

Research on Intellectual Property Management in Open Innovation

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Abstract Facing the change of innovation mode, how to manage and protect the intellectual property(IP) to realize maximum benefits of enterprises becomes one of the core elements in open innovation theory. This paper summarizes the new applications of intellectual property, such as intellectual property licensing and transfer, intellectual property alliance, intellectual property R&D, and intellectual property for free, in open innovation from specific examples, and utilizes two typical cases and related data to analyze the main problems of IP management in Chinese enterprises. This paper also develops an IP management model in enterprises in open innovation, and proposes countermeasures of IP management by analyzing the characteristics of IP application in different stages in technical innovation.

Key words Open innovation; IP management; Empirical analysis; Countermeasures

1 Introduction

Enterprises begin to adopt the open innovation approach to achieve technical innovation owing to the rapid growth of ideas, frequent employee job-hopping, as well as the improvement of research capacity. However, adopting this new approach can present numerous challenges, including how to manage intellectual property and where to look for beneficial external partnerships (Jill Jusko, 2009). A study indicates the increasing privatization of knowledge domains and activities that were previously public makes the ownership in the innovation process more conducive to technology diffusion (Benjamin Coriat, Fabienne Ors.i, 2002). Licensing of IP, as one of the most effective means for technology diffusion, is becoming a new commercialization strategy in technology-based firms (HolgerKollmer, Michael Dowling, 2004), and an appropriate IP strategy can be an enabler of OI activities (Oliver Alexy, Paola Criscuolo, Ammon Salter, 2009). Another study indicates the importance of a strong security policy on managing who has access to what information, and this strong policy must be balanced with sufficient openness to foster partner collaboration and not stifle the innovation process (Michael Burkett, Ian Finley, 2007). But, legal protection strategies are a novelty in emerging business fields. Some new situations are difficult to tackle by legal protection instruments (Martin A Bader, 2008). In this case, informal protection mechanisms partially compensate incomplete formal mechanisms. Also, these informal protection mechanisms can widely prevent imitation and uncontrolled knowledge-spillovers across the duration of the partnership (Christiane Hipp, Ricarda B Bouncken, 2009). As a result, in order to realize greater benefit, the enterprises should not only focus on internal legal protection, but also pay attention to flexible use of their IP outside the enterprises. However, the studies on IP management under the open innovation mode in China are mainly concentrated in IP management theory (Yang Wu, 2006), IP strategy in enterprises (Hu Chenghao, Jin Minghao, 2008), property orectic model of enterprise open innovation (Zheng Xiaoping, Liu Lijing, Jiang Meiyong, 2007), the factors affecting IP protection, and IP protection mechanisms (Tang Fangcheng, Tong Yunhuan, 2007). Most of these studies analyze purely from legal, technological or managing perspective, lack of integrated analysis. This work, therefore, follows an integrated approach to investigate the IP management countermeasures according to the characteristics of IP application in different stages of technical innovation.

2 The Impact of New IP Applications in Open Innovation

Open innovation is a term promoted by Henry Chesbrough and defined as “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” (Chesbrough, H.W, 2003). This new paradigm aims to use minimum inputs to achieve maximum return. Facing the new paradigm, firms that focused on Know-How before pay more attention nowadays to external knowledge and Know-Who (John Dubiansky, 2006).

2.1 New applications of IP

Because of the “open” feature, open innovation is more inclusive and flexible than closed innovation. Besides internal R&D, the enterprises also attach importance to search, purchase and use the

technological achievements of SMEs and other external resources. By combining of the internal and external resources, they develop new products or technology. In this case, IP in enterprises exists in different forms, such as self-developed IP, purchased IP, paid sharing IP and free sharing IP. New applications of IP can be summarized as follows:

2.1.1 IP licensing and transfer

IP licensing, the permission for others to use the intellectual property right (IPR) under certain condition in premise of the holder retain the proprietary of IP, is the ideal way to maximize the benefit. In the progress of open innovation, IP licensing usually appears as patent licensing, especially for cross-licensing which is the most common method and the best solution in solving the problem of patents crossing between different enterprises. For example, in October of 2009, IBM and ASUS came to an agreement of patent cross-licensing which ended the patent litigation between these two companies. This agreement also became the foundation of the cooperation between IBM and ASUS. Besides the IP licensing, IP transfer also helps the increase of enterprise's benefit. Besides, P&G has built up an internal criterion: its patent will be sold to other company, even its competitor, in case that this patent can not be converted into internal productivity. IBM also positively divides up its value chain and gets significant return from selling out its patent.

2.1.2 IP alliance

IP alliance mainly refers to patent alliance or patent pool in the process of technical innovation. It forms with related patents for the common interests among enterprises. During the early market competition, APPLE refused to cooperate with other companies because of its preponderance on both hardware and software technology. At the time of APPLE refusing others, IBM chose to cooperate with Microsoft and Intel. Profiting from this labor division, IBM won in the marketing competition, because their product performance had significant progress and finally exceeded that of APPLE. This kind of IP alliance, such as the cooperation between IBM, Microsoft and Intel, can efficiently change the competitive situation and environment in a short time and bring multiple benefits to the enterprise.

2.1.3 IP cooperative R&D

Cooperative R&D, such as developing cooperation projects between enterprises or building up R&D center at university for Industry-University cooperation, is a main path for enterprises to obtain new IP in open innovation. The Industry-University-Government cooperation has evolved into nation innovation system. In order to solve the European paradox, European Union has treated the improvement of Industry-University cooperation as an important feature in the open innovation project since the age of European Community. The cooperation principle and frame of IP in Industry-University cooperation were discussed and decided in the Framework Program. Also, Japan built up its Industry-University-Government cooperation system in 1980s. With the help of this system, universities, enterprises and institutes in Japan can freely share IP resource and complement each other.

2.1.4 IP for free

While open source and open innovation might conflict on patent issues, they are not mutually exclusive, as the participating companies can donate their patents to an independent organization, put them in a common pool or grant unlimited license use to anybody. Hence, some open source can initiatively merge the two concepts, such as Eclipse platform. It is advocated as a case of open innovation by IBM, where competing companies are invited to cooperate inside an open innovation network.^①

Actually, enterprises may often take combined use of these modes according to the practical situation in order to achieve the best result.

2.2 The impact on IP management

2.2.1 Management concept update

The old innovation mode depends on internal R&D and takes advantage of new technologies and new products to earn high profit. It induces the enterprises to take strict control of their IP to prevent competitors benefitting from them. However, since the "open" feature of open innovation makes the IP resources allocate and flow within larger area, the enterprises pay more attention to how to use their IP resources to realize profit maximization through both internal and external paths, rather than unsophisticated monopolize them.

2.2.2 IPR subject diversification

In closed innovation, enterprises technical innovation prohibits others to participate. But with the

^① Eclipse Open Innovation Networks.http://en.wikipedia.org/wiki/Open_innovation

continual exchange of ideas and employees, it's hard for an enterprise to keep all indispensable employees in a long-term. Sometimes, the most appropriate person to solve a particular problem may locate outside and some new technologies or new products that the enterprise urgently needs may have become the IP assets of others. At this point, it is better for the enterprises to cooperate with external IPR subject than to pursue self-development. This means that the participants of technical innovation may include not only the enterprise itself, but also other enterprises, research institutions, universities, users and government. They actively seek partners and use each others' strength to realize technical innovation. The diversification of participants inevitably leads to the joint ownership of IPR which complicates the distribution of the interest brought by IPR.

2.2.3 Increasing management risks

After the interior R&D department developed something new, the enterprises used to keep them away from others if they can't commercialize the achievements by themselves. So, the risk of IP management in closed innovation is primarily reflected on its R&D management. But in open innovation, enterprises try to make good use of both internal and external paths. They obtain the IP of others by the way of cooperation, exchange or purchase, and gain profit through IP transfer or licensing. As the diffusion of knowledge becomes more rapid, the difficulty of controlling and managing IP in enterprises increases, and the relations between ownership and management of enterprises become more complicated, which easily lead to IP disputes.

3 Empirical Analyses of Intellectual Property Management and Protection in Open Innovation

The emergence of these new IPR operation modes indicates that how to manage and protect the IPR to achieve maximum business value turns into the most important issue. According to statistics, the IPR disputes in China have risen gradually since 2006. (See Figure 1)^① With the increase of cooperation between the external IPR subjects, if the enterprises fail to address the new characteristics of the object, take appropriate IP management and balance the interests between IP subjects, it will inevitably arise IP disputes and hinder the technical innovation process.

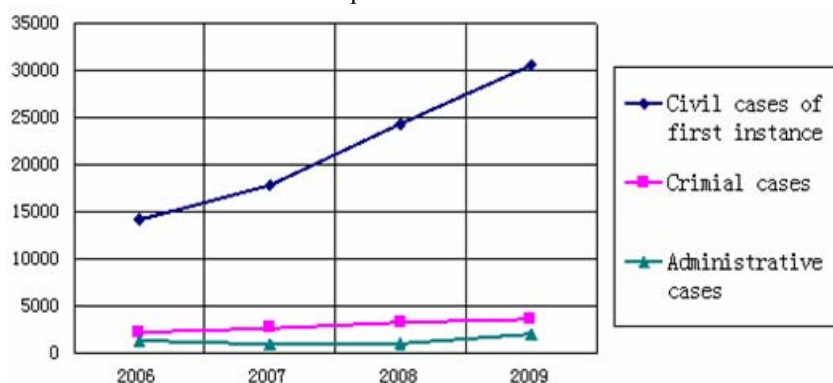


Figure 1 2006-2009 Local Court Cases of IPR in China

3.1 Typical cases review

Case 1 Tianjin Light Industry Machinery Factory (Plaintiff) v. Hangzhou Project & Research Institute of Elector-Mechanic in Light Industry (defendant 1) and Zhangjiagang Huasheng Paper Pulp Equipment Co., Ltd. (defendant 2) Case. In this case, the plaintiff claimed that the two defendants infringed trade secret jointly. It charged defendant 1 for violating the agreement to allow defendant 2 to use the re-innovation technology unauthorized. The defendants pleaded of that the technology in dispute is developed by themselves, and the evidence provided by plaintiff can not prove the defendants infringed the trade secret of plaintiff. After reviewed the evidence and the views of both sides, the court judged the defendants carried the case because of lacking evidence and legal basis.

Case 2 Kingdream "drill bit" case. Kingdream public limited company furnished a huge amount of money for importing oil drilling bit manufacturing technologies from abroad in 1980s and had made great profits by developing self-dominant IPs. In 2001, Xing Fafen, the technical employee of

^① Data organized from China Intellectual Property Yearbook (2007-2009) and http://www.chinacopyright.org.cn/copyrightcase/2010-3-10/100310201016100_11650.html

Kingdream, switched to Tianjin Lilin Drill Bit Co., Ltd., as the manager of technology department. Since 2004, Kingdream had found that some oil field began to use Lilin's drill bit. These drill bit are cheaper and similar to Kingdream's, greatly suppressed the market share of Kingdream. In 2008, Kindream charged Xing Fafen and Lilin with trade secret joint infringement. After 5 years 7 courts 9 times lawsuit and many times mediation, the parties reached agreement in 17 million. This is a typical and influential case caused by employee switch.

3.2 Analysis of IP management actuality in Chinese enterprises

There are a lot of similar cases as discussed above. The essence of these cases is that the enterprise did not complete its IP management regulation to face the challenge from new creative environment. The disadvantages of current IP management regulation in the enterprise appear as follows: (1) Awareness of IP right is weak and the way to protect the IPR is too simple. Few Chinese enterprises own its dedicated IP management section. The enterprises usually focus on the protection of technical resource for creation and ignore that of management resource. Patent management is regarded as an important issue in enterprise but other kinds of IP are neglected. (See figure 2) (2) Lack of confidential training and education for employees. According to the trade secret law, if the obligee do not take security measures, the law and regulation will not forbid anybody obtain commercial secret via legitimate means and method. Consequently, the protection of commercial secret is very important for the enterprise especially with the increase of human resource flexibility in open innovation environment. The survey of trade secret disputes in China shows that 60% of criminal cases are caused by job-hopping of employees, and above 80% of disclosure cases are caused by the employee of the right holder (Zhang Suying, 2010). Even though a confidential agreement is signed between the employer and employee, the commercial secret is still easy to be revealed because of lacking guidelines for the employee to make judge between confidential information and non-confidential information. (3) Confused management of IP trading contract. This problem is mainly caused by the lack of dedicated management regulation and professional management staffs. Most of the enterprises are weak in the establishment, auditing and surveillance of the contract terms. They can not differentiate and control the IP trading risk by reasonable contract management means.



Figure 2 Actuality of Trade Secrets Management in Chinese Enterprises

4 Countermeasures of IP Management in Open Innovation

The effective management of IP is crucial in open innovation, not only in identifying useful external knowledge but especially to capture the value of a firm's own IPRs.^①For better understanding, author simplifies the open innovation as a linear process. Knowledge and technology come into this process through technology import phase, and pass through R&D phase. New products and new technologies access to market after commercialization phase. (See figure 3) Each phase has its own trait, and this requires the enterprises to configure relevant IP management countermeasures according to its trait.

① Open Innovation and Intellectual Property. www.proinno-europe.eu/extranet/upload/.../3_3_Rutz799_5.pdf

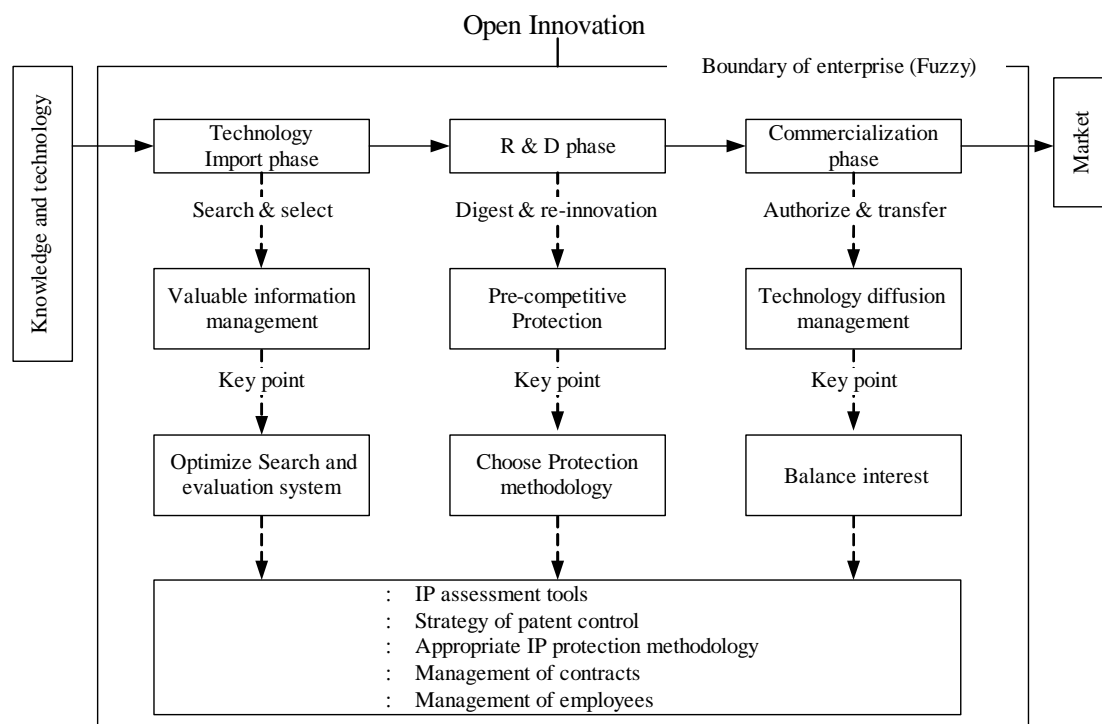


Figure 3 Enterprise IP Management Model in Open Innovation

4.1 Technology import phase

Technology import is the initial point of technical innovation. Acquisition and selection of related information or technological achievements is of decisive significance for enterprises. On one hand, many people in different firms may do the same research and development simultaneously, while the patent has been authorized to others. Therefore, technical innovation may relate to patent analysis, patent avoidance and patent decoding. If enterprises can not take a full grasp of patent information accurately, they would perform similar research, which is not only a waste of money, but also likely causes IP disputes. On the other hand, owing to open innovation, difficult problems can be solved in different ways by greater use of external resources. However, which way would be better becomes another important problem (Jill Jusko,2009). In this case, “search and evaluation” is the key point of IP management in this phase. Enterprises should improve the IP retrieval system and IP assessment tools, including: (1) build up enterprise special appropriate IP database, (2) IP information analysis system, (3) patent control strategy etc.

Another point worth being noted in this phase is valuable information management. New IP is generated during searching and evaluation since many useful information will be gathered and new valuable information like reports of status and forecast on some technology or market competition will be formed through some creative intellectual activities such as data analysis, market analysis and valuation (Fan Zaifeng,2004). In other words, enterprises ought to establish appropriate IP strategy to manage the valuable information not only by means of patent but also copyright or trade secret, and to configure special employees to monitor and track their IP through markets and networks. Besides, IP trading contract management is also a key point of this phase, and it will be discussed thoroughly in 4.3.

4.2 R&D phase

R&D phase is the core phase of technical innovation, whether in open or closed innovation. In this phase, enterprises digest and absorb the technological achievements selected in the previous phase and create new technologies or new products via independent R&D or cooperative R&D. However, these new technologies or products have not yet been put into market competition and the enterprises have not yet been rewarded either. Thereupon, it's important for enterprises to prevent others from applying patents first or getting prior rights on using the same technologies or products. In this sense, IP management in this phase appears more closed than in other phase so that “control and protect” is the key point of pre-competitive technology management.

Coca-Cola's enduring experience indicates that the choice of IPR protection methods is crucial. For

example, patent requirement is novelty, utility and uniqueness. If a core technology applies for patent, the applicant must publish its characteristics to distinguish the current technology. Once be authorized, the patent would be protected by legal force, while if it failed, the core technology might be published. On contrast, trade secret requirement includes confidentiality, value and taken security measurements by its owner, which makes the object scope much wider than patent's and enables the trade secret owner to get certain level of legal protection without publishing its core element, though the strength is less than patent's. Obviously, different protection method have different effect and intensity. During the process of R&D, the keystone of IP management is to configure different strategies of IPR protection and take comprehensive method, according to practical factors such as the characteristics of new technical achievements, the industry characteristics, and economic capacity of the enterprise to realize IP dynamic management.

4.3 Commercialization phase

Commercialization phase is the technology diffusion phase in technical innovation. Contrary to closed innovation, the open innovation expects that new technological achievements can be valuably diffused outside in more ways. This is the most salient feature of open innovation. Thus, the focus of IP management in this phase should be how to improve the management of IP contract to balance the interests and avoid IP disputes effectively. In the main while, IP contract management includes two parts--internal and external IP contract management.

1) Internal IP contract management. The technology diffusion actually includes internal diffusion and external diffusion. The internal diffusion means technological achievements flow from one department to another inside the enterprises. This diffusion leads to the expansion of knowing scope, and increases the risk of spillover of internal technology. From the cases shown in 3.1, it can be seen that if a service invention was unauthorized sold by employee or lost with the staff "quit", the interests of enterprise would be greatly damaged (Zhang Haifeng, 1999). In this sense, managing the internal IP contracts means to clear the ownership of the technological achievements and the obligations of the employees. Enterprises ought to organize professional staffs to complete the contract terms, in order to let the employees know what to do or should not do. Besides, the enterprises should also update knowledge of employee timely by holding training programs regularly, and ensure the employees understanding what kind of information (or technology) is forbid to leak.

2) External IP contract management. Corresponding to the internal diffusion, external diffusion refers to technological achievements flow out the enterprise to enter the market or be used by other enterprise. In open innovation, external diffusion becomes more obvious. Besides absorbing external ideas or technology widely, the enterprises will likely authorized other to use or even transfer the technological achievements (especially the non-core or idle technology) to maximize economic benefits. So, protecting IP by trading contract comes to the fore (Oliver Gassmann, 2006). In commercialization phase(also in technology import phase), there're several problems should be noticed:

A) Restrictions of technology use area. The same technology used with different approaches may have varing functions or produce different purposes. When an enterprise licenses some technology, it may authorize different licensors to use for different purposes. If the licensee (authorized subject) improve this authorized technology, and then re-license the new improved technology to another enterprise in the related field of licensor (original authorizer), it may likely damage the competitive advantage of original authorizer. Therefore, no matter in technology import phase or in commercialization phase, the enterprises should prescribe the use area of authorized technology and improved technology explicitly to avoid the vicious competition between licensor and licensee in configuring IP trading contract (Liu Chengyu, Lai Wenzhi, 2000).

B) Ownership of improved technology. As discussed above, the licensee may develop better technology which has grater commercial value in practice. However, because the new improved technology is built upon the original technology, it could not be used solely if there is no permission of original licensee. Therefore, enterprises should find out the most appropriate mode to distribute the ownership of improved technology and balance the interest of innovation participator (Tang Anbang, 2004).

C) Liability of technology defects. There is a basic law principle that nobody can grant someone else the right he didn't owned. When applied to technology licensing, this principle requires that licensor should has the full disposition of the technology that he provided. That means the licensor should bear warranty liability of right defects about the subject technology (Liu Chengyu, Lai Wenzhi, 2000). This is a basic requirement for technology licensing. However, with the improvement of information access capacity, many technology owners are not sure whether the technology that they developed did not

infringe the IPR of others. In order to avoid responsibility, several licensors made some terms to refuse to promise in licensing contract. In this case, once the third party advocates their rights, generally, the licensee may have to bear by themselves. To the licensee, this is extremely unfavorable. An unfair trading causes disputes that will not only increase costs, but also obstruct the realization of maximum commercial value. Accordingly, enterprises should clear the liability ascription of technology defects in IP trading contract, and this is the effective way to ensure fair trading and to protect the legitimate rights and interests of both trading parties.

5 Conclusions

IP management modes can be generally summarized as open management mode, closed management mode and mixed management mode. Considering the protection efforts, the closed mode> mixed mode> open innovation mode, while considering the management costs, it's on the opposite. This means different management mode has its own advantage and disadvantage. In intellectual economy era, IP, as a scarce resource, reflects core competitiveness of enterprises. The emergence of open innovation mode makes enterprises no longer stick to high-cost independent R&D, but focus on widely using external resources such as cooperative R&D, purchase and licensing in technical innovation. Accordingly, how to use the internal and external IP effectively becomes the new key point instead of the "strict control" in enterprises. Therefore, the enterprises should have an overall consideration on the practical factors and the characteristics of different innovation phase when they are making the IP management strategies. In addition, IP management is a systematic project, and establishing the management strategy internally is not enough. The enterprises should actively participate in the formulation of national IP strategy and policy which adapt to open innovation, and cooperate with the government, university, research institution to enhance the capability of IP management via constructing and improving IP management information platform(include website and database), IP market transaction system, IP transaction intermediary organization, IP legal system, professional personnel training. How to improve the external environment for enterprise IP management is another important study in open innovation.

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