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Research on the Value Evaluation of Enterprise Technology Patent Pledging

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ABSTRACT: Today, in the information age of the 21st century, economic globalization has gained rapid development thanks to the promotion of theinformation revolution. After China's accession to the WORLD Trade Organization, it has become more deeply involved in economic globalization. Obviously, this represents more opportunities and development, but with it comes more fierce international competition. Want to be the more competitive side in the global competition, survive and win the competition. Small and medium-sized enterprises began to find a new way to start from the pledge of intangible assets, one of the more popular is the pledge of patents. Therefore, people pay more and more attention to the evaluation of patent right. However, the evaluation system related to patent right in China is still in the growth stage and is not fully mature. Therefore, it is an urgent task to constantly try to explore and find problems so as to obtain more applicable evaluation methods.

Keywords: Intangible assets; pledge; patent right

I. INTRODUCTION

As the largest developing country in the world,follow the pace of the world's economic development into economic globalization,after accession to the World Trade Organization in 2001,China's awareness of intellectual property protection is only in the primary stage,after that, relevant laws and regulations were drafted and implemented to enhance people's attention to intangible assets and awakening the protection consciousness of intangible assets,this series of operations has been recognized by other countries.However, this is still a preliminary stage for China, and there is only a certain distance between the understanding and thorough protection of intellectual property rights under the imperfect mode of market economy system .In terms of China's situation at that time, the protection consciousness of intellectual property was weak, and enterprises failed to realize the economic benefits that intellectual property could bring.At that time, domestic enterprises were eligible to apply for tens of thousands of major inventions from the Ministry and above each year,but the final number of patent filings is only 10% of the statistical data,this is a fatal blow to the development of China's innovative science and technology industry.Enterprises pay more attention to tangible assets than intangible assets,so the protection of intangible assets is negligent.However, with the promotion of economic globalization, intangible assets have gradually become the decisive factor for the future development of science and technology enterprises. Therefore, it is an extremely important task for enterprises to enhance their protection awareness of intangible assets.

With the development of economic globalization, all walks of life are facing increasingly fierce competition. Corresponding to this, the living environment of small and medium-sized enterprises is also full of opportunities and difficulties. In order to adapt to the increasingly severe living environment, they have to improve their own economic value and enhance their core competitiveness as soon as possible.How to reach the core competitiveness in international competition is inseparable from development. However, when small and medium-sized enterprises seek development, they will inevitably lack of funds due to their limited scale and poor risk control ability.To solve the financial problem, as the economic center of gravity shifts to intangible assets, the State establishes and promulgates relevant legal provisions to promote the awareness of the protection of intangible assets, make the enterprise to pay more attention to intangible assets gradually, it also promotes the development of intangible assets evaluation to some extent, thus the way of intellectual property pledge financing has become a popular choice of small and medium-sized enterprise financing.Intellectual property mainly include patent rights, copyrights, trademark and so on.For small and medium-sized technology enterprises, patent pledge is the most appropriate option.

In order to promote the importance of patent

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rights, to facilitate the pledge of patent rights, guarantee the realization of creditor's rights, and standardize the pledge of patent rights, the State Intellectual Property Office revised the "Measures for registration of patent pledge" in 2010, and then carried out nationwide and implemented on 1 October of that year.The revised "Measures for registration of patent pledge" not only ensures the interests of the pledgee to a greater extent, but also makes relevant services more efficient and reduces the difficulty of patent pledge.It greatly increased the number of patent pledge, and also promoted the initiation and development of related industries.The evaluation work which plays a decisive role in the existence value of patent is gradually developed by the rise of patent pledge financing.However, due to the big difference between patent pledge and asset pledge in the traditional sense, the relevant policies have strict guarantee guidance and standard requirements for patent pledge in the early stage, but this has the opposite effect.The fundamental reason lies in the particularity of patent right, which leads to the difference between the factors affecting the evaluation of patent right pledge and those affecting the traditional assets pledge, resulting in the problems in the evaluation process and the deviation of the evaluation results.

By studying the value evaluation process of patent assets at home and abroad, it can be seen that there are manyalternativeevaluation methods. With the deepening of economic globalization, enterprises pay more attention to win the competition and obtain capital development by mastering intangible assets, so the relevant theoretical knowledge is relatively complete.However, many theories and evaluation methods do not mean that the value evaluation of patent assets has been perfect, and there are still many deficiencies.The number of patent asset value evaluation cases is not much in China, it is also very important to find the method suitable for the evaluation object in the process.Due to its characteristics, the influence of patent assets in the process of value evaluation is greatly different from that of traditional property evaluation. Therefore, it is also necessary to explore the influence factors in the process of research.

Based onthe patent pledge of Zhongyi alloy technology in Dongguan as an example,through the patent pledge evaluation process to find existing problems, and find out the influencing factors of patent pledge evaluation, put forward reasonable Suggestions, we will further improve the technology patent evaluation, more accurate assessment results, the value of the patent right will be better assessedand the interests of the pledgee will be guaranteed to the greatest extent.

II. LITERATURE REVIEW

2.1. Status quo of foreign research

Around as early as the 19th century, Western countries realized the importance of intangible assets to future economic development, awakened the consciousness of protecting intangible assets, this is why some countries are focusing on the construction of professional asset appraisal, and after another has issued a series of laws and regulations, to ensure that research on intangible assets appraisal can be applied to practice as soon as possible,to ensure legal protection of patent value, this measure has greatly promoted the development of intangible assets and driven the progress of the national economy.Among them, the United States and Britain play an important role in the construction of intangible assets evaluation system.In particular, the American evaluation industry has a leading role in the practice of intangible assets evaluation and the theoretical research of intangible assets, which greatly promotes the development of intangible assets evaluation.

In its origin, the rapid development of the American economy is closely related to the loose policies that vigorously promote economic development.After the Second World War, the United States had a lot of things to do. Faced with the disastrous domestic economic situation and people's living standards, the United States decided to vigorously promote economic development with policies, lowered the threshold requirements in all aspects, and tried to stimulate economic development that brought depressed economic situation back.Therefore, intangible assets ushered in a development climax. At that time, the rapid progress of science and technology also made the status of intangible assets more important.In such economic environment, the asset appraisal industry in the United States has developed, and that's why the U.S. assessment industry system is so comprehensive, including many.On the basis of traditional real estate appraisal, it also includes movable property, jewelry, art design, mechanical equipment and intangible assets appraisal. Therefore, compared with other countries, the United States has a deeper understanding and research on the importance of intangible assets evaluation. In the 1960s, the American Association of appraisers realized the importance of standardizing intangible assets appraisal, set up relevant appraisal committees, and assigned committee members to provide professional guidance and standardized training for intangible assets appraisal. After that, through continuous research and analysis, the American Association of Appraisers found that intangible assets and corporate values are assessed to some extent, so they have more

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relevant needs. On this basis, the intangible assets appraisal committee is changed to the enterprise value Committee.While guiding the intangible assets appraisal, the members of the committee will also focus on the enterprise value. This move has a profound impact on the futuredevelopment of intangible assets appraisal in the United States. At present, the U.S. "Uniform Guidelines for Professional Appraisal practice" although lacking specific structural provisions for intangible assets appraisal standards, the enterprise value appraisal standards not only regulate the enterprise value, but also include the requirements for intangible assets appraisal. Driven by the US policy, the value of intangible property has gradually entered people's vision. According to the US Wall Street stock market data, enterprises with proprietary technology and brand value often have higher economic benefits.In 1989 Nabciscp, a maker of Oreo cookies, took out a $26.2 billion bank loan based on the value of its brand, even though its balance sheet showed it had $5.8 billion in assets.In 1990, Dorden Company borrowed $480 million from Citibank with its company trademark as collateral. These cases all prove that banks and other financial institutions increasingly believe in and attach importance to the value represented by intangible assets, and intangible assets pledge loans have become common under the promotion of relevant laws and regulations.

Compared with the United States, Britain's research on intangible is less mature, because it pays more attention to the traditional real estate appraisal in the process of economic development, and does not start the intangible assets appraisal early.The understanding of intangible assets evaluation has not been included in the evaluation system either on the theoretical basis or in the actual operation, so the relevant laws and regulations or evaluation criteria of intangible assets are deficient.But with technology driving the economy, after realizing the important position of intangible assets in the economy, Britain quickly gave the appropriate response. In the late 1970s, British accounting policies related to intangible assets were studied and discussed, giving a certain degree of loose, allowing companies to use when writing the balance sheet as an intangible assets with value, loose policy is the best boost to economic development, so the relevant companies began a more in-depth analysis of intangible assets,trying to bring the value evaluation of intangible assets into practice.

Intangible assets occupy the important positionin in the knowledge economy, the standardization of patent evaluation method for intangible assets was first found in 1979, The United Nations has promulgated three methods to patent evaluation, cost method, market method and income method, has carried on the systematic elaboration, it is also the emergence of the initial prototype of the three basic assessment methods.The Intangible Assets and Intellectual Property Evaluation written by Gordon Smith in 1989 is still the most representative work on intangible asset valuation even today.It was also the appearance of this book that solved many difficulties for the development of intangible assets evaluation. It also firstmentioned that the patent intangible assets should be advocated to consider their future earnings, which opened up people's thoughts on the patent intangible assets evaluation.

2.2. Status quo of domestic research

The professional asset appraisal first appeared at the end of the 19th century, and it has only a short history of more than 100 years.Compared with real estate appraisal, intangible assets appraisal can be described as new industries.As the world enters the knowledge economy, the economic center of gravity has been shifting from tangible assets to intangible assets.In addition, the deepening of economic globalization has made cultural exchanges collide. Under such circumstances, the asset appraisal major has been continuously developed and supplemented,and gradually matured.Compared with the mature asset appraisal industry in foreign countries, the concept of asset evaluation was introduced in China, there are gaps and deficiencies in the 1980s, naturally has some gaps and deficiencies, but it also gives space to think about how to build and improve the asset appraisal industry under the socialist market economy model.

The theoretical basis for China's initial intangible asset evaluation is the book "Goodwill and Other Intangible Assets" published by Mr. Yang Rumei in December 1926, in which the depth of the research on intangible assets has been influenced by countries all over the world and still plays a guiding role in the evaluation of intangible assets today. And in 1933, "GoodwillandotherIntangibles" published in the United States.Although Chinese scholars made a breakthrough in theoretical research on intangible assets, they had no time to pay attention to economic development at that time when China was in the civil war, so missed the opportunity of awakening the importance of intangible assets.Until the end of the war, after the founding of New China, the consciousness of intangible assets protection was awakened under the opportunity of the urgent development of domestic economy.Since then, a series of laws and regulations have been promulgated to help the development and standardization of the asset appraisal industry.The Guaranty Law of the People's Republic of China, which was implemented on October 1, 1995, provides the legal system basis

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for optimizing the realization of the pledge patent right, made patent right pledge more standardized, deepened the enterprises' attention to patent right, promoted the development of patented technology, and pushed the advance of economy.The definition of intangible assets is elaborated in the" Professional Criterion of Asset Appraised -- Intangible Assets", and intangible assets are classified into patent right, proprietary technology, trademark right, franchise right and copyright.The theory and method of evaluation have become the main basis in the process of patent pledge evaluation.The Ministry of Finance issued " Provisions on Certain Financial Issues of Domestic Associated Enterprises"in 1986, the content of specific provisions of them invented for allowing companies to excellent technology, enterprise trademark rights, patent rights as capital investment consortium,the value evaluation of intangible assets is involved in the process of capital contribution, which further promotes the development of intangible assets evaluation.With the deepening of economic reform, thetypes of transaction cases of intangible assets are also increasing, enterprise mergers, auctions, contracts, leases, mortgages and shares reform are common, at that time, the theoretical basis and relevant laws of intangible assets evaluation were not mature, lacking, and could not fully keep up with the speed of economic development,Therefore, the State Council has promulgated the Law on the" Management of State-owned Assets Appraisal", "Detailed Rules on Assets Appraisal", "Basic Criterion on Assets Appraisal and Basic Criterion on Professional Ethics on Assets Appraisal", so that intangible assets appraisal business can be better development.In conjunction with the enactment of relevant legal provisions, the state has also set up intangible assets appraisal agencies and held seminars on intangible assets appraisal in Shanghai, Shenzhen, Beijing, Jilin and other cities, in an effort to strengthen the appraisal of intangible assets in a full range.

According to literature records, there are dozens of options for patent asset value evaluation methods in China, which can be summarized into labor theory of value model, factor theory of value model, marginal utility model and option theory modelAlthough there are many methods for evaluating the value of patent assets, but they are more or less flawed, is not absolutely perfect method, for now, all the evaluation methods on asset appraisal is the most basic of the three methods, what we need to do is to choose the right and reasonable evaluation method in the evaluation process,strive to make the assessment most realistic, promote the reasonable development of the market.For our country, the development of asset appraisal industry started late, industry development status and the related theoretical structure remains to be perfect, although the understanding and protection of the intangible assets have awakened and developed, but still need to strengthen the attention, for the type of patent assets assessment results is less, so in the time of the intangible assets more and more important, should strengthen the attention, reduce the error existed in the evaluation process,optimize the evaluation process.Learningfrom the more mature assets appraisal structure abroad will help reduce unnecessary mistakes on the development road and accelerate the pace of development.

III. RELATED CONCEPTS AND THEORETICAL BASIS

3.1. Concept of patent right

According to the records, it can be seen that the specific concept of intangible assets hasbeen produced more than one hundred years,there are different opinions on the concept of intangible assets.The international interpretation of the concept of intangible assets refers to the existence of assets manifested by their economic characteristics. They do not have specific physical forms, but as their owners, they can obtain special rights and interests and economic benefits through them.The concept of intangible assets in China's early stage can be found in the "Accounting Standards for Business Enterprises" refers to the ownership of the enterprise,Or an enterprise-controlled physical form, can identify the non-monetary nature of the assets.However, the interpretation of the concept of intangible assets in China's "asset evaluation criteria" refers to the resources controlled and owned by specific subjects, which do not exist in physical form and have economic benefits for the long-term production and operation.There are many views on the concept of intangible assets. In a word, it can be concluded that intangible assets are non-physical assets which are controlled by specific subjects and can bring excess economic benefits to holders.

Intellectual property is included in intangible assets. The term intellectual property was first introduced in the "Convention Establishing the World Intellectual Property Organization (WIPO)" in 1967, since then widely spread and used.However, just like the concept of intangible assets, there are various opinions on the definition of the specific concept of intellectual property.In our country specific have with these several points of view:First, the intellectual property rights by the intellectual achievements of the owners or industrial and commercial marks of the holders of the rights in accordance with the law.Second, it refers to the individual mental work achievements and management activities in the relevant records enjoy the rights according to

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law;Third, it refers to the right that the subject of civil conduct has to exclude other people's interference with the intellectual work results, commercial signs and other information with economic value.In a word, the subject of intellectual property refers to the civil subject, while the object refers to intellectual products such as the results of intellectual work or commercial signs.The wider the scope of intellectual property rights and patent rights that belong to the class of intangible assets, the right of the creator or transferee of a technology product to enjoy exclusive rights over the creation of the technology within a certain period of time, after the law application formalities,the relevant state departments will share way granted patent certificate for the patent,no one else may use the invention without the consent of the owner.When a patent expires, the patent becomes useless and anyone can enjoy its benefits.The subject ofthe patent right is to point to in accordance with law, enjoy the proprietary economic benefits brought by the patentee, in terms of our country generally need to meet to the requirement of patent have the characteristics of novelty, inventiveness and practical three, and the first application principle is adopted in patent application, when two or more applicants apply for the same patent,they do not consider who completes the invention first,Who will eventually apply for a patent to grant the patent certificate.This measure also calls for people to raise the awareness of patent protection and improve the registration rate of inventions.According to the China Patent Investigation Report of the State Intellectual Property Office(SIPO) in 2019, since 2008, the SIPO has carried out relevant investigations, and the scope of the 2019 China Patent Investigation covers 25 provinces (municipalities and autonomous regions) in China.By the end of 2018,the valid questionnaire statistics obtained about the change of enterprises' willingness to apply for patents to protect their rights and interests as shown in Figure 2-1:

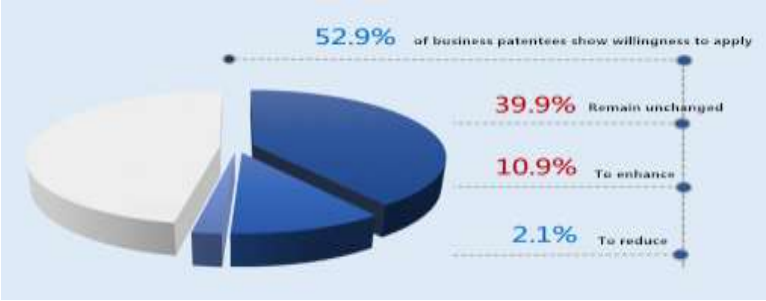

Figure2-1 Enterprises prefer to apply for patent protection rights over the past

The distribution of enterprise types in the recovered valid questionnaire is shown in Figure 2-2:

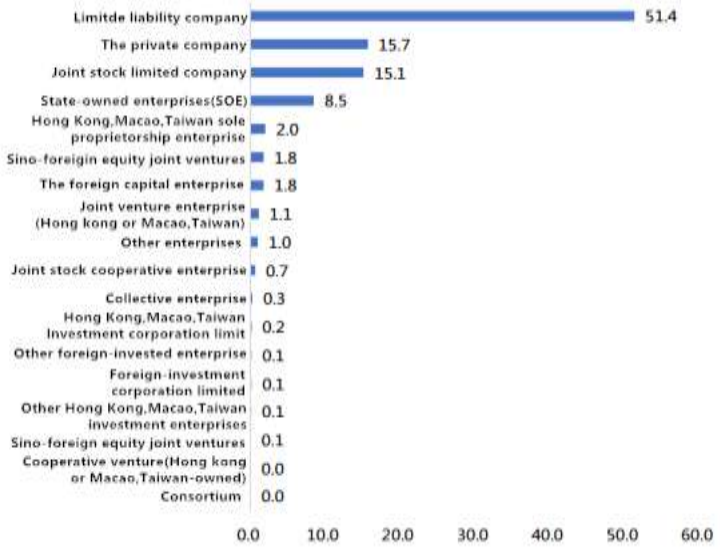

Figure 2-2 Distribution of Business Registration Types (in%)

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3.2. Concept and development of pledge

1）Concept of pledge

Pledge is a kind of real right of security, specifically refers to the debtor or a third party to the creditor transfer of possession of a property, and the latter controls the property, used as a guarantee for the performance of certain cash payments or liabilities in the former.When the agreed obligations are fulfilled, the property pledged must be returned to the debtor.When the debtor fails to perform the agreed responsibilities, creditors are entitled to discount or auction the pledge according to law, and has the priority to be compensated for the proceeds.The essence of patent pledge is exchangeable value, and the bond is guaranteed by exchange value.By means of pledge, further utilization of patent value can be realized and financing can be obtained.

According to the description of relevant researchers, the concept of pledge emerged as early as in ancient Rome, and as a typical real right of security, it provides convenience for the protection of the interests of creditors and is highly admired by people. In the ancient Roman law, the predecessor of pledge was the trust transfer guarantee system, which specifically refers to the trust transfer guarantee system.The debtor may set the security on movable or immovable property for the purpose, the ownership of movable or immovable property will belong to the creditor, when the debtor is due to complete the agreement, the creditor will return the ownership of the pledge;If the debtor fails to fulfill the agreement, the ownership of the pledge will be permanently vested in the creditor, which is the origin of the original model of pledge.With the development of the times, various countries have made some achievements in the pledge of Europe, and began to strictly classify the mortgage and pledge.Around the 14th century, with the awakening of the consciousness of intangible assets,People are aware of the value of intangible assets they have previously recognized, some countries have begun to draft laws and regulations to protect the legality of intellectual property pledge.

China's awareness of the protection of intangible assets is relatively backward,the development of pledge of intangible assets is relatively slow, but with the deepening of economic globalization, people realized the value of intangible assets, therefore our country also pays more and more attention to the protection of intangible assets and the standardization of pledged intangible assets.The relevant legal provisions of the pledge system were amended in the " Property law " revised in 2007.In 2010, the " Patent Pledge Registration Method" was issued to improve the patent protection system and enhance people's awareness of the protection of intangible assets such as patents.In addition, the country has also specially established relevant test sites as the preparatory work to promote the promotion for all aspects of intellectual property pledge financing. This measure has greatly improved the problems existing in the process of pledge,So that intellectual property pledge financing can be better realized.

3.3.Characteristics of Patent Pledge

Patent pledge is different from the pledge of tangible assets because of the particularity of its right form and has its own unique characteristics.

(1)Timeliness and Regionality of Patent Pledge

According to Article 42 of the Patent Law of the" People's Republic" of China, the period of protection of patent right for invention and patent right for utility model and design shall be twenty years after the successful application for patent registration.The ownership of the patent right by the owner is not permanent, beyond the period of patent protection prescribed by law, the patent is no longer protected. Related patents are no longer used by special personnel, everyone can use them free of charge.In addition, patent rights also have geographical restrictions. The patent registered in China's Intellectual Property Office does not represent the ownership of the patent in other countries and regions.Similarly, the patent application in other countries or regions does not have legal effect in China and can not carry on the patent pledge in our country.

(2)Subject matter of patent pledge

In Article 233 of the "Property Law "of China, it can be understood that the debtor or a third party shall have the right to transfer and pledge property rights in intellectual property rights such as exclusive use of registered trademarks, patent rights and copyrights.Patent right can be divided into two parts: patent property and patent personal right. However, according to relevant laws, patent personal right has exclusive nature and cannot be transferred.Therefore, the subject matter of patent pledge is the property right that can be transferred in patent right.

(3)The Uncertainty of Patent Pledge Value

Different from bonds, equity, transferable fund shares, accounts receivable and other pledges, their value can be determined upon the occurrence of the pledge. Moreover, after the occurrence of the pledge,its value fluctuation is not large, basically in a stable state.As the patent belongs to the intangible assets, there is no fixed form, and the value of patent can not be determined according to the social necessary labor time.When determining the value of patent pledge, we should not only consider the

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manpower and material resources, but also take into account the relevant market, legal, technical and other factors.Even considering the influence of many factors, it is difficult to predict the changes that will take place in the future. With the rapid development of science and technology, it is difficult to predict when new technologies will appear, which will lead to the devaluation of the value of patent pledge.As for the value of patent pledge, at the beginning of patent invention, it had the largest value, but with the progress of the times, the development of science and technology, and the change of economic environment, its value will fluctuate and decay continuously.Therefore, when a patent is used as a pledge, its value is difficult to accurately evaluate, and the evaluation process is complex and cumbersome with uncertainty.

(4) High risk of patent pledge

Due to the characteristics of patent technology itself, the evaluation of patent pledge value is the evaluation of the expected transaction price of patent in the future, and the evaluation procedure is complicated and difficult.And compared to real estate mortgage valuation, the patent technology has a special period, which leads to greater value fluctuation during the pledge period and shorter income period of the asset.The patent pledge evaluation is not only limited by the period of patent protection, but also faced with the risk that the value of the pledge of the assessed object will be greatly reduced due to the emergence of other alternative technologies during the protection period.In addition, the patent pledge value evaluation should also take into account the risk that the patent technology is unable to repay the debt due to its poor liquidity ability, the credit risk that the bank is unable to possess the ownership of the pledge, and the risk of the patent pledge value evaluation is not accurate due to the imperfect legal structure based on which the patent pledge value evaluation is based.

3.4.Theoretical Basis of Patent Value

The development of things cannot be separated from the support of theoretical basis. The three value theories of labor value, production cost value and utility value theory are the essential theoretical basis to study the value of patent pledge and solve the problems encountered in the research process.

Labor theory of value concept originally came from the founders of classical economics William match first, and then supplemented the theory and value quantity of labor forming value by Adam Smith and Ricardo.In the end, Marx defined labor value theory by materialist dialectics and historical materialism, demonstrated its historical nature and systematized its results.The labor theory of value holds that value is the general, undifferentiated human labor condensed in commodities.That is to say, the value of a good lies in the amount of labor used to produce it, and that is the only factor that creates the value of a good.The labor theory of value explains that the value of a commodity is determined by the socially necessary labor time required to produce the commodity, and expounds the law of value that governs the production and exchange of commodities.But according to these argumentation contents, it restricts the theory of labor value as the theoretical basis of pledge value evaluation of patent right.

According to the labor value theory, the value of a commodity is determined by the socially necessary labor time required to produce it. On this premise, the commodity has a certain scale of production and reaches a certain quantity of output before it can meet the normal production conditions of the society.However, due to the particularity of patent right, the specific value cannot be directly proportional to the time taken to create the invention. And because the patent right has originality, it is difficult to appear similar patent products in the market to produce competition, forming the necessary labor time of society.In addition, the quality and quantity of patent value formation are different from the previous measurement methods.No longer defined by the amount of production factor possession that is observable at the same time, but through the expected benefits, that is, the value added capacity. Therefore, it is difficult to measure its value by the socially necessary labor time.However, this doesn't mean that the labor value theory has lost its scientific nature. Each theory has its limitations, which only indicates that the labor value theory is not applicable to the patent value.

The value theory of production cost has a preliminary idea foundation in Qurnai's economic theory, that the determinant of value is the production cost, that is, its cost.After having the rudiment, the later economists carried on to see the research extension on this basis, constituted the final production cost axiology.The theory of production cost value is different from the theory of labor valuethat the determinant of commodity value is the social necessary labor time, it was assumed that the value of a commodity consists of all the factors of production consumed in its production, but the social necessary labor time,both the assets and the natural forces involved in the production should be taken into account in commodities.The core of the theory of production cost value is that cost determines value. Its premise is that the quantity of goods produced is equal to the market demand, or less than the market demand, that is, the part of goods beyond the market demand,

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regardless of the cost of production cannot be included in the value base considerations.The expected benefits of patent results are uncertain and unique,different from the products with stable production scale and fixed production cost, the patented product is not directly proportional to its input cost. Some patent product investment is less, but can obtain the huge profit after creating the invention.Some patented products take a lot of effort, and eventually fail, or even lose all their money.Therefore, the value of patented technology may well exceed its production costs, it could be worthless, so in terms of the patents, the amount of input costs does not match the value that can ultimately be realized, there is no direct relationship between them, so the cost is not the primary factor in evaluating the value of patent technology pledge.

The theory of marginal utility value is a theory of economic value which combines the utility value and the marginal analysis method.Marginal utility value theory is different from other value theories in that it considers the value of goods from the perspective of consumers, not commodity producers.So the main feature of marginal utility value theory is based on consumer's subjective psychological, namely the utility of consumers of goods and evaluation to determine the value of the goods, and the utility can produce impairment ceaselessly as the consumption of goods, the marginal utility is the goods in continuous detract from the utility of the last unit of utility, that is the goods from the minimum utility.It is also the core basis of measuring value in marginal utility value theory.Because of its originality and uniqueness, the utility value of patented technology under specific circumstances can be explained on the basis of marginal utility value theory.When the cost of a patented technology is low, butwhen it is possible to solve a particular problem and particular need of society, it will bring huge benefits to the patent holders and its utility is alsoenormous. Based on the theory of marginal utility value, it can be concluded that it has a great value.In a word, the marginal utility value theory is applicable to the evaluation of patent technology pledge value.

IV. INFLUENCING FACTORS OF PLEDGE VALUE OF PATENT TECHNOLOGY

4.1.Legal factors

(1)Types of patents

Different types of patents have different application conditions and duration of protection, but in the final analysis, they are inseparable from novelty, creativity and practicality.Practical patents also have lower requirements for appearance design and focus on practical value. In the application and registration link, they have substantive examination for invention patents, while others only carry out formal examination, in order to confirm the substance of the investigated patents and the effectiveness is more stable.However, the design of the patent has not been substantially examined. If it is maliciously infringed by the bad merchants in the future and the lawsuit is increased, it is very likely that the lawsuit will be invalid because it is unable to find specific evidence, thus invalidating the patent.

(2)Patent applications

There are three legal states of patented technology, namely, before application, during application and authorized, and three corresponding right holders are patent application right, right in patent application and patent right.In terms of invention patent, it is difficult to get a definite reply in a short term whether the application of patented technology can be approved, so the right of patented technology is in an unclear state during this period.Prior to the publication of the reply in the course of the patent application, during this period, during this period, the application of the patented technology under the protection of the patent law, the patent applicant want to use the patent technology, need to pay a fee negotiations with the applicant for a patent, to obtain the right to use the patent technology, but due to the patent technology is in application process,the licensing fee will be lower than that of successful patented technology.Within 6 months after the application is approved, the patented technology is still in the withdrawal objection period. In other words, although the application has been approved, there is still the problem of unstable ownership of the patented technology in these 6 months.After 6 months, the attribution of the patent technology will be settled, the patent right will be stable and protected by law, and its evaluation value will also rise.However, even after the patent application is approved and registered, it does not mean that the patent belongs to the patent applicant forever, but is protected by the law within a certain period of time. After the protection period, the ownership of the technology patent is no longer monopolized by the patent owner, which has a great impact on the value evaluation of the technology patent.

(3)Remaining statutory protection period

After the successful application for the patent registration, the patent belongs to the personal property, is protected by national law within a certain period of time, which has achieved the purpose of legal monopoly.But according to the patent law of our country for national patent protection is provided with a deadline, since the date of registration for a patent for invention has 20 years of protection period, while

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other types of patents have a period of 10 years, and patents beyond the period of protection will no longer belong to personal property and the public can use them free of charge, so the patent no longer has pledge value,Unable to achieve the purpose of pledge financing.Moreover, even if the same patent is in the period of legal protection, its pledge value is not completely the same in different protection periods.With the passage of the legal protection period, the patent value may increase or decrease, and its fluctuation range is difficult to estimate. The patent value of each year may be different from that of the previous year, and the economic life of a patent cannot be treated equally with the legal life.According to relevant data research, patents usually have economic life only within five years after successful registration.Therefore, in the evaluation of patent pledge value, the economic life of a patent has great influence.

4.2.Technical factors

Because the patent registration in China to apply for the first principle, and also need a certain time, In order to prevent other similar patent technology from completing the patent application first, the relevant patent registration application has already begun when the basic invention of patent technology is completed.However, the patented technology has not been fully formedat this time, and the process of putting it into production and use real invention successis also unknown, with certain risks.In the process of patent technology invention research, there are many stages of development, different stages of development, for the future investment needs are different;The magnitude of the risk varies;The impact on future expected earnings is also different.To sum up, whether the patent technology is mature or not has a great impact on the value evaluation of the patent technology.

After the patent technology is registered and put into use, technological progress also has a significant impact on the value evaluation of the patent technology, regardless of the novelty, creativity and practicability of the patent technology itself.In the 21st century with the rapid development of science and technology, people are studying how to optimize the existing technology all the time. The upgrading of technology may occur in the next second, which will lead to the expected future returns of the patented technology, or even the risk of withdrawing from the market. Therefore, the impact of technological progress on the value evaluation of technology patent can not be underestimated.

4.3. Market factors

The valuation of patent pledge value is an assessment of the expected revenue that can be created by patent right. The expected revenue of patent is determined by the market conditions,so it should be focused on whether in the past, in the present or in the future.Research in the past of the patent right trading and assess the situation, help to review in more detail to master the history of the evaluation object data, sufficient understanding for evaluating object data, can also be used as a patent reference basis for the future value of prediction, to conclude whether there is a gap and whether the patent can be traded.When evaluating the value of patent pledge, it is necessary to pay attention to the recent market transactions, investigate and understand the recent transaction cases similar to the appraisal object in the market, so as to obtain effective information such as the market price and the profit situation of similar patents, which is helpful for the selection of appraisal methods and the avoidance of large deviations in the appraisal results.Among the market factors, the most critical influencing factor is the development prospect of patents, which is closely related to the expected future returns of patents. Only by accurately mastering the progress of patents can the future excess returns of this patent be accurately predicted.

Patent can only reflect the value, the difficulty degree and scale is the value of patent pledge, if the patent industrialization difficulty is low, reached the level of industrial scale, and has a greater consumption demand, productsare accepted by the current market, the greater the patent can bring pledge value.

4.4.Other factors

Patent technology is more difficult to calculate accurately than tangible assets.In the process of developing and researching the patent technology, it is necessary to invest a lot of manpower, material and financial resources. In addition, the patent technology is mainly the result of mental work, and its energy is difficult to predict. Moreover, whether patent technology can be successfully invented and put into production and use is also an unknown and risky.In the process of development, the financial loss caused by development failure is also difficult to accurately calculate, and there are many uncertain factors. Therefore, the impact of the development cost of patented technology on its value evaluation cannot be ignored.

In the process of evaluation, there are many uncertain factors, high risk and difficult to realize in the future expected income of technology patent, so there is great risk, which also has credit risk for lenders. Whether or not the technology patent can

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bring benefits in the future also has a great impact on the value evaluation of technology patent.

The impact of the appraiser's professional ability on the value assessment of technology patents. In the evaluation process, because there is no supervision of a third party, there is no mature legal constraints on the patent pledge, only rely on the subjective use of the evaluator to judge the value of the technical patent. In China, there are few cases related to technology patent value evaluation in China, and there is also a lack of active patent trading market. It is difficult for appraisers to learn experience through cases similar to the objects evaluated. If professional ability is lacking, there will be unnecessary errors in the value evaluation of technology patents.

In sum, the value evaluation of technology patent is different from tangible assets. There are many influencing factors of the value evaluation different from tangible assets, and in addition to the ones mentioned above, there are many influencing factors to be found.

V. TECHNICAL PATENT EVALUATION METHOD

5.1.Market Law

Market method refers to the evaluation method of comparing the appraised object with the same or similar patent pledge value evaluation case, collecting previous information about comparable cases, considering the impact on the appraised object at different times, and adjusting the appraised object necessary so as to determine the value of the appraised object. The premise of the patent pledge value evaluation using the market method is an open, transparent, fair and active patent technology trading market; there are a certain number of comparable cases. The key to the adoption of technology patent evaluation is in the market method of comparable cases. Due to the characteristics of patent assets, the influencing factors are basically different, and China with a short history of intangible asset evaluation is scarce, and the use of market method has certain limitations.

Market law is published as follows: $\frac{V}{X}=\frac{V_0}{X_0}$

In formula:

V—Ratio of companies to be evaluated;

X—The value of the company's observable variables to be estimated;

V_0—Value of a comparable company;

X_0—The value of comparable company observable;

Company value to be valued: $V=X\left(\frac{V_0}{X_0}\right)$

5.2. Cost method

The cost method refers to the sum of all the financial resources, material and human resources consumed in the process of creation and invention of the patented technology, which is taken as the replacement cost. After excluding the current state, depreciation in the market or other partial losses, the final value of the pledge of the patented technology is obtained. The core of the calculation is the replacement principle.The cost method is specifically divided into historical cost method and reproduction method. The historical cost method refers to the required cost calculated by the initial cost consumed by the invention created by the patent, and the reproduction method refers to the cost required by the re-invention of the same patented technology with the current technical materials.Of course, now the cost is not the ultimate value of patent pledge, need to reduce on the basis of the costof the part of loss and the depreciation, including physical, economic and functional depreciation, in addition, it is necessary to reduce the depreciation loss to get the final patent technology pledge value, and the so-called depreciation loss is the new rate. If when evaluating the value of the patent technology pledge, using the cost method as the evaluation method, can not incorporate the patent technology of future expected returns to the evaluation factors, only with the cost to get the value of the invention patent technology, the minimum value can only reflect the patent technology, and because the cost of patent technology is not equivalent to its value,If a patented technology can not solve any problems and meet the needs of society, it will not have any value even if it has a huge production cost.Therefore, when the cost method is used to evaluate the pledge value of the patented technology, the premise is that the expected return of the patented technology cannot be obtained, and its expected return cannot be significantly different from its cost.

The basic formula of the cost method is as follows:

Evaluation value of patent technology pledge=Replacement cost×New rate

Replacement cost= $\frac{c+v\beta_1}{1-\beta_2}\times(1+t)$

In formula:

c—Physical labor consumption in the process of patent invention;

v—Living labor loss in the process of patent invention;

β_1—Doubly factor for creative labor of patent owner;

β_2—Average risk factor of patent research;

New rate=$\frac{\text{Remaining life}}{\text{Service life}+\text{Remaining life}}$

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5.3Income approach

Income method refers to the evaluation method that capitalizes or discount the expected income to determine the value of the evaluation object. The theoretical basis of income method is the principle of expected income, and the premise is that the relatively stable relationship between patent technology and operating income, and the future income can be accurately predicted.

The general formula of the income method is the following: $P = \sum_{i=1}^{n} \frac{R_i}{(1+r)^i}$

In formula:

P—Evaluation value of patent technology pledge value;

R_i—Expected revenue from Future i;

r—Discount rate;

i—Specific year of expected earnings;

n—Residual economic period of the patented technology being assessed.

5.4.Pledge coefficient method

Pledge coefficient method specifically refers to the separation of the evaluation parameters of the value of the patent technology under normal conditions and the factors affecting the evaluation of the value of the patent technology, the factors that affect the value of the pledge value and the market value of the patent technology, and finally obtains the evaluation method of the pledge value results of the patent technology.Because all patented technologies cannot be in normal market trading conditions without fluctuations, the value of the patented technology under different circumstances is considered separately in the pledge coefficient method to obtain a ratio, namely the coefficient affecting the pledge value of the patented technology, thus obtaining the final pledge value of the patented technology.In this way, we can not only get the value of the patented technology in the trading market under normal circumstances, but also get the value of the patented technology under the condition of pledge. After this method, the value difference between the two is obvious, which highlights the pledge value of the patented technology.It is helpful for the users of the assessment report to more clearly understand the difference between the value of the evaluation object under the condition of pledge and the market value under normal circumstances, and it is convenient for them to deal with the risk of pledge and find the balance point of return, as well as to decide the amount of loan to be granted and whether to pledge.

The general formula of pledge coefficient method is as follows:

patent pledge evaluation value = Market value of patent to be pledged × (1－Pledge coefficient)

The most important thing in the pledge coefficient method is the value difference between the value of pledge value and market value of patent technology, namely the pledge coefficient, the factors that influence the value of the assessed object under the case of pledge to determine the influence degree of each factor, and reflect them in specific quantity. For the specific research and analysis of the number of pledge systems, the comprehensive evaluation method is generally adopted for measurement. Specifically, it refers to the way of comparing, evaluating, balancing and optimizing the comprehensive value of each factor of the assessed object, so as to quantify the pledge coefficient, which is convenient for the specific calculation of the pledge value of the patent technology.

Table 5-1 Index System of Pledge Impact Assessment

Index	First level indicators	Second level indicators	Third level indicators
Impact factors of the pledge	Macro environment	Policy factors	Favorable policies and adverse policies
		Economic factors	Peak and low periods
	Carrier of the patent right	Market factors	Industry prospects, Market capacity, Market share, Market growth rate and Competition rate, Lifecycle, Profitability
		Enterprise factor	Production capacity, Growth capacity, Marketing capacity, Brand, Goodwill
	Patent right itself	Legal factors	Type of ownership, Validity,

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			Protection scope and period, Infringement determination, Patentee
		Technical factors	Field, Alternative technology, Advancement, Maturity, Innovation and scope of application

The specific steps of the comprehensive assessment method areas follows:

The first step is to establish a mediastinal evaluation index system and determine the range of value taking, which is the premise and basis of the comprehensive evaluation method, which can be established based on the environmental characteristics of the evaluation object under the pledge situation, and then combined with the evaluation indicators of patent technology under normal circumstances.

The second step is to determine the weight of the index. In this step, the influence factors of the pledge value of patent technology will be analyzed, so as to get the weight of the index, the influence factors on the value of the evaluation object, which can be determined by expert scoring, hierarchical analysis and Delphi methods.

The third step, on the basis of the previous one, the score of each index is summarized and calculated, according to the value range, the expert score summary, calculate the score of each index.

The fourth step is to construct a comprehensive evaluation model.

5.5.Compare the applicable methods and the reasons

As far as market law is concerned, there are few cases of patent technology pledge value evaluation that can be used as a comparison in China, and there is no open, transparent and active patent technology trading market. Therefore, the market law is not appropriate for the evaluation of patent technology pledge value.The principle of cost method is relatively simple and easy to grasp, and it is often used in the evaluation of intangible assets. However, intellectual property assets are characterized by long research and invention time, difficulty in calculating their cost, uncertainty of research results, and difficulty in quantifying their value and energy consumption.Most important is not the value of the patented technology, the social necessary labor time required, but can bring future earnings to owners, cost method and future market demand and future expected returns can not be included, so cost method for evaluation of pledge of patent technology is not very appropriate, when evaluating technology patents generally don't use cost method.Income approach the theoretical basis for the expected return principles, through the expected profitability of evaluated objects assessed value, for income effect in the future of technology patents, and more easy to let guarantee banks to understand, but in terms of the future expected earnings of patent technology, there are many unpredictable influence factors.In today's science and technology is very advanced, no one can guarantee whether there will be a complete replacement of the evaluation object in the future, making the evaluation object lose its value.The pledge factor method considers the influencing factors of the value of patent technology pledge, its value is affected by various factors, and influence factors are analyzed, considering the patent technology in normal circumstances of market value, given a scientific ratio, finally obtaining the collateral value of the patent technology, improve the scientific nature and accuracy of the assessment.To sum up, it is more appropriate to use patent coefficient method when evaluating the value of patent technology pledge.

VI. CASE ANALYSIS OF PATENT PLEDGE OF ZHONGYI ALLOY TECHNOLOGY

6.1. Enterprise profile

Dongguan Zhongyi Alloy Technology Co., Ltd. was established in 2003, and started with the production of electrical contacts. The registered capital of the company is RMB 30 million, and the company type is a limited liability company. Zhongyi alloy technology mainly produces electrical silver contacts, electrical contacts, switch shrapnel, hardware, electronic components and silver alloy wires, etc. It is mainly used for electrical appliances, switches, contactors, electric spark machines, automatic punch machines and other large advanced production equipment and precision quality inspection instruments. In the process of development, Zhongyi Alloy Technology adheres to the concept of "focusing on its own industry and sustainable development". So far, the number of patent projects that has been applied for registration is 72.

6.2. Information about the pledge patent

In March 2012, Zhongyi Alloy Technology submitted the loan application to China Merchants Bank Dongguan Branch with its patent as a pledge, and formally handled the intellectual property pledge loan business. The details of the invention patents

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such as "A Processing Process of a Silver / Copper / Iron Composite Belt" (ZL200610123759.4) are listed in the following table:

Table 5-1 Basic Conditions of Patent Assets

Patent name	A Processing Process of a Silver / Copper / Iron Composite Belt	Processing process of a silver / copper double-sided composite strip	Automatic riveting stamping process of wire delivery	Rivevet connection machine in stamping die	Vertical wire welding machine	Integrated mechanism of cutting and welding	Integrated mechanism of cutting and welding
Patent category	Invention	Invention	Invention	Invention	Invention	Invention	Invention
Country area of the patent application	China	China	China	China	China	China	China
Patent application number: Patent number	ZL200610123759.4	ZL200610123758.X	ZL200610122256.5	ZL200810219580.8	ZL200810219579.5	ZL200910214145	ZL200910214145’
Patent application date	2006.11.24	2006.11.24	2006.9.20	2008.11.28	2008.11.28	2009.12.24	2009.12.24
Patent authorization date	2008.11.26	2008.11.26	2009.12.2	2010.3.10	2011.4.27	2012.9.12	2013.1.23
Patent use rights	Lin Yujin	Lin Yujin	Dongguan Zhongyi Alloy Technology Co., Ltd	Dongguan Zhongyi Alloy Technology Department, Ltd	Dongguan Zhongyi Alloy Technology Co., Ltd	Dongguan Zhongyi Alloy Technology Department, Ltd	Dongguan Zhongyi Alloy Technology Co., Ltd

6.3.Pledge evaluation process

In this appraisal, the entrusting party, Liancheng Asset Appraised Co., Ltd. fully analyzed the ownership of the enterprise's patents, the historical sales status of the products and the market competition, and predicted the future development according to the current market demand. Based on the characteristics of the technology patents and evaluation purpose, evaluation objects and the evaluation scope, the pledge coefficient methodwas selected in in the evaluation, will the above patent technology under the condition of collateral value by the influence of factors combined with comparing the value of patent technology, normally get a ratio, finally calculated the collateral value of the patent technology, and through certain into rate, the fair value of several patents of Zhongyi Alloy Technology under a certain scale of operation is assessed on the base date .In March 2012, Liancheng Asset Appraisal Co., Ltd. evaluated five technology patents of SMA

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with an appraised value of 32.63 million yuan. The Dongguan Branch of China Merchants Bank determined the loan amount of 8 million yuan according to the proportion of 24.5% of the appraised value. In June 2013, an alloy technology patents as presented to the Dongguan rural commercial bank the pledge loan applications, still together by Beijing assets appraisal co., LTD., as the trustee, to 7 invention patents were evaluated, the evaluation value of 24.35 million yuan, the bank according to the evaluation of 24.6% of the value of the ratio determines the loan amount is 8 million yuan.

6.4.Deficiencies

In the process of evaluating the bank pledge patent technology, Zhongyi alloy technology entrusted Beijing Liancheng Asset Assessment Co., Ltd. For its intellectual property pledge financing to provide professional services of the assessment, and in the process of evaluation by the Dongguan government departments provide guidance and assistance, can make the success of intellectual property pledge financing. However, a careful study of the evaluation process reveals some deficiencies:

(1) The influencing factors on the value of technology patents are not fully considered. In the 21st century with the rapid development of science and technology, technical products are also changed rapidly. Therefore, the value evaluation risk of technology patents should be considered more comprehensively, the market environment of the assessed object should be fully understood, and the possible errors in the evaluation results should be reduced as far as possible.

(2) Relying only on the appraisers to obtain the evaluation results, which is too strong subjective. There is no third party related departments in the evaluation process unit, also no mature legal environment constraints, all depend on the final result is responsible for the assessment of the researchers, the results subjectivity is stronger, so for evaluating personnel's professional quality is a big test, strengthen the relevant professional quality assessment personnel also should be optimized.

(3) The lack of perfect laws and regulations reduces the risks of the lender, resulting in the gap between the evaluation of the value of the technology patent and the actual value. Due to the large risk in the expected revenue of the technology patent in the future, it is difficult to ignore the credit risk in the evaluation process, which leads to the deviation between the value evaluation result of the technology patent and the actual loan amount provided by the bank when the technology patent is used as collateral for loan financing in actual cases.

VII. CONCLUSION

With the deepening of economic globalization, the competition is intensified. Intangible assets represent wealth for small and medium businesses with lack of funding, and small and medium enterprises in patent research also can promote the development of national economy and the promotion of science and technology, so relevant policies for the lower threshold of patent application for registration, the promotion enterprise awareness of the protection of intangible assets, from this point, also promoted the intangible assets pledged to the bank financing. In such financing true at the same time, the intangible assets value assessment as its very important link, people also should strengthen the importance to intangible assets value evaluation, perfect the relevant legal construction, the formation of active trading market, enhance professional quality requirements for evaluation, etc., so as to reduce the intangible assets value assessment is the purpose of the error. In the process of technology patent pledge evaluation, there are many risksdifficult to grasspprediction. We should strengthen the understanding of the purpose of evaluation and pay more attention to the factors that affect the value of technology patent evaluation. During the evaluation, I will visit relevant enterprises, earnestly understand the development status of enterprises, collect relevant economic data of the assessed objects, and minimize the error of the expected future earnings. It is also very important to choose the right evaluation method, to understand the relevant background and situation of the technical patent, and to choose the most appropriate evaluation method according to different conditions, so that the value evaluation results are reasonable and fair. The relevant legal structure of technology patent pledge evaluation should be improved as soon as possible, promote the formation of active patent trading market, help evaluators have laws to follow in the evaluation process, reduce unnecessary errors, and standardize the evaluationprocess of technology patent value .In addition ,the corresponding requirements can be made for the qualifications of practitioners. Assessors should also strengthen their own professional quality, strengthen the professional ethics education and punishment system for practitioners, and avoid the inaccuracy of the related value evaluation results due to their own limitations. The interest protection of the lender should also be improved to reduce the credit risk in the process of technology patent pledge, promote the development of technology patent pledge financing and protect the interests of the lender from damage, so that the value assessment of the technology patent is more in line with the actual value.

For the technology patents in different industries and facing different market demands, they face different risk factors and thedifferent factors affecting their value evaluation. This study only selected part of the impact factors encountered in the process of technology patent evaluation of Zhongyi alloy, further research is needed on the influencing factors of technology patent value evaluation in other industry background. When the technology patent is pledged to the bank to obtain loan financing, it faces a wide range of risks. Whether the technology patent can successfully obtain the future expected income, and how to completely avoid such risks to the impact of value evaluation is still to be discussed.

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