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The Influence of Chinese Technological Enterprise Quality on Agreement Fulfillment Willingness and Credit Risk

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Doctor of Management

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**BUSINESS
SCHOOL**

Marketing, Operations and General Management Department

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Abstract

Technological enterprises can create employment opportunities, provide quality services and have broad space for development, but there are also operational problems, capital problems, manpower problems and market problems. Among them, the biggest obstacle is credit. The existing credit evaluation mainly focuses on economic indicators and credit risk focuses on repayment risk. Scholars lack in deep empirical research on influencing factors of credit and credit risk research from the perspective of agreement fulfillment willingness once this is very scarce.

Combining the characteristics of previous research object and previous scholars' research, this thesis introduces enterprise quality as an independent variable to explore its impact on credit risk. Enterprise quality refers to the function produced by the collection of various elements within a technology-based enterprise, mainly including enterprise management quality and enterprise innovation quality. The agreement fulfillment willingness is introduced as an antecedent variable of credit risk. In this thesis, agreement fulfillment willingness refers to the subjective aspect of credit awareness of technology-based enterprises' agreement fulfillment, including but not limited to providing quality products, providing real information, fulfilling social responsibilities and repaying debt on time. In addition, the enterprise policy, competitive environment and managerial quality are introduced as regulatory variables to analyze the regulatory role of enterprise policy and competitive environment in the relationship between enterprise quality and agreement fulfillment willingness and the regulatory role of enterprise managerial quality in the relationship between agreement fulfillment willingness and credit risk. Then, we draw on the classic scales studied by previous researchers to design, improve, issue and recall questionnaires, analyze the data collected and draw relevant empirical results.

Results show that the enterprise quality positively affects the agreement fulfillment

willingness; the agreement fulfillment willingness negatively affects credit risk; the enterprise has a significant positive regulatory effect in the relationship between the enterprise quality and the agreement fulfillment willingness; the competitive environment has a significant negative regulatory effect in the relationship between the enterprise quality and agreement fulfillment willingness, the enterprise manager quality has a positive regulatory effect in the relationship between agreement fulfillment willingness and the credit risk.

Resumo

As empresas tecnológicas podem criar oportunidades de emprego, fornecer serviços de qualidade e ter amplo espaço para o desenvolvimento, mas também podem ter problemas operacionais, de capital, de mão-de-obra e de mercado. Entre estes, o maior obstáculo é o crédito. A avaliação de crédito concentra-se principalmente em indicadores económicos e o risco de crédito concentra-se no risco de reembolso. A comunidade académica necessita de investigação empírica robusta sobre os fatores que influenciam o crédito e o risco de crédito na perspetiva da disposição para o cumprimento de contratos, uma vez que esta é muito rara.

Combinando as características da investigação anterior de outros investigadores, esta tese introduz a qualidade da empresa como uma variável independente para explorar o seu impacto no risco de crédito. A qualidade da empresa respeita à função obtida pela recolha de vários elementos de uma empresa de base tecnológica, incluindo principalmente a qualidade da gestão e a qualidade da inovação. A disposição para cumprimento do contrato é introduzida como uma variável antecedente do risco de crédito. Nesta tese, a disposição para cumprimento de contratos refere-se aos aspetos subjetivos da consciência do cumprimento de contratos nas empresas de base tecnológica, incluindo, mas não apenas, o fornecimento de produtos de qualidade, o fornecimento de informações credíveis, o cumprimento de responsabilidades sociais e o pagamento atempado da dívida. Além disso, a política da empresa, o ambiente concorrencial e a qualidade da gestão são introduzidos como variáveis reguladoras para analisar o papel regulador da política da empresa e do ambiente concorrencial na relação entre a qualidade da empresa e a vontade de cumprimento do contrato e o papel regulador da qualidade da gestão na relação entre a disposição para cumprimento de contratos e risco de crédito.

Em seguida, com base nas escalas clássicas usadas por investigadores anteriores, projetamos, aprimoramos, emitimos e recolhemos questionários, analisámos os dados

recolhidos e obtivemos resultados empíricos relevantes.

Os resultados mostram que a qualidade da empresa afeta positivamente a vontade de cumprimento do contrato, que a disposição para cumprir os contratos afeta negativamente o risco de crédito, que a empresa tem um significativo efeito regulador positivo na relação entre a qualidade da empresa e a vontade de cumprir o contrato, que o ambiente concorrencial tem um significativo efeito regulador negativo na relação entre a qualidade da empresa e a vontade de cumprimento do contrato e que a qualidade da gestão tem um efeito regulador positivo na relação entre a disposição de cumprimento do contrato e o risco de crédito.

摘　要

科技型企业可以创造就业机会,提供优质服务,具有广阔的发展空间,但也存在运营问题、资本问题、人力问题和市场问题。其中,发展最大的阻碍是信用问题。现有的信用评价主要侧重于经济指标,信用风险侧重还款风险。学者们缺乏对信用影响因素方面深入的实证研究,从履约意愿角度展开的信用风险研究非常匮乏。

结合之前研究对象的特点和之前学者的研究,本文引入企业素质作为自变量,探究其对信用风险的影响。企业素质指的是科技型企业内部各种要素的集合所产生的功能,主要包括企业管理素质和企业创新素质。引入履约意愿作为前因变量信用风险的前因变量,履约意愿在本文中指的是科技型企业的主观方面履约信用意识,包括但不限于提供优质产品,提供真实的信息,履行社会责任,按时偿还债务等。此外,引入企业政策、竞争环境、管理者素质作为调节变量,分析企业政策、竞争环境在企业素质与履约意愿关系中的调节作用以及企业管理者素质在履约意愿和信用风险关系中的调节作用。然后,本文借鉴了以往研究人员研究的经典量表并设计、完善、发放、回收调查问卷并得出相关的实证结果。

结果表明,企业素质正向影响履约意愿,履约意愿负向影响信用风险,企业政策在企业素质与履约意愿之间的关系中的呈现显著的正向调节作用,竞争环境在企业素质与履约意愿之间的关系中呈现显著的负向调节作用,企业管理者素质在履约意愿与信用风险之间有正向的调节作用。

关键字：科技型企业；企业素质；竞争环境；履约意愿

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致　谢

在电子科技大学经济管理学院专业进行研究学习，对我来说，具有深刻意义。这次机会，让我有幸遇到名师指导，提升了专业知识的同时，也深深感受到了严谨的学术氛围。

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Chapter 1: Introduction

1.1 Raise of problem

1.1.1 Practical background

Among the best in emerging industries, with scientific and technological achievements as the business objects, technology companies are generally led by technical personnel engaged in the research, promotion, service and other integrated business activities of related products. At present, there are more and more registered technology companies which are a new boost for the economy.

In recent years, science and technology enterprises have gradually played an important role in cultivating emerging industries and promoting the upgrading of traditional industries. This kind of enterprises have gradually become an important force to promote economic development because they can offer more job opportunities, better service performance and have huge development space. In the important upgrade developing period, science and technology enterprises has received more and more attention. Although the overall development of China's science and technology enterprises is very well, there are still many problems. The number of science and technology enterprises in China has increased rapidly year by year; on the other hand, the application for borrowing of technology-based enterprises is getting slower and slower and the credit line of enterprises has been reduced. From the current situation of technology-based enterprises, the loan environment is more difficult. The financing of firms has been restricted, so its development will be hindered, and the overall development process of China's science and technology industry will also be affected. In addition to the loan problem, technology-based enterprises also face other constraints such as talent management and market competition. These problems have brought obstacles to the long-term development of enterprises. The credit problem often

grabs the throat of enterprises and it is the biggest obstacle to their normal operation and long-term development.

In the face of accelerating economic development, enterprises must not only keep up with the pace of the economy, but also need to protect their own development quality. The credit problem undermines the healthy market order as well as brings great harm to economic development and negatively affects the various market players. Only when the company pays attention to credit, can it achieve its healthy and sustainable development. Specifically, these issues are mainly presented in the following aspects: (1) the credit problem will make the relevant economic measures of the government fail to achieve the expected goals. (2) From an international perspective, a company that lacks credit will bring bad impression to investors and will lose the trust of investors. It is of great harm to the trade of enterprises. In a trade, both parties must abide by the corresponding rules, which are based on the good credit and mutual cooperation. If the credit is lack, then the fairness of the transaction cannot be guaranteed, which will inevitably damage the development of the enterprise. (3) From the perspective of finance, the credit problem of enterprises will bring financial institutions bad assets, which is very unfavorable for its development. If the enterprise destroys its credit, the financial institutions will not approve the loan application of the enterprise due to risk avoidance. Enterprises will also loss the source of development funds. (4) From the perspective of social consumption, the lack of enterprises' credit has a certain impact on social consumption. Credit problems can increase transaction costs, which is also a deep hurt for consumers. In a market transaction, if one party does not keep promise, it will affect the progress of the entire transaction and endanger the market environment. This deception will make the transaction unfair. (5) As far as enterprises are concerned, after a company that has lost the trust of consumers, it will also be expelled by the market. In addition, many aspects of technology-based enterprises are in the developing stage. Credit problems are very serious for such enterprises and may lead to their failure.

Another point is that technology-based enterprises also have the characteristics of high

risk and they are very sensitive in the market competition. If there is credit problem, such enterprises may encounter various resource difficulties and various market economic problems. The development of the enterprise and the credit problem are crucial for its successful and smooth transition. How to improve the credit of technology-based industry and prevent the credit risk is a problem worthy of discussion.

1.1.2 Theoretical background

Real estate, credit risk is defined as the probability that a real estate company fails to repay debts on time so as to violate the agreement to make the relevant subjects suffer losses Han (2014). It can also be understood as the problem of credit risk caused by insolvency due to the borrowers' decision-making and business problems. Moreover, Han classifies credit risk into passive default and active default according to the repayment ability of real estate enterprises. According to Xu (2012), the credit problem of SMEs (Small and Medium-size Enterprise) mainly includes counterfeit and shoddy products, lack of loan credits, false financial information and false advertisements. In our research we assume that credit risk is the possibility and size of the loss caused by the main body of the enterprises, not only the financial repayment risk, but also the credit risk and crisis caused by other credit problems.

The focus of enterprise risk in current research is on the identification and assessment of risks. For the identification of credit risk, Li and Huang (2006) point out that the comprehensive evaluation method and the econometric model can be used to identify risk factors and determine the magnitude of such effects. Liu and Wang (2015) divide the methods of credit risk identification into fuzzy discriminative methods, quantitative methods and advanced artificial intelligence methods with modern computers. Although the fuzzy discriminative method deepens the credit constituent elements, it mainly depends on the subjective judgment of human beings, so it is difficult to become the mainstream method of credit risk identification. Zhang (2004) advocate the use of KMV model established by the KMV Company in 1997 to estimate the default probability of borrowing companies to identify risks. The KMV model extends the idea that the company's equity value has the

characteristics of options to the credit risk assessment and believes that the company's equity value and call options are isomorphic. Using the Black-Scholes option pricing formula (Black & Scholes, 1973), according to the market value and volatility and debt value and risk-free interest rate of company's equity, it calculates and evaluates the market value and volatility of company asset and then evaluates the default risk of listed companies based on the relationship between company assets and liabilities. In terms of credit rating, the general theoretical model of credit rating mainly develops from qualitative analysis to quantitative expert analysis, including expert evaluation, statistical model and quantitative analysis. Foreign financial institutions tend to use the combination of qualitative and quantitative method to deal with credit problem.

In addition to research on credit identification strategies and models, some scholars (Cheng & Xia, 2008；Zhang, 2010; Han, 2014) have also carried out research on credit risk factors and believe that enterprise credit risk is both affected by the enterprise itself and the external environmental factors. The internal factors affecting credit risk include characteristics, education, age, experience of entrepreneur, historical credit performance, debt maturity, enterprise governance, enterprise size, sales growth rate, net sales rate, current assets ratio, bank debt level, the proportion of independent directors, information disclosure degree and information symmetry; The external factors of credit factors mainly include financial development level, law development level, the location of enterprise, economic development, punishment, credit monitoring and enforcement, national information disclosure system, supply chain stability, social opinion, natural environment, cultural environment, institutional environment, social environment, industry characteristics and government.

Scholars (Zhang, 2004；Li & Huang, 2006; Liu & Wang, 2015) have many researches on credit risk identification and evaluation methods and they choose their own methods and comprehensively explore the credit mechanism. However, the credit evaluation mainly focuses on economic or financial indicators. The risk aspect is also mainly referring to the

risk of loan repayment. In addition, the focus on factors affecting credit is not rich enough. Some scholars have combined the external environment and internal factors, including non-financial factors (Cheng & Xia, 2008；Zhang, 2010; Han, 2014). For the technology-based industry, compared with the general industry, scholars have found through continuous research that in addition to some common influencing factors, science and technology, independent innovation capability and technological innovation capability (Yu & Li, 2006；Zhang, 2010) may also play an important role on credit risk. However, most of these studies (Cheng & Xia, 2008；Zhang, 2010; Han, 2014) are aimed at evaluation and lack of in-depth empirical research. Moreover, although scholars (Li, 2003；Guan, 2004；Zhang, 2010) generally agree that the agreement fulfillment capability and the agreement fulfillment willingness are the direct causes of credit risk, most scholars (Zhang, 2010; Guan, 2011) pay attention on agreement fulfillment capability rather than agreement fulfillment willingness. At present, due to the advent of the big data era of information economy, network economy and knowledge economy, the company's operating environment tends to be complicated and uncertain, so whether the external competitive environment will affect the credit of enterprises needs further research.

1.2 Research purpose and significance

1.2.1 Purpose of research

Nowadays, technology-based enterprises are facing credit risk problems. Credit risk will not only affect the normal market order, but also be detrimental to the company's own development. Technology-based enterprises also have high-risk characteristics, so once credit problems arise, the development of enterprises will be in danger. Domestic and foreign scholars have carried out in-depth and extensive research on the identification (Wang, 2011), rating (Li, Fan, & Shang, 2010) and influencing factors (Malhotra & Murnighan, 2002) of credit risk. However, there is still a need to see some unresolved issues in the field of research:

Scholars generally carried out the study of credit theory or credit evaluation from the

economic point of view, focusing on financial factors. Credit risk has been also mainly studied from the risk of economic repayment, but insufficient attention is paid to the analysis of fulfillment willingness. Chinese domestic credit evaluations pay too much attention on the ability of companies to pay debts but ignore the fulfillment willingness to some extent. At present, domestic credit environment is not good and the dishonest behavior of the market subject is very common. Therefore, the fulfillment willingness of enterprises needs to be given full attention.

Second, research on factors affecting credit tends to be homogenized. At present, many scholars (Cheng & Xia, 2008; Guan & Chen, 2008；Li, Mu, & Lu, 2010) combine the external and internal factors to the research on credit risk. The influencing internal and external factors of credit are very rich. The internal factors generally include the background qualification of the leader, past credit, debt time, enterprise governance level, enterprise scale, sales, growth rate, net sales rate, current assets ratio, bank debt level, proportion of independent directors and information disclosure level, while the external factors mainly include financial development level, legal level, region of enterprises, economic development, legal system punishment, credit monitoring and enforcement, environmental conditions, industrial characteristics and government. However, some of the influencing factors are highly correlated and effectiveness of influencing factors is not high. In our research we will introduce enterprise quality and quality of enterprise manger as important factors to study their roles in the mechanism of credit risk.

For the technology-based industry, compared with the credit risk factors of the general industry, scholars (Yu & Li, 2006) have found that in addition to some common influencing factors, the level of science and technology, independent innovation capability and technological innovation capability have played more and more important role. However, most of these studies are aimed at evaluation; there is lack of in-depth empirical research on the factors affecting credit. Therefore, we also combine the characteristics of science and technology enterprises to study the factors affecting credit risk.

Third, the analysis and research of policy and competitive environment are insufficient. At present, there is basically no analysis and research on the influencing effect of comprehensive policy and competitive environment on credit in China. Although many scholars (Makimovie & Drirguc-kunt, 2001; Yan & Li, 2007; He, 2013) have carried out research on the influencing factors of credit according to industry classification, they have not fully considered the external policies of the enterprises and the impact of the competitive environment. In our research we will study the influence process of external policies and competitive environment on enterprise credit risk.

Based on the current situation of research, from the perspective of enterprise itself and environmental factors, combined with the characteristics of China's credit culture and the shortcoming of quantitative evaluation, we select the enterprise quality of internal factor as start point and choose the enterprise policy and the competitive environment of external factors as regulating variables between enterprise quality and agreement fulfillment willingness and then introduce the enterprise manager's quality to discuss its regulating role in the relationship between the agreement fulfillment willingness and the credit risk to enrich the empirical research on the agreement fulfillment willingness and credit risk in a comprehensive perspective so as to provide a theoretical basis for enterprises to prevent credit risk and carry out sustainable development.

1.2.2 Significance of research

The research on the influencing factors of enterprise credit risk is of great significance. By studying the credit risk of technology-based enterprises, it is conducive to the establishment of a sound, rational and integrated credit management system for technology enterprises and it is also conducive to safeguarding the interests of various economic entities in the market.

(1) Practical significance

The focus and discussion on credit risk issues is to reduce risk. The main practical

significance of this thesis is to provide advice to enterprises and governments to prevent the credit risks and increase the agreement fulfillment willingness of enterprise. At the same time, it will also produce social significance in other aspects that are more profound. Specifically, the main practical significances are as follows.

First of all, this research will help promote the growth and development of technology-based enterprises in a fair environment as well as avoid more serious losses in the long run.

Secondly, it is a win-win situation to achieve the growth of the relevant financial institutions and the healthy development of the enterprise. Especially, it can reduce the risk of financial institutions and promote the ability of financial institutions to expand markets and serve technological companies.

Third, it will help create a good market environment of credit, provide protection for the rights of consumers and maintain a proper market order to achieve healthy, orderly and sustainable development of the company and the market economy.

Fourth, for the enterprise itself, it can enhance it immunity and avoid the risk of the capital chain breaking and failure.

Fifth, for the government, the prevention of enterprise credit risk by technology-based enterprises can enhance the effectiveness of government-related support policies. By establishing a credit management system for small and medium-sized enterprises, the government helps enterprises to find their own advantages and shortcomings, standardize the development of enterprises and make the growth of enterprises more sustainable. On the other hand, it is conducive to enhancing the expected effect of the government's economic policies, especially for technology-based enterprises and improving the credit management of enterprises so as to help enterprises maximize their own resources.

Therefore, credit risk research can help technology-based enterprises to pay attention to credit issues and prevent credit problems and successfully and smoothly transit to mature enterprises and even larger enterprises.

(2) Theoretical significance

The theoretical significance is mainly reflected in the supplement of existing research and the study on credit risk. The main theoretical implications are as follows:

First of all, the research focused on the enterprise quality can also enrich the research on the influencing factors of credit risk and enriches the credit theory.

Secondly, in this research we study the influencing factors of the direct cause of credit risk, fills in the gap in the research of agreement fulfillment willingness.

Thirdly, we discuss the role of enterprise policy in this process and further clarify how enterprise policies specifically affect enterprise quality and agreement fulfillment willingness.

Fourthly, research on the regulating role of the competitive environment deepens the analysis of the impact of the competitive environment on the agreement fulfillment willingness.

Fifthly, the regulating effect of enterprise manager quality is studied and the regulating effect of enterprise manager quality in the relationship between agreement fulfillment willingness and credit risk is analyzed.
Sixthly, credit management generally begins with the issue of credit identification. Our research can enrich the credit management theory from the perspective of credit problem prevention.

1.3 Research methods and technical routes

1.3.1 Research framework

Figure 1-1 shows the framework of this study:

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┌─────────────────────────────┐
│      Raise of Problem        │
│  Practical Background and    │
│    Theoretical Background     │
└─────────────────────────────┘
              │
┌─────────────────────────────┐
│      Literature Review       │
│ Credit Risk, Science and Technology │
│ Enterprise, Enterprise Quality, Competitive │
│ Environment, Fulfillment Willingness, │
│   Enterprise Manager Quality  │
└─────────────────────────────┘
              │
┌─────────────────────────────────────────┐
│   Model Building and Research Hypothesis  │
│  Theoretical framework and research hypotheses │
│  Construct a theoretical model based on literature │
│  review and theoretical analysis. Put forward research │
│   hypotheses based on theoretical models.  │
└─────────────────────────────────────────┘
              │
┌──────────────────────────────┐        ┌──────────────┐        ┌──────────────────────┐
│    Measurement of Variables    │        │              │        │  Questionnaire Design │
│ This thesis draws on the classic scales studied │────│ Research Design │────│ Pre-test of Questionnaire │
│  by previous researchers and focus group │        │              │        │   Data Collection    │
│  interview and expert interview to create │        └──────────────┘        └──────────────────────┘
│  measurement items for related variables │              │
└──────────────────────────────┘              │
┌──────────────────────────────┐        ┌──────────────┐        ┌──────────────────┐
│  Descriptive statistical Analysis, │        │              │        │                  │
│ Confirmatory Factor Analysis, Reliability │────│ Data Analysis │────│ Test of Hypothesis │
│ and Validity Analysis, Regression Analysis │        └──────────────┘        └──────────────────┘
└──────────────────────────────┘              │
                                     ┌──────────────┐
                                     │  Conclusion   │
                                     │ and Prospect  │
                                     └──────────────┘
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Figure 1-1 The steps of the research

First, the problem is raised. By summarizing the relevant research literature, enterprise credit problem and research status, in this study we put forward the research purpose, explain the value and significance of the research, define the concepts involved and finally introduce the research methods and innovations.

Second, the literature is reviewed. By extensive reading of the relevant materials and literatures of this research, it helps grasp the research situation of credit risk, technology-based enterprises, enterprise quality, competitive environment, agreement fulfillment willingness, quality of enterprise managers, among others and give a clear research direction for understanding.

Third, the model on the effect of enterprise quality on credit risk is constructed and the

research hypotheses are put forward. After researching the literature and communicating with experts, relevant assumptions for the construction of the research model are put forward.

Fourth, the research variables of enterprise quality, enterprise policy, competitive environment, agreement fulfillment willingness and enterprise manager quality and credit risk are designed and measured. The questionnaires, pre-test questionnaires are designed and conducted to collect data.

Fifth, demographic characteristics and descriptive statistics analysis, structural reliability analysis, correlation analysis, regression analysis is carried out to analyze data and verify the research hypotheses discussed in detail.

Finally, the conclusions and prospects are put forward are based on the results of empirical analysis. Relevant management suggestions on how to reduce credit risk of enterprises are given with reference to them. Also, the shortcomings of this thesis and the direction of future efforts are explained.

1.3.2 Research methods

Relying on previous studies (Cheng & Xia, 2008；Zhang, 2010; Han, 2014) in the fields of credit evaluation and credit impact factors, we have carried out in-depth research on enterprise quality, enterprise policy, competitive environment, agreement fulfillment willingness, credit risk and enterprise manager quality with both qualitative and quantitative research methods to conduct empirical research work and achieve the research expectations of this study. The research methods used are expressed as follows:

(1) Literature method

A large number of literatures (Li & Huang, 2006; Han, 2014) related to the subject of the research are extensively read and referred to. By combing and integrating extant literature, we summarize results and identify the gaps that need to be further researched. By synthesizing scholars' literature on credit risk, research direction of this thesis is determined. We define the concepts involved, reference the scholars' classic theory and related research

and design the influencing factors model of credit risk of technology-based enterprises and analyze the relationship of variables and derive relevant assumptions.

(2) Interview method and questionnaire survey method

This research use interview method and questionnaire survey method to carry out study. For the measurement of agreement fulfillment willingness and credit risk which lack of mature scale, the relevant measurement items are determined mainly through focus interview groups and interviews with experts. After the expert interview activities, the questionnaire is improved. There are two kinds of questionnaires, the pre-test questionnaire and the wide range of questionnaire. The pre-questionnaire is distributed and collected in west zone of Chengdu High-Tech Park to improve and generate a reasonable questionnaire. For the wide range questionnaire, the survey is carried out from September to November 2018 through the cooperation enterprises, on-site consultation, personal relationships and online channels to conduct objective empirical analysis.

(3) Statistical analysis method

Descriptive statistical analysis is conducted to analyze the total number of samples, sex ratio, average age, size and age of enterprises as well as describe the characteristics and distribution of samples. Reliability analysis is used to detect the internal consistency of the variables of enterprise quality, enterprise policy, competitive environment, agreement fulfillment willingness and credit risk. Validity analysis is used to detect whether the measurement result of variable is accurate, consisted of composition reliability and aggregation validity. The confirmatory factor analysis is used to check the accuracy of the observed variables for the latent variables. In order to better explore the correlation between various things, the correlation analysis is used to reflect the strength of the correlation between them by calculating the correlation coefficient between two. The regression analysis is used to test the hypothesis proposed.

1.4 Innovative aspects in our research

The new points of this thesis are mainly reflected in the following aspects: In the past, scholars generally recognized that the credit risk of enterprises was affected by external environmental factors and enterprises' own factors, but mainly focused on the quantitative evaluation of credit risks. In this thesis we combine the characteristics of China's credit culture and technology-based enterprises and explore the process mechanism of the impact of enterprise quality on credit risk by combining internal and external factors of the enterprise. To a certain extent, it can enrich and improve the theoretical and empirical research on the influences of enterprise quality on credit risk and provide theoretical support for prevention and control of credit risk.

1.5 Main content

The purpose of our research is mainly to explore the factors that affect the credit risk of technology-based enterprises. First of all, we will sort out and analyze the previous research and get a general understanding of the factors affecting the credit risk of enterprises. In this research we adopt a combination of various research methods, mainly including literature, theoretical research and logical reasoning. The empirical research methods include the questionnaire survey, field interviews and data analysis. The following is the relevant chapter arrangement:

Chapter 1: Introduction

In this chapter, we clarify the research background, problems and significance and define the concepts involved and finally introduce research methods and innovations.

Chapter 2: Literature Review

In this chapter we comb the predecessors' research for credit risk, enterprise quality, enterprise manager quality, enterprise policy, competitive environment, the agreement fulfillment willingness, as well as credit risk identification and evaluation method and

influencing factors of credit risk to get a clear research direction which is to explore the influences of enterprise quality on agreement fulfillment willingness and the credit risk and analyze the regulating roles of the enterprise policy, competitive environment and enterprise managers quality in the process.

Chapter 3: Model Construction and Research Hypothesis

According to the research theme, in this part we integrate relevant research theories and literatures, such as credit risk, enterprise quality, enterprise policy and other related research to lay the foundation stone of this research. In this study we take the enterprise quality as the independent variable and first study the influence of enterprise quality on the agreement fulfillment willingness. Then we analyze the regulating role of enterprise policy and competitive environment in the relationship between enterprise quality and agreement fulfillment willingness. Finally, we analyze he direct influence of agreement fulfillment willingness on credit risk and the regulating effect of enterprise manager quality in the relationship between the two. After the analysis and hypothesis of the above relationships, the influencing factor model of credit risk is integrated for theoretical preparation.

Chapter 4: Research Design. The focus of this part is on the application of the scale. For the undeveloped scale, the measurement items of relevant factors are mainly determined through interviews and focus groups. Afterwards, the questionnaires are developed and distributed, the unscientific items are deleted, and the final questionnaire is used to collect data information.

Chapter 5: Empirical Analysis

This part is mainly to carry out descriptive statistics analysis of variables, structural reliability analysis, model fitting degree analysis and regression analysis.

Chapter 6: Conclusions and Prospects

Based on the previous analysis, in this part, we summarize the research conclusions, put forward inspiring suggestions for the technology-based enterprises and the government

and explain the shortcomings as well as the aspects that need improvement of this thesis.

Chapter 2: Literature Review

To carry out research on credit risk of enterprise quality, we must first review and familiarize relevant literature research. The literature review of this research mainly involves the related research on credit risk, technology-based enterprises, enterprise quality, enterprise policy, competitive environment and agreement fulfillment willingness.

2.1 Planned behavior theory

According to the theory of planned behavior, individual behavior is directly affected by behavioral willingness and behavioral willingness is the comprehensive effect of three factors: behavioral attitude, subjective norms and perceived behavioral control. Among them, behavioral attitude is an individual's assessment of the degree of preference for performing a specific behavior; attitude is a positive or negative conceptualized evaluation of a specific behavior. It is composed of the product of an individual's behavioral beliefs and result evaluations. Behavioral beliefs are Assess the belief that certain results may be produced after engaging in a specific behavior and the result evaluation is an individual's evaluation of the results of the behavior. The subject specification is actually a prescriptive specification, which reflects the pressure behavior subjects feel when they perform a specific behavior from important third parties: Perceived behavior control is the degree of easiness or difficulty that individuals perceive when performing specific behaviors and reflects the ability and conditions of the subject to perform the behavior. It can be seen that the theory of planned behavior has integrated the internal and external factors including the actors themselves, the internal management of the organization and the external environment of the organization, which provides a systematic analysis framework for the behavioral intention analysis of the actors.

The theory of planned behavior includes three stages of behavioral analysis. The first stage shows that the individual's actual behavior is directly controlled by the individual's

behavioral intentions and is also affected by the perceived behavioral control. The second stage shows the synthesis of behavioral attitude, subjective norms and perceived behavioral control affects individual behavioral intentions; the third stage shows that behavioral attitudes, perceived behavioral control and subjective norms are determined by their respective beliefs. Other internal factors such as experience and intelligence and external factors such as social environment and background are influenced by beliefs. Indirectly affect behavioral attitudes, subjective norms and perceived behavioral control, which indirectly affect behavioral intentions and individual behaviors (Armitage & Conner, 2001). The theory of planned behavior is mostly applied to personal behavior, but there are also many studies used in company organization. Li and Wang (2010) use the theory of planned behavior to study knowledge sharing in large enterprises' virtual learning communities; Zeng (2009) studied the decision-making process of enterprise products; and (Ma, 2009) used the theory of planned behavior to study family businesses.

Figure 2-1 shows the framework of this study:
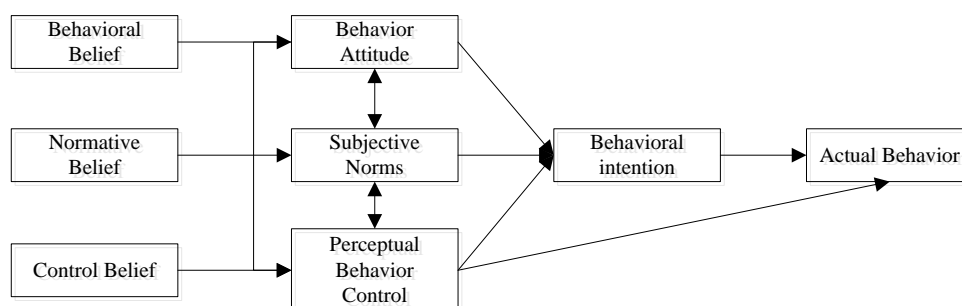
Figure 2-1 Schema of planned behavior theory

Source: Ajzen (1991)

2.2 Credit risk

2.2.1 Meaning of credit

Credit includes forms such as guarantees, commitments, fund lending and performance, which reflects the honest and trustworthy quality of transaction entities that can consciously

perform in the event of prior agreement or constraints. Corporate credit is often regarded as an important strategic resource. Many companies can use their credit resources to carry out large-scale borrowing to alleviate the shortage of operating cash flow, or to implement equipment upgrades and investment expansion. However, if the company's credit risk monitoring measures are taken improperly or in a timely manner, it may cause the company to be forced into bankruptcy and liquidation, leading to a series of problems such as credit defaults, decreased productivity and damaged customer base Brogaard, Li, and Xia (2017). So, research on credit issues is very important. At the same time, the development of credit theory has gone through a course.

Credit originated from western countries first and the corresponding concept in Chinese culture is borrowing. Credit originally meant credibility and later gradually derived the connotation of borrowing and credit. In western countries, credit originated from contract cultural economics. Contract was originally a legal and political concept. After the introduction of the field of economics, it is defined as the power and obligation relationship established by the parties to the transaction based on the pursuit of the best interests (Chen, 2001). Economics considers contracts to be the foundation and medium that support delivery activities. A contract is an agreement reached between two or more parties in a market transaction based on their own interests. It is an economic act that consists of one or more agreements and is enforced by law. Credit in classical economics generally refers to the concept of Marxist credit. Marx's credit theory has been very perfect. He believes that credit is a way of value movement, specifically borrowing and lending. This definition implies that credit is linked to the commodity economy. The focus of Marx's credit theory is to study the commercial credit and bank credit among them, the purpose is to reveal the capitalist system and the laws of its operation, not to examine the moral condition of capitalism and the moral qualities of capitalists. It was a critical attitude towards western capital credit and then a more in-depth study of credit theory was conducted from an economic perspective.

Domestic economist (Zeng & wang, 1993) believes in the "Credit Theory" that the

traditional concept of credit is what Marx calls "modern credit", which is limited to borrowing, while contemporary credit is an economic transaction behavior guaranteed by a contract in the future, highlighting the characteristics of "intertemporal transactions" of credit and extending credit from "fund lending" to "contract transactions" with institutional significance. Contract economics believes that all transactions are contractual relationships, but contracts are divided into complete contracts and incomplete contracts. A full contract means that both parties can foresee the future events of the transaction, can clarify the future state and the rights and obligations of both parties. The premise of this type of contract is that the contracting parties are completely rational; there is no opportunism and asymmetric information. It can also be said that this is an ideal contract state. However, the actual situation is that human rationality is limited, coupled with the uncertainty of the environment and the asymmetry of information, the contractor cannot have a comprehensive perspective, which leads to the incompleteness of the contract.

With the development of information economics and game theory, credit has begun to break through the original debt relationship and penetrate into every corner of social life. Raub and Eroen (1996) propose that corporate credit can be regarded as an important external characteristic of the enterprise. It is formed by the continuous monitoring and participation of other stakeholders in its daily operations. Fombrun and Shanley (1990) points out that corporate credit is a kind of social judgment made by other interested parties based on the company's operating behavior signals. Because the other stakeholders related to the company are diverse, their economic activity behavior signals are also diverse. Wu (1998) believes that credit was trust which based on the trustee's commitment to repay within a certain period. Chen (2001) proposes that credit was the morality of debt and need to be regulated by contract and public opinion.

From the perspective of scale, the following scholars believe that there are two types of credit: individual and group. Individual credit is only for individuals, while group credit is for groups and countries, such as company product quality, national bonds and other credits.

The understanding of individual credit includes two perspectives: perception theory and trait theory. The former believes that credit is the trustee's perception of information credibility, not the source of information; the latter believes that credit is traits that lead to trustworthy sources of information (Kouze & Posner, 1990). When information source credit is related to the company, it is called corporate credit. Chu and Zang (2005) understand from the enterprise's own perspective that corporate credit is considered to be the fulfillment of the trust and commitment of stakeholders to the solvency of corporate value. This view regards credit as an intangible economic resource and an identification of the quality of products and services and the sense of social responsibility of enterprises.

Li, Fan, and Shang (2010) propose that corporate credit is a company's behavior to obtain or grant credit from a broad perspective and it is also the management of the company's honest operation, with the aim of obtaining credit resources that are conducive to the development of the company. From a narrow perspective, credit is the maintenance and management of credit sales. For example, an enterprise regulates credit sales through a specific credit system and prevents and controls credit risks through contracts. The view of Liu (2018) is that credit is the unity of knowledge and action, the unity of faith and behavioral commitment in the heart and the focus is on fulfilling the commitment. From this perspective, credit is more about a relationship related to trust. Previously, many studies have shown that corporate credit behavior depends on its credit ability on the one hand and its willingness to credit on the other. Modern credit is a legal concept and a business concept that transcends moral norms. Credit regulates and corrects the trajectory of society and the market from a unique perspective. It restricts the behavior of legal persons and natural persons as a source of profit, a tradable commodity. In today's global economic integration, for modern market transactions, credit is a capability built on trust, the ability to obtain funds, materials and services without immediate payment and a value subject to repayment. In a broad sense, corporate credit begins with the willingness of the credit of the enterprise and the ability or performance of the enterprise's credit is the prerequisite and basis for achieving corporate credit. Corporate credit is based on two foundations: one is credit willingness and the other

is contract performance. "Credit willingness" relates to the scope of corporate ethics and corporate culture and refers to whether an enterprise is willing to fulfill the contract between the company and various aspects of society. On the other hand, contract fulfillment refers to whether the company fulfills contract if it has the ability.

Credit includes two categories: material level and spiritual level. Credit in this thesis mainly refers to the maintenance and management of credit transactions and credit management by technology-based enterprises, which aims to provide credit support for enterprise development.

2.2.2 Meaning of credit risk

The scope of risk is relatively broad. Generally, risk is the uncertainty of gain or loss in the future outcome of an event. This uncertainty may be either a good direction or a bad direction. Specifically, if there is a possibility that the gain or loss of an event may change and the process of change cannot be determined in advance, there is a risk. Credit economics believes that information incompleteness or asymmetry is a relatively common phenomenon and information between members will not be exchanged completely. In market transactions, there are differences in sources and methods of information. This asymmetry makes it easier for a party with more information to fall into fraud. The information-poor party may be exposed to the risk of fraud, which reduces the environmental credit level and increases credit risk, so credit risk derives from information asymmetry. It is precisely because of the lack of conditions for realizing the complete contract in reality that it also leads to the existence of credit risk. Niels (2002) says haven is based on opportunism and bounded rationality. He believes that people have both credibility and opportunity and believes that opportunism is the root of credit problems and information asymmetry is the cause of opportunism. The research on information asymmetry began in the 1940s. Information asymmetry includes asymmetry beforehand, adverse selection and asymmetry after the information. Adverse selection is the behavior that the party which has the information advantage in order to gain more benefits and conceal information to do harm to others.

Asymmetry after the event means that the party with the information advantage conceals the behavior that the other party does not want to occur in order to obtain more benefits. Information asymmetry is considered to be the main cause of credit problems. Mutual benefit is the premise of the transaction. Without mutual benefit, it is easy to cause a default and it is difficult for the two parties to the transaction to generate a credit relationship. Credit economics believes that incompleteness or asymmetry of information is a common phenomenon and information among members will be retained to some extent. In market transactions, there are differences in the sources and methods of information and the status of information held by both parties to the transaction is also different. This asymmetry makes it easier for the party with more information to fall into fraud. The party with insufficient information may suffer from the risks of fraud, which reduces the surrounding environment's credit level, increases credit risk.

For credit risk, Han (2014) points out that real estate credit risk refers to the size of the real estate company's inability to fulfill the debt agreement, which brings risks to other stakeholders. Moreover, he classifies credit risk into passive default and active default according to the repayment ability of real estate enterprises. Geng (2017) divides credit risks into three kinds according to the differences of defaulters: corporate, individual and national credit risk. Enterprise credit risk is the most important credit risk which is mainly caused by the deterioration of business operations and the decline of credit rating. Other scholar Zhang (2017) believes that credit risk has four characteristics which are uncertainty, potential, the destructiveness and the control of challenge. There are two possibilities for credit risk generation, one is active default and the other is passive default, but both will bring the probability of default. This probability is also the possibility, including the probability of default and the rate of default loss. In nature, credit risk can also be divided into default risk and spread risk. The former means the loss caused by default; the latter means the loss of the other party resulted from the possibility of default. The credit risks mentioned above are analyzed from a broad perspective. For credit risk, in addition to the above risks, there are other risks. Zhang (2007) analyzes the status call of China's credit management and proposes

that enterprise credit loss in China is mainly reflected in information fraud, economic arrears, counterfeiting and scrambling, which increase the transaction cost of enterprises. It has restricted the development of enterprises as well as brought instability to social development. Xu (2012) proposes that the credit problem of small and medium size enterprises mainly includes problems such as the counterfeit and shoddy products, lack of loan credits, financial false information and a large number of false advertisements.

Akerlof (1970). The theory of information asymmetry means that in economic activities, there are differences in the mastery of trading information among various market participants. Participants who master more information are often in a more favorable position; while on the contrary, those with poor information are in a disadvantageous position. Information asymmetry is in the process of transaction. Due to the difference of information channel and environment, both sides of the transaction have different degrees of information. Information asymmetry runs through the transaction before, during and after the transaction. In the process of pursuing the maximization of interests, the decision-making of both parties is also from the perspective of self-interest. The asymmetry before the contract is reached leads to adverse selection, while the asymmetry after the contract is reached leads to moral hazard. Adverse selection refers to the phenomenon that high-quality products are expelled by inferior products in the market. In order to reduce costs and improve profits, enterprises cut corners and replace inferior products with high-quality ones, and inferior products are finally eliminated by high-quality products. Moral hazard is the possibility that one party of a transaction will suffer losses due to the default of the other party. Information asymmetry also exists in the use of commercial credit. In the whole process of signing and performing the purchase and sale contract, the credit granting party and the trusted party of commercial credit may have different information access channels and cognitive levels. People who have a comprehensive grasp of information resources naturally occupy an active position in trading activities.

Information asymmetry theory is an important part of information economics. Its core

idea can be traced back to Adam Smith's classical economics theory in classical economics. Adam Smith believes that the market can reach the balance of supply and demand only under the function of "invisible hand", which implies the idea of information asymmetry theory, and the invisible hand plays a full role. According to credit economics, information is incomplete or incomplete (or asymmetric) (generally, some members have information that other members cannot possess. The main body with information advantage can obtain more benefits in the transaction, which affects the role of the market mechanism in the resource allocation of "invisible hand". The asymmetry of information makes the information dominant party have the motive of fraud, and the party without information advantage faces "moral hazard". The market finally makes adverse selection, which leads to the decrease of market credit level and the increase of credit risk. Since credit risk comes from information asymmetry, a natural logic is that as long as the parties sign a complete contract, the "adverse selection" and "moral hazard" can be prevented by setting up incentive and punishment clauses, and the transaction cost can be reduced at the same time. The complete contract can write all the information related to the contract into the contract terms, clearly describe the responsibilities and rights when unexpected events occur in the future, and can be strictly implemented, so there is no credit risk under the complete contract. However, complete contract is an ideal assumption, which is impossible to become true in reality. In this sense, credit risk is also due to the incompleteness of the contract and opportunistic speculation of the contractor.

From the research of scholars, the current research focus on credit issues is the narrow credit risk problem, which focuses on financial repayment risk research. In our research we assume that credit risk is the possibility and size of the loss caused by the main body of the enterprise to other economic entities, not only the financial repayment risk, but also the credit risk and crisis caused by other credit problems.

2.2.3 Risk management

Credit risk itself is concealed, difficult to control, destructive, long-term and contagious.

There are many reasons for credit risk. First, information asymmetry will bring credit risk. Credit economics believes that information incompleteness or asymmetry is a relatively common phenomenon and there will be certain reservations among members. In market transactions, there are differences in the sources and methods of information and the situation in which the parties to the transaction have information is also different. This asymmetry makes the party with more information more likely to be caught in fraud. The party with lack of information may be exposed to the risks of fraud, reducing the surrounding environmental credit level and increasing credit risk. Second, the occurrence of credit risk is closely related to the cyclical nature of economic development. Credit risk has a strong correlation with economic development. When the level of economic development is high, the enterprise is in good operating condition and has a strong ability to perform the contract, so the probability of default will be greatly reduced, thereby reducing credit risk and vice versa. Third, the occurrence of credit risk is sometimes a special event. The particularity of this incident determines that it will have a deeper impact on the operation of the enterprise. Credit risk is not caused by one party. Both parties may be the factors that cause credit risk. At the same time, the initiator of credit risk is not single or independent. It may be caused by the indirect effect of other factors. The causes of credit risk are also multiple. Fourth, the contagion of credit risk can lead to the mutual influence of corporate credit risks. A company's default may cause another company to default. Contagion is mainly caused by the close and complex links between businesses or debtors. There are generally two types of effects: timely market effects and delayed market effects. The former caused the credit spread of affiliated companies to increase significantly and even jumped. The latter does not happen immediately, but usually happens suddenly and causes subsequent default effects of affiliated companies. The contagion of credit risk between affiliated companies increases the complexity of managing the credit risk of a single enterprise and the credit risk of multiple enterprises.

Regarding risk management, the International Association of Internal Auditors believes that risk management refers to the process of identifying, assessing, managing and

controlling incidents or potential situations in order to provide scientific and effective guarantees for achieving the strategic goals of the enterprise. The connotation of risk management by the false financial reporting committee is expressed as follows. Risk management of China's Guide to Comprehensive Risk Management of Central Enterprises believes that risk management is mainly to protect the overall business objectives of the enterprise from the corresponding strategies of risk management, management of internal information of the organization, organization and control systems, financial management. Management is actually a method and a process. In summary, the definition of risk management in this thesis is the identification, analysis, evaluation, storage and operation of risks to reduce the risk of the enterprise's lowest risk business activities.

2.2.3.1 Theoretical model of risk identification

The area of risk management was originally applied in the insurance industry and it evolved into the current risk theory after decades of history. Risk management is also increasingly applied by enterprises. The first step in risk management is risk identification. Risk identification is to predict risk factors and events through various methods to reduce the adverse impact on project goals. The main methods include process method, brainstorming method and flow chart method and situation analysis. It is necessary to grasp the key points, such as the risks and the reasons for their emergence. Regarding the steps of risk identification by Zhang (2017), when researching the risk evaluation of the construction general contracting unit, put forward that the risk identification must first clarify the overall business objectives of the project, evaluate the performance risks based on the business objectives and combine the content of performance services to collect professional persons' information on the performance risk of such units, so as to analyze and determine the performance risk factors through a combination of theory and practice.

When scholars identify the risks of technology-based enterprises, they will analyze the factors from inside and outside of the organization step by step. Li and Huang (2006) point out that the comprehensive evaluation method and the econometric model method can be

used to identify risk factors and determine the magnitude of such effects. For technology-based enterprises, Wang and Zhang (2011) establish risk assessment indicators. The first-level indicators are mainly talent, economy, technology, reputation and other risks; the second-level indicators are the scientific and technological achievement transformation risk, intellectual property right risk credit rating risk, individual demission risk and market competition risk. Risk identification is usually seen as the basis of risk management (Wang, Ye, & Guo, 2004). High-risk credit identification is a dynamic and repetitive process that changes with objective environment, conditions and personnel. It can be identified by the methods of checklist verification and risk reversal. Liu and Wang (2015) used three methods of credit risk identification: fuzzy discriminative methods based on qualitative analysis, quantitative methods based on quantitative analysis and advanced artificial intelligence methods using modern computers. Although the fuzzy discrimination method deepens the credit constituent elements, it mainly depends on the subjective judgment, so it is difficult to become the mainstream method of credit risk identification. In the study of econometric methods, Zhang (2004) uses KMV (Key Medium Variable) model[1] to identify risks which has become a mainstream method because it is less interfered by subjective judgment. The artificial intelligence method identifies risks and brings new opportunities for risk identification.

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[1] The KMV model is a method established by the KMV Company in San Francisco in 1997 to estimate the default probability of borrowing companies. The model believes that the credit risk of a loan is determined by the debtor's asset market value given the liabilities. However, assets are not actually traded in the market, and the market value of assets cannot be directly observed. To this end, the model reverses the bank's loan problem from an angle and considers the issue of loan repayment from the perspective of the borrowing enterprise owner. On the debt maturity date, if the market value of the company's assets is higher than the company's debt value (default point), the company's equity value is the difference between the company's asset market value and the debt value; if the company's asset value is below the company's debt value, The company sells all its assets to repay its debts, and the equity value becomes zero.

2.2.3.2 Theoretical model of risk rating

Credit risk assessment, credit evaluation and credit rating have the same meaning in essence and credit risk assessment shows credit status and debt repayment level. Credit risk assessment is an important part of credit management and is critical to the quality of enterprise management. Credit rating means to analyze the relevant indicators, combine qualitative and quantitative analysis and conduct detailed analysis on the credit history, management level, asset status, future potential and the credit ability. The ability to pay debts is assessed and registered. The development of the general theoretical model of credit risk assessment mainly experiences expert analysis, expert judgment, statistical model, Moody's model and quantitative analysis model. At present, the institutions are increasingly inclined to adopt qualitative and quantitative integration, with quantitative method as the core.

The expert judgment method refers to the subjective evaluation and grade division of credit information by experts in related fields by means of their own knowledge and experience. It is known as 5C (Character, Capacity, Capital, Collateral, Condition), 5W (Who, Why, When, What, How) and other methods. It is easy to implement these methods to evaluate credit, but they are too subjective and cannot be used as key credit evaluation methods.

The statistical model method mainly calculates the default rate and the default loss rate through the statistical model and then evaluates the credit rating. Common statistical analysis methods include Logistic regression and principal component analysis. However, although the above methods can be used for comprehensive analysis, there are also problems of insufficient quantitative analysis.

The quantitative analysis method is currently the mainstream method in foreign countries and it has not been popularized in China. Generally, there are structured model method and factor model analysis. The first method is based on option pricing, which is related to the defaults of the company's capital. Merton (1974) is the first scholar to propose this method. In his opinion, the company's credit risk is only possible when the enterprise

debt is higher than the actual assets. Black and Cox (1976) further enhance the timeliness of the model. The common view of the above scholars is that debt defaults will not occur before the deadline. In practical applications, the KMV (Key Medium Variable) and Credit Metric models developed by financial institutions are widely used. The Credit Metric model can be used to measure credit risk for products such as bank loans, asset portfolios and financial derivatives, but it needs to be based on certain assumptions, such as assuming that companies with similar credit ratings have the same probability of default and credit rating changes. This will ignore the possibility of enterprise credit situation, which is not in line with the actual situation. Dionne and Laajimi (2012) suggest that the simple model's interpretation of credit spreads needs to be clarified by default rates.

For the domestic research on credit risk assessment of technology-based enterprises, Li, Xi, and Zheng (2009) use principal component analysis and logic model to classify indicators into solvency, operational capability, profitability, and growth ability from a financial perspective. Profitability is an important business goal and a guarantee for companies to repay their debts. If the company has strong profitability, it can repay the debt on time through the benefits that the company has obtained. At the same time, higher profitability can also provide financial support for enterprises to further open up the market, enhance the level of corporate financing and ensure the stable development of enterprises and the operation of the capital chain, thereby reducing the credit risk of enterprises. Among them, the assessment of profitability needs to consider the current profitability of the company, the source of profit and the stability of earnings. Li and Wu (2010) construct credit evaluation indicators of technology enterprises from the elements of enterprise operation, assets and development capabilities and they use multi-layer dynamic fuzzy evaluation method to construct high-tech enterprise credit risk evaluation model.

2.2.4 Factors affecting credit risk

2.2.4.1 Factors affecting general industry credit risk

For the factors affecting enterprise credit risk, scholars also start from the factors of the

enterprise itself and also propose that it is also affected by external environmental factors. For internal factors, Lee and Dawes (2005) find that the trust of the purchasing company for the company is mainly the trust of the salesperson, that is, the credit of the salesperson. Xi, Du, and Liu (2014) believe that leaders, organizational structure and organizational culture are important factors affecting corporate credit. Leadership is the main factor of the credibility of the organization. External environmental factors generally include the institutional environment, cultural environment and industry environment, while the institutional environment includes the credit system and supporting policies; the industry environment represents the development space and prospects of the enterprise. Zhang (2010) believes that the source of credit risk has various internal and external factors. Because of the internal factor of operation problem, the company is no longer able to repay the debt, resulting in credit risk. The external market environment, rules and regulations and policies will also affect the credit and lead to credit risk. Han (2014) studies the impact of real estate credit risk from the perspective of macroeconomic factors and proposes that economic development speed, economic growth level and money supply are significantly negatively correlated with credit risk. Research by Li and Xie (2017) finds that actively taking on social responsibilities is conducive to transmitting high-quality signals, which in turn facilitates enterprises to obtain long-term loans from banks. Research by Frank, Franco, and Frank (2007) shows that neglecting the performance of corporate social responsibility will lead to higher financing costs.

For the relationship between internal and external factors, Cheng and Xia (2008) propose that external factors such as market economy and laws and regulations will inhibit internal factors of the company. He (2013) believes that the intrinsic factor is the determining factor, while the external factor affects the enterprise through internal variables, for example, the cost-benefit choice of enterprise. In addition, Stellner, Klein, and Zwergel (2015) find that under the influence of national environmental and social factors, positive social responsibility performance can reduce the risk of corporate default on credit. Table 2-1 summarizes the influencing factors of credit risk.

Table 2-1 Summary of factors affecting credit risk

Author	Influencing Factors	Industry / Company
Malhotra and Murnighan (2002)	Entrepreneurial characteristics, company geography, past credit, debt cycle	
Yan and Li (2007)）	Enterprise Governance Level	Listed Companies
Cheng and Xia (2008)	Enterprise size, sales growth rate, net sales rate, current assets ratio, laws and regulations, etc.	Listed Companies
Li, Mu, & Lu (2010)	Internal department communication, bank credit rating, supply chain stability, public opinion	
Guan and Chen (2008)	Enterprise Credit Awareness, Credit Ability, Enterprise Environment	
Lv , Ni, & Zhu (2007)	Cost effectiveness, solvency, operating capacity, growth capacity and environmental conditions	Extractive industry
Dai and Zhao (2012)	Enterprise Finance, Size, Management, Leadership Quality, Industry Characteristics, etc.	
Guo, Zhong, &Chen (2013)	Company sales, debt ratio, equity, etc.	China's small real estate companies
He (2013)	Incentive, Punishment, Scale, Property Rights, Law	

Source: Hu (2013)

Through the summary of the factors affecting credit risk, the factors affecting credit risk of many industries have been studied, such as finance industries, listed companies, extractive industries, small real estate and general small and medium-size enterprises. The credit risk of enterprises can be affected by internal and external factors. Scholars believe

that the internal factor is the decisive factor and the influence of the external factor on the credit risk is indirect and generally acts through internal factors.

2.2.4.2 Factors affecting credit risk of technology-based enterprises

Zhang (2010) proposes that high-tech enterprises are technology-based products, with high value-added benefits and high-risk costs. Coupled with the influence of information asymmetry, enterprises are vulnerable to financing problems. Chen and Liu (2015) have shown that the competitiveness of enterprises, enterprise environment and enterprise resources have a great impact on the development of enterprises. Zhang (2010) puts forward there are significant industrial differences and regional differences in enterprise credit risk when researching the risks of high-tech enterprises. However, the size, development stage, region and industry of enterprises have little effect on credit risk and there is also a significant negative correlation between the innovation ability and possibility of default in technology listed companies. Yu and Li (2006) propose that enterprise innovation, talents and finance have a significant relationship with the credit risk of small and medium-sized enterprises. Fei and Liu (2012) believe that the size and profitability of enterprises will affect the credit risk of small and medium-sized enterprises. Liu and Yan (2012) propose that supply chain finance will affect the credit risk of small and medium-sized enterprises.

For the influencing factors of technology-based enterprises, compared with the credit risk factors of the general industry, in addition to some common factors, scholars also propose the level of science and technology, independent innovation capability and technological innovation capability (Yu & Li , 2006；Zhang, 2010).

2.3 Technology-based enterprises

2.3.1 Meaning of technology-based enterprises

Technology-based enterprises are pursuing technology and such enterprises are engaged in technology research, production and sales services. Innovation is the vitality of

such enterprises. It also has the mechanism of innovation. It can respond to the market skillfully and has great potential for development. It is also often called high-tech enterprises. When defining a technology-based enterprise, the conceptual aspects may be inconsistent, but they can be roughly classified into several categories.

Technological enterprises are often referred to as high-tech enterprises. When defining a technological enterprise, due to different starting angles and different priorities, there will be some deviations in the definition of the concept of a technological enterprise. There are several main definitions of technology-based enterprises. China's main criteria for defining technology-based companies is to define high-tech companies as high-tech companies whose investment intensity and the ratio of scientific research personnel to the total number of personnel are twice the national manufacturing average. The United States defines science and technology enterprises according to the characteristics of enterprises as high-tech enterprises are a type of high-growth rate, high research and development costs, and high added value, strong export-oriented and highly skilled labor-intensive production technology company. In the European Union, there are mainly broad and narrow definitions of technology-based enterprises. A broad definition holds that all new enterprises that are produced and operated in the high-tech industry. A narrow definition holds that a high-tech enterprise is based on the use of inventions and creations or on the basis of technological innovation and bears its own technical risks and establishes an independent business unit for less than a year. Dess and Beard (1984) pointed out that technology-based companies refer to companies with a high proportion of professional and technical personnel and a high proportion of R&D investment in sales revenue but did not specify the specific values of these two proportions. Jiang (2017) proposed that science and technology enterprises are based on scientific research personnel, with the commercialization and marketization of scientific and technological achievements as the main behavior, focusing on high-tech activities such as product development, technical services, and consulting, and finally continue to innovate and develop the market intensive economic entities.

In China, it is generally thought that science and technology enterprises are the enterprises with higher proportion of scientific research workers and R&D (Research & Development) than double of manufacturing industry. Specifically, there are three indicators and the proportion of R&D (Research & Development) personnel needs to exceed tenth of enterprise; the proportion of staff above junior college is more than three-tenths; the R&D (Research & Development) expenditure is more than 0.05 of sales; and the investment ratio of technical products and services needs to reach more than four-fifths of income. Jiang (2017) proposes that the main body of the technology-based enterprise is consisted of technical staffs. The behavior emphasizes the transformation of technology products and the enterprise integrating product research, promotion and service is an intensive economic entity that constantly introduces new products and develops the market. The United States defines high-tech enterprise as the enterprise with high research and development costs, high added value and high skill level. From a broad perspective, the EU (European Union) proposes that all the businesses engaged in business activities in this industry belong to high-tech enterprises. From a narrow perspective, this type of enterprise is a risk business organization with technology as a carrier.

In our research we assume that technology-based enterprises are the high investment and high-risk enterprises engaged in the research, development, conversion, sales and service of technical products.

Frank, Franco, and Frank (2007) proposed the life cycle hypothesis in the consumption function theory, the life cycle theory was introduced into the research in the field of economic management. On this basis, related theories such as leadership life cycle and enterprise life cycle were derived. Among the enterprise life cycle theory, the most influential is the enterprise life cycle stage theory. The concept of the business life cycle was first proposed by (Greiner, 1972). He believed that the business, like life, also has a natural growth process and it hurts that life in nature will go through the entire process from birth to final death. In this process, it can also be divided into different stages, each stage has different

characteristics. This is regarded as the beginning of life cycle theory.

Greiner (1972) first proposed the concept of corporate life cycle in the article "The Evolution and Change of Organizational Growth". Among them, Greiner (1972) stage theory believes that each stage contains a fairly peaceful period of stable evolution and ends in different forms of management crisis. Adizes (1999) believes that although companies of different natures have their own characteristics, the growth of most companies still has the same pattern, which is a sign of the formation of the corporate life cycle theory. He divides the corporate life cycle into three stages: growth, regeneration and the maturity stage and the aging stage of the enterprise are specifically divided into ten periods of enterprise pregnancy, infancy, toddlerhood, adolescence, prime, stable, aristocratic, early bureaucratization, bureaucratization, and death. The discovery of this study marks the formal birth of the enterprise life cycle theory. Chen (1995) based on a series of studies on the enterprise life cycle, put forward the enterprise life cycle theory, and divided the enterprise life cycle into the incubation period, survival period, high-speed development period, maturity period, recession period and transformation period.

Although there are many theories related to the enterprise life cycle, the basic idea of these theories is to look at the growth of an enterprise as a process of dynamic development with several stages, through research and analysis of the factors that affect the growth of the enterprise in each stage, and the life cycle of the enterprise The characteristics and problems encountered in the stage should be dealt with corresponding strategies or tactics. The foundation of the establishment of the enterprise life cycle theory is the system theory and contingency theory, that is, the enterprise life cycle theory regards the enterprise as a system that is affected by many factors such as internal and external factors. The enterprise presents different views and characteristics at different stages and faces different views. , The method and strategy to solve the problem should be chosen contingently. Although there are many theoretical models of life cycle, these life cycle models have the same core idea, that is, the growth of the enterprise follows a certain law, and it will be in different growth stages. Show

different characteristics and problems. At present, domestic and foreign scholars have different life cycle divisions, but life cycle provides another perspective for enterprise development research.

For the stages of the life cycle, Timmons (1990) proposed the term growth stage and divided it into three stages. Smith, Mitchell, and Summer (1985) proposed the life cycle stage and divided it into three stages. Churchill and Lewis (1963) proposed the development stage and divided it into five stages. The basis used by scholars at home and abroad to determine the life cycle is also different, mainly from the perspective of corporate organizational behavior characteristics and corporate value indicators to determine the life cycle. Most scholars agree with the point of view of the first stage. Scholars who agree with the three-stage view often divide the start-up period and the growth period into one stage, while those who agree with the five-stage view divide the start-up period into the incubation period and the entrepreneurial period, or It is believed that there will be a phase-out period after the recession period. Therefore, the three-stage and five-stage views can be integrated into the four-stage model.

From the point of view of domestic and foreign scholars on enterprise life cycle, technology-based enterprises will also experience a certain life cycle. However, scholars have little research on the division standard of each stage so far. For the division of enterprise life cycle, Tang (1993) according to the previous research and the characteristics of high-tech enterprises studied in this thesis, he believes that any enterprise has a life cycle, and divides the life cycle of an enterprise from time. The first year of enterprise development is called the immature period, in which the incubation period is one year, the opening period is generally one year, and the early growth period is one year. Li (2000) proposed a modified model of enterprise life cycle on the basis of previous studies and pointed out that the enterprise life cycle can be divided into three stages: initial stage, growth period, mature period and recession period, with sales volume as the division index. Gao, Zhuang, and Wang (2011) conducted a questionnaire survey and empirical analysis on 265 science and

technology-based enterprises in Shanghai, and concluded that the registration period, sales growth rate and product structure are the main criteria for dividing the growth stage of science and technology-based enterprises. On this basis, Chen (2014) further defined the life cycle division standard of technology-based enterprises, in which the registration period of technology-based enterprises in the seed stage is 0-2 years, the annual sales growth rate is less than 0% - 10%, and the product structure is single product or single product series; the registration period of enterprises in the start-up stage is 3-5 years, the annual sales growth rate is 0% - 30%, and the product structure is a single product series. In the growth period, the registration period is 5-8 years, and the annual sales volume is more than 10%, forming the leading products or product diversification; the registration period of the mature technology-based enterprises is 8-10 years, with the annual sales growth rate of 10% - 50%, and the products are more diversified.

This thesis holds that the division of life cycle by foreign scholars is more scientific, but there is no specific division standard; domestic scholars mainly divide the life cycle from time, sales, product structure, this thesis agrees with the views of (Gao, Zhuang, and Wang, 2011; Chen 2014), and judges the growth period of technology-based enterprises mainly from time, sales and product structure. The growth period of technology-based enterprises mainly refers to the technology-based enterprises whose registration period is 5-8 years, the annual sales growth rate is less than 30%, and the product organization is a single product series or growth leading product.

2.3.2 Characteristics of scientific and technological enterprises

After the initial stage of development, technology-based enterprises will achieve a certain market share by the expansion and transformation of technology products. After entering the development stage, the scale gradually expands Leung et al. (2006). The focus of the company shifts from initial technology to both technology and market. Generally, there are mainly the following characteristics for scientific and technological enterprises:

(1) High proportion of intangible assets account

For technology-based enterprises, such enterprises do not need a large amount of l and space at first. After experiencing the research and development of technology, the uncertainty is gradually stable. When the product is accepted by the people in the initial stage, the company enters the market growth period. Through the new-stage technology-based enterprises, the products occupy a certain market share and the sales volume continues to increase. For such enterprises, innovation ability and management level as intangible assets is the key to affect their core competitiveness and sustainable development.

(2) Insufficient funds and sources of talent input

In terms of input factors, the development process of science and technology enterprises involves the input of various economic resource elements and exhibits high growth characteristics. Advances and stability of technology can help companies achieve product transition, which in turn will further promote enterprise innovation and production. Enterprises increase their investment in technology research and development and strive to gain a certain market share in the fastest time. However, the competition in this market and the expansion of production often put higher demands on the equipment and funds of enterprises. However, it is difficult to for enterprise to have sufficient funds to meet the demands.

How companies attract people of insight to participate in this process is very important for business development. In addition to the needs of high-quality leaders, technical personnel with professional skills, the development of the enterprise also need other knowledge-based talents to take part in. How to optimize the management of human resources, scientifically make the company development more stable and efficient, is of great importance to the growth of technology-based enterprises.

(3) High risks

The legitimacy of scientific and technological enterprises has gradually taken shape and

external cooperation networks have become more and more stable Leung et al. (2006). The organizational hierarchy of the organization has changed from single to multi-functional form (Scott, 1981), which is more conventional. However, there are still risks in the development of technology-based enterprises. Zhang (2016) proposes that in terms of risk characteristics, there are generally two types of enterprise risks: one is the risk brought by the turmoil in the external market; the second is the risk caused by the problem of enterprise management. External risks include policy risk, market risk; internal risks include credit risk. Firstly, policy risks are closely related to national development strategies and regional development strategies, especially with regard to the planning and development prospects of the industry development of technology-based enterprises, relevant policies issued by government departments, strategic adjustments and policy adjustments affect financing. The production and operation situation of technology-based enterprises is highly likely to aggravate the risk control of the enterprise. In addition to policy changes, there are also changes in the regional operating environment that may bring impact on the company's healthy and sustainable development due to changes in leaders. Secondly, for technology companies, the market risk they face is generally the risk of achievement transformation. Due to the variability of market demand, market risk presents persistent characteristics. Market risk is mainly due to changes in the market. Changes in the market will affect the capital business of the enterprise, which may cause the enterprise to suffer certain losses. Thirdly, most of the credit risk arises from unwillingness, mainly due to the borrower's inability to complete the agreed obligations on time or take the social responsibilities. For enterprises engaged in technological innovation models, there are extensive business risks. The products promoted by technology-based enterprises are technologies and services and their risks are often doubled compared with those of ordinary enterprises. This is mainly because the risks arising from the operation and economy of enterprises are high.

(4) Clear goals

From the perspective of behavioral patterns, enterprise innovation is not limited to a

certain person or government, but more is a voluntary activity of the enterprise. This kind of innovative behavior is not aimless. On the contrary, it has certain business objectives. For the goal, some scholars have proposed that occupying the market and developing stably is the goal of the enterprise Yin, Peng, and Peng (2014). Some scholars believe that these enterprises have experience and capital accumulation, and they will focus on the advancement of technology (Scott, 1981; Yin, Peng, & Peng, 2014).

(5) Weak credit ability

Compared with general enterprises, technology-based enterprises have weaker credit capabilities. This characteristic is caused by the excessive uncertainty in the development of technology-based enterprises. This uncertainty mainly includes the uncertainty of results, the uncertainty of the market and the uncertainty of benefits. With regard to the uncertainty of results, scientific and technological innovation is faced with the no implementation of innovative results and the incompleteness of information technology, making it difficult for companies to confirm the possibility of scientific and technological achievements being converted into products and services and the possible impact of technological innovation. For the uncertainty of the market, the uncertainty of scientific and technological achievements further leads to the uncertainty of market acceptance of products. Because of uncertainty of efficiency, even if the innovation results are successfully converted into products, there is still a high degree of uncertainty as to whether the products are suitable for quantitative production and put into the market. Various uncertainties have led to the relatively weak credit capacity of technology-based enterprises and their credit risk needs more attention.

2.4 Enterprise quality

2.4.1 Connotation and dimension of enterprise quality

Enterprises, as the main body of the market, have their own ideas and specific behaviors and sometimes have certain "personalities", so that enterprises will also have certain qualities.

Hu and Hu (1997) believe that the quality of enterprises is the functions realized by the mutual correlations and actions of the internal factors of the industry. Pang (2012) proposes that the quality of the enterprise means all the parts and organic components that can meet the development need of the enterprise. Li (2013) believes that the quality of innovative enterprises is an innovative function, which is formed by the combination and evolution of various elements within the enterprise, with continuity and dynamics. This quality allows companies to be more innovative, influential and comprehensive than ordinary businesses. Jiang (2015) proposes that it is more important to focus on the quality of the enterprise than the scale of the external enterprise.

Yu (1983) divides the quality into technology quality, management quality and personnel quality. This method of division has been commonly accepted. Guo, Wang and Shi (2011) propose that the quality of enterprises has three types of quality: technology, management and culture. Lin (2012) believes that compared with competitiveness, the quality of enterprises can reflect enterprises more comprehensively and systematically and he divides the quality of enterprises into basic elements, ability factors and benefits. From the characteristics of technological orientation, management assistance and innovation of innovation stress, Li (2013) divides the quality of innovative enterprises into technical quality, management quality and personnel quality, starting.

Wang, Ye, and Guo (2004) believe that enterprise quality is composed of enterprise personnel, enterprise measures and enterprise system and enterprise human resources management and so on and is used to evaluate the quality of an enterprise. Jiang (2015) believes that there are three qualities: corporate leadership, staff and management. The quality of personnel mainly refers to the collective awareness of the ideological consciousness and knowledge skills, qualities and working ability of enterprise staff (Luo, 2016). This kind of quality is a unique way of thinking, working methods and operating procedures for human resources management, starting from the needs of organizational strategic development and aiming at strengthening competitiveness and improving actual

performance. The innovation quality of an enterprise is the quality related to the innovation of the enterprise, such as new equipment, products and design concepts.

This thesis is a discussion of the credit risk of technology-based enterprises. The quality of technology-based enterprises is a function of the aggregate of various elements within such as new equipment, products and design concepts. Considering that technology-based enterprises have higher operating risks and their own characteristics as technology-based enterprises, combined with the above scholars' research on the division of enterprise quality, this thesis believes that the quality of technology-based enterprises mainly includes enterprise personnel quality, management quality and enterprise innovation.

2.4.2 Research on the quality of the enterprise

The scholars' attention to the quality of the enterprise shows a clear wave of dynamic trend. In the 1980s, the quality of the enterprise was the research topic of many scholars (Guo & Feng, 1984). However, there have been few articles on the quality of enterprises since 1980s and it was not until the 1990s that they returned to the academic field.

Guo & Feng (1984) propose that enterprise quality is a collection of resources needed for enterprise development. The internal quality of enterprises is mainly talents, skills and operations. The quality of management and enterprise leadership is very important for enterprises. Since the past 90 years, Cha (1990) has systemized the company and has carried out research on the characteristics, nature and development laws of the company and proposed a plan for improving the quality of the company from a system perspective. Jiang (2006) believes that enterprises are the cells of the national economy and enterprises are interdependent with the entire economic lifeline. Therefore, the quality of the enterprise is not only affected by the internal factors of the enterprise, but also by the relevant policies of the government. He believes that the improvement of the quality of the enterprise is to enhance the vitality of the enterprise and the quality of the enterprise will be affected by both internal and external forces. High-quality enterprises generally have talents, communication,

culture, technology and other resources and they can use resource management and mobility strategies to drive the growth of enterprises. Miao (2012) proposes that the quality of the enterprise is mainly affected by capital and manpower in the railway construction company

It can be seen from the above research that the quality of the enterprise will be influenced by the company's own efforts and external factors and they pay more attention to the management quality of the enterprise, but it is rarely linked to the study of quality and credit.

2.5 Quality of enterprise managers

2.5.1 Quality theory

Competence refers to the collection of outstanding characteristics of individuals, showing their knowledge, skills, motivation and personality. Competence is the starting point for a person's competence for a certain job. For competence, there are two main models, the iceberg model shown in Figure 2-2 and the onion model shown in Figure 2-3. The iceberg model divides competency into explicit parts exposed above the sea level and implicit parts hidden below the sea level based on the differences in expression. As its name implies, the explicit part is mainly composed of knowledge and ability, which is the basic quality that can be cultivated and strengthened through observation and acquired. The implicit part is due to its concealment and difficult-to-observe characteristics. It is an inherent characteristic of the individual. The influence of the external environment on it will be minimal, but it does affect the core factors of individual behavior. It mainly includes individual quality image, behavior characteristics, motivation. The iceberg model is a research carried out around observing the characteristics of competence, highlighting its observability.
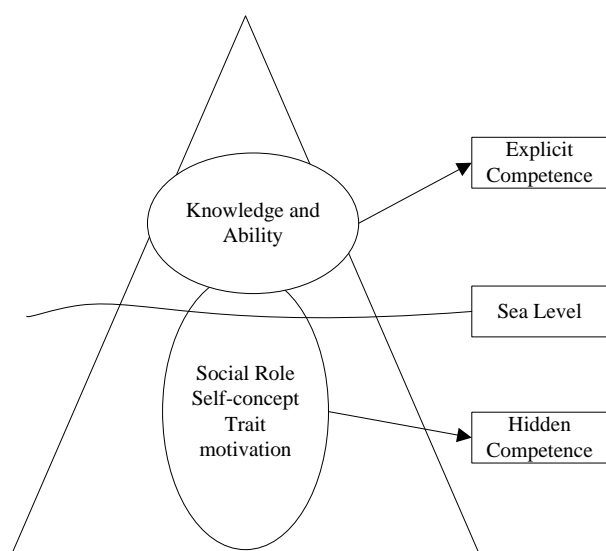
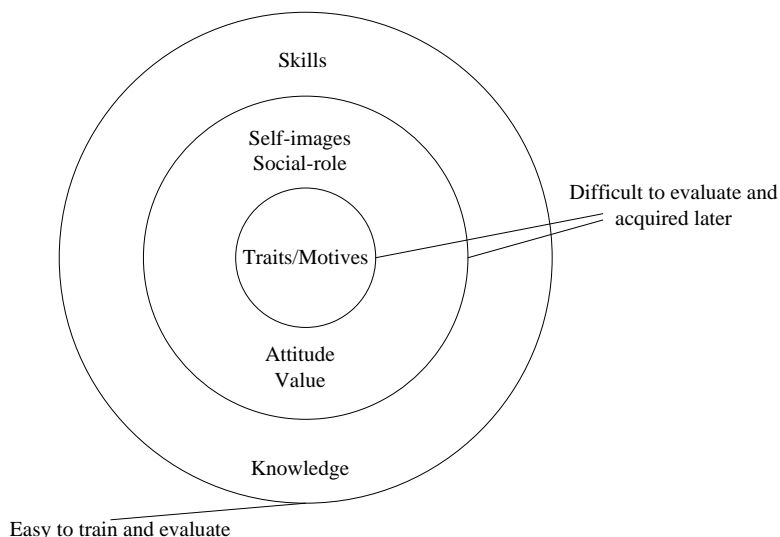Figure 2-2 Quality iceberg model

Source: Lyle and Signe (1993)

Figure 2-3 Quality onion model

Source: Peng and Jin (2003)

The onion model, another classic competency model widely mentioned in the academic world is the onion model. By peeling off the layers of onion, it shows the competence qualities in the model from easy to difficult observation and it is more layered and operable. The performance of the onion contains two elements that are easy to be strengthened through training, such as knowledge and skills. With the deepening of the layers, the more difficult it is to find and pass the acquired training and evaluation; it is the intrinsic and hidden qualities of the individual. But it is the core of the whole onion, which determines its excellence.

Although there is no uniform standard on the applicability of quality models in China, under normal circumstances, technology-based, innovative companies or high-tech departments in enterprises are more suitable for this management model, while labor-intensive companies are not suitable to use this management model.

2.5.2 Connotation and dimension of enterprise managers

Enterprise managers have the power to allocate resources needed for enterprise development and determine the direction of enterprise development. They are the confirmers of enterprise development goals, planners and work guides and play an important role in the

enterprise. The level of managers is determined by their qualities. If you want to study the quality of enterprise managers, you first need to clarify the concept of quality. American psychologist Mc (1973) has promoted people's research on quality. He believes that quality is a collection of various personality characteristics that drive individuals to produce excellent work performance, reflecting the knowledge and skills of individuals that can be expressed in different ways, such as personality and internal drive. Quality is the starting point for judging whether a person is competent for a certain job and is the personal characteristics that determine and distinguish the difference in performance. The American Management Association (AMA) compares the performance of excellent managers and general managers, extracts personality characteristics to define job competency characteristics and the research results identify five key competency characteristics for excellent managers: professional knowledge, enterprise Home maturity, personal maturity, professional maturity and interpersonal maturity. From the perspective of psychology and management, Spencer and Spencer (1993) believe that quality is a potential characteristic that distinguishes excellent and ordinary people in certain job and can be quantifiable individual characteristics such as motivation, values, knowledge and behavior. This view emphasizes the quality structure. Management quality focuses on the company's business philosophy, management decisions and the rationality of related systems, emphasizing the management of human resources (Jiang, 2015). The quality of managers is aimed at the quality characteristics that should be possessed by the personnel with management responsibilities in the company. Leadership and leader are two different concepts. Leadership and management refer to the various activities that affect the individual, group or organization to achieve the desired goal. It represents a relationship, a process, while or a leader is someone who takes a position, plays a leadership role and implements a leadership process. For the quality of enterprise managers, that is, the leadership quality of enterprises, Zhang (2002) believes that the fierce market competitiveness and large-scale management put forward higher requirements for the professional management level of managers. If managers want to obtain success in the competition, he should have seven types of qualities:

highly educated; possess a variety of cultural abilities and sensitivities; the ability to integrate moral and ethical values; the ability to respond flexibly and move quickly; individual charm; communication skills. For the quality of enterprise managers, Liu (2014) believes that leadership qualities include quality, decision-making, emergency response and reputation. Li (2013) divides the quality of enterprise managers mainly from capability, quality and knowledge. Jiang (2015) believes that the quality of leaders mainly refers to the comprehensive management ability, leadership ability and coordination and communication ability of the main leaders of the enterprise, as well as their personal moral cultivation and responsibility. Jiang and Dong (2015) believe that the quality of leaders mainly refers to the leadership, management, talent, communication and sense of morality and mission. Liu (2016) believes that leaders of the new era not only need to have the qualities that mainly represent personal character, morality, style, knowledge, knowledge structure, but also need to have the management ability to be leader, to discover talents, to innovate and make strategy as well as to resist difficulty.

According to the views of scholars (Li, 2013; Jiang 2015), the quality of enterprise managers is the quality for them to be qualified for management positions, mainly referring to their quality, ability and knowledge.

Combining the views of scholars (Li, 2013; Jiang, 2015), the onion quality theory and the iceberg quality theory, the quality of enterprise managers is the quality required for enterprise managers to be qualified for management positions, including not only obvious qualities that are easy to discover and cultivate, such as knowledge ability and skills, but also hidden qualities that are difficult to detect, such as roles, self-concept and image, traits and internal motivation.

2.5.3 Research on the quality of enterprise managers

Some scholars believe that the quality of an enterprise depends on the quality of people. Enterprise managers and enterprise personnel are the most basic components. The enterprise

quality is basically determined by the character of the entrepreneur. Qin (2003) proposes that the quality of an enterprise can be reflected by its operation, response and competitiveness. Thomas, Schermerhorn, and Dienhart (2004) points out that investors pay more attention to the quality of business managers. If the management and leaders of the company can correctly convey the quality of the company, investors will feel peace of mind and the possibility of investment for the company will be higher. Conducting a related research on enterprises and Liu, Chen, and Lin (2005) find that there is a significant positive correlation between the educational background and the proportion of enterprise share. When a company's management information is clearer and the manager has a higher reputation, the managers are more likely to make the best decisions in a fast time to get the best opportunities for the company and achieve the best results. Scholars (Carpenter, 2002) also propose high-level team has relationship with enterprise performance when conducting research on enterprise executives. The human capital theory of Becker (1975) believes that individuals be provided with education, training and experience to enhance their own capabilities. This ability will then promote the performance of the company, because individual knowledge and skills can bring more value to the enterprise. The reputation of managers is considered to be a manifestation of capabilities, which can reduce the enterprise risk and reduce organizational costs. Bantel and Jackson (1989) argue that when managers have a business experience, they are often more insightful to carry out creative management based on the company's situation. Tesar and Werner (1992) suggest that the quality of managers is significantly related to organizational goals. Mueller (1997) believes that the value of company managers themselves can be influenced by the organization through the use of organizational resources, organizational response and so on. Cohen and Dean (2005) find that executives' experience represents management and leadership, helping to manage tasks and gain positive feedback and trust from investors.

From the point of view of comprehensive scholars (Becker, 1975); Bantel & Jackson, 1989), the quality of enterprise managers will have an impact on investors' evaluation, enterprise performance, management innovation, but it is lack of empirical research and the

role of enterprise managers' quality in the impact mechanism of credit risk needs to be further verified.

2.6 Enterprise policy

2.6.1 Government intervention economic theory

The theory of government intervention refers to the comprehensive use of macro-policy measures by the government to properly intervene and regulate economic life to eliminate market failures. The theory was clearly put forward by Keynes, a famous British economist, in the book "General Theory of Employment, Interest and Money" in 1936. The logical starting point of the theory is that in the face of the problem of insufficient effective demand, market forces alone cannot automatically promote the expansion of effective demand and must be resolved through government intervention. The main point is to advocate that in the face of the economic crisis, it is recommended to abandon the previous liberal market and actively adopt the policies and regulations of the government to intervene in the economy, relying on means such as finance and economy to solve the insufficient effective demand. Modern Western economics believes that in a perfectly competitive market where consumers buy the commodity at a product price determined by the marginal cost, the allocation of economic resources is the most efficient and the Pareto optimal state can be achieved. However, complete competition is like a complete contract, which is an ideal market state and difficult to achieve. In addition, under the market mechanism, there will inevitably be unfair distribution and macroeconomic imbalances. This is market failure. The main causes of market failure are competition failure, externality issues and incomplete market and incomplete information.

First, competition is invalid. In the market economy, the irreplaceability of products and the existence of transaction costs have increased the market influence of some manufacturers, reduced the competitiveness of the market and thus easily formed a monopoly, resulting in a reduction in the efficiency of market resource allocation. This is

especially true for technology-based enterprises. The scale production of monopoly enterprises will dampen the enthusiasm of other technology-based enterprises for growth and development.

Second, there are externalities. Under the conditions of a market economy, the production and consumption of a certain product will unnecessarily benefit or damage a third party other than the producer and consumer of such a product. This externality leads to asymmetry in costs and benefits, reducing the efficiency of the market in allocating resources. Therefore, it is necessary for government departments to intervene and adopt measures such as fines, subsidies, public control and legal sanctions to correct external effects.

Third, the market is incomplete. Market incompleteness means that the market is unable to provide or is unable to provide some products adequately. For technology innovation lines that have not yet matured, the possibility of incompleteness has increased. Technology-based industries have large investments, high risks and long profit cycles. The new technological enterprises do not dare to rush into business and government departments are required to intervene and support it.

Fourth, there is personal preference. The rationality of personal preference is a prerequisite for the rationality of the market competition structure, but in the real market, not everyone's preferences are reasonable. For example, some people's preference for technology products is not reasonable and they cannot correctly recognize the benefits brought by technology. These circumstances provide reasons for government intervention.

Fifth, the information is asymmetric. In a market economy, consumers and producers cannot fully grasp current market information and anticipate future conditions. The information provided by the private market is often inadequate, which leads to inadequate competition and ultimately reduces the operating efficiency of the market mechanism. In addition, the common phenomena in the market economy, such as fraud and irregular operation caused by information asymmetry, also require government departments to intervene and stabilize. The market economy will inevitably lead to unfair income

distribution while achieving resource allocation efficiency. This kind of injustice will affect the stability and cohesion of a society and it is not in line with the moral concept of the society. The responsibility of the government lies here. Under the market economic system, the government's management of technology-based enterprises is essentially an intervention in the economy.

The government intervention mechanism can be used as a basis for economic policy guidance in a certain period of time and government intervention can also overcome the blindness of the market to a certain extent. Due to the defects of the market economy itself and technology companies are often in a weak position in the freely competitive market, with the help of government intervention to create a fair and healthy market development environment for technology companies. In a sense, the support policy for science and technology enterprises is the macro policy adopted by the government to make up for the market failure phenomenon that the vulnerable group of science and technology enterprises faces in the market economy. The government influences market economic activities through the use of policy tools. Policy tools are essentially a means that the government promotes to achieve policy goals and achieve policy results. They are all composed of one or more economic variables and are directly controlled by the government in order to influence the macroeconomic development goals. In other words, the economic theory of government intervention provides a theoretical basis for the implementation of corporate policies.

2.6.2 Connotation and dimension of enterprise policy

Generally speaking, policy refers to the political actions or prescribed codes of conduct adopted by the ruling party and other political groups of the country (government) to achieve certain social, political, economic and cultural goals in a specific period, such as measures, methods, methods and regulations. Its expressions include laws and regulations, administrative regulations or orders, government documents and leadership speeches. Liu (2010) believes that policy is a political measure taken by political organizations to achieve a certain task and its form is generally presented by regulation or behavior. Wang (2010)

believes that enterprise policy is the relevant policy measures provided by the government for the purpose of stimulating enterprise development. For the growth policy of small and medium-sized enterprises, Wu (1999) divides the policies of science and technology enterprises into the reduction and exemption of taxation, the provision of technical guarantee funds, the encouragement system for advanced technology personnel and the asset mortgage loan. Du and Du (2018) believe that government policies include policies on law, industry, finance, fiscal taxes and technology incentives. Sun, Xu, and Ma (2010) divide enterprise policies into technical support, communication services, financial support, training and education. Zhuang, Li, and Qin (2012) believe that among the government industrial technology policy tools that have an impact on the growth of innovative enterprises, fiscal policies and taxation policies are the most influential, followed by government procurement policies; technological financial support has a greater impact on R & D financing. The government's policy awards for technological innovation continue to accumulate the company's market reputation, enhance the company's awareness, help to increase the company's product sales revenue and encourage scientific and technological R & D personnel to continue to innovate. Wu (2010) artificially state that the incentives of government policies for enterprises are mainly achieved through policy tools such as tax incentives, financial support (financing), intellectual property protection, financial subsidies and talent services. Fiscal policy refers to the government's direct subsidy to corporate funds. The government provides funding and guidance for technological innovation activities of innovative enterprises through the establishment of special fund projects and supports or promotes R & D funding investment or technological type in the innovation process of innovative enterprises. After the enterprise obtains certain innovation achievements, the government provides financial incentives or direct subsidies; tax preferential policies include tax preferential policies implemented by the government before or during the innovation activities of technology-based enterprises and tax preferential policies after the achievement of innovation achievements; government procurement policies mainly refers to technological enterprises obtaining technological innovation achievements and the

industrialized products of innovation achievements form a certain market demand under the role of government policies and guide enterprises to re-innovate. Reasonable government procurement policies play a key role in opening up technological innovation markets, mitigating business risks and guiding investment directions for innovative enterprises; full financial support policies mainly refer to the government's efforts to build a sound investment and financing environment and guide financial capital. Invest in science and technology enterprises to make relevant policy formulations, aiming to solve the problem of financing difficulties for innovative enterprises, especially small and medium-sized technological enterprises; Intellectual property policy aims to create a standardized and good external environment to protect the technological research and development achievements of innovative enterprises In order to ensure the enthusiasm of enterprises for technological innovation; public service policy refers to the multi-faceted public services provided by government policies for technological enterprises. These public services include the infrastructure formed by the scientific and technological innovation ecosystem, the conditions for attracting innovative talents and enterprise innovation exchanges, innovation network platform, intellectual property service platform for patent operation, public technology research and development service institutions that promote the industrialization of scientific and technological innovation achievements and platforms for promoting cooperation among enterprises, universities and research institutions.

According to the above definition, the science and technology enterprise policy is the government's activities and measures aimed at promoting the development of enterprises. Enterprise policy should be the result of the combination or coordination of multiple policies. According to scholars' views, corporate policies cover fiscal and taxation policies, financial policies and public service policies.

2.6.3 Related research on enterprise policy3

Under normal circumstances, enterprise policies will mainly affect the development environment of enterprises. For example, Lv and Li (2001) propose that the government

would create a space for the survival and development of technology enterprises by regulating market supply and demand and taking measures for capital technology. Li and Jin (2013) believe that government support is very important for the development of technology-based enterprises. It has been found that enterprise policies affect every aspect of the business.

First is the impact of government policies on the quality of personnel. Zhang and liang (2011) believe that the government's service system, such as the government's entrepreneurial support, management training and talent support, can help companies improve their talent quality.

Second is about the impact of government policies on the management level of the enterprise. Herbert Simon believes that decision-making and management are unified. Decision making always plays a role in the management of the company. If the company has high decision-making ability, it will promote the achievement of enterprise goals and organizational perfection, enhance the communication ability inside and outside the organization, enhance the scientific operation of the enterprise and let the enterprise develop in a better direction. Management quality is the core quality and the prerequisite for the development of innovative quality. For the role of enterprise policies in business management, Wu, Feng, and Yu (2000) believe that policies can provide help and guidance for enterprises, create creative environments for enterprise development, implement specific solutions of reducing the difficulty of technology company entrepreneurship, adopt relevant policies to regulate enterprise behavior, provide talents and financial support for enterprises and enhance the freedom of enterprises.

Third is about the impact of government policies on the enterprise innovation. Freeman (1987) believes that technological innovation includes product promotion, technology used in the use of equipment, creation, production and other enterprise behaviors. Bower and Clayton (1995) conduct research on computer companies and proposes that new technologies require a certain policy environment as the soil. Gonzalez and Pazo (2008)

believe that enterprise innovation needs to be supported by the government's fiscal and taxation. Fan and Ban (2008) think that financial and taxation policy recommendations are used to stimulate enterprise innovation through fiscal and tax incentives. Li, Cui, and Chen (2008) verify that technological innovation policies affect organizational innovation and generate innovative performance. Porter and Vander (1995a) suggests that scientific environmental policies have a stimulating effect on innovation. Li, Mu, and Lu (2008) believe that innovation policies can encourage organizational innovation and improve the efficiency of the application of scientific and technological achievements. Mayer (2010) finds that the technology industry research and development policy in the United States promotes development of science and technology policies. Through fiscal and tax incentives, the government can ensure the company's production and R&D (Research & Development) investment, ease the pressure on the shortage of funds for enterprise development and enable enterprises to grow. Some foreign governments will use direct methods to assist enterprise development and some governments use indirect measures to support enterprise technology research (Huang & Tian , 2008).

In the study of innovation performance, Kong (2010) finds that innovation policy has a positive effect on innovation performance. The time that enterprises receive policies will affect this process. The length of time is positively related to innovation performance; fiscal policy is significantly related to the performance of all industries in the study; the correlation degree of science and technology policy and innovation behavior is the highest.

2.7 Competitive environment

2.7.1 Connotation and dimension of the competitive environment

The external environment of the company is also subjective because it can be perceived by internal personnel, which based on the perspective of social psychology (Weick, 1979). Under the guidance of this view, the environment is seen as an alternative perception. Environmental perception of company leaders is related to the decisions and they elaborate

on the decision-making from this subjective perception. However, this is too subjective and controversial, the objectivity of the environment and the perception of the leader are not accurately related. Aldrich (1979) proposes that the focus of subjective perception is generally a special case of an environment, but it cannot describe the credit of the environment, so it is easy to lead to cognitive bias. Therefore, the scholar tries to study the subjective perception and external environment together. Researchers tend to use different combinations of dimensions to explain and measure the situation that companies face. March and Simmon (1958) only explores the inclusiveness of the environment. Thompson (1967) divides the environment into nature and dynamics. Child (1972) argues that the environment has three dimensions which are complexity, dynamics and rigor. In addition, Sharfman and Dean (1991) have proposed the scarcity of resources. Among them, complexity emphasizes the diversity of factors in the environment that companies need to face when making decisions; dynamics emphasizes the frequency of environmental changes; resource scarcity emphasizes the availability of less resources.

According to the scholar's point of view, the competitive environment is the perception of the overall external competitive environment and the competitive environment, including the complexity, dynamics and scarcity of the competitive environment.

2.7.2 Structure of corporate competitive environment

The competitive environment of the enterprise is quite extensive. As the competitive environment changes rapidly, enterprises pay more and more attention to the changes of internal and external environment.

Based on the five-force model of industrial structure proposed by Professor Porter (Porter, 1980), the competitive environment of the enterprise can be summarized into six aspects, which are potential entrants, enterprise product substitutes, enterprise product buyers, suppliers of raw materials for enterprises, existing competitors and government policies, which together determine the intensity of competition between enterprises and

industries and the profitability of industries. The competitive environment structure is shown in Figure 2-4. The reason for potential enterprise entrants is that the driving force of profit promotes the flow of capital among industries. When an industry has a profit higher than the average profit, it will inevitably attract the entry of free capital; when the capital is in an industry whose profit is lower than the average profit, the capital will escape this industry. New enterprises entering a certain industry will pose a threat to enterprises already in the industry. By occupying market shares and obtaining profits, prices may be lowered, or the cost of the defenders will increase, and the profit rate will decline.
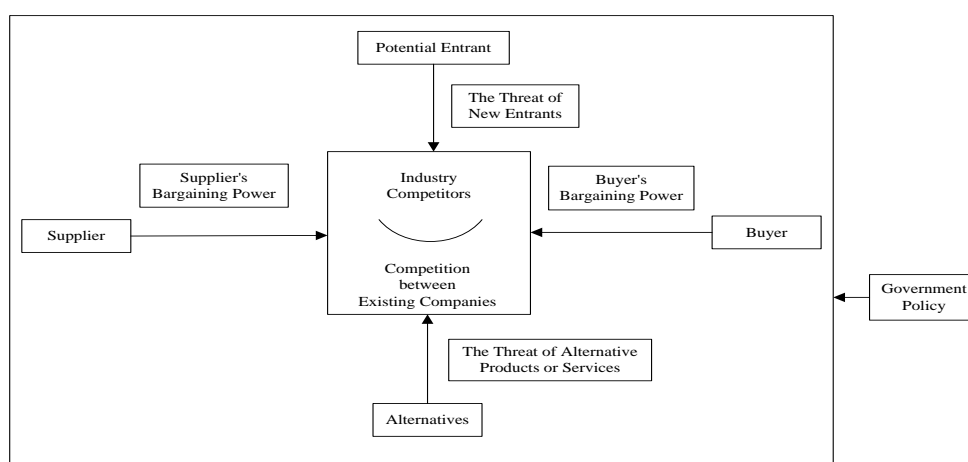
Figure 2-4 Analysis chart of competitive environment structure based on the five-force model

Substitute products are other products or services that can achieve the same function of the enterprise's products. By providing a better price-performance ratio, it may pose a serious threat to the industry's products. Because customers can choose and compare the products and substitutes in the industry, this limits the upper limit of the profitable pricing of enterprises in the industry, thereby limiting the potential revenue of an industry. The more attractive the price of substitutes, the more severe the restriction on the profit of the industry and when the substitutes have a tendency to crowd out the original industrial products by improving the price-performance ratio, it must attract the attention of enterprises. When a customer has many choices and can satisfy the customer's needs, or when the customer has a low alternative conversion cost and the customer is sensitive to high prices and the alternative price is low, the alternative will cause the enterprise Serious threat.

Buyers of enterprise products often make profits by forcing enterprises to lower prices or requiring enterprises to provide higher product quality and better services and taking advantage of mutual competition among enterprises in the industry.

Suppliers can exert pressure on companies in an industry by threatening ways such as increasing product prices or reducing product or service quality. The increase of the supplier's price increases the company's product cost and the company cannot make its own product price keep up with the cost increase to make up for the loss of profits.

Also, the importance of government policy cannot be ignored. The government can restrict the development of industries or enterprises through the control of issuing licenses or restricting the access to raw materials, but at the same time, it may also prevent the entry of potential competitors. Therefore, government policy is also an important element of competition.

In addition to the above analysis, for the competitive environment, the analysis of the organizational environment divides the competitive environment into environmental uncertainty and resource dependence. Environmental uncertainty theory holds that the environment is the source of information (Duncan, 1972), while the resource dependence theory holds that the environment is the source of scarce resources that companies compete for. Combining the ideas of the above two schools, Tan and Litschert (1994) propose for the first time to decompose the changes of the hyper-competitive environment into three dimensions for empirical research: hostility, complexity and dynamics. Threatening mainly refers to the degree of support provided by the environment to the maintenance and development of the organization and it more reflects the perspective of resource dependence. The rich external environment can provide the organization with relatively sufficient resources. Even when the organization is facing certain difficulties, the friendly environment can provide the necessary help and support for the organization, thereby creating a relaxed condition for the long-term development of the organization. On the contrary, it will adversely affect the development of the organization and even restrict the normal market

behavior of the organization. The complexity mainly comes from information uncertainty theory. Complexity reflects the differences in the components of the external environment and the intensity of competition. According to the theory of information uncertainty, the environment is the source of information. If there are more forms and types of organizations, the more information these organizations provide to a single company, the more they come from suppliers, customers and competitors. A large amount of information from collaborators and relevant government departments impacts the enterprise and the enterprise will face a complex information processing process, thereby improving the enterprise's information processing ability and decision-making ability. Environmental dynamics are related to the rate of unpredictable changes in the environment. Environmental dynamics can also be viewed as instability that can be perceived in the market.

2.7.3 Related research on the competitive environment

The academic community (Kotha & Nair, 1995; Goll & Rasheed, 1997) often studies the competitive environment with enterprise performance. In resource theory, the increasing emphasis on competition and the environment has made the role of the enterprise environment and out as one of the important factors of enterprise uncertainty in management factors (Hunt, 2000). Numerous studies (Fredrickson, 1984; Barringer, Jones & Lewis, 1997) have been carried out to analyze on the environment with enterprise behavior, promotion and operations.

Prior to this, the dynamics of the environment were neglected (Morris, Schindehutte, & LaForge, 2002) and only organizational procedures and activities determine business performance. This research is based on neoclassical economic theory, which treats the environment as static to strictly control the operation and efficiency of the company (Fredrickson, 1984; Hunt & Arnett, 2003) proposes that the company's behavior depends on its environment. Only a stable environment can ensure the rational operation of the company. On the contrary, the dynamic environment cannot guarantee this, because it may change or develop in the long term.

For the relationship between environment and performance, Kotha and Nair (1995) argue that environment is related to performance. Some researchers have also suggested that the enterprise environment directly affects enterprise performance. Miller and Friesen (1982) suggest that the opportunities and possibilities for enterprise innovation will be greater when environmental factors are more abundant and active. Goll and Rasheed (1997) study further verifies that the environment regulates leaders' decision and the company's performance.

Kotha and Nair (1995) propose that the inclusiveness and dynamics of the environment will continue to affect the company's development. Horne and John (1992) propose that the environment that affects enterprise performance also reflects the possibility of enterprise development, which means that enterprises have the possibility to make use of the environment to achieve their own development. The dynamic nature of the external environment can have an impact on business decisions. When companies are in a good environment, the rapid developing entrepreneurial companies grow better than the general developing entrepreneurial companies, indicating that the environment is also an opportunity for enterprises.

If the environment changes rapidly, then mangers who observe it will become unclear and unable to make appropriate judgments, resulting in the lack of rationality and objectivity in decision-making (Chaganti & Damanpour, 1991; Peng, 2009) believes that the environment has a regulatory effect on organizational and management and the dynamic environment poses challenges and risks for the continued growth of enterprises.

It can be seen that the perceptions have experienced process from static to dynamic in the study on the external environment. Technology-based enterprises are in a dynamic competitive environment and whether their fulfillment willingness and behavior are affected by the competitive environment needs further study.

2.8 Agreement Fulfillment willingness

2.8.1 Meaning of agreement fulfillment willingness

Hu (2013) proposes that the company's agreement fulfillment willingness refers to whether the company is willing to fulfill the agreement, such as repaying debts on time, providing quality products and fulfilling social responsibilities. Willingness is a soft constraint, and the fulfillment willingness will be subject to the dual constraints of the company's quality and the company's loss. Guan (2004) proposes that the company's credit requirements it to operate honestly and fulfill the agreement. When the company conducts social production activities, it should have the awareness and quality of self-responsibility. Liu (2018) believes that the so-called willingness is individual's own attitude and thought, a subjective thinking model and he proposes that under the modern market economy, the enterprise credit willingness refers to whether the enterprise is willing to fulfill the various economic contracts signed with other economic entities or stakeholders.

Judging from the above scholars' definition of agreement fulfillment willingness, some believe that the fulfillment willingness is that the company fulfill economic contract while others think fulfillment willingness also include repaying debts on time, providing quality products, fulfilling social responsibilities, etc. We believe the latter connotation is more complete. Therefore, in this thesis we define the agreement fulfillment willingness as the subjective credit consciousness of technology-based enterprise to fulfill the contract, provide quality products, provide real information, fulfill social responsibility and pay back on schedule and so on.

2.8.2 Fulfillment willingness and fulfillment ability

Guan (2004) proposes that subjectivity alone is insufficient to guarantee the ability of the company to fulfill the agreement and responsibility and it must also have the objective elements to achieve credit performance, that is, the company needs to have certain ability. Enterprise credit requires consistency in quality and ability. The quality emphasizes the

quality standards of the company, the ability is the ability requirement, and they are indispensable to jointly protect the realization of enterprise credit. Li (2003) proposes that enterprise credit has the willingness and ability to fulfill agreement at the same time and the management model and rules and regulations of the enterprise itself can enhance the level of credit fulfillment of enterprises. Zhang (2010) believes that the ability and willingness of fulfillment directly affect the degree of credit risk. Enterprises' defaults, for example, not being able to repay the loan within the specified time, are also due to the possibility of passive default or intentional default.

It can be seen from the literature review that the willingness to fulfill agreement and the ability to fulfill agreement have a significant impact on credit. The former focuses on the awareness and initiative of compliance, while the latter focuses on the ability to fulfill agreement and the two complement each other. From a cultural perspective, combined with the characteristics of Chinese technology-based enterprises, we will focus on the level of fulfillment willingness.

2.8.3 Research on the agreement fulfillment willingness

In the concept of Weigelt and Camerer (1988), credit reflects a certain part of the company's characteristics and can be used to assess the company's compliance attitude and ability. Under normal circumstances, the ability to fulfill and the willingness to fulfill agreement directly affect credit risk Zhang (2010). Therefore, credit risk is mainly analyzed from these two aspects. Zhang (2010) research focus is still on the ability to fulfill agreement and there is no research on the willingness to fulfill agreement. Du and Du (2018) believes that according to China's current credit risk management situation, the information of the loan companies cannot be wholly acquired, so the bank risk assessment mainly focuses on enterprise's financial indicators.

It is believed that credit and quality are the driving force behind the development of the company. The focus of research about credit at home and abroad has always been on the

quantifiable credit ability. The research on the fulfillment willingness has not developed much in the past few decades. Guan and Chen (2008) propose that there are cultural differences between China and western countries. Western countries usually focus on financial performance and the Chinese credit culture is more concerned with the quality of enterprise leaders. Tesar and Werner (1992) demonstrate the relationship between leadership credit and company self-inspection and finds that leadership quality is a prerequisite for team goals. Mu0ller (1997) believes that the leaders' concepts and ideas of credit will spread to the organization through their use of resources and behavior. Some scholars explore the credit and financing situation from the perspective of enterprise social responsibility, for example, Miao, Li, and Hu (2018) propose that the company's commitment to social responsibility will make the company better to the outside world, which is conducive to its long-term financial support from financial institutions.

It can be seen from the above literature that scholars' research are focusing on financial performance ability. Although Chinese scholars also realize that the study of agreement fulfillment willingness is more in line with China's credit culture and they also pays more attention to the quality and social responsibility consciousness of managers and enterprises, they still pay more attention on agreement fulfillment ability from financial indicators based on quantitative considerations, rather than the willingness to fulfill agreement.

2.9 Chapter summary

This chapter focuses on the theory and research of credit risk, technology-based enterprises, enterprise quality, enterprise policy, competitive environment and agreement fulfillment willingness and so on. It also reviews related research, clarifies the achievements and shortcomings of the current research and finds the direction for this research.

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Chapter 3: Theoretical Model and Research Hypothesis

3.1 Thoughts on model construction

In a complex market credit environment, it is a complex and systematic behavioral decision-making process for companies to implement performance behavior to reduce credit risk. Li (2003) proposes that enterprise credit combines the agreement fulfillment willingness and agreement fulfillment ability and the management organization and financing mechanism of the enterprise have an intensified effect on the agreement fulfillment capability. Under the analysis framework of planned behavior theory, whether an enterprise has the willingness to perform is the key to achieving the performance-driven behavior. Then, the research first needs to systematically analyze the influencing factors of the enterprise's willingness to fulfill the contract and explore the driving source of the enterprise's fulfillment willingness.

Zhang (2010) proposes that the source of credit risk has various internal and external influencing factors, and the occurrence of default is also divided into active default and passive default. The external market environment, rules and regulations, policies will affect the credit of the borrower and lead to credit risk.

Considering that scholars' research on agreement fulfillment ability is rich enough, in this thesis we focus on the agreement fulfillment willingness of technology-based enterprises and introduces the agreement fulfillment willingness as a direct cause of credit risk. From the perspective of the causes of credit risk, scholars believe that the causes of credit risk mainly include internal and external reasons (Guan, 2004; Zhang, 2010) believes that the realization of enterprise credit requires enterprises to abide by the law and commitments in the production and operation activities. For the relationship between internal and external factors, He (2013) believes that the intrinsic factor is the determining factor, while the

external factor affects the enterprise through other variables, for example, the enterprise cost-benefit choice. Then, when considering the factors affecting credit risk, internal factors and external factors also need to be considered. For the self-conditions of the behavioral subject, the quality of the scientific and technological enterprise mainly refers to the functions produced by all the collections of various elements within the technology-based enterprise. In this thesis, we introduce the quality of the enterprise as the main influencing factor and explore its impact on agreement fulfillment willingness and credit risk. Considering that the credit risk of enterprises is also affected by external factors which have certain influence on internal factors, in this research we introduce enterprise policies and competitive environment as regulating variables and study its regulating effect on the relationship between enterprise quality and agreement fulfillment willingness. In addition, the quality of enterprise managers will also have an impact on the development of an enterprise and the external credit evaluation. In this thesis we will also explore the role of enterprise manager's quality in regulating the relationship between agreement fulfillment willingness and credit risk. Combining the relevant research results of planned behavior theory and enterprise quality, enterprise manager quality and enterprise policy, this study attempts to analyze the correlation between driving factors, fulfillment willingness and credit risk, thus revealing how to minimize credit risk. On the basis of clarifying the source of the company's willingness to fulfill, stimulate the company's sense of social responsibility, through the internal logic of how to reduce credit risk, improve the company's ability to predict, coordinate, control, guide and change the fulfillment, to stimulate enterprises to give play to the spirit of fulfillment and make more contributions to market stability.

3.2 Theoretical model

3.2.1 Construction of theoretical models

The proposed verification content is as follows:

(1) Analyze the impact of enterprise quality on the agreement fulfillment willingness;

(2) Analyze the regulating role of enterprise policies between enterprise quality and agreement fulfillment willingness;

(3) Analyze the regulating role of the competitive environment between the quality of the enterprise and the agreement fulfillment willingness;

(4) Analyze the impact of agreement fulfillment willingness on credit risk;

(5) Analyze the regulating effect of the quality of enterprise managers on the relationship between the agreement fulfillment willingness and the credit risk.

3.2.2 Description of variables

Referring to the previous research, the variables in this research model are explained as follows:

(1) The independent variable of enterprise quality. This thesis is a discussion of the credit risk of technology-based enterprises. The quality of such enterprises refers to the functions produced by the collection of various elements within the technology-based enterprises. Combined with the characteristics of the research objects and the previous scholars' research, this study believes that the quality of science and technology enterprises mainly includes the quality of enterprise management and the quality of innovation of enterprises.

(2) The regulating variable of enterprise policy. The science and technology enterprise policy in this thesis is the government's activities and measures aimed at promoting the development of enterprises in the industry. The measurement of enterprise policy mainly focuses on the support degree of various policies.

(3) Regulating variable of competitive environment. According to scholars (Child, 1972; Sharfman & Dean, 1991), the competitive environment is the overall competitive environment and perception of the outside world, including the complexity, dynamics of environment

(4) Regulating variable of the quality of enterprise managers. According to the views of scholars (Li, 2013; Jiang, 2015), the quality of enterprise managers is the quality that enterprise managers need to be qualified for management positions, mainly in terms of quality, ability and knowledge.

(5) The antecedent variable of agreement fulfillment willingness. In this thesis we define the agreement fulfillment willingness as a credit awareness of the subjective aspect of the technology-based enterprise that is willing to fulfill the agreement, be honest and trustworthy, including but not limited to providing quality products, providing real information, fulfilling social responsibilities and repaying on time.

(6) The dependent variable of the credit risk. In this study we assume credit risk is the possibility and size of the loss caused by the enterprise to other economic entities, not only the financial repayment risk, but also the credit issue in the process of enterprise transaction activities and other credit problems in the credit management behavior.

3.3 Research hypothesis

3.3.1 Hypothesis on the impact of enterprise quality on the fulfillment willingness

Combined with the division of enterprise quality of Yu (1983) and the characteristics of technology-based enterprises, this study divides the quality of enterprises into the quality of enterprise management and the quality of innovation.

(1) Enterprise management quality and fulfillment willingness

The agreement fulfillment willingness in this thesis refers to the credit consciousness of the subjective aspect of the technology-based enterprise that is willing to perform the agreement and credit management. Li (2013) believes that management quality mainly includes management methods, management mechanisms, enterprise culture and social responsibility of innovative enterprises. Jiang (2012) believes that enterprise culture is the spiritual support of enterprises and the foundation for long-term development of enterprises.

It has an activation effect on individual enthusiasm. Survey of (Miao, Li, & Hu, 2018) of financial enterprises shows that the stronger the sense of enterprise responsibility, the greater the opportunity for the company to obtain financing, indicating that the stronger the sense of enterprise social responsibility and the stronger the initiative, the easier it is to gain the trust of financial institutions. The stronger the sense of enterprise social responsibility, the greater the cultural atmosphere in which the company forms a good faith management, which will stimulate a common positive spirit of compliance, so that the initiative and possibility of enterprise compliance will be stronger.

(2) Enterprise innovation quality and agreement fulfillment willingness

The introduction of enterprise innovation quality is based on the characteristics of technology-based enterprises. There are many related research on the quality of enterprise innovation. Freeman (1987) argues that technological innovation is the technology, design, manufacturing and commercial activities associated with the sale of new products, new processes, or the first commercial application of new equipment. Li, Wang, and Hao (2016) believe that the company's research and development behavior convey a positive signal, which will attract investors' interest. Scholar (Griliches, 1998) argues that the relationship between patents and enterprise value is more pronounced. The emergence of patents indicates that R&D has entered a stable stage. However, it is undeniable that innovation itself is risky. Innovation is often the coexistence of risks and benefits. The risk of R&D (Research & Development) investment is mainly due to its lag, because R&D (Research & Development) investment and returns are not synchronized; sometimes even negative (Liang & Zhang, 2002). Considering that innovation requires high capital and resource requirements and management costs, enterprise performance will also be negatively affected. Although the impact of technological innovation on the company is controversial, the focus of this thesis is on technology-based enterprises. Most of the innovation investment has been transformed into more patents and income. The technology-based enterprise technology has been transformed into products and the market has been recognized. Although it is necessary

to expand the market and update the products, the pressure and risk of innovation are not as great as the initial stage. At this time, the innovation quality is more positive, the enterprise is more innovative and the possibility that the company has the willingness to fulfill will be higher.

Based on the above, the analysis assumes the following assumption:

H1: The quality of technology-based enterprises is positively affecting the agreement fulfillment willingness.

3.3.2 Hypothesis on the role of enterprise policy in regulating the quality of enterprises and agreement fulfillment willingness

(1) The role of enterprise policy in regulating the relationship between enterprise management quality and agreement fulfillment willingness

Wu, Feng, and Yu (2000) believe that policies can provide help and guidance for enterprises, create creative environment for enterprise development and implement specific solutions, such as formulating relevant programs, reducing the difficulty of creating technology companies; and then adopting relevant policies to regulate enterprise behavior for enterprises, provide talent, financial support and enhance the freedom of experience of the company. The survival environment of science and technology enterprises includes a certain institutional environment, and the construction of the institutional environment is mainly reflected in the establishment of SME management institutions. The management organization serves as a bridge between the government and the enterprise. The government provides corresponding support policies for the development of small and medium-sized enterprises, which can provide support for the development of the enterprise to the management organization. In addition, the government's policy is to ensure that small and medium-sized enterprises can participate in fair competition under market economy conditions and to create a good external environment for managers to exert management skills. During the development of science and technology enterprises, if they can obtain

preferential policies such as government policy regulation and loan support, as well as optimization and support in human resources, the corresponding management aspects will become more standardized and the human resources structure will be optimized. The impact of enterprise management quality on the agreement fulfillment willingness will also be strengthened.

(2) The role of enterprise policy in regulating the relationship between innovation quality and agreement fulfillment willingness

Bower and Clayton (1995) conduct research on computer companies and proposes that new technologies require a certain policy environment as the soil. Xulia and Pazo (2008) believe that enterprise innovation needs to be supported by the government's fiscal and taxation. Porter (1995) suggests that scientific environmental policies have a stimulating effect on innovation. Mayer (2010) points out that the technology initiatives introduced by the US government will strengthen the company's innovation. The government supports small and medium-sized enterprises by building a socialized service system from various aspects. For example, it provides services such as management information consultation and technical innovation guidance, which may promote the modernization of enterprises. It can be seen that after the support of enterprise policies, the innovation of enterprises will be more powerful and promote the improvement of innovation quality. In this way, the impact of enterprise innovation quality on the fulfillment willingness will be strengthened.

Based on the above, the analysis assumes the following assumptions:

H2: The enterprise policy of technology-based enterprises is positively regulating the relationship between enterprise quality and fulfillment willingness.

3.3.3 Hypothesis on the regulating role of the competitive environment between enterprise quality and the agreement fulfillment willingness

(1) The role of the competitive environment in regulating the relationship between enterprise management quality and agreement fulfillment willingness

When the enterprise is in a relatively dynamic environment, if the environment changes rapidly, the environment observed by the viewers of the enterprise will become insufficiently clear and they cannot make appropriate value judgments, which may make the decision-making lack sufficient rationality and objectivity (Chaganti & Damanpour, 1991). The stronger the dynamic and the higher the degree of competition, the more decision-making pressure it brings to the management of the enterprise, which will affect the performance of the management quality of the enterprise and thus reduce the influence of the management quality of the enterprise on the agreement fulfillment willingness.

(2) The role of the competitive environment in regulating the relationship between the quality of innovation and the agreement fulfillment willingness

According to (Miller & Friesen,1982), a dynamic and diverse environment makes it more likely that companies will innovate and that companies will have the opportunity to innovate. Similarly, Goll and Rasheed (1997) study also supports the inclusiveness and dynamism of the organizational environment to regulate managers' rational decision-making processes and firm performance. The above factors emphasize that an inclusive and dynamic environment will play a better role in the innovation quality of enterprises. However, if the external objective environment is too dynamic and competitive, then it will be difficult for enterprises to keep up with changes in the environment. It is difficult to ensure the continuity of innovation through existing resources and opportunities, which is not conducive to the development of innovation quality and thus reduce its impact on the agreement fulfillment willingness.

Based on the above, the analysis assumes the following assumptions:

H3: The competitive environment of technology-based enterprises negatively regulates the relationship between enterprise quality and agreement fulfillment willingness.

3.3.4 Hypothesis on the impact of the agreement fulfillment willingness on credit risk

It is generally believed that the agreement fulfillment ability and the fulfillment

willingness are direct causes of credit risk (Zhang, 2010), indicating that scholars generally believe that the agreement fulfillment willingness and credit risk are directly related. Hu (2013) puts forward the willingness of enterprises to fulfill their obligations is the willingness of enterprises to repay debts and operate in good faith, guarantee quality service and assume enterprise responsibility within the specified time. Zhang (2010) mentions that there are two types of cases in which the company fails to perform due to overdue, subjective malicious default and objective default. That is to say, when the enterprise does not have the ability to fulfill, the enterprise has to violate the agreement fulfillment willingness and the credit risk will still occur. At this time, the willingness to fulfill will have less impact on the credit risk and no assumption is made here. When a company has the ability to fulfill, the higher the willingness of a company to fulfill, indicating that it has a higher sense of compliance and the tendency to repay debts or fulfill social responsibilities is higher and the corresponding credit quality will be higher. The risk will also be lower. If the level of willingness to fulfill is low, the credit risk may increase.

Thus, the hypothesis is assumed as follows:

H4: The agreement fulfillment willingness has a negative impact on credit risk.

3.3.5 Hypothesis on the role of enterprise manager quality in regulating the relationship between agreement fulfillment willingness and credit risk

Willingness refers specifically to the enthusiasm of agreement fulfillment, which is related to the moral quality of the enterprise. It is a soft constraint and is affected by the quality of the enterprise and the loss of default. The role of enterprise quality is even more critical (Muller, 1997; Hu, 2013) believes that the value of company managers themselves can influence the organization and it can be reflected through the use of organizational resources and organizational response. If the manager of the company has good quality, it means that on the one hand, the enterprise manager itself will also be an important resource for the enterprise, improve the performance and productivity of the enterprise (Becker, 1975)

and enhance the ability of the company to fulfill. On the other hand, managers with higher quality will be more credit-conscious, able to standardize the system and avoid opportunistic practices (Hu, 2013). Thus, this sense of honor and credit can positively influence agreement fulfillment willingness. Conversely, if the leader's own quality is low and he does not have the relevant knowledge, ability and quality, then the probability of fulfilling the willingness may be reduced, thus further increasing the credit risk. Thus, the hypothesis is assumed as follows:

H5: The quality of enterprise managers is positively adjusting the impact of the agreement fulfillment willingness on credit risk.

In this thesis we firstly integrate and analyze the relationship between enterprise quality, enterprise policy, agreement fulfillment willingness, credit risk and quality of enterprise managers and make a comprehensive theoretical preparation for the research on the influencing factors of credit risk of technology-based enterprises. A research architecture using the relationships of the above related variables is constructed, as shown in Figure 3-1. The summary of hypotheses is shown in Table 3-1.
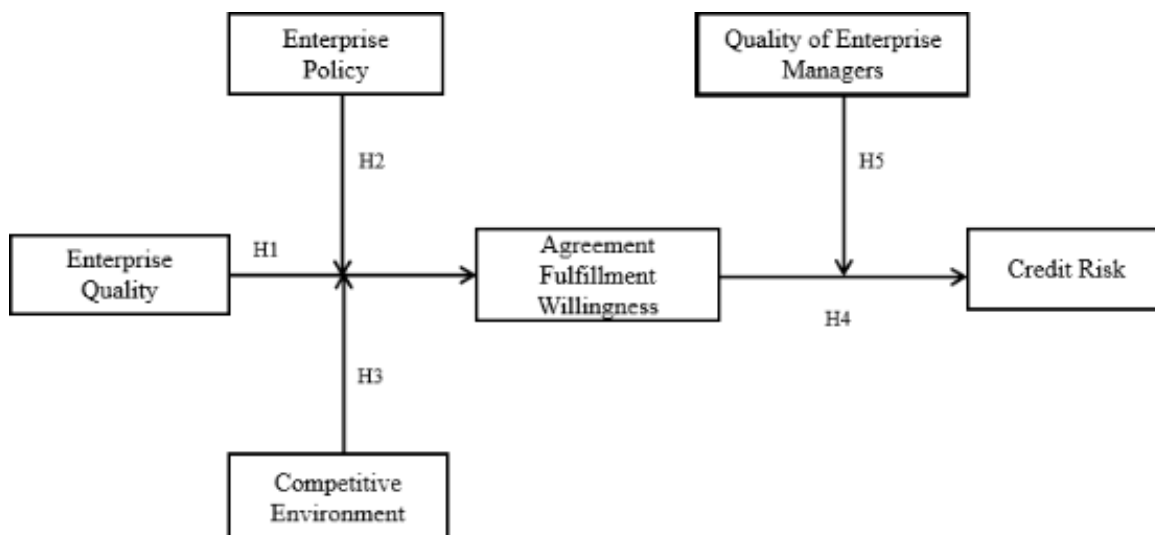
Figure 3-1 Conceptual model of this research

Table 3-1 Summary of hypotheses and supporters

Hypothesis	Correlation	Supporters
H1：	The enterprise quality of technology-based enterprises is positively affecting the willingness	(Freeman, 1987; Griliches, 1998; Liang & Zhang, 2002; Jiang, 2012; Li, 2013; Li, Wang, & Hao, 2016; Miao, Li, & Hu, 2018
H2：	The enterprise policy of technology-based enterprises has made positive regulations on the relationship between the quality of enterprises and the willingness to abide by the agreement.	(Porter,1995; Bower & Clayton, 1995; Xulia & Pazo, 2008; Wu, 2000)
H3：	The competitive environment of technology-based enterprises negatively regulates the relationship between enterprise quality and agreement fulfillment willingness.	(Chaganti & Damanpour, 1991; Goll & Rasheed, 1997)
H4：	The agreement fulfillment willingness has a negative impact on credit risk.	(Zhang, 2010; Hu, 2013)
H5：	The quality of enterprise managers is positively adjusting the relationship between agreement fulfillment willingness and credit risk.	(Becker, 1975; Mueller, 1997; Hu, 2013a; Hu, 2013b)

3.4 Summary of this chapter

This chapter is based on the previous chapter on the research on the risk-related research of science and technology enterprises and the discussion of related theories. Taking the quality of enterprises as the starting point, the agreement fulfillment willingness as the antecedent variable of it and the enterprise policy, the competitive environment and the quality of the enterprise managers are used as the regulating variables to study the influence on the credit risk of enterprise. This part has done a good theoretical work for the later

research.

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Chapter 4: Empirical Research Design

This chapter draws on the classic scales studied by researchers in the past and combines the characteristics of technology-based enterprises to create measurement items related to the theoretical models and design questionnaires. Because the academic community has relatively few research on the measurement of agreement fulfillment willingness and credit risk, there is no mature scale that can be directly used for reference. For the measurement of these two variables, the relevant measurement items are determined mainly through focus interview groups and in-depth interviews with experts. After the expert and consumer interview activities, the questionnaire is improved. After the pre-test, unnecessary options are removed and a questionnaire survey that could be popularized is conducted. Finally, the questionnaire is distributed, and data collection is done. The contents of this chapter can be summarized as measurement variables, questionnaire generation, prediction questionnaires, questionnaire recovery and statistical analysis of data.

4.1 Design of measurement variables.

In this thesis we intend to use technology-based enterprises as the object of questionnaire design. The first thing to do in the design of the questionnaire is the design of the scale. The variables of this questionnaire consist of six factors: enterprise quality, enterprise policy, competitive environment, agreement fulfillment willingness, quality of enterprise managers and credit risk. The scale is crucial for the questionnaire survey. The choice of the scale is usually based on the mature scale. Because the mature scale is verified, its reliability and validity are higher. However, it is also necessary to pay attention to the insufficient aspects of scale, such as semantics and need to consider the applicability of the scale. This study searches for materials in related fields at home and abroad, selects appropriate scales according to needs and designs items for related variables by means of

multi-item scale. For variables that lack a mature scale, the items are mainly identified by the focus interview group and the in-depth interviews of the experts. The principle is that the questions are concise and easy to understand, easy for respondents to answer.

As has mentioned before, in the previous study, the existing research was systematically classified and summarized, but there is no mature reference scale for the measurement of agreement fulfillment willingness and credit risk. Therefore, based on the analysis of the agreement fulfillment willingness and credit risk, a preliminary perceptual understanding of the agreement fulfillment willingness and credit risk is formed, an interview outline is drafted and focus group interviews and expert interviews are organized. In the first method step, the study conducts qualitative and exploratory research on the agreement fulfillment willingness and credit risk to ensure the integrity of the design of the measurement items. The exploratory research approach is important for the next quantitative research step of collecting and analyzing large sample data and for building a questionnaire.

The selection principle of respondents is to choose the staff of credit risk management. Through focus group interviews, group discussions and exchange of ideas, this study proposes some specific measurement items related to agreement fulfillment willingness and credit risk. An interview outline is developed based on the main measurement items summarized in the above scale. Moderators and respondents pre-arrange time to conduct interviews in rooms that are not subject to interference. The interview has three main aspects: how do you understand agreement fulfillment willingness and credit risk; explore the rationality of the items involved in the above variables and ask the respondent why it is unreasonable. Focus group interviews are conducted with relevant personnel, a total of 25 people, a group of 5 people whose gender, age, education level, work experience should be and the core is the perspective on agreement fulfillment willingness and credit risk. The sample of the focus group is shown in Table 1 of the Appendix.

After the qualitative study by experts and focus interview groups, the questionnaire is further clarified.

In order to supplement the focus group analysis, we conducted in-depth interviews with two professors engaged in credit risk research. The interview results show that the responses of the two respondents do not exceed the scope of the open-ended answer discussion. According to the steps of the content analysis method, the study first encodes the data and then uses the vocabulary-based method and the concept group analysis method to analyze the qualitative questionnaire in the content analysis method. The results of the content analysis are shown in Table 4-1. "A" in the table represents the source of the literature (related literature based on agreement fulfillment willingness and credit risk); "B" represents the source of in-depth interviews with focus interview groups and experts. Table 4-1 shows the analysis of the agreement fulfillment willingness and the content of credit risk. After the qualitative study by experts and focus interview groups, the questionnaire is further clarified.

Table 4-1 Content analysis of agreement fulfillment willingness and credit risk

NO.	Item	Level	Source
1.	The company's products and technologies are with high quality	Agreement Fulfillment Willingness	A and B
2.	The information authenticity of the enterprise is high		B
3.	The company strictly controls quality and eliminates counterfeit products and technologies.		A and B
4.	The technology promoted by the company is in line with the actual situation.		B
5.	The company's serious with contract performance		B
6.	The company does not falsely report the price		B
7.	The company does not make false financial information		B
8.	The company refuses to evade tax		B
9.	The company does not default on debt		A and B

10.	There is a problem with the information disclosed by the company.	Credit Risk	B
11.	The company has contract fraud		A and B
12.	The company has false advertising		A and B
13.	The company has false promotions and false hypotheses		A and B
14.	The company makes fakes and has product quality fraud phenomenon		A and B
15.	The company's accounting statements are fraudulent		A and B
16.	The company has a tax evasion phenomenon		A and B
17.	The company has arrears in bank loans		A and B

4.1.1 Measurement of enterprise quality

Jiang (2015) argues that the quality of the enterprise is the result of the interrelated effects of various elements within the enterprise. Compared with the scale, it is more important to look at the intrinsic quality of the enterprise. The quality of technology-based enterprises mainly refers to the functions produced by the collection of various elements within the technology-based enterprises. Combining the characteristics of the research object and the previous scholars' research (Yu, 1983; Li, 2013), in this thesis we believe that the quality of science and technology enterprises mainly includes the quality of enterprise management and the quality of innovation of enterprises. For the measurement of enterprise quality, we use the enterprise quality measurement scale of Li (2013). The enterprise quality measurement table is shown in Table 4-2.

Table 4-2 Enterprise quality scale

NO.	Content	Reference Resource

Enterprise Management Quality	(Li, 2013)

EQ1　The company's existing employee recruitment and promotion system is reasonable and can maximize the value of employees.

EQ2　The salary and welfare system adopted by the company can effectively motivate employees' innovative behavior and tolerate the occurrence of failure.

EQ3　The performance appraisal of the company can correctly assess the actual contribution of employees to the company.

EQ4　The financial control system adopted by the company can effectively test the gap between actual work performance and company goals.

EQ5　The company's current customer complaint handling solution can effectively solve customer complaints

EQ6　The company can improve services according to customer needs

EQ7　The company can make a major contribution to environmental protection and sustainable development

EQ8　The company is able to actively participate in social welfare and charity activities

Enterprise Innovation Quality

EQ9　New tools or equipment purchased by the company can greatly improve production or work efficiency.

EQ10　Our employees often come up with many ways to improve their product processes.

EQ11　The company often develops new products or services that are acceptable to the market.

EQ12　The company has more patents than its peers.

EQ13　The company has a very high profit from newly developed products.

Source: Li (2013)

4.1.2 Measurement of enterprise policy

Du and Du (2018) believe that government policies include policies on law, industry, finance, fiscal taxes and technology incentives. Sun, Xu, and Ma (2010) divide corporate policies into technical support, communication services, financial support, training and education. The science and technology enterprise policy in this thesis is the government's activities and measures aimed at promoting the development of enterprises in the industry. In this research we mainly draw on the relevant measurement scale of Fang (2002) and adjust the scale as shown in Table 4-3.

Table 4-3 Enterprise policy scale

NO.	Content	Reference Resource
EP1	The government further relaxes l and use approval	（Fang,2002）
EP2	Government lowers l and lease price	
EP3	Give tax benefits	
EP4	Provide financing guarantee for enterprises	
EP5	Implement government subsidies for major industries in the region	
EP6	Formulate industrial support policies for the economic development of the region	
EP7	Strengthen education in the region	
EP8	Provide training for business executive	
EP9	Formulate policies to support technological innovation in enterprises	

Source: Fang (2002)

4.1.3 Measurement of competitive environment

For the measurement of competitive environment, this study mainly uses the scale of

(Dess & Beard, 1984; Sharfman & Dean, 1991) to measure the competitive environment. Thus, the competitive environment measurement dimension of this thesis includes the dynamics and complexity of the environment. The competitive environment measurement scale is shown in Table 4-4.

Table 4-4 Competitive environment scale

NO.	Content	Reference Resource
CE1	It is difficult for companies to predict customer demand and product preferences	(Dess & Beard, 1984; Sharfman & Dean, 1991)
CE2	It is difficult for companies to predict the market behavior of competitors	
CE3	It is difficult for companies to predict the trend of industry technology development	
CE4	Industry new product technology and development and new service projects are launched fast	
CE5	Market demand is growing rapidly	
CE6	New companies entering the market can easily join the industry	
CE7	The number of competitors in the industry in which the company is located is large	
CE8	There are large number of potential substitute producers	
CE9	The dependence on upstream and downstream manufacturers has a great impact on business performance.	
CE10	The customer satisfaction has great impact on enterprise performance	

Source: Dess and Beard (1984); Sharfman and Dean (1991)

4.1.4 Measurement of agreement fulfillment willingness

Hu (2013) proposes that the company's willingness to perform refers to whether the

company is willing to perform the contract, such as repaying debts on time, providing quality products and fulfilling social responsibilities. In this thesis we define the agreement fulfillment willingness as the technology-based enterprises' credit awareness of subjective aspect to fulfill the agreement, including but not limited to the willingness to provide quality products, provide real information, fulfill social responsibilities and repay on time. Because the academic community has relatively few research on the measurement of agreement fulfillment willingness and there is no mature scale for direct reference. The measurement of agreement fulfillment willingness mainly combines the definition of Hu (2013) and the in-depth interview with focus interview groups and experts to determine the related measurement items. The agreement fulfillment willingness scale is shown in Table 4-5.

Table 4-5 Agreement fulfillment willingness scale

NO.	Content	Reference Resource
PI1	The products and technology of this company are with very high quality	(Hu, 2013)
PI2	The company's information is more authentic	
PI3	The company strictly controls quality and eliminates counterfeit products and technologies.	
PI4	The technology promoted by the company is in line with the actual situation.	
PI5	The company seriously fulfills the contract	
PI6	The company does not falsely report the price	
PI7	The company does not make false financial information	
PI8	The company refuses to evade tax	
PI9	The company does not default on debt	

Source: Hu (2013)

4.1.5 Measurement of credit risk

Chen (2001) proposes that credit is a debt ethics and needs to be regulated by contracts and public opinion. From a broad perspective, credit is the behavior of the market entity to obtain or grant credit. It is the decision-making and management of credit as the transaction object and is used to obtain the credit resources needed by the subject in the future. In this study, credit mainly refers to the maintenance and management of credit trading and credit management by technology-based enterprises, with the aim of providing credit support for enterprise development. For credit risk, in this research we assume that credit risk is the possibility and size of the loss caused by the main body of the enterprise to other economic entities, not only the financial repayment risk, but also other credit problems in the process of corporate transaction activities and credit management behavior.

At present, there have been many methods for measuring and evaluating credit risk, but there is no measurement scale of credit risk itself. For the measurement of credit risk in this study, we mainly refer to the descriptions of corporate credit problems by scholars (Zhang, 2007; Xu, 2012) and related measurement items determined by focus interview groups and in-depth interviews with experts. Table 4-6 shows the credit risk measurement.

Table 4-6 Credit risk scale

NO.	Content	Reference Resource
CR1	There is a problem with the information disclosed by the company.	(Zhang, 2007; Xu , 2012)
CR2	The company has contract fraud	
CR3	The company has false advertisements or false promotions and false prices	
CR4	This enterprise makes false products	
CR5	The company's accounting statements are fraudulent	
CR6	The company has a tax evasion phenomenon	

CR7	The company has arrears in bank loans

<div align="center">Source: Zhang (2007); Xu (2012)</div>

4.1.6 Measurement of the quality of enterprise managers

The quality of enterprise managers, combined with the views of scholars (Li, 2013; Jiang, 2015), the quality of enterprise managers is the quality that enterprise managers need to be qualified for management positions, mainly in terms of quality, ability and knowledge. The reference of this research scale is adapted from the enterprise management personnel quality table of Li (2013), see Table 4-7.

<div align="center">Table 4-7 Enterprise manager quality scale</div>

NO.	Content	Reference Resource
EMQ1	The business manager has excellent quality of honesty.	(Li, 2013)
EMQ2	The business manager has a strong sense of responsibility	
EMQ3	The business manager has positive customer service awareness	
EMQ4	The business manager can adapt to changes in the environment quickly	
EMQ5	The business manager has the awareness and ability to innovate constantly	
EMQ6	The business manager can make good judgments on external affairs or unexpected events at work.	
EMQ7	The business manager can adapt to fierce market competition and be good at handling customer relationships.	
EMQ8	The business manager can effectively integrate resources and have a sense of collaboration	
EMQ9	The business manager has good communication skills	
EMQ10	The business manager has a good sense of work and can quickly discover problems in the enterprise.	

EMQ11   The business manager actively learns and accepts new things.

EMQ12   The business manager has a good knowledge of technology

EMQ13   The business manager keeps in mind the company's various corporate rules and regulations

Source: Li (2013)

4.2 Questionnaire design

Questionnaire survey, a common tool in empirical research, is used to obtain the required data and information. There are a few rules to keep in mind when designing the questionnaire. The first is to consider the purpose of the questionnaire. The second is to grasp the beginning, end and specific steps of the questionnaire. The third is to consider the relevant problems, the situation that the questionnaire may encounter to make a preparatory work.

First of all, to clarify the purpose of the questionnaire design, the design of the questionnaire must not deviate from the research theme in order to truly and truthfully present the research questions. This questionnaire is to study the impact of enterprise quality on the agreement fulfillment willingness and credit risk. In this thesis we firstly discusses the relationship between the enterprises quality and the agreement fulfillment willingness, the regulatory role of corporate policy, the regulatory role of the competitive environment in the relationship between corporate quality and the agreement fulfillment willingness, the impact of the agreement fulfillment willingness on credit risk, the regulatory role of corporate managers quality in the relationship between agreement fulfillment willingness and credit risk and studies corporate credit risk from the perspective of internal and external factors and agreement fulfillment willingness. Based on the theoretical model of this thesis, the questionnaire needs to include six aspects: enterprise quality, enterprise policy, competitive environment, agreement fulfillment willingness, enterprise credit risk and quality of enterprise managers. Combined with the actual situation, the questionnaire

consists of six parts of the scale. Considering the popularity and extensiveness of the current use of the Likert 5 scale, in this thesis we also use this method for measurement and divides the answer from disagreement to agreement into 5 levels and assigns relevant answers. The score reflects its degree of recognition. In addition, in this thesis we use technology-based enterprise managers and employees as object.

Second, consider it comprehensively. (1) In terms of scales, the relevant scales are clarified based on the objects and objectives of the research. The measurement items of the variables were confirmed by expert interviews and technical personnel exchanges. (2) Build a questionnaire. The questionnaire consists of introduction, information of enterprise and individual and the content of the body. The topics, greetings and descriptions are clearly defined prior to the start. The purpose of the survey and the requirements of the questionnaire are clarified so that the respondents can understand the purpose and rules of the survey. It is required to be concise and objective and not mislead the respondents. The scope of application of the questionnaire data is explained and the respondents can choose to answer anonymously to ensure the authenticity of the answer.

Third, clear what factors may be affected by the implementation of the questionnaire method. The biggest difficulty in the study of the questionnaire is that the respondents do not take the questionnaire seriously and are unwilling to choose real ideas, which leads to the problem of the data quality and the inability to derive objective conclusions. With this in mind, in order to ensure the reliability of the data, the test statement is used to examine the quality of the questionnaire. Set the synonymous test basis and evaluate the collected questionnaire. If the respondent's answer is inconsistent, it means that it is filled in at will and the questionnaire is invalid. On the contrary, if the answers are consistent, indicating that the respondents are serious, the questionnaire is valuable. The questions in the questionnaire are arranged in a sequence from short answer to complex to make the respondents patient with questions. In addition, it should be noted that the questionnaire topics need to be concise, too complicated and too many topics will make the respondents

lose the patience, resulting in the suspension of the questionnaire, so it is necessary to control the number of questions as well as the filling time. The detailed questionnaire content is shown in Appendix 2.

Before conducting a formal questionnaire, the questionnaire will be pre-tested first. The purpose of the questionnaire pre-test is to investigate the reliability and validity of the questionnaire. Through the feedback of the respondents, improve or modify the questionnaire, abandon the ambiguous, unreliable questions and generate a reasonable questionnaire to make the empirical analysis effective and objective.

4.3 Research tools and analytical techniques

4.3.1 Descriptive statistics of pre-test samples

The technology-based enterprises in this research are related enterprises that use technology as products and invest in a large number of technology research and development. In order to obtain the information of credit risks and related factors of technology-based enterprises, a questionnaire survey was conducted to investigate the relevant conditions of various science and technology enterprises. Taking into account the regional differences and the convenience of the questionnaire distribution and collection, we choose the technology-based enterprises in Chengdu, China as the research object, the enterprises have a similar economic, social and cultural background, which is conducive to the accuracy of the research results. The pre-questionnaire is distributed in the west zone of Chengdu High-Tech Park. The questionnaires are distributed to the passing enterprise personnel. After completing the relevant questions, their feelings about the item are asked.

In this forecast, 100 questionnaires were issued, and 90 copies were collected. Eight of them were invalid because they were not seriously answered. Therefore, 82 of them were reasonable and effective and the recovery rate was 82%.

Table 4-8 shows the descriptive statistics of the predicted samples for this study.

According to the table, there are more men than women and most of them are 24-30 years old. The education level is mostly undergraduate and master's degree. Most enterprises are technology-based enterprises, private enterprises, electronic information technology and biomedical technology. Table 4-8 is a descriptive statistical analysis table of the pre-sample.

Table 4-8 Descriptive statistical analysis of pre-test samples

	Classification	Quantity	Percentage Occupied
Gender	Male	50	61
	Female	32	39
Age	Under the age of 23	20	24.4
	24-30	35	42.7
	31-35	18	22
	36-40	8	9.8
	More than 4	1	1.2
Years of Working	Less than 1year	8	9.8
	1-3years	12	14.7
	3-5years	23	28
	5-10years	39	47.6
	More than 10 years	0	0
Educational Degree	High school and below	0	0
	College degree	10	1.2
	Undergraduate degree	32	39
	Master's degree	35	42.7
	Doctor degree and above	5	6
Position	General staff	50	61

	Department manager	18	22
	Department manager	10	1.2
	Administrative officer	4	4.9
Time of Enterprise Registration	Less than 5 years (initial)	4	4.9
	5-8 years (growth period)	62	75.6
	More than 8 years (mature period)	16	19.5
Ownership Pattern	Private enterprise	70	85.3
	State-owned enterprise	10	12.1
	Foreign enterprise	2	2.4
Field of Enterprise	Electronic information technology	25	30.5
	Biomedical technology	20	24.4
	Aerospace technology	0	0
	New material technology	8	9.8
	High technology industry	7	8.5
	New energy and energy-saving technologies	10	12.1
	New and high technologies transform traditional industries	7	8.5
	Others	5	6.1
Number of Employees	1-10	10	12.1
	11-100	15	18.3
	51-200	25	30.5
	101-300	15	18.3

301-1000	15	18.3
Above 1000	2	2.4

4.3.2 Reliability analysis of each variable

Reliability, that is, the same strategy is used to measure the same object and the results are consistent. This consistency is reflected in two aspects: First, whether the same group of variable reflects the same concept, that is, the internal consistency of the problem; second, the external consistency of the variable, that is, whether the results of multiple measurements are consistent. The Cronbach'α coefficient is used for the measurement of intrinsic consistency and the external consistency is mainly reflected in the test-retest reliability coefficient. This study is mainly about the intrinsic consistency measurement of the problem, namely the Cronbach'α coefficient and whether the verification items reflect the same content.

In general, a Cronbach'α coefficient is greater than 0.7 indicates a high internal consistency. If it is less than 0.7, the total correlation coefficient is less than 0.35. After deleting the topic, the overall Cronbach'α coefficient is increased, then it is deleted.

In this thesis, we use SPSS 22.0 to analyze the reliability of each variable. The specific test results are shown in Table 4-9 to Table 4-13.

(1) The revised total correlation coefficient CITC and reliability of enterprise quality

It can be seen from Table 4-9 that the measurement items of the enterprise quality do not meet the deletion criteria, so they are all retained.

Table 4-9 Enterprise quality CITC and reliability

Variable	Measurement Item	CITC	Cronbach'α If Item Deleted	Cronbach'α Based on Standardized Items

	EQ1	0.621	0.390	
	EQ2	0.623	0.756	
Enterprise	EQ3	0.620	0.757	0.762
Quality	EQ4	0.631	0.754	
	EQ5	0.628	0.387	
	EQ6	0.581	0.782	
	EQ7	0.682	0.758	
	EQ8	0.582	0.725	
	EQ9	0.641	0.803	
	EQ10	0.725	0.745	
	EQ11	0.425	0.715	
	EQ12	0.629	0.526	
	EQ13	0.598	0.570	

The revised total correlation coefficient CITC and reliability of enterprise policy.

It can be seen from Table 4-10 that the measurement items of the enterprise policy do not meet the deletion criteria, so they are all retained.

Table 4-10 Enterprise policy CITC and reliability

Variable	Measurement Item	CITC	Cronbach'α If Item Deleted	Cronbach'α Based on Standardized Items
	EP1	0.570	0.762	
	EP2	0.632	0.728	
Enterprise Policy	EP3	0.588	0.546	0.816
	EP4	0.424	0.624	
	EP5	0.512	0.714	

	EP6	0.541	0.809
	EP7	0.635	0.846
	EP8	0.621	0.625
	EP9	0.514	0.710

(2) The revised total correlation coefficient CITC and reliability of competitive environment

It can be seen from Table 4-11 that the measurement items of the competitive environment do not meet the deletion criteria, so they are all retained.

Table 4-11 Competitive environment CITC and reliability

Variable	Measurement Item	CITC	Cronbach'α If Item Deleted	Cronbach'α Based on Standardized Items
Competitive Environment	CE1	0.570	0.741	
	CE2	0.621	0.698	
	CE3	0.688	0.654	
	CE4	0.514	0.612	
	CE5	0.483	0.845	0.832
	CE6	0.541	0.823	
	CE7	0.624	0.821	
	CE8	0.547	0.671	
	CE9	0.632	0.725	
	CE10	0.614	0.821	

(3) The revised total correlation coefficient CITC and reliability of agreement fulfillment willingness

Table 4-12 shows that the CITC of the 9 measurement items all meet the criteria, but the deletion of the third measurement item can improve the overall reliability of the scale. After the pretest, the number of items measuring the agreement fulfillment willingness is reduced from 9 to 8.

Table 4-12 Agreement fulfillment willingness CITC and reliability

Variable	Measurement Item	CITC	Cronbach'α If Item Deleted	Cronbach'α Based on Standardized Items
	PI1	0.651	0.748	
	PI2	0.659	0.803	
Agreement Fulfillment Willingness	PI3	0.580	0.812	0.769
	PI4	0.652	0.842	
	PI5	0.574	0.835	
	PI6	0.654	0.841	
	PI7	0.621	0.629	
	PI8	0.634	0.575	

(4) The revised total correlation coefficient CITC and reliability of credit risk

It can be seen from Table 4-13 that the measurement items of the credit risk do not meet the deletion criteria, so they are all retained.

Table 4-13 Credit risk CITC and reliability

Variable	Measurement Item	CITC	Cronbach'α If Item Deleted	Cronbach'α Based on Standardized

				Items
	CR1	0.458	0.812	
	CR2	0.641	0.632	
	CR3	0.622	0.590	
Credit Risk	CR4	0.531	0.535	0.842
	CR5	0.625	0.614	
	CR6	0.623	0.826	
	CR7	0.789	0.874	

(5) The revised total correlation coefficient CITC and reliability of quality of enterprise manager.

It can be seen from Table 4-14 that the measurement items of the quality of enterprise manager do not meet the deletion criteria, so they are all retained.

Table 4-14 Quality of enterprise manager CITC and reliability

Variable	Measurement Item	CITC	Cronbach'α If Item Deleted	Cronbach'α Based on Standardized Items
	EMQ1	0.421	0.825	
	EMQ2	0.645	0.636	
Quality of Enterprise Manager	EMQ3	0.626	0.534	0.837
	EMQ4	0.487	0.514	
	EMQ5	0.638	0.625	
	EMQ6	0.641	0.821	
	EMQ7	0.589	0.745	
	EMQ8	0.687	0.852	

EMQ9	0.654	0.863
EMQ10	0.741	0.892
EMQ11	0.725	0.825
EMQ12	0.748	0.767
EMQ13	0.714	0.792

This questionnaire is aimed at the technology-based enterprise staff. There are two types of questionnaires: small sample surveys and large sample surveys. The preliminary investigation was mainly conducted in the west zone of Chengdu High-Tech Park. The interviewees were the staff of the companies in the west zone of Chengdu High-Tech Park. In the later investigation, considering the efficiency of data collection, this study relied on cooperation enterprises, on-site consultation, personal relationships and networks to conduct questionnaire surveys.

This work uses the measurement method to analyze and process the data in the collected questionnaires. The method is as follows:

(1) Descriptive statistical analysis: The personal information in this questionnaire mainly includes gender, age, education level, position, and working years. The enterprise information mainly includes enterprise registration time, personnel size, field, ownership, etc. This method is conducted to analyze the total number of samples, sex ratio, average age, size and age of enterprises as well as describe the characteristics and distribution of samples

(2) Reliability analysis: This method is used to detect the internal consistency of the item. The same problem, if the answer is close, indicates that the consistency is higher; on the contrary, it indicates that the item needs to be reconsidered and it does not have the reliability it deserves. Cronbach α coefficient is a commonly used method of internal consistency test. If the value is higher than 0.7, it indicates that the table has high reliability; if the value falls between 0.5 and 0.7, the reliability is medium and relatively strong; If the value is less than 0.5, then the scale does not have the relevant reliability and cannot be used

for formal research. It is necessary to consider redesigning or removing related items.

(3) Validity analysis means to detect the objectivity and clarity of each measurement contents to the expected measurement information: the method is used to detect whether the measurement result of variable is accurate, consisted of content validity and structural validity. The consideration and choice of content validity requires some judgment. In order to select the appropriate scale, in this thesis we use a lot of literature and information to find mature and reliable scales. Based on the existing scales to adjust the items to guarantee the content validity and meet the actual measurement needs. The validity of the results is used to consider the possibility that the research hypothesis can be verified, indicating the degree to which the test results are consistent with their definitions. Structural validity includes convergence validity and discrimination validity: the first validity is to measure the degree of conformity of a variable; the second validity is used to test the degree of differentiation between variables and components. Whether the convergence validity is qualified mainly depends on the factor load and the degree of significance; the combined reliability value must not be lower than 0.7; the square difference extraction value is at least greater than 0.5.

(4) Structural model analysis: This method is a very typical quantitative statistical method, which is often used in the field of behavioral research and social research. Based on traditional multivariate statistical analysis methods, this method combines factor analysis with regression analysis for the determination, estimation and testing of causal models. In this research we adopt this method to test the theoretical model and carry out a fitting test on the hypothetical model.

4.4 Chapter summary

This chapter covers measurement variables, questionnaire generation, predictive questionnaires, questionnaire collection and statistical analysis of data. First, the measurement variable design, drawing on previous research and related literature, gives the specific items of enterprise quality, corporate policy, competitive environment, agreement

fulfillment willingness and credit risk in this study. Then, conduct interviews and identify and improve the questionnaires through expert and consumer interview activities. After pre-testing, remove unnecessary options and conduct a questionnaire survey that can be popularized. Finally, the questionnaire is distributed and collected and data collection is done. The survey in this chapter is a pre-test and a formal survey is required. The conditions for the personnel in this thesis are limited to employees of science and technology enterprises and related management personnel. The channels of the survey include organization, on-site consultation, personal relationship, network and others. The preliminary survey is mainly conducted in the west zone of Chengdu High-Tech Park to issue questionnaires; the later questionnaires are considered in terms of efficiency, mainly conducted through cooperation organizations, consultation, personal relationships, networks and other ways.

Chapter 5: Research and Analysis

Based on the theoretical model and hypothetical model of the impact of enterprise quality on credit risk, we take an empirical analysis of the hypothetical model through quantitative methods. In this study, we use SPSS 22.0 for data processing. Firstly, we enter all the data of the questionnaire into SPSS software to perform structural reliability analysis, descriptive statistical analysis, correlation analysis, regression analysis on the data and finally get corresponding empirical results.

5.1 Descriptive statistical analysis of variables.

For a wide range of questionnaires, the survey was conducted from September to November 2018. Through the cooperation enterprises, on-site consultation, personal relationships and online channels, a total of 300 questionnaires were distributed to the enterprises and 300 questionnaires were finally collected, 7 questionnaires from non-technical employees and 12 non-technical companies were excluded. The final valid questionnaire was 281and the effective rate of the questionnaire was 93.7%. The basic statistics of all participants are shown in Table 5-1. From the table, it can be seen that he respondents of questionnaires were mostly from electronic technology, biomedical technology, high-tech and other science and technology industries and most of the enterprises have a scale of 11-100 people, are private enterprises or state-owned enterprises with a set-up time of more than 5 years. Among them, the proportion of men participating in the questionnaire is much higher than that of women. The age is mainly concentrated in the age of 23-30 years old. The majority of the working years are 3-5 years.

Table 5-1 Statistical table

Classification		Quantity	Percentage Occupied
Gender	Male	201	71.5

The Influence of Technological Enterprise Quality on Agreement Fulfillment Willingness and Credit Risk

	Female	80	28.5
	Under the age of 23	53	18.7
	24-30	184	65.5
Age	31-35	32	11.4
	36-40	10	3.6
	More than 40	2	0.7
	Less than 1 year	20	7.1
	1-3 years	82	29.2
Years of Working	3-5years	143	50.9
	5-10years	30	10.7
	More than years	6	0.4
	High School and Below	0	0
	College degree	67	23.8
Educational Degree	Undergraduate degree	158	56.2
	Master degree	50	17.8
	Doctor degree and above	6	2.1
	General staff	184	65.5
	Department supervisor	56	31
Position	Department manager	31	11
	Administrative officer	10	3.6
Enterprise Registration	Less than 5 years (initial period)	0	0
	5-8 years (growth period)	281	100
	More than 8 years (mature period)	0	0
Ownership	Private enterprise	225	80

Pattern	State-owned enterprise	51	18.1
	Foreign company	5	6.2
Field of Enterprise	Electronic information technology	94	33.5
	Biomedical technology	84	30
	Aerospace engineering	0	0
	New material technology	40	14.2
	High technology industry	31	11
	New energy and energy-saving technologies	14	5
	New and high technologies transformed from traditional industries	18	6.4
	Others	0	0
Number of Employees	1-10	35	12.5
	11-100	98	34.9
	101-200	50	17.8
	201-300	57	20.3
	301-1000	41	14.6

5.2 Validity analysis

5.2.1 Confirmatory factor analysis

The confirmatory factor analysis is used to check the accuracy of the observed variables for the latent variables. See Table 5-2 for details. The table shows that all factor load factors are greater than 0.5, in accordance with the requirements of the structural model.

Table 5-2 Factor load coefficient

Variable	Enterprise Quality	Enterprise Policy	Competitive Environment	Agreement Fulfillment Willingness	Credit Risk	Quality of Enterprise Manager
Enterprise Quality	0.752					
Enterprise Policy		0.768				
Competitive Environment			0.675			
Agreement Fulfillment Willingness				0.684		
Credit Risk					0.725	
Quality of Enterprise Manager						0.741

5.2.2 Reliability and validity analysis

The reliability mainly refers to the reliability or consistency of the measurement results, that is, to what extent is correct. Reliability means reliability, consistency, stability and accuracy. The smaller the measurement error, the higher the reliability will be. Therefore, the reliability can be regarded as the degree to which the measurement result is affected by random factors. Verify the reliability of the data. The method is to calculate CITC, if the value is less than 0.5, delete the index; at the same time, calculate the Cronbach's α coefficient, if the α coefficient is above 0.6, indicating that the index reliability is acceptable.

Validity refers to the validity of the measurement index, that is, to the extent that it can express the meaning of the desired expression. Each measurement method has its own scope

of application. The higher the validity, the more the characteristics of the measured object can be measured. Therefore, when designing the measurement method, validity is a very important condition. If a measurement tool cannot measure the characteristics of the object to be measured, no matter how good the reliability and excellent measurement steps are, it is not possible, so validity is the most important prerequisite for scientific measurement tools.

The purpose of reliability analysis is to test the internal consistency of the variables, usually with the compositional reliability, Cronbach α as the detection index. The composition reliability CR is greater than 0.6. If Cronbach's alpha value ≥ 0.7, it is indicating that the variable and the internal consistency of the variable are higher. The reliability test of the measurement model is shown in Table 5-3.

Table 5-3 Reliability test of measurement model

Variable	composition Reliability	Cronbach's α	Number of Items
Enterprise Quality	0.825	0.816	13
Enterprise Policy	0.853	0.815	9
Competitive Environment	0.856	0.936	10
Agreement Fulfillment Willingness	0.849	0.821	8
Credit Risk	0.874	0.854	7
Quality of Enterprise Manager	0.821	0.863	13

The aggregation validity is mainly measured by the average variance extraction (AVE), which needs to be greater than 0.5. Table 5-4 shows the validity checklist and each value meets the requirements.

Table 5-4 Aggregation validity test

Variable	Measurement Item	AVE
Enterprise Quality	EQ1	0.862
	EQ2	

	EQ3	
	EQ4	
	EQ5	
	EQ6	
	EQ7	
	EQ8	
	EQ9	
	EQ10	
	EQ11	
	EQ12	
	EQ13	
Enterprise Policy	EP1	0.689
	EP2	
	EP3	
	EP4	
	EP5	
	EP6	
	EP7	
	EP8	
	EP9	
Competitive Environment	CE1	0.672
	CE2	
	CE3	
	CE4	

	CE5	
	CE6	
	CE7	
	CE8	
	CE9	
	CE10	
Agreement Fulfillment Willingness	PI1	0.785
	PI2	
	PI3	
	PI4	
	PI5	
	PI6	
	PI7	
	PI8	
Credit Risk	CR1	0.739
	CR2	
	CR3	
	CR4	
	CR5	
	CR6	
	CR7	
Quality of Enterprise Manager	EMQ1	0.842
	EMQ2	
	EMQ3	

EMQ4

EMQ5

EMQ6

EMQ7

EMQ8

EMQ9

EMQ10

EMQ11

EMQ12

EMQ13

In order to better explore the correlation between various things, the correlation analysis, a quantitative analysis method, can be used to reflect the strength of the correlation between them by calculating the correlation coefficient between two. In this study, the Pearson correlation coefficient index is mainly used. The relevant analysis results of credit risk, fulfillment willingness, competitive environment and enterprise quality and enterprise policy are as follows Table 5-5 :

Table 5-6 Correlation coefficients between variables

		Credit Risk	Agreement Fulfillment Willingness	Competitive Environment	Enterprise Policy	Enterprise Quality	Quality of Enterprise Manager
Credit Risk	Pearson Correlation	1					
Agreement	Pearson	-0.486**	1				

Fulfillment Willingness						
Competitive Environment	Correlation	0.345**	-0.215**	1		
Enterprise Policy	Pearson	-0.261**	0.354**	0.225**	1	
Enterprise Quality	Correlation	-0.426**	-0.259**	0.478**	0.493**	1
Quality of Enterprise Manager	Pearson	-0.321**	0.263**	-0.280**	0.429**	0.528**	1

Note: ** indicates a significant correlation at the level of 0.01 (bilateral).

It can be drawn from the relevant analysis result table that there is a correlation between credit risk, willingness to perform, competitive environment, enterprise quality and enterprise policy. This provides a premise for the further verification of the influence mechanism among the variables using multiple linear regression analysis below.

5.3 Regression analysis

Using the statistical analysis tool SPSS, in this part, the information collected from the formal questionnaire statistics will be further analyzed using regression analysis to test the hypothesis proposed in Chapter 3.

(1) The impact of the enterprise quality of technology-based enterprises on fulfillment willingness

In this part, we discuss the impact of enterprise quality on fulfillment willingness, take enterprise quality as the independent variable and fulfillment willingness as the dependent variable, perform a one-way linear regression analysis and obtain a regression analysis table of enterprise quality and fulfillment willingness. See Table 5-6 below.

Table 5-7 Analysis of the effect of quality of enterprise on the fulfillment willingness

Dependent Variable	Independent Variable	Beta	t	F	R^2	Adj.R^2	Sig.
Fulfillment Willingness	Enterprise Quality	0.672	16.760**	280.913**	0.573	0.571	-.000

Note: **P < 0.05

It can be seen from the above table that at 95% confidence level, satisfying the T test and F test, the enterprise quality has a significant regression effect on the fulfillment willingness. The regression model is established, and the table also shows that the adjustment analysis R2 of the regression analysis is 0.571; this shows that the quality of the enterprise can explain 57.1% of the fulfillment willingness. The statistical results of the regression analysis indicate that H1 is established, that is, the quality of the company positively affects the fulfillment willingness.

(2) Impact of fulfillment willingness on credit risk

In this part, we discuss the impact of fulfillment willingness on credit risk, take fulfillment willingness as the independent variable and credit risk as the dependent variable, perform a linear regression analysis and obtain a regression analysis table of fulfillment willingness and credit risk, as shown in Table 5-7 below Show.

Table 5-8 Analysis of the effect of fulfillment willingness on credit risk

Dependent Variable	Independent Variable	Beta	t	F	R2	Adj.R^2	Sig.
Credit Risk	Fulfillment Willingness	-0.224	-0.409	0.168	0.029	-0.271	0.675

It can be seen from the above table that at the 95% confidence level, the T test and the F test are satisfied, and the fulfillment willingness has a significant regression effect on credit risk. The regression model is established, and the table also shows that the adjustment R2 of

the regression analysis is -0.271, which shows that the fulfillment willingness can explain -27.1% of credit risk. The statistical results of the regression analysis indicate that hypothesis H4 holds, that is, the fulfillment willingness negatively affects credit risk.

(3) The regulatory role of the enterprise policies of science and technology enterprises in the relationship between the enterprise quality and fulfillment willingness

In this study, SPSS 22.0 is used to test whether the regulatory role of enterprise policy exists between enterprise quality and fulfillment willingness. The enterprise quality in the original theoretical model is used as an independent variable, enterprise policy as adjustment variable and fulfillment willingness as dependent variable and hierarchical regression analysis is used to test whether the hypothesis holds. Before officially entering the hypothesis testing stage, the sample data is first decentralized to make the sample data suitable for the analysis of regulatory effects. Specifically follow the three steps: 1) Regardless of the influence of moderating variables on enterprise policy, perform regression analysis on the impact of the perceived value as independent variables on fulfillment willingness as dependent variables; 2) Introduce the moderating variable of enterprise policy into the current regression equation and observe significance of variables and moderator variables; 3) Further introduce the interactive terms of perceived value of independent variables and fulfillment willingness in the regression equation, observe R2 and P values, if the coefficient before the interaction term is significant and model R2 becomes significantly larger , It proves that enterprise policy has a significant adjustment effect between enterprise quality and fulfillment willingness. The data results of SPSS are shown in Table 5-8 below.

Table 5-9 Analysis of the regulating effect of enterprise policies on enterprise quality and fulfillment willingness

Variable	Step1		Step2		Step3	
	Standardized Beta	t	Standardized Beta	t	Standardized Beta	t

Enterprise Quality	0.796	15.791**	0.357	6.965**	0.609	6.374**
Enterprise Policy			0.622	12.752**	0.931	8.426**
Interaction Term						
Enterprise Quality * Enterprise Policy					0.227	3.201**
R^2	0.544		0.744		0.755	
F	249.343**		302.370**		213.146**	

Note: **$P < 0.05$

From the data analysis in the table, we can see that using SPSS to perform hypothesis testing needs to be divided into three steps, which can be analyzed in the table data results. The coefficient before the interaction term is 0.227, $P < 0.05$ and the significance test is passed. Therefore, the hypothesis test here illustrates the acceptance of hypothesis H2, that is, enterprise policies play a regulatory role between enterprise quality and fulfillment willingness.

(4) The regulatory role of competitive environment on the relationship between the between enterprise quality and fulfillment willingness.

From the Table 5-9, we can see that using SPSS to perform hypothesis testing needs to be divided into three steps. It can be analyzed in the table data results that the coefficient before the interaction term is -0.137, $P < 0.05$ and the significance test is passed. Therefore, the hypothesis test here shows the acceptance of hypothesis H3, that is, the competitive environment plays a moderating role between the quality of the enterprise and the fulfillment willingness.

Table 5-10 Analysis of the regulatory effect of competitive environment on enterprise quality and fulfillment willingness

Variable	Step1		Step2		Step3	
	Standardized Beta	t	Standardized Beta	t	Standardized Beta	t
Enterprise Quality	0.892	18.691**	0.256	6.845**	0.687	6.614**
Competitive Environment			0.638	18.563**	0.931	8.426**
Interaction Term						
Enterprise Quality * Competitive Environment					-0.137	-3.582**
R^2	0.562		0.741		0.763	
F	248.314**		321.370**		225.225**	

Note: **$P < 0.05$

(5) The regulatory role of managers' quality on the relationship between fulfillment willingness and credit risk

From the data analysis in Table 5-10, we can see that the use of SPSS for hypothesis testing needs to be divided into three steps, which can be analyzed in the table data results. The coefficient before the interaction term is 0.281, $P < 0.05$ and passed the significance test. Therefore, the hypothesis test here illustrates the acceptance of hypothesis H5, that is, the quality of enterprise managers plays a regulatory role between fulfillment willingness and credit risk.

Table 5-11 Analysis of the regulatory effect of managers' quality on fulfillment willingness and

credit risk

Variable	Step1		Step2		Step3	
	Standardized Beta	t	Standardized Beta	t	Standardized Beta	t
Fulfillment Willingness	0.45	18.654**	0.322	6.921**	0.601	6.214**
Manager's Quality			0.687	13.684**	0.925	9.412**
Interaction Term Fulfillment Willingness * Manager's Quality					0.281	0.367**
R^2	0.569		0.715		0.782	
F	232.152**		310.384**		225.186**	

Note: **$P < 0.05$

By data analysis on the formal questionnaire survey, analysis of the basic characteristics of the subjects, analyses of sample data such as degree, validity, correlation, linear regression, hierarchical regression, the column hypothesis is tested one by one and the final result is as follows (as shown in Table 5-11) and the final model factor path diagram is shown in Figure 5-1 below.

Table 5-12 Variable relationship test table

Hypothesis	Content	Result
H1:	The enterprise quality of technology-based enterprises is positively affecting the agreement fulfillment willingness.	Accepted

H2:	The enterprise policy of technology-based enterprises is positively regulating the relationship between enterprise quality and agreement fulfillment willingness.	Accepted
H3:	The competitive environment of technology-based enterprises negatively regulates the relationship between enterprise quality and agreement fulfillment willingness.	Accepted
H4:	The agreement fulfillment willingness has a negative impact on credit risk.	Accepted
H5:	The quality of enterprise managers is positively adjusting the relationship between agreement fulfillment willingness and credit risk.	Accepted
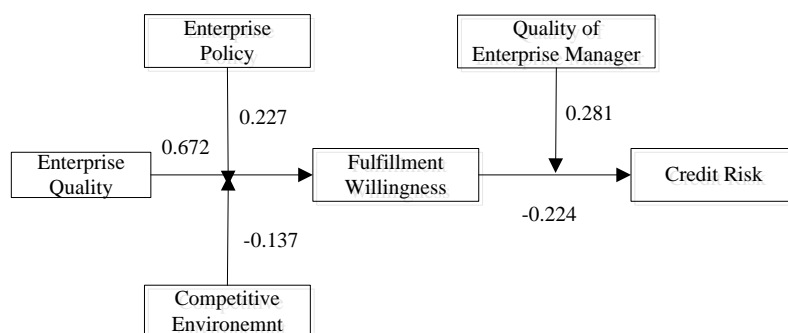
Figure 5-1 Factor path diagram of the final model

5.4 Result discussion

In this research work we choose the enterprise quality as the starting point to explore the agreement fulfillment willingness of enterprises under the regulating effect of enterprise policy and competitive environment, further explores the impact on corporate credit risk and the regulating effect of enterprise manager's quality on the relationship between enterprise agreement fulfillment willingness and credit risk. Now the discussions of main findings are as follows.

(1) Discussion on the relationship between enterprise quality and agreement fulfillment willingness

The results of this study indicate that the enterprise quality is positively affecting the agreement fulfillment willingness. The reason is that when the company's personnel have high quality, high moral standards, integrity, responsibility and then the company will fulfill its responsibilities more consciously and maintain the company's quality, provide technology and products with high quality and adhere to the agreement, so that the agreement fulfillment willingness will be at a high level. On the other hand, the management quality indicates that the structure and system of the enterprise are more reasonable, especially in the new situation. When this management model reflects good values and corporate culture, the enterprise will have higher requirements for itself and the sense of compliance so that it tend to have high agreement fulfillment willingness. For technology-based companies, enterprise innovation is critical to the business. When an enterprise has excellent innovation quality and has excellent technology and patents, it will greatly reduce the risk of enterprise innovation and enhance the confidence of enterprise development, so the possibility of enterprises actively fulfilling their obligations will be greatly increased. According to previous research, scholars believe that the credit quality of managers (Tesar & Werner, 1992) and their sense of integrity (Hu, 2013) are conducive to business management and avoiding opportunistic behavior and the R&D and innovation activities of enterprises will also convey the signal of positive development of enterprises(Li Wang, & Hao, 2016), which could win recognition from outside investors and show that companies have good innovation capabilities and high possibility of fulfillment. This is consistent with the results of this study.

(2) Discussion on the role of enterprise policy in regulating the relationship between enterprise quality and agreement fulfillment willingness

Enterprise policy is positively regulating the relationship between enterprise quality and agreement fulfillment willingness. This shows that when technology-based enterprises receive government policy support, such as strengthening corporate education or training of enterprise personnel, the corresponding personnel quality and management quality will be improved and the impact on the agreement fulfillment willingness will be even stronger. The

investment and support of enterprise policy for enterprise innovation will enable enterprises to have sufficient conditions further innovate products and develop new technologies. Then the impact of corresponding enterprise innovation quality on enterprise willingness will be enhanced. In the past, scholars (Porter and Vander, 1995b; Wu, Feng, & Yu, 2000; Zhang and Liang, 2011) also believed that a sound enterprise service system, enterprise policies and a good policy environment are conducive to promoting the quality of corporate personnel, standardizing corporate management processes and promoting the role of technological innovation in enterprises. Therefore, the company has the conditions and qualifications for fulfilling promise and the results of this study are consistent with the views of scholars.

(3) Discussion on the role of competitive environment in regulating the relationship between enterprise quality and agreement fulfillment willingness

The research results show that the competitive environment negatively regulates the relationship between enterprise quality and agreement fulfillment willingness. When the external competitive environment is high, the company's own personnel quality, management quality and innovation quality will face new threats. Excessive competition and dynamic environment will increase the difficulties of enterprise personnel's adaptation, management decision-making and technological innovation, then the impact of enterprise quality on the agreement fulfillment willingness will be reduced. Scholars (Chaganti & Damanpour, 1991) generally believe that a generous environment can have a positive impact on companies, but a higher dynamic environment may force managers to make limited rational decisions. That is to say, the quality of the enterprise cannot be guaranteed under the situation of excessive competition pressure, especially the decision that lacks clear value judgment may lead to mistakes and is not conducive to the positive effect of the enterprise quality. Therefore, the research results and the direction of scholars' research is the same.

(4) Discussion on the effect of agreement fulfillment willingness on credit risk

The agreement fulfillment willingness negatively affects credit risk. More risk represents an uncertainty and loss. The agreement fulfillment willingness represents a sense

of observance of commitment and abiding by principles and more reveals a sense of trust and conveys a reliable signal. For companies with a high degree of fulfillment, they have the tendency to comply with relevant regulations, provide quality products, execute related contracts and pay off debts in a timely manner. This awareness and tendency will reduce the probability of default, no credibility, reduce uncertainty and reduce the loss of the enterprise partner or related party, so that the two variables present a negative impact relationship. Previous scholar Zhang (2010) believed that the fulfillment ability and agreement fulfillment willingness were the direct cause of credit risk. This study clarifies this point and verifies the negative effect of the agreement fulfillment willingness on credit risk.

(5) Discussion on the role of enterprise manager's quality in regulating the relationship between agreement fulfillment willingness and credit risk

The quality of enterprise managers is positively adjusting the relationship between agreement fulfillment willingness and credit risk. The quality of enterprise managers is very important for the development of enterprises and corporate image and evaluation. If the quality of managers is high and the managers have high knowledge background, cultural level and personal quality, then the management of tasks and decision-making will be more scientific and conducive to the development of the enterprise and at the same time, the possibility of fulfilling the promise will be great, thereby reducing the credit risk. Hu (2013) believes that the agreement fulfillment willingness is mainly determined by the ethical quality of the company itself. The quality of the company's managers will strengthen the company's agreement fulfillment willingness and then influence the credit risk, so this result is consistent with the research direction of previous scholars.

5.5 Chapter summary

This chapter begins with descriptive statistics on variables, then develops reliability and validity analysis and finally tests the relevant hypotheses and discusses the results.

Chapter 6: Summary and Prospect

6.1 Main conclusions

The international economic competition is becoming increasingly fierce and international trade is becoming more frequent. However, the economies of various countries are not synchronized. The development level of technology-based companies in different countries is also different. The industries in which technology-based companies are located are also very diverse. Since technology-based enterprises are growing up in dynamic changes, the credit quality and social environment that determine the level of credit achievement of technology-based enterprises are all in dynamic changes. Therefore, the level of future credit realization of technology-based enterprises must also be in dynamic changes. For technology-based enterprises, in addition to the general environmental factors and internal factors of the company, it is also closely related to the quality of innovation. Therefore, when conducting research on credit risk, we should explore the impact of enterprise quality on the agreement fulfillment willingness, explore the role of external factors, corporate policy and competitive environment in this process and finally explore the impact on corporate credit risk and the regulating role of enterprise managers' quality in the relationship between the two.

Through empirical research, this study concludes that the enterprise quality positively affects the fulfillment. The enterprise policy positively regulates the relationship between the enterprise quality and the agreement fulfillment willingness. The competitive environment negatively regulates the relationship between the enterprise quality and the agreement fulfillment willingness. The agreement fulfillment willingness negatively affects the credit risk. The quality of enterprise managers positively adjusts the relationship between agreement fulfillment willingness and credit risk.

6.2 Research implications

6.2.1 Theoretical implications

For the influencing factors of enterprise credit risk, scholars generally look at it from the perspective of evaluation. Research on credit risk assessment and cognitive methods is already very rich and researchers use a variety of methods to evaluate credit and some are quite innovative. However, scholars currently focus on economic or financial indicators for credit evaluation and focuses on the repayment risk of credit risk. Regardless of whether it is a general-purpose or technology-based enterprise, scholars are more committed to the fulfillment ability and the research on the fulfillment is very scarce. Based on the quality of the enterprise, this study studies the influencing factors of agreement fulfillment willingness, which is the direct cause of credit risk, fills in the gap in the research of agreement fulfillment willingness.

Secondly, it discusses the role of enterprise policy, competitive environment and the quality of enterprise managers in this process and further clarifies the regulating role of enterprise policy, competitive environment and manager quality in the process of credit risk.

Third, when conducting credit risk management for technology-based enterprises, credit risk needs to be based on prevention as well as prevention and treatment integrated.

The ability of resisting credit risk should be enhanced from the aspects of enterprise quality, the enterprise management quality, enterprise policy and the response to the competitive environment.

6.2.2 Management implications

This study finds that the agreement fulfillment willingness negatively affects credit risk. This finding is consistent with the views of many previous scholars. If you want to reduce the credit risk of enterprises, then the premise is that the company needs to have the willingness to perform. Therefore, the company mainly should focus on how to improve the

company's agreement fulfillment willingness in terms of enterprise quality, enterprise policy and competitive environment and so on.

(1) This study finds that the enterprise quality is positively affecting the agreement fulfillment willingness

Enterprise management quality. Technology-based enterprises strengthen their own management and prevent credit risks. Technology-based enterprises need to realize the transformation of quality from the inside out, improve their ability to cope with environmental changes and reduce the adverse impact of credit risk on market players. Recently, the increasingly fierce competitive environment has made the survival and development of China's science and technology enterprises face a severe test. The credit of technology-based enterprises is also facing the same test. Some high-tech enterprises with high credit quality can not only obtain a large amount of credit funds, but also get wider social recognition. The high-quality technology enterprises with good credit status, pay attention to their own management, reform management strategies to prevent credit risks, improve the utilization rate of funds, strengthen their own operations and enhance the credit quality of enterprises. On the other hand, enterprises can practice a good culture of enterprise fulfillment by practicing some management concepts. Enterprise culture is vital to the long-term development of the company and has a huge impact on the values and awareness of the company's personnel, representing the direction of the company's progress. . Among them, the culture of fulfillment is a guided culture in which companies abide by their commitments and achieve quality management. In order to enhance the reputation of the enterprise and ensure the quality of its products, the enterprise must guarantee quality and quantity, which will be an intangible wealth. If the company has its own culture of fulfillment, then this culture will invisibly bring more benefits to the enterprise. Individuals in this culture will also become more responsible because they know that counterfeiting and breach of commitment will eventually be ruthlessly eliminated. Only by the diligence, the improvement products or technologies quality and guarantee of credit level can we continue

to protect the development of the company.

(2) The quality of enterprise innovation. Different from ordinary enterprises, technology-based enterprises have the characteristics of high technology, high risk and high return. The development of technology-based enterprises cannot be separated from a high level of innovation; otherwise they will not be able to continue in a highly competitive market. The innovative behavior of technology-based enterprises includes the generation of innovative ideas, the development and implementation of technologies, the promotion of products, production and sales, etc. Innovation is a systematic industry rather than a one-step process. Innovation requires a lot of investment, but sometimes it may not be rewarded. Any environmental error will influence the quality of innovation results. As a long-term, uninterrupted activity, innovation requires continuous resources. For such enterprises, it is necessary to ensure their own sustainable development in the long run, lay a solid foundation for innovation and experience continuous trials before they can reap the value brought by innovation. In the case of stable output of innovative results, the willingness to fulfill promise will also be stabilized.

(3) This study finds that enterprise policy positively regulates the relationship between enterprise quality and agreement fulfillment willingness

The government's support will have a significant impact on the quality of the company's personnel and the improvement of its innovative quality. For the governments' support policies, it is necessary to improve education and training policies, such as talent introduction and training and enterprise innovation and entrepreneurship management. The government should take measures to promote collaboration and mutual support of industry, education and research and focus on supporting the incubation and development of technology-based enterprises, especially small and micro enterprises. Encourage advanced technology companies to play an exemplary and guiding role for small businesses. On the other hand, the government can provide support and assistance to the technology enterprises in the startup stage through various preferential measures. Policy subsidies are a boost to corporate

innovation, enabling companies to innovate in this supportive environment. This kind of policy support is also a kind of affirmation and encouragement for enterprises, which will increase the confidence of the development of technology-based enterprises. Third, support small and micro enterprise technology innovation with first support and later re-regulation. After adopting measures to support small and micro enterprises, then introduce relevant technical standards step by step, to standardize the development for the quality of enterprises in the future.

The government should strengthen the assistance and support for the quality of enterprise management, especially to assist the management and regulation of industry organizations. For example, the government takes the lead in organizing industry associations related to science and technology enterprises to play a representative role in the technology industry. To create an organization of this nature, the industry standards should be defined first to standardize the development of the industry and ensure fair competition among enterprises in the industry. Second, this organization should be given a certain power, so that the industry can express their opinions on behalf of the relevant companies. Third, in order to ensure the efficiency and significance of the operation of the industry, it is necessary to supervise this type of organization to ensure its role as a bridge between the outside world and the enterprise. Fourth, supervise the communication between industry organizations and enterprises, let the industry organizations play the biggest effect and guarantee the credit construction of the entire industry.

(4) This study finds that the competitive environment negatively regulates the relationship between enterprise quality and agreement fulfillment willingness The industry competitive environment is the cornerstone of an enterprise's survival and development. The improvement and development of the industry environment can create a better development space for the growth of the enterprise. For enterprises, the competitive environment of enterprises is objective. At the same time, it can be perceived and the changing market demand and peer competition will bring a series of pressures to enterprises. Facing dynamic

and complex external competition environment and various pressures of survival and development in the volatile market, if companies want to maintain a competitive position, then they need to adapt flexibly, apply their own resources to carry out innovative work and let the company make long-term and steady progress. At the same time, it is also important to note that in a dynamic and diverse environment, companies are more likely to innovate and the opportunities they have to innovate are more (Miller & Friesen, 1982). Although the external environment is difficult to change, enterprises can create an organizational environment conducive to the organization to play an innovative quality, thereby improving their level of innovation and management and escorting their credit development. Secondly, enterprises should assume an irreplaceable mainstay role, strictly abide by industry rules and pay attention to market changes, fulfill corporate social responsibilities and increase capital accumulation. For the government, in addition to playing the role of the market, the government can adjust the industrial organization structure and improve the unified and orderly market system on the basis of respecting the laws of the market. For example, break local protection policies to realize the free flow of resources; strengthen the improvement of market rules to ensure a fair competitive environment and create a good market environment for the growth and development of technology-based enterprises through various measures, enhancing their ability to resist risks and enterprises quality. Finally, consumers are an indispensable part of the entire market. Consumers should actively play their regulatory role, standardize individual purchase behaviors, supervise speculative operations of enterprises and improve market efficiency.

(5) This study finds that the quality of enterprise managers positively regulates the relationship between enterprise quality and agreement fulfillment willingness

The concept of personnel is the forerunner of change. Without the renewal of ideas, it is difficult to open up in action. At present, to improve the quality of managers of new technology enterprises, we must reach an agreement in the two aspects:

First, realize that the growth of human capital is the core condition for the survival and

development of enterprises, the improvement of enterprise employees who grasp certain knowledge and skills is of vital importance to the development of the enterprise. Therefore, the development of the quality of enterprise personnel, especially the quality of managers, is the first strategy for enterprise development. Secondly, it is necessary to recognize that the cultivation and promotion of the quality of enterprise personnel is a continuous systematic project. The cultivation of integrity and responsibility will benefit the whole life. Therefore, it is necessary to establish a lifelong learning concept for enterprise personnel and cultivate a good sense of responsibility and quality. The managers need to play an exemplary role, lead by example, improve enterprise quality and credit.

6.3 Research Limitation

After theoretical and empirical research, this study has obtained clearer conclusions, but due to the lack of time and research experience, there is still room for improvement in this study.

(1) In the design of the questionnaire, part of the questionnaire scale of this study comes from relevant literature materials and some of it comes from interviews and research groups. There may be insufficient comprehensiveness in the scale, which can be further improved and refined in the later study.

(2) This research questionnaire mainly invites employees and managers of science and technology enterprises to answer. Although the anonymous reply method is adopted, the internal personnel of the enterprise also understand the situation of the enterprise, some problems are sensitive, it is difficult to determine whether the relevant personnel will produce the avoidance psychology and not answer based on the real situation. Although the effective sample size of this survey has reached the basic requirements of empirical research, it is limited by the lack of research time and research experience and it fails to achieve the ideal results of 2 collected valid questionnaires in each enterprise to further reduce the measurement deviation caused by the subjective attitude of the respondents.

(3) In this thesis we attempt to explore the impact on credit risk from the perspective of the agreement fulfillment willingness, chooses the enterprise quality and enterprise policy and the competitive environment as the independent variables and regulating variables of the research. However, there may be other factors to be studied.

6.4 Research prospect

For the shortcomings of this research at this stage, the recommendations for future research are as follows:

(1) In the future research, the application of the scale needs to keep pace with the times, closely follow the development of science and technology enterprises and the evolution of policies. At the same time, it needs to be repeatedly verified and become a mature scale for reference.

(2) In order to further reduce the measurement bias caused by the subjective attitude of the respondents, future research can appropriately enrich the sample size.

(3) For the study of the influencing factors of credit risk, other variables, such as corporate culture, can be introduced to explore the impact of these variables on enterprise risk, so that enterprises can prevent credit risk from all aspects and improve their credit quality.

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Appendix

Appendix 1

Sample description of focus groups is shown in the table.

Table-1 Sample Description of Focus Groups

Classification		Quantity	Percentage Occupied
Gender	Male	20	80
	Female	5	20
Age	Under the age of 23	5	20
	24-30	10	40
	31-35	5	20
	36-40	0	0
	More than 40	0	0
Years of Working	Less than 1 year	2	10
	1-3 years	5	20
	3-5years	5	20
	5-10years	10	40
	More than years	3	12
Educational Degree	High School and Below	0	0
	College degree	2	8
	Undergraduate degree	15	60
	Master degree	8	32
	Doctor degree and	0	0

	above		

Appendix 2

Questionnaire

Dear sir or madam:

Hello!

Thank you very much for participating in this survey. The questionnaire is mainly used to explore the factors affecting the credit risk of technology-based enterprises. I hope that you can answer the truth. This questionnaire is designed to understand your experience and perception of enterprise credit and it is mainly for   work management personnel and employees of the technology-based enterprises. Please answer the questionnaire questions in light of the actual situation.

The purpose of this survey is to pay attention to the credit situation, enterprise quality and policy of the enterprise; to explore the influencing factors of credit risk of technology-based enterprises based on the life cycle perspective. To ensure the validity of this survey, please answer your questions with your own real feelings. Your answer (including personal information) is for this research only and will not be used for other purposes. For the security of your personal information and enterprise information and privacy, your opinions will not be disclosed to others without your permission. Please feel free to answer the questions. Thank you very much for your cooperation!

Before filling in, please briefly answer the basic information of yourself and the company.

Part 1: Personal Information

1. What is your gender?

○ Male ○ Female

2. What is your age?

○23 years old or younger ○ 24-30 ○ 31-35 ○ 36-40 ○40 or more

3. Working years?

○ less than one year ○ 1 year - 3 years ○ 3 years - 5 years ○ 5 years - 10 years ○ 10 years or more

4. What is your highest educational degree?

○ High school and below ○ Junior college ○ Undergraduate ○ Master ○ PhD degree and above

5. What is your position?

○Ordinary staff ○ Department head ○ Department manager ○Senior manager

6. Your contact information (voluntarily)

Part 2:   Corporate Information

7. What is your company name? (voluntarily)

8. What is your company registration time?

9. Does your company have leading products or diversified products?

10. What is the annual growth rate of your company's sales?

11. What type of ownership is your company?

○Private enterprises ○ Enterprises owned by the whole people (state-owned enterprises) ○ Foreign-invested enterprises (including joint ventures)

12. What is your company's field?

○Electronic information technology ○ Biological and medical technology ○ Aerospace technology ○ New material technology

○High-tech industry ○ New energy and energy-saving technology ○ High-tech transformation of traditional industries ○Other fields

13. Number of employees in the company

○1-10 ○ 11-100○ 51-200○101-300○301-1000○ 1000 or more

Part 3:

Please answer a few questions according to the situation of your company: 1 is very disagree, 2 is not very agree; 3 for uncertainty; 4. 5 is very agree.

1. The company's manpower system helps to promote the realization of individual values

2. The company's compensation system is conducive to giving encouragement to innovation.

3. The company's performance appraisal is fair and accurate for individual value creation.

4. The company's financial control system can test the gap between job performance and company goals

5. The company's existing customer complaint mechanism can deal with complaints from consumers.

6. The company will improve its services to meet consumer needs.

7. The company implements a green sustainable development strategy

8. The company pays attention to social welfare and charity

9. The tools purchased by the company help to increase productivity

10. The employees can often come up with many ways to improve their product processes.

11. The company often supply new products and technologies.

12. The company has a higher number of patents than other companies.

13. The company's profits come from a large number of newly developed products and technologies.

14. The government further relaxes land use approval

15. The government lowers the land lease price

16. The government gives tax benefits

17. The government provides financing guarantees for enterprises

18. The government implements government subsidies for major industries in the region

19. The government formulates industrial support policies in light of the economic development of the region

20. The government strengthens education in the region

21. The government provides training for business executives

22. The government develops policies to support technological innovation in enterprises

23. It is difficult for companies to predict customer demand and product preferences

24. It is difficult for companies to predict the market behavior of competitors

25. It is difficult for companies to predict industry technology trends

26. Industry new product technology and development and new service projects are

launched fast

27. Market demand is growing rapidly

28. New companies entering the market can easily join the industry.

29. The number of competitors in the industry in which the company is located is large

30. There are a large number of potential substitute producers

31. The dependence of upstream and downstream manufacturers on business performance is large

32. The importance of customer satisfaction to the impact of corporate sales (or business volume) is large

33. The company launches products and technology with very high quality

34. The information of the company is highly authentic

35. The company strictly controls quality and eliminates counterfeit and shoddy products and technologies.

36. The technology promoted by the company is in line with the actual situation.

37. The company's serious with fulfillment.

38. The company does not falsely report the price

39. The company does not make false financial information

40. The company refuses to evade taxes

41. The company does not default on its debts

42. There is a problem with the information disclosed by the company.

43. The company has contract fraud

44. The company has false advertisements

45. The company has false promotions and false price.

46. The company has product quality fraud

47. The company's accounting statements are fraudulent

48. The company has a tax evasion phenomenon

49. The company has arrears in bank loans.

50. The manager of the company has good quality of honesty and integrity.

51. The manager of the company has a strong sense of responsibility

52. The business manager has positive customer service awareness

53. The business manager can adapt to changes in the environment more quickly

54. The manager of the company has the awareness and ability to innovate constantly

55. The business manager can make good judgments on external affairs or unexpected events at work.

56. The business manager can adapt to fierce market competition and be good at dealing with customer relationships.

57. The enterprise manager can effectively integrate resources and have a sense of collaboration

58. The business manager has good communication skills

59. The manager of the company has a good sense of work and is able to quickly identify problems in the company.

60. The manager of the company actively learns and accepts new things.

61. The business manager has a good knowledge of science and technology.

62. The company's managers keep in mind the corporate rules and regulations of the enterprise.