

Research on Innovative Patterns of Financing of Intellectual Property Finance

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Abstract: Intellectual property is a strategic resource of national development and essential factor of international competitiveness, and finance is the core of modern economy. Strengthening the financing of intellectual property is an important way to promote the innovative development of society. However, the financing channel of intellectual property is not smooth in China, and enterprises have difficulty in financing and sink into the dilemma of high cost of financing. Therefore, the paper innovates to construct financing pattern of intellectual property finance and makes a detailed analysis about its implementation approaches based on the reference of useful experiences from foreign countries. Furthermore, the paper will build risk-compensation mechanism of intellectual property Finance. The purpose of the paper is to expand the financing channel and to improve the financing efficiency of intellectual property.

Keywords: Intellectual Property Finance; Financing Pattern; risk-compensation mechanism

1 Introduction

In recent years, as a way of financing innovation, intellectual property finance is gradually concentrated by diversified financial organizations. For enterprises which are asset-light, high-risk and high-yield, financing of intellectual property finance can help enterprises find its internal value and get support from financial resource.

According to statistical data of industry and business administration bureau, there are more than 462 000 small and medium-sized technology-based enterprises (tech SMEs) in China, but obtain opportunities about intellectual property pledge financing only have 1 850, which account for 0.4% of tech SMEs. In conclusion, although the innovation achievements in tech SMEs are rich, but there is no effective channel to obtain financing, and intellectual property is put aside and limited. The obstacles for the difficulty of financing of intellectual property finance lie in that the assessment of intellectual property is difficult; the degree of guarantee risk is high; the financing channel is few; the financing cost is high and so on. Firstly, the assessment of intellectual property involves many factors, such as law, market, and technology. So it is hard for value assessment to be stable, which directly influences the financing willing of financial organizations. Secondly, guarantee organization separate from appraisal agency, so

they fail to know the detail information of assessment. Once they provide service for the intellectual property which is incorrectly valued, they will pay huge amount of money. Thirdly, many tech SMEs only know intellectual property pledge financing and ignore other financing channels. Finally, the assessment fee, guarantee fee, and interest fee during the financing of intellectual property finance are high, which cause burden on tech SMEs.

2 International Experience of Financing of Intellectual Property Finance

2.1 Experience of Financing of Intellectual Property Finance in America

The United States has the world's most active intellectual property financial markets which has the most complicated transaction rules. And a significant feature of its intellectual property market is led by private enterprises.

The Handbook of Business Valuation and Intellectual Property Analysis issued by American scholars Jr. Robert Reilly and Robert Sehweih's represents the highest level of the research of assessment method for technology-oriented intellectual property. The book argues that when income method is used in intellectual property assessment, it should consider expected income, discount rate, and residual life.

To expand the financing channel, the United States

chose to develop intellectual property securitization which uses future earnings of intellectual property to financing. Furthermore, America established SBA to provide guarantee services for tech SMEs to strengthen the loan confidence of banks with the method of policy guarantee and to encourage banks to provide loan for tech SMEs.

China is still in the exploratory stage of intellectual property finance, and the intellectual property financial market has many problems. Because of this background, we can't fully copy the American model which has been relatively mature, but useful local experience such as value assessment, guaranty style, financing channel design, can be high-end learning and innovating.

2.2 Experience of Financing of Intellectual Property Finance in South Korea

Intellectual property finance is developing rapidly in South Korean because of government's great attention. The feature of financing pattern is that the government leads and manages intellectual property financial market, so the government is in the dominant position in the whole process of financing of intellectual property.

For the cultivation and development of intellectual property financial market, South Korean government takes the powerful support policy on market framework and market operation mechanism to provide a clear direction of development in market. In South Korea, if agency organizations such as guarantee organization want to attend financing business of intellectual property, they must be allowed by the government. Furthermore, enterprise can directly enters into financial organization to get loan when its intellectual property is evaluated by South Korean Sci-

ence and Technology Research Institute. In conclusion, South Korea develops financing of intellectual property finance and supports the development of tech SMEs with the method that the government completely intervenes in market.

We should use the power of government to integrate resources to promote development of intellectual property finance by learning about the Korean experience.

3 Innovative Patterns of Financing of Intellectual Property Finance and the Analysis on the Implementation Routine

3.1 Innovative Patterns of Financing of Intellectual Property Finance

The aim of intellectual property finance is to deal with financing and shoulder the task of scientific development. And expanding financing channels of intellectual property is the most direct reflection of this aim. Main innovation of financing patterns of intellectual property finance is reflected in depending on the diversified combination between tech SMEs with investment, credit, guarantee, mortgage, security, insurance, and transaction in different levels to build multiple financing channels of intellectual property, which is shown as in figure 1.

On the basis of assessment and guarantee of intellectual property , the pattern uses diversified combination between the assessment and guarantee organization, bank and lending institution, securities company, insurance organization, investment organization or individual, mortgage organization, and transaction platform in the financial market to develop new financing channels, such as intellectual

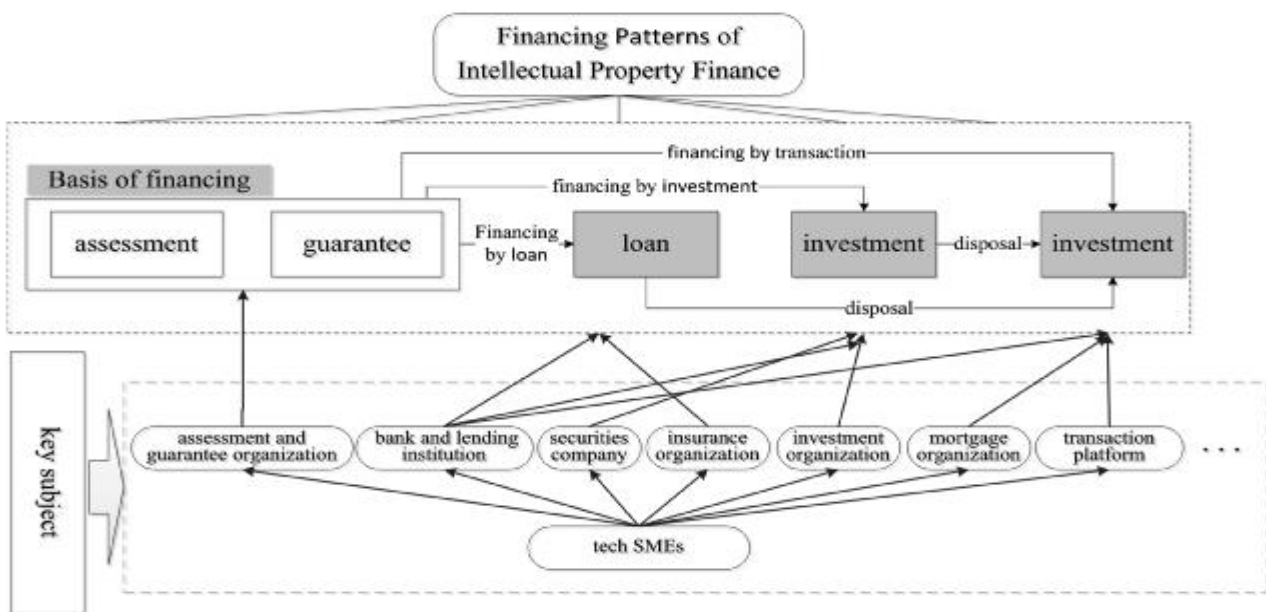


Fig.1 Innovative Patterns of Financing of Intellectual Property Finance

property pledge financing, right of license financing of intellectual property, integration financing of intellectual property, intellectual property securitization, transaction of intellectual property, and refinance of intellectual property and so on. The financing channels of intellectual property can be divided into three types: the first type is loan financing which is use the real right of intellectual property; the second type is investment financing by capitalizing the intellectual property; the third type is transaction financing by exchanging the commodity nature of intellectual property such as property right and use right to financing.

For assessment and guarantee, they are the foundation of financing pattern of intellectual property, and the starting point of financing. Any financing activity of intellectual property needs to pass the value assessment of intellectual property in assessment organization and the credit enhancement in guarantee organization. The pattern advocates to use the integrate system of policy assessment and guarantee to assure the accuracy and authority of valuation.

For loan financing, the most representative one is intellectual property pledge financing. And the subjects mainly include but not limit to tech SMEs, assessment and guarantee organization, commercial bank, and insurance company. The basic procedure of loan financing have four steps, firstly, assessment and guarantee organization assesses and guarantees the intellectual property; secondly, tech SMEs uses the property right of intellectual property as the pledge to loan from commercial banks; thirdly, commercial bank checks the loan and purchases insurance to reduce the risk; finally, tech SMEs get financing with the ownership of intellectual property.

For investment financing, the most representative one is intellectual property securitization. And the subjects include but not limit to tech SMEs, assessment and guarantee organization, securities company, and investor. The basic procedure of investment financing have four steps, firstly, tech SMEs employ assessment and guarantee organization to confirm the value of intellectual property and give guarantee to add credit of intellectual property; secondly, securities company takes intellectual property as major basic asset to securitize and issue in the market; thirdly, if investors are optimistic to the intellectual property, they would purchase this security; finally, tech SMEs get financing with the future profit of the intellectual property.

For transaction financing, the most representative one is direct transaction of intellectual property. And the subjects include but not limit to tech SMEs, transaction plat-

form, and purchaser of intellectual property. The basic procedure of transaction financing have three steps, firstly, tech SMEs and purchaser of intellectual property go to the transaction platform hang out one's shingle; secondly, the transaction platform matches and finds the parties with consistent supply and demand; thirdly, tech SMEs get financing by selling the ownership and use right of intellectual property.

By constructing the innovative patterns of financing of intellectual property finance, we can find the new way to make use of marketization to solve the financing of tech SMEs. As a result, the financing channels of intellectual property are expanded and the financing efficiency in tech SMEs is raised.

3.2 Analysis on the Implementation Routine of Financing of Intellectual Property Finance

Financing of intellectual property finance is a pattern which covers multiple financial subjects with the purpose of expanding financing channels. In order to assure pattern can be implemented smoothly, we must build database of intellectual property, and find value assessment approach which is dynamic. What's more, we should implement the integration of policy assessment and guarantee.

(1) Build the Database of Intellectual Property.

The database of intellectual property intends to input the detailed information of intellectual property, including basic data of intellectual property, process and result of assessment and guarantee, progress of financing, policy, and risk level and so on. The participation subjects of financing are not only the operator of the database but also the user of the database, who realize data unification, resource sharing, business interworking, and cooperation with the help of the database. Three sub-databases including loan, investment, and transaction are built in the database of intellectual property to track and manage the work of subjects in different financing channels of intellectual property.

In order to build the database of intellectual property, we should integrate resources at first. The database involves all subjects of intellectual property to assure the completion of data resource and requires subjects to input the progress of financing of intellectual property in real time to assure the effectiveness of data resource. Furthermore, we should assure the completion of the database of intellectual property in the technology field, so its building standard can refer to the setting of The High-tech Technology Fields that State Supports and Handbook of Key Fields of High-tech Industrialization that is Developed First to assure the database covers all industries and fields of intellectual property finance. Finally, the data-

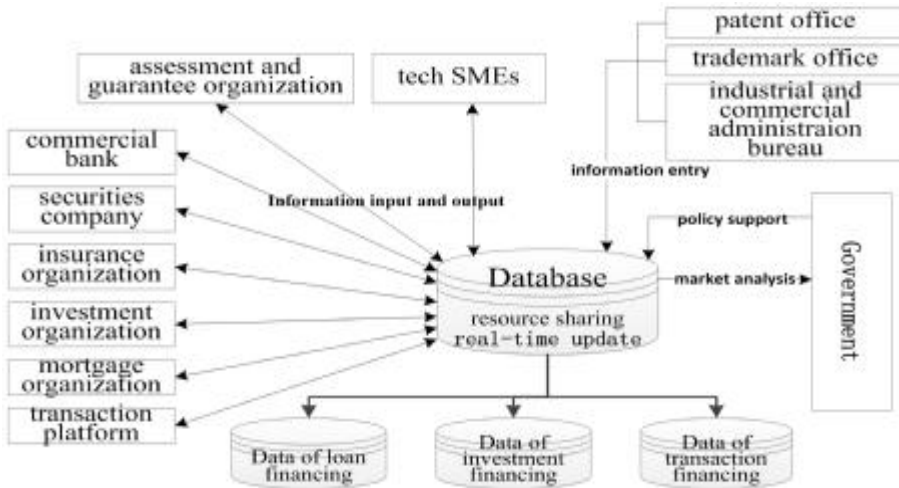


Fig.2 The Design of Database of Intellectual Property

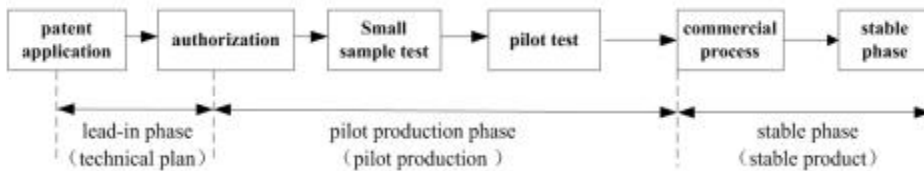


Fig 3. The Development State of Patent Technology

base should have the nature of deep processing, such as data selection, statistical analysis on line, and early warning of intellectual property, based on making full use of the original database of intellectual property in different countries.

With this database, experts can find the future development routine of current technologies according to the distribution of intellectual property. Investors can prevent the possible obstacles and risks of the development of technology in the future in the technology investment decision. The tech SMEs can analyze the degree of association and similarity of intellectual property and seek the potential investment partners. The pattern makes full use of the data of intellectual property to associate the subjects of intellectual property and to realize the information delivery and sharing between all subjects of intellectual property finance.

(2) Implement the dynamic valuation.

According to the experience of intellectual property assessment in America and the explorations of our scholars, the income method can be used in the intellectual property assessment, especially the assessment of technology-oriented intellectual property. And the parameters such as expected income, discount rate, and residual life should be considered. However, in the era of knowledge economy, the risk of intellectual property is a dynamic risk. With the updating of technology and the continuous

change of operation situation, the value of intellectual property is also in the changing process. Thus, it is not practical to fix the value of intellectual property with only one valuation.

Intellectual property institution persists in the principle of prior application in China. Take patent as an example. In order to dominate in intellectual property as soon as possible, an invention tends to apply for patent when it will be completely soon and its productivity has not shaped. At the moment, what the applicant of the patent provides is only technical plan. The technology which gets patent

right is not necessarily the mature and reliable technology. Before it is applied in industrial production, it is necessary to invest a lot of human resources, material resources, and financial resources with technical risks. Generally speaking, the development state of patent technology is shown as in Fig 3.

Therefore, the use of intellectual property in the pattern can be divided into three phases including lead-in, pilot production, and stable phase. According to the general life cycle of intellectual property, the proportion of time in three phases is 20%, 30%, and 50% respectively. In the valuation, assessment and guarantee organization should consider the present value of profit of intellectual property in different phases and should revalue in each phase to adapt to the dynamic change of value. The assessment of intellectual property is shown as in Formula 1:

$$V=K \cdot \left[\sum_{t=1}^{0.2T} \frac{P_1}{(1+i_1)^t} + \sum_{t=0.2T+1}^{0.5T} \frac{P_2}{(1+i_2)^t} + \sum_{t=0.5T+1}^T \frac{P_3}{(1+i_3)^t} \right] \quad (\text{Formula 1})$$

In the formula, V represents the value of intellectual property; K represents the divided rate of intellectual property; T represents discount period; P_i represents the profit amount in different phases; i_i represents discount rate of income. The connotation of the formula is that find the real value which is generated from intellectual property.

(3) Implement the integration of policy assessment and guarantee.

With the integration of assessment and guarantee, the mixed operation of assessment and guarantee is realized to guarantee the fairness of assessment. Furthermore, according to the beneficial experience in South Korea, building policy assessment and guarantee organization can strengthen commercial banks' confidence to loan with the help of government's authority. For example, government can organize to establish the subordinate assessment and guarantee organization to assess and guarantee the intellectual property that tech SMEs submit and apply for.

According to the regulations, SBA guarantees 80% of amount of the petty loan and guarantees 75% of amount of the large loan; the longest loan payback period is 25 years. We can learn the American experience that organization supply different guarantee services to different loan volume. Besides, guarantee is generally divided into full guarantee and partial guarantee. The full guarantee has higher risk and it is not equivalent with the expected profit, so the range of full guarantee should be enterprises that state supports first and the prior enterprises in the key fields of high-tech industrialization. For other types of enterprises, we can adopt the partial guarantee to reduce the risk and raise the profit risk ratio to improve the enthusiasm of attending financing of intellectual property finance.

4. Design of Risk Compensation Mechanism of Financing of Intellectual Property Finance

Risk compensation mechanism is a remedy mechanism after financing. It is easy for the high risk of financing of intellectual property to cause the loss due to failure of financing, which directly causes the dilemma that all financial subjects are not willing to enter into the financial market of intellectual property. But a set of scientific and complete risk compensation mechanism can effectively relieve the fear of all financial subjects. The risk compensation mechanism can be divided into internal compensation and external compensation.

4.1 Build Government-oriented External Risk Compensation Mechanism

The construction of external risk compensation mechanism mainly depends on the government. This mechanism, for one thing, can assure the compensation fund for financing of intellectual property has long-term and stable fund source. For another, it can make up the profit gap of financial subjects and effectively to reduce the financing cost of tech SMEs. The operation of the mechanism is shown as in Table 1.

Table 1 Government-oriented External Risk Compensation Mechanism

Fund Source	External Compensation Way	Risk Compensation Effect
All Subsidy Funds of Tech SMEs in the Central Government's Financial Budget	Policy Subsidies	Economic Leverage→Credit Risk (Amplifying Effect of Amount of Financing)
All Subsidy Funds of Tech SMEs in the Local Government's Financial Budget		Policy Orientation Effect→Risk of Market Selection
Fund from Policy Financial Organizations. (Assessment and Guarantee Fee From Policy Assessment and Guarantee Organization)	Specialized Fund	Cost Reduction Effect→Asymmetry between Profit and Risk
Donation of Large Enterprises and All Walks of Life		Loss Compensation Effect→Failure Risk

(1)External Risk Compensation Mechanism Based on Policy Subsidies.

Due to the credit risk in tech SMEs, most of financial organizations steps back when facing financing of intellectual property finance. But the government can make full use of the subsidy fund in the financial budget in the central government and the local governments to subsidies all interests in the process of financing of intellectual property. Policy subsidies can motivate subjects' participation motive, and promote fund to enter into the financial market of intellectual property effectively, which play the role of economic leverage.

Tech SMEs could acquire f—the total amount of financing due to high credit risk. When f=0, it represents enterprise fails to acquire financing. And enterprise acquires the profit (P) before the policy subsidies is implemented; bank's loan interest is r; the standard of policy subsidies is R. When the government is willing to give the policy subsidies rate (I), the financing amount (Y) that the enterprise will acquire is shown as in the Formula 2:

$$Y = \frac{P}{P - f \cdot r \cdot (1 - I)} \cdot R + f \tag{Formula 2}$$

The formula reflects that the result of leverage is that tech SMEs get Y-f as the financing amount. P/[P-f·r·(1-D)] is the financing leverage coefficient, which reflects the proportion of social fund promoted by the policy subsidies. The economic leverage of policy subsidies reflect that when the amount of subsidies change slightly, the financing efficiency of tech SMEs will change sharply, which has the amplifying effect and reduces the credit risk of tech SMEs.

In the financial market of intellectual property, the resources of expert and information that subjects have are limited, and they fail to confirm the intellectual property which has better prospect. But they can refer to the government's policy subsidies to find the industries and technologies that the government support and use policy orientation effect to reduce the risk of market selection.

(2) External Risk Compensation Mechanism Based on Specialized Fund.

Financing of intellectual property finance always faces the asymmetry between profit and risk due to high financing cost. That is to say, high financing cost directly compresses the profit space of financial participants of intellectual property. Therefore, government can use specialized fund of risk compensation provided by policy financial subjects as the subsidy of credit level, financing guarantee business and risk. By this way, conflict between profit and risk can be directly alleviated.

The specialized fund of risk compensation can reduce the financing cost effectively. Concretely speaking, the fund can directly make up enterprises' explicit cost such as assessment expense (C_1), guarantee expense (C_2), and auxiliary expense (C_3), and notarial expense (C_4). The reduction proportion for the specialized fund of risk compensation (I) is 30% ~ 70%. If C is the financing cost of intellectual property after the specialized fund of risk compensation is embedded, the effect on reduction of financing cost of intellectual property is reflected in Formula 3:

$$C = \sum_{i=1}^n C_i \cdot (1 - I) \quad \text{(Formula 3)}$$

In Formula 3, the cost before the specialized fund of risk compensation is embedded is $\sum_{i=1}^n C_i$; the cost after it is embedded is C . With the support of policy, the financing cost reduces by $C - \sum_{i=1}^n C_i$. That is to say, the government undertakes $\sum_{i=1}^n C_i \cdot I$. The formula reflects the saving effect of financing cost after the specialized fund of risk compensation is used, which solves the asymmetry between financing profit and risk effectively.

Besides, another effect of specialized fund is that it compensates the loss of all financial subjects if they fail in the financing of intellectual property. For example, when tech SMEs fail to pay back the loan in the intellectual property pledge financing, banks will have the relevant loan loss. In this time specialized fund can compensate parts of the loss. Thus, specialized fund can reduce the failure risk of financing effectively, and remove financial

subjects' fear of financing to some degree.

4.2 Build the Risk Retention-based Internal Risk Compensation Mechanism

Risk retention is an important risk management way. All financial subjects measure risk with some methods to count the expected loss caused by risk and compensate the loss with the internal resources.

Table 2 Internal Risk Compensation Mechanism Based on Risk Retention

Fund Source	Internal Compensation Method	Risk Compensation Effect
Loss Reserve drawn by Financial Subjects	Build Internal Fund	Loss Compensation Effect → Failure Risk
Line of Credit from Bank		

The most basic method of risk retention is to build the internal fund. Financial subjects draw the reserve peer year and negotiate with banks about the line of credit of loan, which is regarded as the foundation of building the internal fund. When financial subjects fail in the financing of intellectual property finance and result in losses, they can use this fund rapidly to compensate the losses. Financial subjects are initiative when they compensate the loss, whose financial flow will not be attacked. Furthermore, the internal fund is owned by subjects, so its operation can make investment profit.

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