forms. The first of these is the integral type in which companies within the same industry but at different positions in the supply chain work together on the development of new innovations, as it occurs in sub-contracting arrangements. The second is the independent type where completely independent companies utilize each others' innovations. The third and final type is that of modularization where inventions are standardized across a particular industry. Each of these types of open innovation will be discussed in turn in the context of an industry example in the following analysis.

2) Integral Open Innovation

A prime example of integral open innovation can be seen in the automotive industry, where subcontracting is common. In such contractual arrangements, subcontractors (parts manufacturers) manufacture parts which are ultimately used by other manufacturers in the production of a finished product. Often, the design for such parts is developed and pro-

vided by the final product manufacturer so that the subcontractor's contribution is limited to the manufacturing process. However, in some cases, the subcontractors not only manufacture the parts but are also engaged, by the final product manufacturers, in designing and developing new parts. Such engagement entitles the parts manufacturers to a greater proportion of the profit made in the sale of the final product than they would otherwise get, were their role limited to manufacture.

It is generally understood that this subcontracting of the design process to the parts manufacturers has resulted in technical innovation, increased efficiency and a shortening of the product model cycle in the automotive industry due to the sharing of both risk and returns. For example, the parts manufacturer not only has a more efficient wage structure, but it is also able to easily adjust production in response to changes in market demand, allowing the system, as a whole, to respond quickly to changes in the economy.[5]

Despite falling within Chesbrough's definition of "open innovation", subcontracting is not the clearest example of open innovation. This is because, in a subcontracting arrangement, the subcontractor's technologies are dedicated solely to meeting the needs of the final product manufacturer, particularly in the case of the automotive industry. In other words, unless the parts are standardized so that they can be used by more than one contractor (an example in the automotive industry would be where two different car manufacturers, such as Toyota and Nissan, can make use of the same part), the parts designed and manufactured by a particular subcontractor are only of use to a particular contractor or even only in a particular model produced by that contractor. In turn, this breeds a relationship of mutual dependence between the contractors and their subcontractors.[6]

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[5] *See* Banri Asanuma, *Chousei to Kakushinteki Tekiou no Mechanism*, *in* NIHON NO KIGYOU SYSTEM 4: KIGYOU TO SHIJOU 69-72 (Hiroyuki Itami et al. eds., Yuhikaku 1993).

[6] *See* Takahiro Fujimoto, *Nihongata Supplier System to Moduleka: Jidousha Sangyou wo Jirei toshite*, *in* MODULEKA: ATARASHII SANGYOU ARCHITECTURE NO HONSHITSU 169-74 (Masahiko Aoki and Haruhiko Ando eds., Toyo Keizai 2002).

This dependence has serious implications for the patent system. Both parties need to enter into transactions with each other regardless of whether the subcontractors are able to patent their designs. Therefore, as long as both parties are mutually dependent, integral open innovation will continue and as such, does not require any reform to the patent system.

On a side note, there may be an industrial relations problem that subcontractors may have less bargaining power compared with the original contractors. However, this is irrelevant to whether or not subcontractors should hold patents, and cannot form the grounds for granting patent rights to subcontractors. It is preferable to correct those problems by using other currently available legislative measures (for example, by applying the Antimonopoly Act or the Subcontract Act (the Act against Delay in the Payment of Subcontract Proceeds, etc. to Subcontractors)) rather than by reforming the patent system.

3) Independent Open Innovation

(i) Open Innovation in the Biotechnology Industry

The term "independent open innovation" refers to the situation where external, totally independent companies enter into contracts with each other despite the possibility of entering into contracts with various third parties. A good example of independent open innovation is the current state in the biotechnology industry focusing on the development of new drugs.

In the early 1990s, biotechnology focused mainly on isolating DNAs and new proteins, and the only difference between these patents and existing ones was their subject matter. However, with the development of human genome analysis, which enabled protein analysis at the molecular level, and the significant progress made in a branch of information engineering called bioinformatics, biotechnology companies have been able to develop new drugs comprising of low-molecular compounds. This has given rise to an area of research known as genomic drug discovery and of the new types of patents, now called as "the second-generation

bio-patents", which cover inventions relating to screening technologies and functional medical use inventions. The characteristic of this era of second-generation bio-patents is open innovation.[7]

(ii) Separation of Roles between the Upstream and Downstream Sectors

In a system of closed innovation, ideas are conceived, embodied and developed into a product within a single company. For example, in the traditional drug development industry, before genomic drug discovery became available, the major pharmaceutical companies researched, produced and marketed new drugs, which were, after a period of time, manufactured and sold under generic-branding by other manufacturers.

However, in the 1980s, following genomic drug discovery, venture companies, such as those spinning out from universities, often appeared in business-academia partnerships. These companies are collectively referred to as the "pstream sector". The main role of the upstream sector is to identify target genes (genes which have been identified as indicators of certain diseases) by utilizing DNA technologies or biotechnologies and to screen for lead compounds which may prevent protein expression of such genes. The major pharmaceutical companies then use this information to develop drugs which can be used in the treatment of diseases. In this way, research and development in the biotechnology drug industry is now characterized by two groups of entities with their own distinctive and separate roles: the venture companies in the upstream sector and the pharmaceutical companies in the downstream sector.[8]

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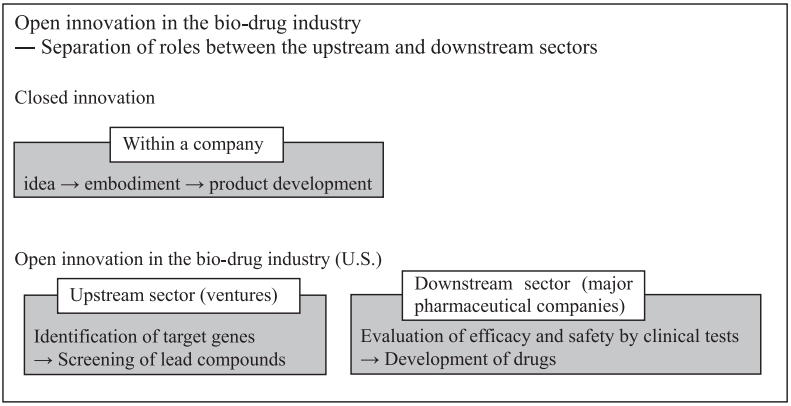
[7] *See* Hatsushi Shimizu, *Daini Sedai Bio Tokkyo ga motomeru Chitekizaisan Mind*, 2001-10 GIJUTSU TO KEIZAI 41-42 (2001).

[8] *See* Rebecca S. Eisenberg, *Bargaining over the Transfer of Proprietary Research Tools: Is This Market Failing or Emerging?*, *in* EXPANDING THE BOUNDARIES OF INTELLECTUAL PROPERTY: INNOVATION POLICY FOR THE KNOWLEDGE SOCIETY 227 (Rochelle Dreyfuss *et al.* eds., Oxford University Press 2001); Hatsushi Shimizu, *Souyaku Sangyou no Kasseika to Chitekizaisanken*, 23 ANN. INDUS. PROP. L. 144-47 (2000).



(iii) Cause of Separating the Roles in the R&D Process in the Biotechnology Industry

While the reason for this separation of roles in the R&D process in the biotechnology industry is not known for certain, there are a number of possible explanations. One such explanation may lie in the difference between the parties' risk preferences. Fundamental research undertaken in the upstream sector is commonly associated with relatively high risks, because it is habitually based on trials and errors and may yield no results. Such risk can be better handled by the venture firms in the upstream sector than by the pharmaceutical companies in the downstream sector. Conversely, major pharmaceutical companies, who are profit-motivated, tend to be more risk averse, and thus, are better suited to downstream research which utilizes the successes of upstream research. Therefore, this separation of roles allows the sectors to specialize in the area of research to which they are most suited, allowing for the efficient allocation of risk.[9]

Another reason for the division may be differences in the type of research undertaken by the respective sectors, *i.e.* knowledge-based re-

[9] *See* Hiroyuki Odagiri, *Iyakukenkyukaihatsu niokeru "Kigyou no Kyoukai"*, *in* IYAKUHIN SANGYOU SOSHIKI RON 134 (Tsuruhiko Nanbu ed., University of Tokyo Press 2002).

search versus investment-based research. While venture firms gather and utilize the knowledge and intelligence which results from research conducted at universities and the like, major pharmaceutical companies focus on research which requires considerable financial resources such as clinical trials. This difference in the types of research is attributable to difference in the characters of their organization.[10]

The division may also be attributable to an information gap, which has historically existed, between the institutions conducting the primary research, such as the universities and research institutes, on the one side, and the major pharmaceutical companies on the other. The venture companies are able to bridge this gap by facilitating the dispersion of knowledge and news of recent discoveries across the industry and thus to increase the likelihood of innovation.[11]

Whatever the actual reason for the separation of the R&D process into the upstream and downstream sectors is, it has occurred naturally as a result of market forces. Therefore, it has given rise to a particularly efficient system which should be supported by the patent system. In the next section, I will examine how well the current patent system is able to do so and whether any reform of the patent system is necessary.

(iv) Appropriate Patenting in the Biotechnology Industry

From the conventional view of the Japanese Patent Act, it may be desirable to grant patents only after a specific use for the compound has been identified and a saleable product has been developed. The development of drugs entails a long and costly process composed of identification of target genes, screening for lead compounds, generation of a pool of candidate compounds, and conducting of clinical trials to see if selected compounds are able to be utilized as drugs. If a single company undertakes this entire process as it occurs in a system of closed innovation,

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[10] *See* Shimizu, *supra* note 8, at 145-46; HIROYUKI ODAGIRI, BIOTECHNOLOGY NO KEIZAIGAKU: "EKKYOU SURU BIO" NO TAMENO SEIDO TO SENRYAKU 162, 228 (Toyo Keizai 2006).

[11] *See* ODAGIRI, *supra* note 10, at 162-63.

some may argue that patent rights should be granted only at the later stages of the process so as to promote competition among competitors and to drive innovation. Having said that, it is necessary to acknowledge that there is a trade-off between encouraging competition in order to achieve innovation and to avoid redundant investment.

The biotechnology industry can thus be best described by Merges and Nelson's theory of cumulative innovation which allows for patent protection in the upstream sector.[12] If patent rights are not granted until the industrial applicability of the innovation has been identified by the downstream sector, the innovations made in the upstream sector are left unprotected. This does not mean that ventures in the upstream sector are unable to obtain any benefit from their contribution to the R&D process. Not only may venture firms gain some protection from trade secrets, they may, via the inclusion of specific clauses in their contracts with the pharmaceutical companies in the downstream sector, also be entitled to a proportion of the royalties which result from the future successful patenting of innovations in the downstream sector.

However, whether a patent right is eventually granted or not in the downstream sector depends upon a variety of factors which are outside the control of the upstream sector.[13] Accordingly, if the cumulative innovation theory is applied and inventions are patentable in the upstream sector as well, venture firms will not be dependent upon the downstream sector in order to benefit from their contributions to the R&D process.

Based on the above, the optimal solution, where there are two distinct upstream and downstream sectors, would be to grant patent rights to the upstream sector where their innovation is capable of being traded with the downstream sector.[14] An innovation is only tradable where it is capable of being used for a specific purpose. If firms in the upstream sector are not able to obtain patents for their innovations, it is likely that

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[12] *See* Robert P. Merges and Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 909-16 (1990).

[13] *See* Arti K. Rai, *Fostering Cumulative Innovation in the Biopharmaceutical Industry: The Role of Patents and Antitrust*, 16 BERKELEY TECH. L.J. 813, 822 (2001).

[14] *See id*. at 823-24 and 828-31.

the patent system will inhibit the effective functioning of the upstream and downstream sectors and thus will constrain innovation in the biotechnology industry. From the view of the role-sharing between market and law, the law needs to protect what is being traded in the market.

(v) Problems Regarding Patent Enforcement in the Biotechnology Industry

Enforceability of so-called "research tool patents" has recently become a controversial issue. The term "research tool patents" refer to the patents which are owned by the upstream sector and, as the name suggests, protect technologies which are of general use in the identification, development and so on, of new compounds and drugs, such as patents of screening techniques.[15] As a result, there are likely to be numerous companies in the downstream sector interested in obtaining a license for the patent owned by the upstream sector.

In respect of these patents, the division between the two sectors is of particular benefit to the upstream sector. As the firms in the respective sectors are involved in different stages of the R&D process and in particular as the venture firms do not utilize the patents of the downstream sector, the venture firms are immune from retaliation by the downstream sector. For example, in the consumer electronics industry, where there is no such division, major manufacturers voluntarily refrain from excessive enforcement of their patent rights where there has been an infringement by another major manufacturer in order to avoid any possible retaliation. However, where there is a separation in the R&D process, retaliation is not an issue. Instead, the ventures, as owners of the research tool patents, actually have an advantage over the downstream sector which may be of benefit to them in licensing negotiations.[16]

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[15] *See* INSTITUTE OF INTELLECTUAL PROPERTY, CHITEKIZAISAN NO ENKATSU NA RIYOU NI KAKARU SHOMONDAI NI KANSURU CHOUSAKENKYU HOUKOKUSHO: "SHIKEN MATAHA KENKYU" NO REIGAI NITSUITE 7 (Institute of Intellectual Property 2004).

[16] *See* ODAGIRI, *supra* note 10, at 138.

Another problem arises from the fact that the biotechnology industry entails substantial relation-specific investments (sunk costs). Once the licensees have invested a certain amount, they are effectively locked into using the particular technology and thus into paying for the use of the patent. In turn, this may encourage opportunistic behavior on the side of patent-holders who may demand that the licensee pay higher royalties (the so-called "hold-up" problem).[17] This is particularly problematic when the patents are of general use and therefore the patent-holders have a large pool of potential licensees whom they can approach. This may give rise to another problem which is called the "patent troll" problem. The term "patent trolls" refers to patent holders who aggressively and excessively enforce their rights against infringers. The word "troll" has its origin in the Western folktales and refers to a mythical creature which guards crossings and bridges, and demands payment from travelers before allowing them safe passage.

However, while the tactics, such as "patent ambushing", are not uncommon, it is only a problem where the patent holder has greater bargaining power than any of her potential licensees for the reasons discussed above. In such cases, patentees are able to earn high license fees through strategic or opportunistic behavior. The upshot is that companies may refrain from making relation-specific investments which will, in turn, constrain innovation.

As research tools are essential to innovation, it is important that the patent system is able to provide for the granting of patent rights for research tools which take into account the separation between the upstream and downstream sectors so as to avoid the problem of patent trolls.

Note that the exemption from exclusivity of patented inventions used for experimental or research purposes under Article 69 (1) of the Japanese Patent Act is narrowly interpreted and as such, it cannot be applied to research tools. Article 69 (1) reads as follows: "A patent right shall not be effective against the working of the patented invention for experimental or research purposes". It is generally understood that a

[17] *See* Yoshiyuki Tamura, *Shijou to Soshiki to Hou womeguru Ichikousatsu*, *in* YOSHIYUKI TAMURA, SHIJOU, JIYU, CHITEKIZAISAN 16-20 (Yuhikaku 2003).

patent right is not enforceable against the working of a patented invention for experiment or research of the relevant patented invention itself, and this provision does not therefore cover cases where the relevant patent is used for other inventions.[18]

The reason for this narrow interpretation is that if Article 69 is interpreted to allow free use of any invention relating to, say, measuring instruments when the use is intended for experimental or research purposes, enforcement becomes virtually impossible. As a result, inventions for measuring, experimental or research purposes would, in effect, be unable to obtain any patent protection. However, Article 69 is not written so as to deny patentability. Rather, it is understood that Article 69 only allows research on inventions relating to such measuring instruments (such as the improvement of the measuring instruments, and the experiments or research on patent invalidation grounds of the measuring instruments). Consequently, Article 69 can be interpreted in a different way if the proper duration of exclusivity under patent rights needs to be considered.[19]

In short, as far as post-grant enforcement of patents is concerned, it is reasonable to expect post-grant assessment by courts, rather than pre-grant assessment by the Japan Patent Office (JPO). It is therefore desirable to modify the patent system so as to limit the right to claim injunctions and to assess such claims on a case by case basis.

4) Open Innovation by Modularization

(i) Open Innovation in the IT Industry

The third and final type of open innovation is innovation by modularization, which is also a kind of independent form of innovation. The IT industry is a prime example of modularization. The IT industry is unique in that it utilizes a multitude of technologies and many patents in

[18] *See* YOSHIYUKI TAMURA, CHITEKIZAISANHOU 294-95 (5th ed., Yuhikaku 2010).
[19] Supreme Court, April 16, 1999, Minshu, Vol. 53, No. 4, p. 627 [Foipan Tablets Case].

the development of a single product.[20] As a result of digitization and printing technologies which are used in the production of semiconductor chips, it is not uncommon for as many as 500 to 1,000, or recently even 10,000 patents, to be used in the development of a single standardized technology.

The current patent system is, however, unsuited to this type of cumulative innovation as it is based on the British patent system of the 17th century, which assumed one patent for each product. Therefore, with more and more patents being utilized in the development of new products, the tragedy of the anticommons[21] becomes increasingly apparent. As a result, innovation in the IT industry is being constrained.

In order to deal with the anticommons problem, standard-setting organizations have attempted not only to standardize technologies but also to achieve network externalities (also known as the network effect). Such practices do not only make use of the products more convenient, but also reduce the risk borne by businesses, by ensuring the compatibility between products and systems, and the ready availability of replacements. As a condition for participation in the standardization process, the standard-setting organizations require their members to declare and grant licenses for all of their patents and any technologies, which may be patentable, under the reasonable and non-discriminatory (RAND) terms and conditions.

Yet, the RAND licensing obligation is unable to completely solve the anticommons problem for two reasons. Firstly, companies tend to overvalue their own technologies. Secondly, they may act strategically in order to minimize the impact of such obligations. Instead, it is often suggested that it is better to adopt a ceiling clause in the license agreement which would cap the license fees that can be charged by patent holders, *e.g.*, not allowing license fees to amount to a sum which would be greater than, say, 20% of the total product price.

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[20] *See* Mark A. Lemley, *Ten Things to Do about Patent Holdup of Standards (And One Not To)*, 47 B.C. L. REV. 149 (2007).

[21] *See* Michael A. Heller and Rebecca S. Eisenberg, *Can Patents Stifle Innovation?: The Anticommons in Biomedical Research*, 280 SCI. 698 (1998).

Nevertheless, even if the RAND, ceiling or other conceptually-similar clauses in the license agreements work to properly control enforcement of patent rights by companies participating in standardization, there will always be companies which will not participate and will continue to enforce their patent rights. This may result in an acceleration of the hold-up problem.

Further, once technical standards have been agreed, substantial relation-specific investments are made in order to prepare production lines and to develop standardized products. If a patent right is enforced following such activities, the alleged infringer will probably be forced to pay high license fees to the patent holder in order to avoid an injunction. It is also important to recognize that because this is achieved through a settlement, the true extent of this problem within industry is not known. In fact, in respect of known cases involving the hold-up or patent troll problem, there are only a few cases from the United States and no case from Japan.

These problems are more exacerbated if the relationship between the licensors and licensees is unequal, as already mentioned. With a rise in the number of companies in the IT and other industries who do not themselves manufacture the patented products and license patents as their primary business, the problem of patent trolls is increased because such companies have no incentive to cross-license or to fear retaliation.

Despite these problems, some commentators in the U.S. argue that patent trolls are not all bad, particularly in industries, such as the IT industry, where innovations may be made by individual inventors, small ventures and other persons, without the need to make large investments in equipment and experimentation.[22] While these small entities may be unable to enforce their patent rights by themselves due to the cost of initiating legal proceedings, or because of a lack of legal expertise, patent-

[22] *See* James F. McDonough III, *Note, The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy*, 56 EMORY L.J. 189, 210, 213 (2006); Gerard N. Magliocca, *Blackberries and Barnyards: Patent Trolls and the Perils of Innovation*, 82 NOTRE DAME L. REV. 1809, 1810 (2007).

troll companies, who have access both to money and legal advice, can purchase and then can enforce these patents in the case of infringements.

However, the royalties to be paid for use of these patented inventions are often excessively high, not because of the technical merit of the patent, but for the reasons mentioned above. Firstly, the licensees are locked into using the technology as a result of large relation-specific investments.[23] Secondly, the effect of network externalities results in a large number of users.[24] In turn, this over-incentivizes companies to patent excessively.

(ii) Measures against Patent Trolls in the IT Industry: Limitation on the Right to Claim an Injunction

The above discussion illustrates that measures need to be taken against patent trolls in the IT industry. One such measure may be to limit the patent holders' rights to claim an injunction and instead, only to award damages. In the U.S., the Supreme Court gave a revolutionary judgment in the *eBay* case in 2006[25] in which it stated that an injunction should not automatically be issued in response to a finding of patent infringement. Following this decision, injunctions are not necessarily granted where there has been an infringement of a patent right. While previously injunctions were granted almost without exception, they are now only granted in about 73% of cases where patent infringement is found.[26]

What about Japan? In Japan, there is a deep-set sense of discomfort against flexible approaches to injunctions such as the one presented by the *eBay* case. A lawmaking solution, which tried to limit the availabil-

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[23] *See* DAN L. BURK AND MARK A. LEMLEY, THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT 25 (The University Chicago Press 2009).

[24] *See* Noboru Kawahama, *Syber Kukan niokeru Chitekizaisanken to Dokusenkinshihou: Essential Facility Riron wo Chushin ni*, 215 TOKUGIKON 28 (2001).

[25] *eBay Inc. v. Merc Exchange, L.L.C.*, 547 U.S. 388 (2006).

[26] University of Houston Law Center, *Post-eBay Permanent Injunction Rulings By District Courts – to 5/26/2013*, *available at* http://www.patstats.org/Patstats2.html (last visited Dec. 15, 2013).

ity of injunctions in recent years, has failed in 2011.[27] As for the judiciary, although the decision of the Naha District Court adjudicated on September 24, 2008 (Shuri-Castle Case) expressed an opinion very similar to the *eBay* ruling in the copyright infringement suit, it is a very exceptional case and no similar court decision has been reported since then.[28]

However, the traditional view that patent rights are a form of property rights and thus are exclusive needs to be modified, if the final goal of patent law lies in "the prosperity of industry" (Article 1 of Japanese Patent Law). The exclusivity of patents is not the end itself, but only an instrument to achieve the goal of patent law. And if the full enforcement of an injunction somehow hampers the achievement of this goal, there should be some restriction on the exclusivity of patents.

Moreover, if it is necessary for patent system to take into consideration the *ex post* factors, such as relation-specific investments, asymmetric

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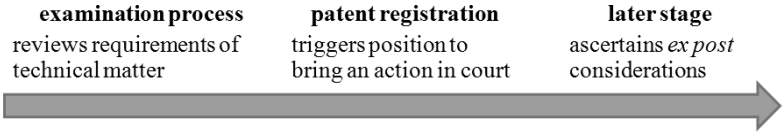
[27] Sangyoukouzou Shingikai Chitekizaisan Seisaku Bukai Tokkyo Seido Shouiinkai Houkokusho, Tokkyo Seido nikansuru Houseiteki na Kadai nitsuite (draft), at 56-57 (2011), *available at* http://www.jpo.go.jp/shiryou/toushin/shingikai/pdf/tokkyo_syiryou034/01.pdf (last visited Dec. 15, 2013).

[28] Naha District Court, September 24, 2008 in Case No. (Wa) 347 of 2007 [*Shashin De Miru Shuri-jo* Case].

The case dealt with a photo book which comprised of 95 pages of size B5 paper and of 177 photos in total, and one of those photos was found to infringe another person's copyright. The infringing photo was located on the last page, which itself contained nine photos, and was only 4 cm by 3 cm in size, occupying only a small area of the total page. However, it should be noted that this was not a simple infringement case. There were extensive surrounding circumstances which the court took into account in denying the claim for an injunction. For example, the publisher had reasonable grounds to believe that the photo could be legally used for publication because it had already appeared in a previous edition of the book without any claim from the photographer. Further, there was a misunderstanding over whether the photographer was retired at the time of the photo being taken and thus whether the work-for-hire doctrine was applicable. To interpret this decision so that a defendant can avoid an injunction merely by investing substantially in their endeavor would be incorrect. Without additional surrounding circumstances, an injunction would most likely have been granted. From an economics perspective, this is a good decision. The court identified whether it was reasonable for the defendant to make the investment in order to avoid excessively extending the grounds for not granting an injunction.

bargaining powers and opportunistic behaviors, there should be some process in the system where those factors are considered. In the *ex-ante* examination of Patent Office, the consideration of anti-competitive effects is limited to the technical matters (*e.g.*, patentable subject matter, novelty and non-obviousness). On the other hand, the consideration of abovementioned *ex-post* factors is a difficult task for the *ex-ante* examination of Patent Office, because they cannot be predicted in advance. As the problem lies in the matter of the *ex-post* execution of rights, it is more effective to rely on *ex-post* adjustment by the courts than on prior screening by the patent office.

In other words, since the *ex-post* factors have never been considered in the process of patent examination, the grant of patent rights by the Patent Office does not mean that the patent rights are exempted from the scrutiny of these factors in the later stages such as in the infringement litigation. Patent "right" at the time of its registration (after the examination of Patent office) can be seen only as a transit point in a broader process in which requirements of regulation against other persons' uses of an invention are reviewed step by step. In this transition demarcation of the scope of a patent right (or more correctly "regulation against other persons' acts") is gradually concretized.



(iii) Measures against Patent Trolls in the IT Industry: Limitation on Claims for Damages

A "royalty stacking" problem is said to be arising in the IT industry as a result of increasing modularization. The term "royalty stacking" refers to the situation where royalties accumulate so that by the time standardization is achieved, the total amount of royalties is too high, even where the individual rates are very low (*e.g.*, 0.01% or 0.001% per a pa-

tent).[29] To mitigate this problem, the courts need to adjust the award of the damages in the cases of infringing a patent right. Leaving this problem to be solved by private parties through license negotiations is not enough.

If a patent holder does not work her patented invention, the Japanese courts will refer to Article 102 (3) of the Patent Act which deals with the calculation of the amount equivalent to royalties, since the provisions of Article 102 (1) (presumption of the amount of lost profit) and 102 (2) (presumption of the amount of profit earned by infringers) are inapplicable. The recent judgments demonstrate that the Japanese courts calculate the reasonable royalty rates in light of the nature of inventions and other related circumstances viewed as a whole. The result is that the damages payable have been found either too high or too low.

An example of where the Japanese court found a low royalty rate is the *Disposable Diaper* case.[30] In this case, the court found that a royalty rate of 0.7% was reasonable, considering that the front and back leak prevention, one of the features of the relevant patented invention, was unlikely to be particularly effective, that there were other similar patents at the time of filing the application, and finally, that the relevant patented invention was only one of many technologies used in the design of disposable diapers. It is worth noting that this product was successful on the market and the amount of economic damages awarded to the winning party was over JPY 100 million.

While this last case is not a case illustrating the tragedy of the anticommons, it does show that the royalty rate of even a single patent right can be less than one percent. This rate should be reduced even more in cases of standardization.

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[29] *See* Mark A. Lemley and Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1993 (2007)

[30] Tokyo District Court, February 15, 2007 in Case No. (Wa) 6346 of 2005 [Disposable Diaper Case]; Intellectual Property High Court, April 17, 2008 in Case No. (Ne) 10024 of 2007 [Disposable Diaper Appeal Case].

(iv) Measures against Patent Trolls in the IT industry: Appropriate Patenting

So far, I have proposed to deny granting an injunction and to lower damages in certain specific cases. However, in the light of anti-commons problem and gradual nature of innovation in the IT industry, it is also necessary to examine whether denying software patenting categorically would be the appropriate solution in the first place.

Even if the patent office tries to diminish the number of patents by utilizing the requirement of inventive steps (non-obviousness), the gradual nature of innovation in the IT industry may possibly make the most of inventions gather so closely around the same low level of inventiveness that it may be difficult to discern which inventions are patentable and which are not. Further, the probabilistic approach (*i.e.*, an approach where patentability is determined by chance, such as by lottery) is also unacceptable as a means of determining patentability as it is unfair, because it makes no reference to merits. In jurisprudence, this is considered as "checker-board ordinance" which includes the odd-even scheme where cars are banned on particular dates of the week depending on whether their number plates end by an odd or even number.[31] Although it is likely to be difficult, we need to find the best solution from those which are available.

It is then inevitable to deny patent rights by type. However, the largest obstacle for this approach is path dependency under the public choice theory.[32] Patent departments in companies, patent attorneys, the patent office, and various other organizations are used to the current system of software patenting. And it might be possible that the total abolishment of software patents would cause very significant cost to the entire society.

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[31] *See* RONALD DWORKIN, LAW'S EMPIRE 179-84 (Harvard University Press 1986).
[32] *See*, *e.g.*, DOUGLASS C. NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE AND ECONOMIC PERFORMANCE 92-104 (Cambridge University Press 1990).

In short, an approach based on "muddling through"[33] may possibly be the only viable alternative left to us.[34] I hope that my proposal presented in this Article, admitting the patentability of the inventions in the IT industry on the one hand, and exploring the diverse methods to mitigate the problems caused by patenting on the other, could possibly amounts to such "muddling through".

[33] *See* Fritz Machlup, *The Economic Review of the Patent System*, 15 U.S. Senate, Committee on the Judiciary Study 80 (1958).

[34] *See* Peter S. Menell, *The Challenges of Reforming Intellectual Property Protection for Computer Software*, 94 COLUM. L. REV. 2644, 2644-45 (1994).