

Open Innovation and Intellectual Property

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1. Introduction¹

An intellectual property right is an exclusive right. Justification of this proposition involves more than one theory. In the case of a patent right, typical theories involved may well include the theory of incentives for creation and the theory of compensation for public opening.² The former theory contends that denying an exclusive right to the creator of an invention that is a physically unseizable and intangible entity would give rise to the possibility of a third party getting a “free ride” and would thereby diminish the incentive to create. Therefore, an exclusive right is granted to the creator so that she can preclude any third party’s unauthorized use of her invention and thus personally make exclusive use of it. The latter theory asserts that an exclusive right is granted to the inventor as compensation for opening her invention to the public. In both cases, it is expected that a patent right plays a major part in enabling exclusive use of an invention by virtue of its exclusivity. In the case of copyright, some people rely on the so-called theory of ownership based on mental labor, which says that ownership of a sort should be recognized for a product of mental labor, just as ownership over a tangible entity that is the product of physical labor is recognized.³ Naturally, this theory is premised on the exclusivity of such ownership.

¹ This paper is adapted from Ichiro Nakayama and Yuko Harayama, “Open Innovation and Intellectual Property,” Patent Research No. 46 (2008) p. 6 and Ichiro Nakayama, “Open Innovation and the Patent System,” to be included in the Annual Report of Japan Association of Industrial Property Law No. 33.

² Nobuhiro Nakayama, “The Patent Law in the Context of Laws Concerning Industrial Property Rights,” 2nd enlarged edition (Koubundo Publishers, 2000) pp. 5-11; Yoshiyuki Tamura “Laws Concerning Intellectual Property,” 4th edition (Yuhikaku Publishing, 2006), pp. 11-21; Kosaku Yoshifuji, “Overview of the Patent Law,” 13th edition, as revised and enlarged by Ken-ichi Kumagai (Yuhikaku Publishing, 1998), pp. 8-11, et al. In a report prepared in 1958 by Machlup at the request of the Senate to provide an economic analysis of the patent system, Machlup cited the following four arguments as forming the rationale that has been traditionally employed to explain the necessity of patent protection: (i) Natural law; (ii) Compensation from monopoly; (iii) Profit incentive from monopoly; and (iv) Exchange for secret knowledge (Fritz Machlup, “An Economic Review of the Patent System,” translated by Teruo Doi [Nikkei Inc., 1975], p. 63). As far as patent rights, at least, are concerned, the argument based on natural law appears to have become irrelevant. The argument based on compensation from monopoly is different from that based on profit incentive from monopoly in that the former takes the grant of a patent as a just compensation for the inventor while the latter positions it as an incentive rather than fair compensation (Machlup, id, at 69), although these two arguments these days are not so clearly differentiated.

³ Masao Handa, “Overview of the Copyright Law,” 14th edition, (Hougakushoin, 2009), p. 52

Turning to the innovation strategy of private enterprise, open innovation has come under the spotlight in recent years. Under the open innovation paradigm as discussed later, an enterprise pursuing a profit from innovation does not have to stick to exclusive use of its intellectual property and can justifiably open the same to the public without charge, according to circumstances. The circumstances themselves will be discussed later. Apparently, under open innovation, a high value is not attached to the notion of exclusivity that has traditionally been attached to a patent right as an exclusive right. This may suggest that open innovation is incompatible with the intellectual property system, which is intended to create an exclusive right to protect intellectual creations, and may render it insignificant. This issue will be discussed later. For preliminary considerations, the author's view can be summarized as follows: Open innovation does not render the intellectual property system insignificant, and in fact, the former is built upon the latter. In the area of open innovation, however, intellectual property is expected to fulfill a different function or role from that which it has traditionally been assigned. Consequently, open innovation gives rise to policy issues as well as issues of innovation strategy.

These issues will be examined in detail in this paper. Specifically, to begin with, what open innovation is and how it was put forward will be explained in a systematic manner. Following this will be a discussion on how we should view the relationship between open innovation and the patent system. Finally, some of the policy issues raised by open innovation in relation to the intellectual property system will be identified.

Given that discussions about open innovation are mainly focused on technological innovation, what follows will be centered on the patent system, which is specifically designed to protect technological ideas, as opposed to other rights under the intellectual property system.

2. Essential Characteristics of Open Innovation

(1) Definition

Open innovation is a concept put forward by Chesbrough et al. in a number of books.⁴ Chesbrough defined open innovation as follows: “Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology”⁵; “Open innovation means that companies should make much greater use of external ideas and technologies in their own business, while letting their unused ideas be used by other companies”⁶; and “Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively.”⁷ These definitions all allude to the internal use of external ideas, the external use of unused internal ideas, and an innovation strategy as envisaged from the viewpoint of the firms.

This gives rise to the question of how open innovation was put forward and what its specific features are. In the following section, these questions will be discussed in a systematic manner, using examples mainly taken from Chesbrough’s writings.

⁴ HENRY CHESBROUGH, *OPEN INNOVATION: THE NEW IMPERATIVE FOR CREATING AND PROFITING FROM TECHNOLOGY* (Harvard Business School Press, 2003) (translated by Keiichiro Omae under the title of “OPEN INNOVATION” [The Sanno Institute of Management, Publishing Dept., 2004]); HENRY CHESBROUGH, *OPEN BUSINESS MODELS: HOW TO THRIVE IN THE NEW INNOVATION LANDSCAPE* (Harvard Business School Press, 2006) (translated by Kiyoshi Kurihara under the title of “OPEN BUSINESS MODEL” [SHOEISHA, 2007]); and HENRY CHESBROUGH, WIM VANHAVERBEKE AND JOEL WEST, EDS., *OPEN INNOVATION: RESEARCHING IN A NEW PARADIGM* (Oxford University Press, 2006) (translated by Takahiro Nagao under the editorship of PRTM under the title of “OPEN INNOVATION” [Eiji Press, 2008])

⁵ CHESBROUGH, *OPEN INNOVATION* supra note 4, at xxiv

⁶ CHESBROUGH, *OPEN BUSINESS MODELS* supra note 4, at xiii

⁷ CHESBROUGH et al., *OPEN INNOVATION* supra note 4, at 1

(2) Background (A Shift in Innovation Paradigm)

Chesbrough called traditional innovation—as opposed to open innovation—“closed innovation” and took open innovation to represent a shift away from the closed innovation paradigm.

Closed innovation is a self-contained model in which a series of processes from research and development to product sales is vertically integrated within an organization. In such a model, research and development activities are subject to economics of scale, with the central research laboratory playing an important role.

In recent years, however, the environment surrounding innovation has changed. On the one hand, rising technology development costs, shortened product life cycles and an outflow of firms’ human resources has reduced the effectiveness of closed innovation, while on the other, the growing efforts of intermediary agents, including venture capitalists, along with start-up companies and universities to identify external partners have been setting the stage for the realization of open innovation.

It has long been hinted that closed innovation centered on a firm’s own central research laboratory has its limits, as symbolized by the phrase “the end of an era of central research laboratories,”⁸ which Chesbrough used to describe the end of the monopoly on knowledge. In the U.S. in 1981, seventy percent of all research and development spending was by large companies with 25,000 or more employees. This share decreased to forty percent in 2001.⁹ The leading role that the central research laboratory of large companies played in research and development has diminished. Given such a trend, firms seeking innovation should promote the division of innovation labor based on the premise that good ideas are available outside the company. Open innovation is an approach that could just meet the needs of this situation.

⁸ RICHARD ROSENBLOOM AND WILLIAM SPENCER, *ENGINES OF INNOVATION: U.S. INDUSTRIAL R&D AT THE END OF AN ERA* (Harvard Business School, 1996) (translated by Yoshio Nishimura under the title of “The End of an Era of Central Research Laboratory”) [Nikkei Business Publications, 1998]

⁹ CHESBROUGH, *OPEN BUSINESS MODELS* *supra* note 4, at 22, Table 2-1; CHESBROUGH *et al.*, *OPEN INNOVATION* *supra* note 4, at 16

(3) Features of Open Innovation

(i) Integration of Internal and External Knowledge

To realize open innovation intended to promote the division of innovation labor in an environment in which knowledge is widely dispersed, it is vital to integrate internal and external knowledge.

The method of integrating internal and external knowledge involves two patterns of flow of knowledge: An outside-in flow that involves the import of useful ideas and technologies that are available outside the company, and an inside-out flow that involves the export of unused ideas and technologies to outside locations in order that much greater use be made of them.

An outside-in flow of knowledge would save time and cost required to develop a technology and launch a new product and thus reduce the risk involved. At the same time, an inside-out flow of knowledge would lead to increased profits through the licensing or transfer of unused technologies and formation of entrepreneurial ventures.

Given that open innovation has resulted from reflection on the limits of closed innovation in an environment in which knowledge is widely dispersed, the former pattern of flow is clearly beneficial. As mentioned earlier, a variety of entities assume a role in research and development activities nowadays, while technology development costs are rocketing and greater importance is attached to time-to-market. Under the circumstances, an outside-in flow of knowledge allows the saving of time and cost and the reduction of risk by importing external knowledge in a positive way. The outside-in pattern of knowledge flow marks a clear departure from the flow involved in routine outsourcing in that the involvement of start-up companies provides an opportunity to run and monitor a field test with new ideas and technologies and experiment with new business models.

On the other hand, the inside-out pattern of knowledge flow is premised on an internal reservoir of unused technologies which Chesbrough attributed to a tension between a firm's research department and engineering department and/or a lack of communication between them. Traditionally, research departments have encouraged independent and original research without regard to commercial viability, and the measure of success is whether or not the research results in a

patent and/or paper.

Once the research has resulted in a patent and/or paper, the research is regarded as complete, and the department's limited budget is allocated to some other new area of research. On the other hand, engineering departments determine the effectiveness of research based on its commercial viability or market potential, rather than its originality. This incongruence leads to an accumulation of ideas "on the shelf" between the research and engineering departments. The inside-out pattern of knowledge flow is intended to make external use of these unused ideas.

Even though open innovation places more importance on the effective use of external knowledge, it does not eliminate the need for an internal R&D department. Instead, under the open innovation paradigm, an internal R&D department is required to have the ability to "identify the quality" of external knowledge and the ability to absorb and promote greater use of it, in addition to the ability to create knowledge. Therefore, the role of an internal R&D department is redefined as moving beyond the bounds of mere knowledge creation to the integration of internal and external knowledge.

(ii) Business Model

Chesbrough emphasizes the importance of a business model. He says that it is meaningless to discuss the value of an idea or a technology in and of itself. Much more important is a business model, or put differently, a framework in which the potential value of an idea or a technology is transformed into an economic value. The importance of a business model lies in its two major functions: (a) value creation, with a focus on what value the entire value chain comprised of a focal firm, its suppliers, customers and distribution partners will create; and (b) value capture, with a focus on how the focal firm will capture a part of value thus created.

In this way, the objective of open innovation is to expand the market (value creation) and capture a share of profit from that expanded market (value capture), rather than lying in the use of external knowledge itself. For example, Chesbrough cited IBM as an example of success, but, at the same time, asserted that although IBM's early success created great value for the subsequent computer industry, over the long term much of value created was captured by other companies such

as Microsoft and Intel. The case of IBM represents an example of a company that succeeded in value creation but failed in value capture.¹⁰

The business model by its very existence highlights the distinction between open innovation and open source. Open innovation aims at value capture as well as value creation through the use of a business model, while open source does not attach importance to value capture as a concept separate to that of value creation. Open source does not necessarily rely on a specific business model. However, if a company captures profits with the aid of open source (provision of value-added products or support), there does exist a business model (open source business model). Therefore, such a case is positioned as a type of open innovation.¹¹

(iii) Value Network

Under open innovation centered on the business model of a focal firm as the innovating firm, value creation and value capture are enabled by the existence of such other players as technology innovators, suppliers of parts and components, system integrators, and customers—dubbed a “value network”—and their interrelationships.

In contrast with closed innovation, the business model of the focal firm and that of other players are mutually dependent. Therefore, the focal firm is required to perform new functions of (i) positioning itself inside the value network, (ii) making positive efforts to manage its relationship with outside players, and (iii) reconciling any tension between these players that may arise from or in connection with the distribution of captured value.

(iv) Intellectual Property Management

¹⁰ For the history of IBM's shift from closed to open innovation, see CHESBROUGH, *OPEN INNOVATION*, supra note 4, at Chapter 5. For his argument that the company succeeded in value creation but failed in value capture, see CHESBROUGH, *OPEN BUSINESS MODELS*, supra note 4, at 97. Some analyses of IBM's computer business indicate that although IBM's concept of modularization of a computer system into multiple subsystems led to the company's early success that same modularization allowed other companies entering into manufacturing and sales of compatible parts and components and software to make substantive profits, thereby lowering IBM's profitability from its own computer business (“Modularization,” authored and edited by Masahiko Aoki and Haruhiko Ando, [Toyo Keizai, 2002]; Carliss Y. Baldwin and Kim B. Clark, “Design Rules,” translated by Haruhiko Ando [Toyo Keizai, 2004]).

¹¹ CHESBROUGH, *OPEN BUSINESS MODELS*, supra note 4, at 42-48; CHESBROUGH et al., *OPEN INNOVATION*, supra note 4, at 82-106

The concept of open innovation discussed above prompts firms to review their ways of managing intellectual property. Under closed innovation, firms have centered their intellectual property management on pursuing rights to their own research products and using such rights as a means of excluding others or, as needed, as a foothold if the right of another party is enforced against them. This is based on the premise that intellectual property created by them be put into practical use as their own product. In contrast, intellectual property management under open innovation encourages firms to make positive use of licensing and transfer of their rights or opening the same to the public in order to promote the introduction of external technologies and/or the external use of unused patents and other intellectual property. Under open innovation, the marketable aspect of intellectual property (though it would be hard to describe an intellectual property as a property right if it is opened to the public) is considered to be much more important than the right-to-exclude aspect.

At the same time, open innovation does not require that intellectual property be opened or released under all circumstances. Firms would judiciously choose to release their intellectual property if doing so would strengthen their business, and what matters is openness as viewed from a strategic perspective. Chesbrough demonstrated why a firm should take measures to identify to whom and in what circumstances it should strategically release its intellectual property by citing a negative example involving a case in which a firm disclosed its intellectual property to its direct competitor too openly. He also referred to another case in which IBM succeeded in reducing its software development costs by opening 500 patents to the open source software community without charge.¹²

Chesbrough developed an argument for intellectual property management based on the life cycle of technologies. The life cycle of a technology is comprised of four stages: the early stage; the growth stage; the maturation stage; and the decline stage. He says that the way in which intellectual property is managed

¹² In January 2005, IBM announced that it would not enforce 500 patents it owned in the development, use and distribution of open source software and made these patents available in the public domain without charge (<http://www.ibm.com/ibm/licensing/patents/pledgedpatents.pdf>). In January 2010, IBM made 4,000 of its inventions made available under a free license “as a part of its commitment to improving patent quality” (<http://www-03.ibm.com/press/us/en/pressrelease/29168.wss>).

should be varied according to the current technological stage. For example, if no marketplace for a technology exists during the early stage, and if no business model is established for the technology, it is meaningless to protect the technology to secure exclusive use. Instead, the technology should be opened to the public so that efforts can be focused on market and value creation. Then, protection of intellectual property should be strengthened in the course of the technology achieving the dominant market position in terms of design. In the maturation stage, positive efforts should be made to apply the intellectual property to other industrial fields. And finally, in the decline stage, efforts should be solely directed toward value capture from intellectual property protection.

Taking the Chinese piracy issue of Microsoft Windows as an example, Chesbrough explained this argument as follows: In the Chinese market, Windows and Linux are competing for dominance, and as long as the situation remains unchanged, Microsoft should welcome pirated versions of Windows. Chesbrough says this is because the installation of a pirated version of Windows on a personal computer would preclude installation of Linux and expand market opportunities for complementary products such as applications. If instead great efforts are made to exclude pirated editions, Microsoft may indeed win that battle but at the cost of losing the war for the position of dominant design. However, leaving those pirated editions unattended in China is likely to serve as a vicious precedent in other regions. Even taking this into consideration, he says, priority should be placed on achieving a dominant position in the Chinese market.¹³

(v) Intermediate Market

For patent management under open innovation to try to make active use of licensing and transfer of rights, the prerequisite is that an intermediate market or a market for innovation wherein intellectual property is traded is maintained and that intermediaries are functioning properly within it. Without a properly functioning intermediate market, division of innovation labor does not work. Unfortunately, it is difficult to make the claim that such an intermediate market has been functioning efficiently. Although this is partly attributable to a lack of enthusiasm on the part of concerned parties to strike deals under a closed

¹³ CHESBROUGH, OPEN BUSINESS MODELS, supra note 4, at 101-104

innovation environment, it is undeniable that the limited availability of information on the location of ideas and technologies that could be traded and of evaluations of their value has had a negative effect on the development of an intermediate market. Admitting that such a market is in its infancy, Chesbrough described why he believed that the market would grow under open innovation and showed that, in fact, the increasing number of transferred patents demonstrated that the intermediate market was actually growing.¹⁴ It should be noted, however, that an increase in the number of transferred patents cannot be directly translated into market growth.¹⁵

(4) Overview

(i) Significance of Open Innovation as an Innovation Strategy

As discussed above, open innovation is an approach aimed at expanding the market (value creation) and capturing a share of profits therefrom (value capture) through a combination of two patterns of flow of internal and external knowledge (public opening). This approach originated out of the awareness of the problem of the decreasing effectiveness of the conventional vertically integrated closed innovation model in today's innovation environment. As discussed earlier, such awareness has often been expressed before and is not in itself novel. Then, what is the significance of open innovation as compared with conventional theories of innovation? Chesbrough himself indicates that the significance of open innovation

¹⁴ CHESBROUGH, *OPEN BUSINESS MODELS*, supra note 4; See Figure 3-1 on p. 62 and Figure 3-1 and Figure 3-2 on p. 63.

¹⁵ Points to consider include the fact that, along with the increase in the number of transferred patents, the number of registered patents itself is on the increase. And the rising percentage of deals between affiliated companies cited as the reason for transfer should also be taken into account. Admitting this point, Chesbrough states that attention should be given to a growing percentage of transfers conducted for the cited reason of securitization, which is occurring parallel. For the ratio of the number of transferred patents to that of registered patents, Chesbrough's subsequent research report shows that the ratio of the number of patents transferred at least once to that of patents registered in the relevant year has remained at approx. 25% (Henry Chesbrough, "Emerging Secondary Markets for Intellectual Property: US and Japan Comparisons," p. 59 [March 31, 2006] (<http://www.ryutu.inpit.go.jp/pldb/download/download/H17esm-j.pdf>)). Chesbrough indicates that although this figure of 25% has not changed over time, the figure itself is substantial enough (id, at 59). The research report also covered the trends in Japan, wherein it is interesting to note that, out of the total number of patents transferred, the percentage of patents transferred for reasons other than a change in name and/or address or merger by the owner increased from slightly over 20% in 1997 to slightly over 30% in 2005 (id, at 84).

lies in the widespread recognition that external knowledge is equal in importance to internal knowledge, that what matters is a business model that transforms the outcome of R&D activities into economic value, that intellectual property management should be expected to take an active role, and that attention should be focused on innovation intermediates.¹⁶

On the other hand, a few people challenge the effectiveness of open innovation as an innovation strategy, saying “It is not yet clear whether or not open innovation holds good in any industry and under what conditions open innovation can prove to be effective.”¹⁷

(ii) Spread of Open Innovation

Apart from the question of whether or not open innovation can be an effective innovation strategy under any conditions, open innovation is attracting a great deal of interest in Japan. At first, Chesbrough cited advanced efforts by several U.S. corporations (including IBM, Intel, Lucent Technologies, P&G, Air Products, etc.) as examples of open innovation.¹⁸ In the years following his reports, some Japanese companies took inspiration and made their own efforts toward open innovation.¹⁹ In January 2008, with the founding of Eco-Patent Commons, a

¹⁶ CHESBROUGH et al., OPEN INNOVATION, supra note 4, at 8-11

¹⁷ Akiya Nagata, “Conditions Compatible with an Open Innovation Strategy,” International Patent Licensing Seminar 2009 (January 19, 2009) (http://www.ryutu.inpit.go.jp/seminar_a/2009/pdf/19/B1/B1-02.pdf). See also Hiromitsu Watabe, “Open Innovation: Intellectual property management strategies of Japanese Corporations,” Quarterly Journal of Public Policy and Management 2009, Vol. 3 (2009), p. 36 (<http://www.murc.jp/report/quarterly/200903/36.pdf>).

¹⁸ For cases of IBM, Intel and Lucent Technologies, see CHESBROUGH, OPEN INNOVATION, supra note 4, at Chapters 5 to 7. For cases of IBM, P&G and Air Product plus introductory information on intermediary agents for trading of intellectual property, see CHESBROUGH, OPEN BUSINESS MODELS, supra note 4, at Chapters 6 to 8.

¹⁹ For presentations on Japanese companies working on open innovation see Yoshinobu Murofushi, “Open Innovation in the Pharmaceutical Industry,” Patent Research No. 46 (2008), p. 19; Kouki Sone, “Open Innovation in the Automobile Industry,” Patent Research No. 46 (2008), p. 27, etc. Takashi Minakami in “Changing Intellectual Property Strategy under Open Innovation,” New Industries Report, fall 2008 issue (2008), p. 78. (<http://www.dir.co.jp/souken/research/report/emg-inc/intellect/08091601venture.pdf>) took NEC, Teijin, Sharp, Nippon Light Metal, DOWA Holdings and Hitachi as examples. In addition, see “Efforts to Promote Open Innovation as Viewed from Intellectual Property Strategy Perspective,” published by the Policy Planning and Research Section of the Japan Patent Office, (February 2009, http://www.ipo.go.jp/cgi/link.cgi?url=/sesaku/tokkyosenryaku_openinnovation.htm) which presents case studies that can be considered to represent open innovation efforts made by Japanese companies, even if not knowingly.

number of different firms donated environment-related patents into a pool that was freely released into the public domain. Japan has become a member of the organization.²⁰ In addition, the Japanese government announced a policy of promoting business strategies and intellectual property strategies that respond to open innovation.²¹

At this moment, however, it is not clear to what extent open innovation will gain universal acceptance, particularly in Japan. Given that observers have occasionally suggested what the limits of conventional vertically integrated closed innovation might be, it is unlikely that open innovation, which is intended to address such vertical separation issues, will become completely ineffectual. Therefore, the following section will examine the relationship between open innovation and the intellectual property system based on the premise that open innovation will gain a certain level of universal acceptance.

²⁰ For Eco-Patent Commons, see the website <http://www.wbcds.org/web/epc>, which reports that Japanese companies including Sony, Fuji Xerox, Ricoh and Taisei Corp. have joined the effort. For an outline of Eco-Patent Commons and its positioning as an approach to open innovation, see Takeshi Ueno, "Eco-Patent Commons," Tokugikon (Patent Office Society) No. 251 (2008), p. 70.

²¹ "The Modality of an Intellectual Property Strategy that Responds to Open Innovation," published by the Task Force for Strengthening Competitiveness through Intellectual Property at the Intellectual Property Policy Headquarters, (March 4, 2008, http://www.kantei.go.jp/jp/singi/titeki2/houkoku/open_innov.pdf); as a follow-up thereto, "Intellectual Property Strategy Promotion Program 2008," published by the Intellectual Property Policy Headquarters, (June 18, 2008, <http://www.ipr.go.jp/sokuhou/2008keikaku.pdf>); "New Intellectual Property Strategy toward Enhancement of Innovation," published by the Society of the Study of Innovation and Intellectual Property Strategy at the Japan Patent Office, (August 8, 2008, <http://www.meti.go.jp/press/20080808005/20080808005.html>) et al.

3. Relationship between Open Innovation and the Intellectual Property System

In the exordium of this paper, the author referred to the suggestion that open innovation was incompatible with the intellectual property system, which is intended to create an exclusive right to protect intellectual creations, and could thereby render it insignificant.

However, in actual fact, in no way does open innovation deny or make obsolete the intellectual property system. The rationale for this may be obvious from the points contained in Section 2, which will here be expanded upon.

(1) Difference in Level

Open innovation makes available the option of releasing intellectual property only as a means of pursuing profit. Under this paradigm, discussions should be focused on a particular business model, rather than on the intellectual property system itself. In fact, the existence of the intellectual property system constitutes a basic premise of open innovation. Open innovation should be seen in the context of corporate innovation strategy as it is not on the same level as the intellectual property system. The relationship may be analogous to that of open source software and the copyright system.

Traditionally, it has been understood that software is highly vulnerable to unauthorized reproduction and that it is therefore vital to control the reproduction of software under the protection of copyright. In the open source approach, however, unconstrained reproduction and alteration are both permitted in software development. Does the possibility of developing software without controlling reproduction eliminate the need for the copyright system? From this perspective, open source software often gives rise to an argument that the copyright system is unnecessary. However, some observers say that open source software uses copyright licensing to ensure its free use and that far from invalidating the copyright system, open source software is not viable without it.²² In fact,

²² Ryuta Hirashima, "The Open Source Model and Intellectual Property Law: An Introduction"; Yoshiaki Aida, Ryuta Hirashima and Koichi Sumikura, "Advanced Scientific Technologies and Intellectual Property" (Japan Institute of Invention and Innovation, 2001), p. 57; Tetsuya Imamura, "Open Source Software and Copyrights"; and "Intellectual Property Strategy and Management," authored and edited by Koichi Sumikura (Hakuto-Shobo Publishing, 2008), p. 41

paradoxically speaking, open source software is a way of utilizing copyrights.

In a similar way, open innovation can be deemed to offer a new way of utilizing intellectual property based on the premise of the existence of the intellectual property system.

(2) Strategic and Equivocal Characteristics of “Public Opening”

Seen in the context of a business model, open innovation does not completely eliminate the need for the conventional model envisaged under closed innovation in which the creator of an intellectual property has exclusive use of it under the protection of an intellectual property right and thereby recoups his investment and captures profits, with licensing used in a limited way as a negotiation tool if a right is enforced against him.

As mentioned earlier, under open innovation, “public opening” should be employed where the circumstances make it appropriate. To this end, open innovation and closed innovation should both be employed strategically. In fact, IBM indicated that both proprietary innovation and open innovation are essential,²³ and this has been demonstrated by an experimental study.²⁴ As mentioned earlier, Japanese companies have shown an increasing amount of interest in open innovation, while at the same time strengthening their control of proprietary information.²⁵ This seemingly contradictory phenomenon may be accounted for by a strategic perspective involved in the use of open innovation.

Both an open and a closed method of intellectual property management are therefore needed under open innovation and they are considered to complement each other.

It should be noted that the term “open” as used in the context of public opening of intellectual property does not necessarily mean “free of charge.” Naturally, in some cases, the term “open” does mean “free of charge,” as is the case with patents

²³ Ueno, supra note 20, at 75

²⁴ Masaya Kinukawa, “Open Innovation and Voluntary Public Opening of Research Products,” Fujitsu Research Institute Research Report No. 312 (March 2008, <http://jp.fujitsu.com/group/fri/downloads/report/research/2008/no312.pdf>)

²⁵ According to the Ministry of Economy, Trade and Industry, the Ministry of Health, Labour and Welfare and the Ministry of Education, Culture, Sports, Science and Technology in their joint report, the “2007 White Paper on Japanese Manufacture Industry,” p. 86 and p. 90, out of 357 firms surveyed, 35% responded that they identified an actual or potential outflow(s) of technology and some 80% responded that they internally control proprietary information in an appropriate manner.

released without charge into the public domain. But public opening of patents is a strategy a firm employs for value creation and value capture, and is motivated by the firm's desire to increase revenues from other streams. In contrast, as discussed earlier, under open innovation, the active use of licensing and transfer of intellectual property rights is encouraged. The term "open" as used in this context means that a firm, as the owner of the relevant intellectual property, is willing to utilize a third party's technology and let a third party utilize its technology, in what represents a departure from the NIH syndrome both in the creation and utilization of technology and is premised on a patent right being traded for value. In short, in some cases the term "open" means "free of charge" and in other cases it means "for value."

In cases where an intellectual property such as a patent is traded for value, an essential prerequisite for the deal is that a patent right has been created as a tradable property right and that a trading rule applicable to the deal has been established under the framework of the Patent Law. This latter point will be discussed in more detail later. In that sense, it is safe to say that open innovation cannot exist without the intellectual property system.²⁶

(3) Summary

As discussed above, open innovation only provides a model in which individual players manage and utilize their patents in the pursuit of their own profits, based on the premise of the existence of the intellectual property system. In a very real sense, far from making it redundant, open innovation actually provides an endorsement for the intellectual property system.

²⁶ In this respect, arguments concerning the relationship between open source software and the copyright system (see Footnote (22) and the corresponding part of the text) appear to hold true with regard to the relationship between open innovation and the patent system.

4. Policy Implications

(1) Do Institutional and/or Policy Issues Exist?

As discussed in Section 3, given that open innovation is premised on the existence of the intellectual property system, no other institutional or policy issues appear to be left open for further discussion. In the author's opinion, however, as far as the following issues at least are concerned, open innovation raises questions about intellectual property policy that stem from beyond its position as a mere business model.

One such question concerns the fact that open innovation gives more weight to the tradable property aspect of intellectual property than the exclusive right element. As mentioned earlier, an essential prerequisite for trading an intellectual property under an open innovation model is that an intellectual property right has been created as a tradable property right and that a trading rule applicable to the deal has been established under the framework of intellectual property legislation. Viewed from the opposite angle, this means that the modality of the intellectual property has an influence on the trading of intellectual property. Simply imagining what trading of intellectual property would amount to in the absence of the intellectual property system makes it easy to see how the existence of various rules on the creation and utilization of property rights under the intellectual property laws facilitate the smooth implementation of such deals as licensing and transfer of intellectual property rights. The transaction cost theory is said to account for this as follows: The patent system has the effect of facilitating transactions with respect to inventions by reducing costs involved therein.²⁷ In the light of this facilitatory effect of the patent system, an issue arises as to whether or not the rules and scheme

²⁷ Ryo Shimanami, on page one of his article "Scope of Exclusivity of Patent Right" published in the Annual Report of Japan Association of Industrial Property Law No. 33, says that although use of a contract would allow for the trading of an invention without the patent system, in the absence of the patent system the first question that emerges is how do the parties concerned identify inventions that they may wish to use. Apart from this question, it is easily conceivable that the parties concerned would have to spend a tremendous amount of money in defining the scope of the subject invention and the mode of utilization thereof. In contrast, the patent system requires an applicant to define the scope of claims and published the same (though on a voluntary basis) beforehand, which markedly reduces costs involved in the proposed transaction. It can therefore be assumed that the patent system has the effect of reducing costs involved in the trading of inventions and hence of facilitating such trade.

for intellectual property trading under the current intellectual property system are well positioned to facilitate trading of intellectual property under open innovation.

Another question concerns the fact that the business model based on the current intellectual property system is different from the one envisaged by open innovation. Given that the current intellectual property system is built around an exclusive right, it would be reasonable to assume that a business model in which a right holder exclusively uses the intellectual property she has created should prevail under the current intellectual property system. However, if such situation is reversed, with the general principle becoming an exception and vice versa, or if a business model in which a right holder does not exclusively use her invention prevails, the necessity of or the validity of granting an exclusive right to intellectual creations which, by nature, are available for parallel use by any person may be challenged. Given that the right to injunctive relief underlies the right to exclusively use an intellectual property, this issue is concerned with the modality of the right to injunctive relief.

It should be further noted that open innovation would have a wider variety of players involved in the intellectual property system, particularly in the patent system. As discussed earlier, open innovation is premised on a non-vertically integrated business model wherein any person—not just the creator of an invention—is allowed to make use of the invention, which quite simply affords an incentive to set out a trading scheme for inventions. However, open innovation in no way denies the vertically integrated model that exists under closed innovation. It follows that a vertically integrated model and a non-vertically integrated model exist in tandem, with the former involving an inventor herself (exclusively) making use of her invention and the latter any other person making use of the inventor's invention. This may lead to the idea that a neutral system based on how inventions are made use of should be built, whether it is premised on a vertically integrated model or a non-vertically integrated model.

(2) Specific Examples of Policy Issues

In light of the issues discussed in the preceding subsection, although not exhaustive, the following is offered as a list of some of the specific policy issues to be considered:

(i) Activation of the Market for Intellectual Property

As discussed earlier, more active trading in intellectual property is expected to take place under open innovation, and therefore, activation of the market for intellectual property surfaces as a challenge.

Beyond doubt, under the transaction cost theory discussed earlier, the existence of the patent system has the effect of facilitating trade in intellectual property. And, under the patent system that lays down the rules for the creation and utilization of a patent right, it relies on the negotiating parties to decide whether the right holder himself will make use of his invention or have another person do so through licensing, which naturally is premised on the existence of the market for intellectual property. This, however, does not mean that patents are actually being actively traded within such a market.

Looking at the current situation in the Japanese patent market, it is hard to make the case that the market is booming. As is well known, only 50% of the total number of patents owned by firms are actually utilized, with the remaining half never even utilized by the owner, not to mention traded on the market.²⁸ As a function of time, the number of patents transferred not including those transferred under general succession such as a merger by absorption did increase by well more than fourfold in the past decade. This data, however, includes patents transferred between affiliated companies, and the number of patents transferred is small relative to the number of patents registered in the corresponding period. (The number of patents transferred in 2006 is less than 10% of the number of patents registered in the same year).²⁹ Although the Japanese patent market is steadily

²⁸ The Japan Patent Office, “Overview of the Result of the 2008 Survey of Intellectual Property-Related Activities” (http://www.jpo.go.jp/shiryuu/toukei/pdf/h20_tizai_katudou/kekka.pdf),

Chart 3. Note that defensive patents, accounting for some 30% of the total number of patents registered, are classified as unused patents. Although defensive patents are admittedly unused patents, recognition of their latent contribution to the right owner’s business may change the evaluation of unused patents.

²⁹ In the Report by Non-Exclusive License Registration System Working Group (Patent System Subcommittee, Intellectual Property Policy Committee, Industrial Structure Council): “Review of the Non-Exclusive License Registration System to Promote Utilization of Patents, etc.,” (December 2007, http://www.jpo.go.jp/shiryuu/toushin/shingikai/pdf/tokkyo_shiryuu024/file_07.pdf),

Charts 1-5 on page three indicate that the number of patents transferred increased well over fourfold, from 2,409 in 1996 to 11,174 in 2006. Although these figures exclude patents transferred as a result of general succession such as merger by absorption and inheritance, they include patents transferred between affiliated companies for other reasons than a merger by absorption. In 2006, some 140,000 patents were registered,

growing, as it currently stands it remains admittedly small.

The current status of the patent market may be partly attributable to a lack of substantial need for right holders to have their patents transferred or licensed to the extent that many of them have a vertically integrated organization. If the present state of the patent market only reflects the traditional dominance of players with a vertically integrated organization, the spread of open innovation based on the premise of a non-vertically integrated organization will naturally increase the number of deals in the patent market. If this is the case, no further consideration would be required with respect to institutional and policy issues.

However, as mentioned earlier, firms proceeding with a deal to trade an invention often encounter difficulties in evaluating the value of the invention, and, in not a few cases, the terms and conditions of the transfer contract or license agreement are negotiated on a case-by-case basis. Such limited availability of information on a proposed deal and the considerable costs involved can constitute a constraining factor for the development of the market function.

As discussed earlier, Chesbrough is optimistic about the future growth of the patent market, and focuses attention on intermediate agents who specialize in intellectual property deals. Recalling the high rate of unused patents, an increase in the number of intermediate agents with professional expertise in evaluating the value of inventions would be a welcome development. At the same time, however, intermediate agents bear a resemblance to patent trolls, who will be discussed later, in the sense that an intermediate agent itself does not make use of a patented invention. There is concern that the increasing number of intermediate agents raises the possibility of the emergence of patent trolling.

Traditionally, there have been both optimism and pessimism about the efficiency of the patent market.³⁰ The well-known phrase the “tragedy of the anticommons”³¹ highlights the skepticism that exists with regard to the market function. The

while the number of patents transferred in the same year was less than 10% of this figure. In contrast, the corresponding ratio in the U.S. is approx. 25% (see Footnote 15). However, the difference in the basis of comparison between the U.S. and Japan should be noted.

³⁰ In this regard, see Ichiro Nakayama, “‘Pro-Patent’ and ‘The Tragedy of the Anticommons’: The Significance, Effects and Challenges of ‘Pro-Patent’ as Implied by Research on Patents and Innovation,” Discussion Paper 02-J-019 published by the Research Institute of Economy, Trade & Industry (November 2002), pp. 33-37.

³¹ Michael A. Heller and Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 *Science* 698 (1998)

reference is to the argument that a patent granted with respect to a basic invention made upstream in the biomedical field would deter product development from taking place downstream. At the same time, some people have expressed optimism, arguing that collective management of license and patent pools would allow the market itself to build a mechanism to facilitate intellectual property deals.³² The division of opinion over this issue cut off the option of sitting back and waiting until the spread of innovation naturally results in active trading.

The government therefore conducted a review of the license registration system with respect to patents as measures to promote the utilization of patented inventions. More specifically, in the first place, the 2007 amendment to the law established a registration system for comprehensive license contracts. Under the amendment, any non-exclusive license granted under a “specified non-exclusive license contract” (defined in Article 2, paragraph 20 of the Act on Special Measures for Industrial Revitalization as a written contract between corporations under which one party grants a non-exclusive license to the other party, with at least a part of the intellectual property right under the license identified by the patent number or the utility model number) is required to be registered and, if so registered (the term used in Article 58 and following of the same law is “specified non-exclusive license registration”), shall be deemed to become effective against a third party. This amendment reflected the consideration that, under a comprehensive license contract, the scope of a non-exclusive license was identified not by the patent number but by the product classification or the technical field, which made the old registration system based patent numbers hard to utilize.

In addition, the 2008 amendment established a license registration system with respect to pending patents and restricted the disclosure of part of the registry under the conventional registration system. The establishment of this license registration system was intended to take into consideration the actual situation where, in practical terms, a right to obtain a patent—as is the case of a pending patent—is often involved in a licensing contract, and to meet the growing needs among businesses for protection of that right through the introduction of a new registration

³² Robert P. Merges, *Institutions For Intellectual Property Transactions: The Case Of Patent Pools*, in EXPANDING THE BOUNDARIES OF INTELLECTUAL PROPERTY: INNOVATION POLICY FOR THE KNOWLEDGE SOCIETY, ed. by R. DREYFUSS, D. ZIMMERMAN, and H. FIRST. 123 (Oxford University Press 2001)

system. The amendment added new provisions stipulating the need for a provisional non-exclusive license (Article 34.3 of the Patent Law), a provisional exclusive license (Article 34.2 of the Patent Law) and registration thereof (Articles 34.4 and 34.5 of the Patent Law). At the same time, the restriction of disclosure of registry was intended to promote the utilization of the registration system to meet the need for confidentiality of license contracts. Under the amendment, information such as the name of non-exclusive licensors and the scope of non-exclusive licenses was in principle prohibited from disclosure (Article 18 of the Patent Law Enforcement Order, except where an interested party's demand for disclosure is accepted; for this exception, see Article 19 of the same law).

Finally, the possibility of allowing an unregistered license to become effective against a third party is under consideration.³³ Admittedly, this institutional arrangement, by securing a certain level of stability, will help stimulate the trade in inventions.

Also under consideration is the licensing of right system.³⁴ It is understood that, under the licensing of right system, a patentee registers her willingness to license her patent on a voluntary basis, and, in return for this, is entitled to a reduction or exemption of the annual patent fee. This arrangement is also assumed to be intended to promote licensing by reducing transaction costs involved in concluding a license contract.

Be that as it may, it is uncertain whether or not these measures can solve major issues such as the difficulty in evaluating the value of an invention and high transaction costs.

In addition to the measures mentioned above, it is proposed to require disclosure of the terms and conditions of a transfer contract or license contract with respect to a patent as a strategy for reducing transaction costs.³⁵ The idea underlying this proposal is that the principle by which the disclosure of data on home sales greatly benefited the real estate market would hold true in the patent market. In anticipation of criticism of the proposal, some proponents argue that requiring every player in

³³ Patent System Workshop, "Organizing Issues over the Patent System" (December 2009, <http://www.jpo.go.jp/shiryou/toushin/kenkyukai/pdf/tokkyoseidokenkyu/houkokusyo.pdf>)

³⁴ Patent System Workshop, *supra* note 33, at 18-20

³⁵ Mark A. Lemley and Nathan Myhrvold, *How To Make A Patent Market*, Hofsa L. Rev. (2008)

the patent market to disclose such information would not put anyone at a competitive disadvantage. Apart from the question of feasibility, it is undoubtedly an interesting proposal.

(ii) Modality of Right to Injunctive Relief (Countermeasures against Patent Trolls)

Although not clearly defined, the term “patent trolling” is generally used to mean a party who, with no intent of making use of patented inventions, purchases patents from bankrupt companies, etc. and imposes outrageous licensing fees on companies who are making use of the patented invention(s) under the threat of a legal suit.³⁶ Normally, in cases where a patent dispute arises between parties utilizing a patented invention, they settle by entering into a cross license contract to prevent either party’s business from being suspended by the virtue of the other party’s patent right. If the right holder is a patent troll who does not actually run a business, however, it becomes impossible to enter a cross license contract between the parties concerned. This becomes an extremely powerful weapon for such a right holder and a significant threat to the party accused of infringement as the right holder has nothing to lose.

In the context of open innovation, Chesbrough recognizes patent trolls as a potential risk in the sense that activating the trade in inventions would raise concerns about their emergence. He suggests as a defense measure the forestalling of patent trolls by preemptive buying of patents.³⁷ In fact, according to news reports, large U.S. corporations have established an organization dedicated to buying patents as a form of self-defense.³⁸ In the U.S., a decision of the Supreme Court in 2006³⁹ held that, even if the infringement of a patent right is found by the

³⁶ Toshiko Takenaka, “VI Moves of Intellectual Property in the U.S. and Europe”; Tatsunori Shibuya, Toshiko Takenaka and Ryu Takabayashi, “I.P. Annual Report 2005,” Separate Vol. NBL. No. 106 (Shoji-Homu, 2005), p. 171 and Note (6) on p. 172; Hiroki Kitamura and Takahiko Toyama, “The Trends in Amendment of the U.S. Patent Law,” Patent Research No. 40, p. 48 and Note (12) on p. 57; “Research Report on Issues Concerning the Enforcement of Patent Rights in Japan, the U.S. and Korea” published by the Institute of Intellectual Property, (March 2008, http://www.jpo.go.jp/shiryoutou/shin/chousa/pdf/zaisanken/1912nitibei_all.pdf), pp. 121-122

³⁷ CHESBROUGH, OPEN BUSINESS MODELS, supra note 4, at 99

³⁸ According to the *Wall Street Journal*, June 30, 2008, “Tech Giants Join Together To Head Off Patent Suits,” the newly established organization is named Allied Securities Trust and its members includes Verizon, Google, Cisco Systems, Ericsson, Hewlett-Packard, and others.

³⁹ *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837 (2006); Japanese-language

court, it should not automatically grant an injunction but rather determine the appropriateness of doing so by examining certain criteria, thereby leaving the door open to impose restrictions on the granting of injunctions. This is one example of how, in the U.S., where the issue of patent trolls has come under close scrutiny, people appear to have started taking measures against them.

In contrast, in Japan, it still remains unclear whether the issue of patent trolls really exists or not, and the ongoing process of reviewing the patent system involves arguments for and against limiting the right to demand an injunction.⁴⁰

Fundamentally speaking, the patent system does not directly require a patentee to make use of the patented invention.⁴¹ Given this, it ought to have been anticipated that a patentee failing to make use of the patented invention can still have his patent right enforced. It is probably solely due to the dominance of players with vertically integrated organizations under the conventional patent system that people have not taken much notice of such issues as patent trolling. This may well suggest that the issue of patent trolls, though an old one, has only really surfaced as a problem as the number of players with non-vertically integrated organizations has increased

commentary on the eBay Case decision: Katsuya Tamai, "To What Extent a Patent Right is of the Nature of a Right: Discussions on Recent Precedents Concerning Injunction on the Grounds of Infringement of a Right under U.S. Patent Law," *Patent Vol. 59 No. 9*, (2006), pp. 45-64; Shigetoshi Matsumoto, "Comparative Study of the eBay Case Decision and the U.S. and Japanese Patent Laws: Relative Positional Relationship between a Right to Injunctive Relief and a Right to Compensation for Damage," *Intellectual Property Management Vol. 57 No. 2* (2007), pp. 183-194; Akira Shimao and Noriko Nihei, "Requirements for Granting an Injunction on the Grounds of Infringement of a Patent: The Full Text of and Commentary on the *eBay Inc. v. MercExchange, L.L.C.*," 126 S. Ct. 1837 (Decision of the U.S. Supreme Court of May 15, 2006)," *Intellectual Property Research Forum No. 69* (2007), pp. 41-50, et. al

⁴⁰ Patent System Workshop, *supra* note 33, at 58-64

⁴¹ A patentee's failure to make use of the patented invention can put someone else at disadvantage. A typical example is a compulsory license in the case of a patentee's failure to make use of the patented invention (Article 83 of the Patent Law). In addition, the prevailing opinion regarding Article 102, paragraph 2 of the Patent Law, which stipulates that the amount of profits earned by the infringer shall be presumed to be the amount of damage sustained by the patentee or exclusive licensee is that this provision is not applicable to a patentee who fails to make use of the patented invention. (See Nakayama, *supra* note 2, at 34; Nobuhiro Nakayama, "Annotated Patent Law," 3rd edition, Vol. I, [Seirin-Shoin, 2000], pp. 1017-1023 [Reiko Aoyagi]; Ryu Takabayashi, "Standard Patent Law," 3rd edition [Yuhikaku Publishing, 2008], p. 259.) It is also understood that a patentee, shall at the very least have been selling products that compete with the infringing product to justify application of Article 102, paragraph 1 of the Patent Law. (It is a matter of controversy whether the product manufactured by the patentee should be an embodiment of the patented invention; see Nakayama, *supra*, at 1002-1004; Takabayashi, *supra*, at 257-258.) On the grounds of the foregoing, it may be safely said that the Patent Law indirectly encourages a patentee to make use of the patented invention.

under open innovation.

It was stated earlier that if a business model in which a right holder does not use his own invention exclusively prevails then the necessity or validity of granting an exclusive right for intellectual creations may be challenged. At the moment, however, a business model in which a right holder does not exclusively use his invention does not yet prevail. The transaction cost theory suggests that the creation of an exclusive property right would also have a promotional effect on the trading in inventions under open innovation. Consequently, it would not be necessary, at this time, to walk away from the principles underlying the patent protection framework based on the idea of exclusive rights or the right to injunctive relief. Given that it is unnecessary to regard the exclusive-right or injunctive-relief framework of intellectual property protection as an absolute essential,⁴² however, it is suggested that the focus of discussion should be shifted from whether to limit the right to injunctive relief to in what circumstances such right should be limited, whether such question should be clarified beforehand as legislation or be decided upon by the courts on a case-by-case basis,⁴³ and what would be the appropriate amount of compensation for damages in cases where the right to injunctive relief is limited.

(iii) Licensing with regard to Jointly Owned Patents

Awareness of the need to design neutral industrial arrangements with respect to the specific form of an invention directs our attention to an issue concerning jointly owned patent licensing, which requires each of the joint owners to obtain the consent of the other joint owners.

It is expected that the spread of open innovation, with its emphasis on the integration of internal and external knowledge, will naturally result in an increase in the number of jointly owned patents. The Japanese Patent Law stipulates in Article 73, paragraph 2 that where a patent right is jointly owned, unless otherwise agreed upon by contract, each of the joint owners may practice the patented invention without the consent of the other joint owners. At the same time, the law stipulates in paragraph 3 of the same Article that where a patent right is jointly owned, no joint owner may grant an exclusive license with regard to the patent right to any third party without the consent of all other joint owners. This rule works out to the advantage of a right owner with a vertically integrated

⁴² Nobuhiro Nakayama, "Multimedia and Copyright" (Iwanami-Shoten, 1996), p. 300; Shigetoshi Matsumoto, "The True Nature of a Patent Right and Its Limits" (Yuhikaku Publishing, 2005), p. 141

⁴³ Or falling somewhere in between, a framework similar to government use (28 U.S.C. §1498) in the U.S., for example, is possible in which the government gives an "authorization or approval" to limit the right to injunctive relief on a case-by-case basis while the court decides on compensation for damages. Ichiro Nakayama, "Some Observations about the Balance between Protection and Use of and Exclusivity of a Patent Right"; "Intellectual Property Policy and Management," authored and edited by Koichi Sumikura (Hakuto-Shobo Publishing, 2008), p. 211

organization because under this rule, such a right owner can secure freedom to make use of the patented invention while denying other joint owners the ability to grant an exclusive license to a third party. Conversely, if any of the joint owners wishes to let a third party utilize the patented invention under the concept of open innovation, there is a likelihood that the other joint owners will withhold their consent. (The likelihood would increase if the other joint owners have a vertically integrated organization.) Given the default rule set forth in Article 73, however, special arrangements can be made to restrict each of the joint owners from making use of the patented invention or to allow the freedom to grant an exclusive license to a third party. Considering the transaction costs involved in venturing to make such special arrangements, however, the default rule under Article 73 of the Patent Law has too significant an impact to be set aside. Under the transaction cost theory discussed earlier, obedience to the default rule under the Patent Law would reduce transaction costs, and therefore, it would have a decisive influence on the success or failure of future transactions, which would in turn influence thinking on what the default rule should be. In that sense, the existing law is advantageous to closed innovation over open innovation.

The purpose of the existing provision of Article 73 has been explained as follows: A patented invention is a physically unseizable entity and making use of a patented invention by any of the joint owners would not hinder the use of other joint owners. Therefore, each of the joint owners may freely make use of the patented invention in principle; at the same time, the infringement by any third party would have a significant economic impact on each of the joint owners who are making use of the patented invention, and therefore, it is necessary to prevent this from occurring without the knowledge of the joint owners.⁴⁴ It is, however, still open to debate as to what extent the joint owners' expectation of their ability to make use of a patented invention will remain unchanged when a third party's involvement is legally protectable. Whether under closed innovation or open innovation, it may be worthwhile considering the modality of Article 73 of the Patent Law from the perspective of designing more neutral industrial arrangements.⁴⁵

⁴⁴ Nakayama, *supra* note 2, at 301-302; Takabayashi, *supra* note 41, at 108

⁴⁵ Ichiro Nakayama, "An inquiry into the legal requirement that, where a patent right is jointly owned, no joint owner may grant an exclusive license with respect to the patented invention without the consent of all other joint owners: From the perspective of design of neutral institutional arrangements with respect to specific forms of invention," AIPPI Vol. 47, No. 2 (2002), p. 82. This paper argues that a joint owner's ability to make use of a patented invention can vary as a result of general succession or self-exploitation through their subcontractors and therefore that other joint owners' expectation of such ability may not be perfectly protectable. It goes on to suggest that Article 37 be reviewed in light of changes in industrial organization such as the progress of horizontal division of labor and a Japan-U.S. comparison thereof.

(iv) Patent Registration and Licensing with regard to Inventions Created at Universities

Although not directly related to the issue under paragraph (1) of this Section, further reference should be made to patent registration and licensing with respect to inventions created at universities. This is prompted by the recent trend of universities pursuing patent registration and licensing with respect to inventions created through joint efforts by the government and others. On the surface this appears to be consistent with the concept of open innovation, but this has not always been the case.

As may be guessed by the fact that the purpose of open innovation is to utilize external knowledge, Chesbrough takes a positive view of the promotion of industry-university cooperation, but he takes a negative view of the pursuit by universities under the Bayh-Dole Act of patents with respect to inventions created as a result of such cooperation. Chesbrough says that kernels for next-generation technologies should be disseminated widely and rapidly and that the possibility exists that a university's pursuit of patents and licensing agreements with respect to the results of basic research may hinder the dissemination of useful knowledge.⁴⁶ In the real world, the evidence is beginning to support this concern.⁴⁷ Explaining the possible threats to the intellectual property system, he says that without proper management of the system universities can claim large amounts of compensation for alleged infringements with respect to their intellectual property, noting that in fact many universities are actually receiving patent royalties.⁴⁸

Following on the heels of the Bayh-Dole Act in the U.S., both the government and individuals in Japan have been making efforts to introduce a scheme for technology transfer in which universities can obtain patent rights and grant exclusive licenses to external parties for their inventions. This scheme appears to be fraught with a variety of problems.⁴⁹

(v) Justifications for the Existence of the Intellectual Property System

Finally, the author would like to bring the reader's attention to the implications of open innovation with respect to justifications for the existence of the intellectual property system.

⁴⁶ CHESBROUGH, *OPEN INNOVATION*, supra note 4, at 193

⁴⁷ CHESBROUGH et al., *OPEN INNOVATION*, supra note 4, at 134-160, which, however, indicates that some companies with a successful industry-university cooperative structure established have caused no delay in knowledge utilization.

⁴⁸ CHESBROUGH, *OPEN BUSINESS MODELS*, supra note 4, at 18

⁴⁹ For problems involving university patents, see Ichiro Nakayama, "Significance of and Review of University Patent and Research Commons" as included in "Analyses of Managerial and Economic Implications of Patents," edited by the Institute of Intellectual Property (Yushodo, 2007), p. 301.

Under the concept of open innovation, a firm's effort to open a patent to a third party or, for example, an open source software community without charge is accounted for as a strategic move that will help reinforce another aspect of the firm's business. Such account, however, is only applicable to an analysis of what motivates a firm to open a patent, but not to an analysis of what motivates a software engineer to develop open source software.

So why does a software engineer take part in the development of open source software in full knowledge of the likelihood that the software she is creating will be subject to reproduction without constraint? One explanation frequently offered is that the software developer, driven by a desire for reputation, cares more about receiving credit as the creator of the software than she does about subsequent reproduction and/or modification of the software she created.⁵⁰

In addition, confirming the impact of a good reputation, some people attribute the motivation of software developers to a combination of "career incentive," or the desire to enhance future career opportunities (both in terms of employment and fund-raising) based on the strength of a good reputation, and "self-satisfaction incentive," in other words, seeking increased visibility in the organizational unit to which she belongs, with both incentives collectively referred to as a "signaling incentive."⁵¹

Others have argued that as long as the individual tasks involved in software development are divided into small modules, the motivation of a single software developer does not matter.⁵² According to this view, it is important to match tasks that require creativity and skill with individuals who possess those qualities. However, it is the relevant individual himself who best knows his own skill, and when tasks are assigned by others within an organization there is an inevitable mismatch between the individual's capability and the skills required for the task. In the marketplace, the concept of individual creativity is incompatible with the formulaic style of business transactions, and trying to specify requirements for the

⁵⁰ Eric Steven Raymond, "Homesteading the Noosphere" as translated into Japanese by Hiroo Yamagata and included in "The Cathedral and the Bazaar" (Kobosha, 1999), p. 84. (The original text, E. S. Raymond, "Homesteading the Noosphere" is available at <http://www.catb.org/~esr/writings/homesteading/>.)

⁵¹ J. Lerner and J. Tirole, *Some Simple Economics of Open Source*, 50 *J. Indus. Econ.* 197, 212-223 (2002)

⁵² Yochai Benkler, *Coase's Penguin, or Linux and The Nature of the Firm*, 112 *Yale L. J.* 369 (2002)

purpose of drawing up a contract involves difficulties and high costs. In an important contrast, open source software is written under a scheme in which a pool of software developers is created from a large network of individuals so that the most appropriate person for a job can voluntarily identify himself as a candidate to perform the task as divided into a small module. This scheme is known as the “peer production system.”

As the above shows, there are a variety of different opinions about the adequacy of incentive with regard to open source software. Whatever the case may be, this issue appears to need an explanation based on some theory other than the theory of incentive for creation.

The purpose of open innovation is not only value creation but value capture, and “public opening” is regarded as a way of pursuing profit. This perspective excludes a software developer’s motivation to develop open source software from analysis. However, these issues encountered under open innovation appear to raise an interesting question about what theoretical framework could justify the existence of the intellectual property system if not the theory of incentive for creation and the theory of compensation for public opening.

5. Conclusion

In this paper, the author has discussed the concept of open innovation in a systematic manner and examined the relationship between open innovation and the intellectual property system, particularly the patent system. This was followed by a consideration of the implications of open innovation for the intellectual property system, particularly the patent system.

As observers have occasionally suggested, the vertically integrated closed innovation model has exposed its own limits. The significance of open innovation lies in its setting out a new model in which, based on the premise of a non-vertically integrated model, equal importance is attached to external knowledge and internal knowledge and efforts are made to create and capture value by a combined use of the two, together with other resources. Open innovation is also characterized by its emphasis on the need for intellectual property management to play an active role in the context of innovation strategy.

In terms of its relationship with the patent system, open innovation is a business model that provides a new way for firms to use the patent system as a means of pursuing profit, while neither denying the existence of nor eliminating the need for the patent system in any sense. In the first place, the term “public opening” has a strategic and equivocal meaning, which implies that open innovation prompts users of the patent system to further improve their patent management. So, basically, open innovation sends a message specifically to users of the patent system.

Since the enforcement of the Intellectual Property Basic Act of 2003, the government has taken various institutional and policy measures aimed at the realization of “a nation built on intellectual property.” In this regard, some observers expressed the view that the “success or failure of a series of measures called Intellectual Property Reform solely depends on whether these measures can accommodate the trend within society, particularly industrial society, toward informatization, rather than on legislation.”⁵³ From this viewpoint, open innovation prompting firms to manage their patents in a strategic manner represents an important issue as far as the trend toward informatization in industrial society is

⁵³ Nobuhhiro Nakayama, “Retrospection of Research on Laws on Intellectual Property and Future Issues,” NBL No. 877 (2008), p. 5

required to be accommodated. However, at the moment, it is not clear to what extent open innovation will gain universal acceptance as an entrepreneurial innovation strategy, and further developments are yet to be seen.

As stated above, open innovation is a business model based upon the intellectual property system, and at the same time, it raises several issues from a policy perspective. With regard to the role of a patent right under open innovation, more importance is attached to its tradability than to its power to enforce exclusivity. This indicates the need to verify whether the current rules and schemes for patent trading under the current system are adequate or not in the light of applicable laws even though the very existence of the patent system itself has a facilitating effect on the trade in patents.

Traditionally, the patent system appears to have assumed its major players would be rights holders with vertically integrated organizations. As open innovation progressed, the number of non-vertically integrated players increased and a wider variety of players have come to be involved in the patent system. The issue of jointly owned patents discussed earlier gives rise to the question of to what extent the patent system should be neutral in the presence of increasingly diverse players. With regard to the issue of limiting the right to injunctive relief, having an increasingly diverse mix of players also raises the question of to what extent the patent system should be flexible.⁵⁴

This would appear to provide a good reason for not only individuals with some direct connection with companies to take an interest in open innovation but for policy makers to do the same.

⁵⁴ Ryo Shimanami, "The Present Situation and Future Prospect of the Patent System: From Juristic Perspective," included in "The Patent System at the Crossroad" jointly edited by Institute of Intellectual Property and Ryo Shimanami (Institute of Intellectual Property, 2003), p. 3, which, with regard to the issue of flexibility of the patent system, indicates that the patent system has lost its uniformity in recent years, with emphasis on weighing on an individual basis, thereby raising an alert on this trend.