Study on Collaborative Utilization of Intellectual Property in Strategic Alliance

Yang Liuqing, Wang Sirong
School of Management, Wuhan University of Technology, Wuhan, P.R.China, 430070
(E-mail: yangliuqing1988@163.com, wangsirong19880910@163.com)

Abstract: With the development of strategic alliance cooperation form, strategic alliance has gradually become the important way to share intellectual property for enterprises. Based on analyzing the forms and obstacles of intellectual property collaborative utilization in strategic alliance, this paper proposes agreement safeguard mechanism of intellectual property collaborative utilization in strategic alliance, Through constructing the game analysis model of intellectual property collaborative secrecy incentive agreement, the paper concludes the best incentive agreement. Finally, it puts forword related suggestion according to the government behavior in intellectual property collaborative utilization in strategic alliance.

Key words: Strategic alliance; Intellectual property; Collaborative utilization; Agreement safeguard mechanism

1 Introduction

With the continuous development of economic integration, enterprise competition gradually become fierce, strategic alliances are established among more and more enterprises. As a core competency of strategic alliance, knowledge sharing occupies an important position in the development of strategic alliance. Therefore, how to make the good intellectual property collaborative utilization mechanism formed among alliance enterprises is an important guarantee for implementing strategic alliance effectively, which could prevent one party of the alliance doing moral hazard behavior.

Many experts do some research about collaborative management of intellectual property. Trappey Amy and Ding Lian consider that the critical success factors for enterprises operating in knowledge-based economies include the ability to effectively accumulate knowledge, the ability to utilize knowledge, and the drive to create intellectual property (Trappey Amy, 2005 and Ding Lian, 2009)[1-2]. Mehlman thinks that it requires careful internal alignment and appropriate negotiations of non-disclosure and joint development agreements (Mehlman, 2010)[3]. Chen Li puts forward the line of thoughts and countermeasures of collaborative management on the basis of full cooperation and win-win (Chen Li, 2011)[4]. Liang Yingillustrates the main contents of patent resources collaborative management between enterprises,then proposes the patent resources collaborative management methods and steps (Liang Ying,2009)[5]. Hipp puts forward that informal protection mechanisms partially compensate incomplete formal mechanisms and largely prevent imitation and uncontrolled knowledge-spillovers across the duration of the partnership (Hipp, 2009)[6]. These researches focus on the methods, contents and steps of intellectual property collaborative management, while this paper do the research from the point of intellectual property collaborative utilization, construct agreement safeguard mechanism of intellectual property collaborative utilization in strategic alliance, and establish the game analysis model of intellectual property collaborative secrecy incentive agreement, finally concludes the best incentive agreement.

2 The Forms and Obstacles of Intellectual Property Collaborative Utilization in Strategic Alliance

2.1 The forms of intellectual property collaborative utilization in strategic alliance

As the intellectual property collaborative utilization in strategic alliance develops and evolves continuously, its formal diversification gradually form,which includes intellectual property sharing, intellectual property internal implementation, license and transfer of intellectual property, building technical advantage and barriers, forming patent alliance, establishing the industry standard.

(1) Sharing intellectual property

Sharing intellectual property is to gather every alliance enterprises' intellectual property information into intellectual property information base among alliance enterprises for sharing.The sharing under this form doesn't include licenses and ownership of Intellectual property. Furthermore,

alliance enterprises could not disclose intellectual property information, this information can only be used within the enterprises.

(2) Internal implementing of intellectual property

Internal implementing of intellectual property is a interactive license form only towards specific intellectual property among alliance enterprises.

(3) Licensing and transferring of intellectual property

Licensing and transferring of intellectual property means that alliance enterprises license and transfer the intellectual property which is jointly possessed by their collaborative research, or alliance enterprises pack their own associated intellectual properties and license them, then distribute the intellectual property license fee or transfer fee.

(4) Constructing technological advantages and barriers

Constructing technological advantages and barriers need to gather many effective related core intellectual property,and use the spillover effect of the aggregate,then form technical barriers to obtain more intellectual property income.

(5) Setting up patent alliance

In the process of strategic alliance, enterprises share intellectual property through coproduction, joint sales or co-operate on new technology, finally, the alliance which is only used to manage patent is gradually formed.

(6) Establishing industry standard

Establishing industry standard happens after the patent alliance develops to a certain level.It only can be implemented when there are all the relevant patent about a certain advanced technology in the patent pool.

2.2 The obstacles of intellectual property collaborative utilization in strategic alliance

In recent years, although intellectual property collaborative utilization in enterprise strategic alliance develop fastly, there are certain obstacles in the collaborative utilization process, including the following three types: the collaborative obstacle brought by competitive cooperation, the collaborative obstacle brought by agreement incompleteness,and default risk obstacle brought by insufficient supervision and incentive mechanism.

The cooperation between the alliance enterprises is built on the competition, the relationship of collaborative utilization only rely on the agreement constraints,which do not have enough binding effect upon parties.Thus, concerned with interest of themselves, strategic alliance enterprises will take some measures to guard against other enterprises breaching agreement, which would bring obstacle to intellectual property collaborative utilization. Strategic alliance enterprise hides part of intellectual property information, leading to other enterprises not fully grasping information. So they cannot successful use the information to produce and provide service, which make synergy don't play fully.

Because intellectual property collaborative utilization in strategic alliance is still in the primary stage, the institution has not been perfected, therefore collaborative agreemnts are incomplete. Based on this, the collaborative obstacle brought by agreement incompleteness form. As the main constraint way, collaborative agreemnts play an important guiding role for alliance enterprises' behavior. If the agreements are not complete, the binding effect of agreements to alliance enterprises is not strong, then enterprises may use agreements' vulnerabilities for private gain, and damage the interests of other enterprises, which make the whole synergistic effect lower. If the regulation in agreement for profit distribution is not clear, it will result in conflict of interest among enterprises during profit distribution, which reduce the stability of the collaborating organization and lead to collaborating failure.

Default risk obstacle brought by insufficient supervision and incentive mechanism is due to the lack of a third party which do supervision and incentive within the collaborating organization. Supervision is the foundation of agreement execution and incentive, lack of supervision mechanism will make the breach behavior increase. Furthermore, supervision could restrict the abuse of power. If there is not supervision mechanism, the power of some stronger enterprises in collaborative organization can not be restricted, then these enterprises will only consider from their own benefits, prevent other enterprises from using the intellectual property. Incentive mechanism is the important measure to realize restraint, if there is not incentive mechanism, we could not encourage and punish properly the behavior of alliance enterprises in intellectual property collaborative utilization, so enterprises will break agreements for their maximum benefits, which would disturb the balance of collaborative utilization.

3 Agreement Safeguard Mechanism of Intellectual Property Collaborative

Utilization in Strategic Alliance

That constraint force of agreement is not enough is the important reason for the obstacles of intellectual property collaborative utilization in strategic alliance, therefore, establishing an effective agreement safeguard mechanism is the important measure to guarantee the intellectual property collaborative utilization. The vital agreements in agreement safeguard mechanism among enterprises include intellectual property information internal disclosure agreement, patent grant for each other agreement, and intellectual property collaborative confidentiality agreement.

Intellectual property information internal disclosure agreement requires the collaborative enterprises to disclosure the intellectual property information which has approved to announce and is related to collaborative utilization information base. In addition, collaborative enterprises should conduct patent search of their owned patents in the construction of intellectual property collaborative utilization system, and then disclosure the intellectual properties related to collaborative utilizationa information base. They need to express of their intension of licenseing their intellectual properties as well. If collaborative enterprises intentionally hide the relevant core intellectual property rights, or don't do patent search, and they only disclosure their lower value intellectual properties for other collaborative enterprises' intellectual properties, we think these enterprises break the internal disclosure agreement.

Patent grant for each other agreement requires the collaborative enterprises to grant their existing and future owned patents' use right for each other. There are a lot of complementary patents and obstructive patents in patent collaborative utilization organization, if patent collaborative utilization organization break up, the collaborative enterprises must pay for the usage of patents which are free before breaking up. Thus, this agreement provides the safeguard for alliance enterprises to get low cost intellectual property rights from the alliance organization.

Intellectual property collaborative confidentiality agreement requires the collaborative enterprises not to let out the information in intellectual property information base. When the intellectual properties are used, the collaborative enterprises license their intellectual properties to other enterprises for free, at the same time, they also get the information of other enterprises' intellectual properties. Thus collaborative enterprises may leak the intellectual property information for additional benefits. Although the behavior would bring loss to the collaborative organization, the loss is borne by all collaborative enterprises, then the loss of the enterprises which leak the information is much less than their benefits, which make the enterprises tend to leak information. This agreement identifies this behavior as a breach. Based on this, when enterprises leak information, they will consider default penalties after they are found, thereby reduce the possibility of leaking information. Thus it can be seen that the interest relationship of alliance enterprises in the process of property collaborative utilization is game relationship, so we can build an incentive agreement game analysis model to get the incentive coefficient of the best incentive agreement.

In the organization of intellectual property collaborative utilization, the alliance enterprise which leak intellectual property can be regarded as one part of the game, and the alliance organization can be regarded as the other part of the game. For the convenience of analysis, we divide the distribution of interests of intellectual property collaborative utilization into two steps: the first step is that enterprise put all the excess profit to the alliance organization after they obtain profit by using alliance intellectual property; the second step is that alliance organization return a certain percentage of the excess profit to the alliance enterprise according to the agreement signed before, and then increase or decrease a certain amount of excess profit according to the incentive coefficient to achieve the purpose of incentive.

According to the game process, let β be incentive coefficient decided by alliance organization, under a incentive coefficient,let a be the extent of the damage to intellectual property value brought by enterprise's moral hazard behavior, its corresponding loss of intellectual property excess profit is θ, and θ follows the fuction $\theta = f(a) = a + \gamma$, γ is a random variable of which mean is 0 and variance is δ^2. The moral hazard behavior of enterprise make loss to alliance intellectual property excess profit, it also create additional benefits to itself. Due to that the additional benefits brought by moral hazard behavior of enterprise is related to the extent of the damage to intellectual property value, we assume that the additional benefits brought by moral hazard behavior of enterprise is a function about the extent of the damage to intellectual property value a. For calculating easily, we assume that the additional benefits brought by moral hazard behavior of enterprise is $h(a) = \frac{a^2 b}{2}$.

Because alliance organization can not observe the extent of moral hazard behavior of enterprise, it only could confirm enterprise's moral hazard behavior through the loss brought by moral hazard behavior, then let $t\,(t>0)$ be the loss limitation accepted by alliance organization, which is caused by various reasons.When the loss brought by the enterprise is larger than the limitation, alliance organization considers that the enterprise does moral hazard behavior and then punish it. When the loss brought by the enterprise is smaller than the limitation, alliance organization considers that the enterprise does not do moral hazard behavior and reward it.

Let π be additional benefits of enterprise brought by using alliance intellectual property, and α be distribution of excess profit consulted by alliance organization and enterprise. Agreement Incentive is a funtion about incentive coefficient β and loss limitation t: $g(\beta,t)=\beta(t-\theta)$. Therefore, when both sides fix the incentive coefficient and loss limitation, the interests distribution is a function about θ. $s(\theta)=\alpha+\beta(t-\theta)$.

The net benefits obtained by alliance orgnization is that excess profit (π) of enterprise brought by using alliance intellectual property minus the interests distribution($s(\theta)$) under incentive agreement and the loss(θ) to alliance organization by enterprise's moral hazard behavior. The net benefits of alliance enterprise inlude the interests distribution($s(\theta)$) and the benefits by leaking intellectual property information. Thus, the net benefits of alliance orgnization(E_1) and alliance enterprise(E_2) are as follows:

$$E_1=\pi-s(\theta)-\theta \tag{1}$$

$$E_2=s(\theta)+\frac{a^2b}{2} \tag{2}$$

Alliance organization can't observe the action selection of the alliance enterprise directly, so it could confirm the extent of damage of enterprise's leaking behavior by the profit result, and then concludes whether incentive is realized. Consequently, this game is a determination of optimal incentive agreement under information asymmetry.

According to the assumed condition and constraint conditions of incentive model under information asymmetry, we build a incentive agreement game model of intellectual property collaborative utilization:

$$\max\left\{E_1=\pi-s(\theta)-\theta\right\} \tag{3}$$

$$\text{s.t}\quad \max\left\{E_2=s(\theta)+\frac{a^2b}{2}\right\} \tag{4}$$

$$E_2\geq\varpi \tag{5}$$

ϖ is the social average returns which the alliance enterprise could get when it don't sign the agreement of intellectual property collaborative utilization. It is decided by the enterprise's other market opportunities, and it is the precondition of signing the alliance agreement.

The solving process optimal incentive agreements are given below. First, calculate the first derivative constraint conditions of the optimization problem. Under the condition of given incentive coefficient, alliance enterprise chooses its damage extent. According to (4), get the first derivative of a as follows:

$$\frac{\partial E_2}{\partial a}=0,\ \frac{\partial(\alpha+\beta(t-a-\gamma)+\frac{a^2b}{2})}{\partial a}=-\beta+ab=0$$

$$a=\frac{\beta}{b} \tag{6}$$

Therefore, the first derivative incentive compatibility constraint condition of the optimization model is $a=\frac{\beta}{b}$.Due to that ϖ of individual rationality constraints is decided by market opportunity,

for the sake of discussion, we assume that the benefits obtained by enterprise in this alliance are not less than social average returns, which means that enterprise is willing to sign the agreement. Thus, the equation (5) is true.

Then put (6) to objective function (3), we get as follow:

$$E_1 = \pi - \alpha - \beta(t - \frac{\beta}{b} - \gamma) - a + \gamma \tag{7}$$

In order to get the optimal incentive coefficient β, we calculate the first derivative of β according to(7):

$$\frac{\partial E_1}{\partial \beta} = 0$$

$$-t + \frac{2\beta}{b} - \frac{1}{b} + \gamma = 0$$

$$\beta = \frac{bt - br + 1}{2} \tag{8}$$

Through the above game analysis, the optimal incentive coefficient of alliance organization is $\frac{bt - br + 1}{2}$, and at the same time the damage extent of alliance enterprise is $\frac{\beta}{b}$. In conclusion, incentive coefficient should be set according to income coefficient *b* brought by leaking behavior. The larger b is, the higher incentive coefficient is set; the smaller b is, the lower incentive coefficient is set.

4 Conclusion

In conclusion, at present the main obstacles of intellectual property collaborative utilization result from the alliance members' moral hazard behavior brought by the incompleteness of agreement. So the best way to inhibit the moral hazard behavior of alliance members is perfecting agreement mechanism of strategic alliance. Under the current agreement mechanism, lack of incentive mechanism cause the alliance organization to bear all the risk.While enterprise don't bear risk,it is likely to damage the alliance interests to achieve the maximization of self-interest, and then do the moral hazard behavior. Therefore, it is the key of perfecting agreement mechanism to establish proper incentive mechanism, which make the enterprise take the certain risk.

Meanwhile, playing the role of agreement mechanism must be based on two conditions: firstly, the guarantee of force. Law, the powerful guarantee of agreement, is based on regime force. Thus, it is vital of playing the alliance agreement's role to perfect the relevant law by government, and it also is the foundation of perfecting alliance agreement machanism; secondly, the effective supervision to the breach of agreement. Because strategic alliance is of instability, it is difficult to restrict the behavior of alliance members only through the internal supervision mechanism of alliance and the market mechanism, government must supervise the alliance strategic as a third party to inhibit the moral hazard behavior of alliance members.

References

[1] Trappey Amy J.C., Trappey Charles V., Lin Felix T.L. Automated Silicon Intellectual Property Trade using Mobile Agent Technology[J].Robotics and Computer-Integrated Manufacturing,2005, 22(3):189-202

[2] Ding Lian, Davies Dannie, McMahon Christopher A. The Integration of Lightweight Representation and Annotation for Collaborative Design Representation[J]. Research in Engineering Design, 2009, 20(3):185-200

[3] Mehlman Stewart K., Uribe-Saucedo Silvia, Taylor Ronald P., Slowinski Gene, Carreras Ed, Arena Chris. Better Practices for Managing Intellectual Assets in Collaborations[J]. Research Technology Management,2010,53(1):55-66

[4] Chen Li, Xu Fuyuan, Gu Xinjian. Analysis of Patent Resource Collaborative Management among Enterprises[J]. Enterprise Economy, 2011,2:27-30 (In Chinese)

[5] Liang Ying,Xu Fuyuan. The Research on Patent Resources Collaborative Management between Enterprises[J]. Science of Science and Management of S. & T., 2009,11:35-39 (In Chinese)

[6] Hipp Christiane, Bouncken Ricarda B. Intellectual Property Protection in Collaborative Innovation Activities within Services[J]. International Journal of Services, Technology and Management, 2009,12(3):273-296