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Factors Influencing Innovation Input and Operational Efficiency: The Role of Social Capital

PENG Jinlong

Doctor of Management

Supervisors:
PhD Virginia Trigo, Professor,
ISCTE University Institute of Lisbon
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Jury:

PhD Elizabeth de Azevedo Reis, Full Professor
Iscte - Instituto Universitário de Lisboa
PhD Maria José Aguilar Madeira, Assistant Professor with Habilitation
Universidade da Beira Interior
PhD Zhang Chichen, Full Professor
Southern Medical University
PhD Renato Telo Freitas Barbosa Pereira, Assistant Professor
Iscte - Instituto Universitário de Lisboa
PhD Virgínia Maria Trigo, Emeritus Professor
Iscte - Instituto Universitário de Lisboa

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Declaration

I declare that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed: 彭金龙 Date: 2022.2.15

Name: Peng Jinlong

作者申明

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作者签名：彭金龙 日期：2022.2.15

姓名(拼音)：Peng Jinlong

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Abstract

Innovation is an effective way to help enterprises shift from “high growth” to “high quality” development. China’s investment on R & D has been steadily on the increase but, in a transitional economy with incomplete institutions, what are the important factors that influence Chinese enterprises to make innovation input and improve operational efficiency? What factors can replace formal institutions to guide enterprises to innovate and improve operational efficiency?

From the perspective of the theories of social capital, resource-based view (RBV) and the new institutional economy theory, this study mainly explores the relationship of corporate social capital, access to resources, corporate innovation input and operational efficiency in China’s healthcare sector. The sample data of Chinese medical enterprises were obtained through questionnaire survey; then, multiple linear regression analysis was used to verify the influence mechanisms among the variables, and the results of the survey show that:

(1) Corporate social capital significantly promotes corporate innovation input and operational efficiency; (2) Resource acquisition plays a mediating role in the relationship among corporate social capital and innovation input and corporate operational efficiency; (3) the institutional environment positively moderates the influence between corporate social capital on corporate innovation input and operational efficiency; (4) the competition degree of the industry negatively moderates the influence of corporate social capital on corporate innovation input and operational efficiency.

This study enriches the theories related to social capital, access to resources, innovation input, and operational efficiency in China’s healthcare sector, and may provide meaningful practical insights for stakeholders including enterprises in China’s healthcare sector, governments, and associations.

Keywords: corporate social capital; resource acquisition; innovation input; corporate operational efficiency; China’s healthcare sector

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Resumo

A inovação é uma forma eficaz de ajudar as empresas a transformarem o seu modelo de desenvolvimento de "crescimento elevado" para "qualidade elevada". Nos últimos anos a China tem vindo a fazer um grande investimento em I&D mas, sendo uma economia em transição com uma envolvente institucional ainda incompleta, quais os fatores que influenciam a dinâmica de inovação das empresas chinesas e a melhoria da sua eficiência operacional? O que poderá substituir as instituições formais e ajudar as empresas a concretizar estes objetivos?

Tendo em consideração as teorias sobre o capital social, a perspetiva dos recursos e a teoria institucional, esta tese explora a relação entre capital social, acesso a recursos, inovação organizacional e eficiência operacional tendo por base o sector da saúde na China. Um questionário foi especialmente concebido de acordo com o modelo teórico e administrado a uma amostra de empresas do sector médico. Os dados foram analisados através de regressão linear múltipla para verificar as relações entre as diferentes variáveis e os resultados demonstram que:

(1) A existência de capital social promove significativamente quer a inovação, quer a eficiência operacional; (2) A capacidade de acesso a recursos desempenha um papel mediador na relação entre capital social, inovação e eficiência operacional; (3) A envolvente institucional modera positivamente a influência entre capital social e os constructos inovação e eficiência operacional; (4) O grau de competitividade da indústria modera negativamente a relação entre capital social e os constructos inovação e eficiência operacional.

Este estudo contribui para enriquecer as teorias relacionadas com o papel que o capital social pode desempenhar no desenvolvimento da inovação e na melhoria da eficiência operacional das empresas no sector da saúde na China e pode contribuir com uma nova perspetiva para a gestão das empresas nesta indústria, para o governo e associações.

Palavras-chave: capital social; acesso a recursos; inovação; eficiência organizacional; sector de saúde na China

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摘　要

创新是促进企业从“高增长”转向“高质量”发展的有效方式，中国的研发经费总量投入持续增长，但是在制度不完备的转型经济情境下，什么是影响中国企业进行创新投入、提升经营效率的重要因素？什么因素可以替代正式的制度引导企业进行创新、提升经营效率？

本研究将基于企业社会资本理论、资源基础观理论、新制度经济学理论探究中国医疗行业企业社会资本与企业创新投入、经营效率之间的关系，通过问卷调研获得中国医疗行业企业样本数据并使用多元线性回归分析验证变量之间的影响机理，研究结果表明：

（1）企业政府资本对企业的创新投入及经营效率具有显著的促进作用；（2）资源获取在企业社会资本与创新投入及企业经营效率之间起到中介作用；（3）制度环境对企业社会资本与创新投入及经营效率之间的功效具有正向的调节作用；（4）市场竞争程度对企业社会资本与创新投入及经营效率之间的功效具有负向的调节作用。

本研究丰富中国医疗行业社会资本、资源获取与创新投入、经营效率相关的理论，同时，对这些变量之间的关系研究为医疗行业企业、政府、协会等利益相关者提供了有意义的实践启示。

关键词：企业社会资本；资源获取；创新投入；企业经营效率；医疗行业

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博士毕业论文的写作终于迎来了定稿之日，在写作过程中，备尝各种艰辛，有迷茫、郁闷、无助和不知所措，现在终于可以定稿，心中暗喜。读博这五年是我一生中极其难忘的五年。而在我学习和成长的背后，满载着老师、家人们对我的关爱、指导和帮助。

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Chapter 1: Introduction

1.1 Research background

At present, China's economic development has entered a critical period of transition from "high growth" to "high quality". The government has repeatedly emphasized the importance of independent innovation by continuously issuing relevant supporting policies to vigorously push forward enterprises' independent innovation from various aspects such as tax policies and government subsidies, so as to promote the optimization and upgrading of the industrial structure. Medicine provides the basis and conditions for economic and social development. Medical and pharmaceutical innovations not only reflect the development of national advanced technology, but also relate to the well-being of people and social stability, with significant positive externalities and the nature of quasi-public goods. Consequently, actively promoting medical innovation and development plays an important role in economic growth, national prosperity and the happiness of people. Since the 13th Five-Year Plan period (2016-2020), China's pharmaceutical industry has made outstanding achievements: the development foundation has been more solid, the driving force for development has been stronger, the overall development has reached a new level, new breakthroughs have been made in industrial innovation, supply and security has been enhanced, and the pace of internationalization has been accelerating, which has made great contributions to the prevention and control of COVID-19.

Affected by the technological innovation policies of developed countries, in order to promote the development of the medical and pharmaceutical industry, and for the purpose of industrial catch-up, Chinese local governments at all levels have continuously increased financial subsidies for the innovation of medical and pharmaceutical enterprises, and the research and development (R&D) intensity has been rising. China's *"14th Five-Year Plan" for the Development of Pharmaceutical Industry* put forward the goal of "making the effects of innovation-driven transformation emerge" for the medical and pharmaceutical industry, which requires that during the 14th Five-Year Plan period, many pharmaceutical innovations should complete clinical research and listing application, and that the pharmaceutical industry will continue to increase innovation input and accelerate innovation-driven transformation.

Meanwhile, during the period, the total R&D investment of the industry will increase by over 10% annually. By 2025, the proportion of new sales of innovative products in the increment of operation revenue of the industry will further increase. However, in this context, the problems restricting the development of the industry are still prominent, and the problems of "emphasizing imitation and neglecting originality" and "emphasizing quantity and neglecting quality" in the medical and pharmaceutical industry are still serious. Despite the "considerable number of new drugs", most of them are improvements of existing drugs, lacking internationally recognized heavyweight original drugs. For example, in the field of traditional Chinese medicine (TCM), where China is supposed to have technological comparative advantages, it only accounts for 5% in the international market, which also invites reflection. In the context of the state-led gradually advanced reform, China's current mixed economy or the coexistence of the two systems means that the market economy sector and the redistribution economic sector are of equal importance for resource allocation. In particular, in the context of a weak institution with a lack of property rights and "the pattern of difference sequence" of Chinese culture, people do not treat all people as universally as the Western society, but determine different treatments based on the closeness and distance of the relationship. When resources cannot be completely allocated through the market or state redistribution, social networks become an effective resource allocation mechanism. Based on the perspective of resource dependence, enterprises lacking resources are bound to be affected by the surrounding environment such as institutional environment and operational environment when they conduct operations and make innovative investments. In other words, the social capital embedded in the relationship network between the enterprise and the surrounding organizations will turn into an important factor affecting the enterprise's business and innovation input (J. Du et al., 2013; Ferri et al., 2012; Zhou, 2013).

Since the concept of social capital was first put forward, relevant theory has been widely used in economics, sociology, political science and management to answer research propositions in various fields. For example, economists use social capital to explain regional and national economic growth (Yan, 2012); sociologists use social capital to study social stratification, social transformation, labor employment, family and employment, immigration, and others (L. Zhang et al., 2016); political scholars view social capital as a characteristic of social organization and put emphasis on the important role of social capital in organizational behavior and collective action (Gant et al., 2004).

Bourdieu took the lead in putting forward the viewpoint about social capital (Bourdieu, 1980). Later, American sociologist Coleman incorporated Granovetter's and Lin's research on

social networks into their own research framework in the book *Foundations of Social Theory*, and conducted in-depth analysis of the concept, characteristics and manifestations of social capital (Coleman, 1990). Coleman's systematic research on social capital caused scholars in various fields to discuss social capital extensively. The concept of social capital was introduced into the research of general issues in school education, youth behavior, social life, national democracy and management, collective action, and economic development. Later, with the efforts of many other scholars, the theory of social capital and empirical analysis methods were further improved.

Although the initial research focus of social capital theory was to explore the impact of networks on individuals from a sociological perspective, an increasing number of management scholars have used them in the field of organizational management over recent years (S. Y. Chen et al., 2010; Dai & Liu, 2014). There are four main aspects in this view: First, the impact of social capital on occupations such as career success, job search, and compensation mechanism (Bian et al., 2018; Maclean et al., 2015); Second, the impact of social capital on resource exchange, innovation, intellectual capital, and team efficiency (Cheng & Bian, 2014; Zhang et al., 2015); Third, the impact of social capital on organizational life cycle, and enterprise development (D. L. Du et al., 2015; Ou, 2018); Last, the impact of social capital on inter-organizational networks and internal organizational networks (Yoon et al., 2015).

Existing literature has also covered the impact mechanism of corporate social capital, resource acquisition, corporate innovation input and operational efficiency, but more research focused on the impact of corporate social capital on resource acquisition, innovation decision-making and innovation performance, or the impact of enterprise resource allocation on enterprise innovation performance. However, there is little research on the impact of corporate social capital on corporate resource acquisition, innovation input and operational efficiency, and how corporate social capital affects corporate innovation input and operational efficiency through corporate resource acquisition, especially in the context of institutional environment with Chinese characteristics. At the same time, due to different factors such as the nature of industry and corporate, corporate social capital may have different effects on enterprises in different industries. In the existing studies on the impact of social capital on corporate innovation and efficiency, there is little research on the healthcare sector, and there is a lack of detailed analysis on the current innovation of the healthcare sector. As a result, this thesis takes China's healthcare sector as the targeted industry and explores the impact mechanism of corporate social capital on corporate resource acquisition, innovation input and

operational efficiency in this industry.

1.2 Research problem and purpose

The purpose of this study is to answer the following questions and underlying problem:

(1) In the context of a transitional economy with imperfect systems, what are the important factors that affect enterprises' innovation input and their improvement of operational efficiency in China's healthcare sector? Based on the perspective of the theory of new institutional economics, a perfect system is conducive to stimulating enterprise innovation activities. However, the Chinese market system and policy system in transition and upgrading are not perfect. What can replace the formal institutional factors to promote the innovation input of enterprises in the healthcare sector and improve their operational efficiency? It is from this problem that this study attempts to find answers from the perspective of informal institution. Previous research believes that political network/association, as an effective alternative mechanism for the formal system, can provide guarantees for enterprises' innovation input and operational efficiency. Yet, the research that is currently been conducted in China simply views the political network as the connection between the enterprise and the government, focusing on the resource advantages and control advantages of the enterprise as they occupy the center of the network or the location of the structural hole. This perspective of network structure ignores the institutional background embedded in the enterprise: for example, the enterprise occupies a favorable location in the social structure due to institutional arrangements. This location is different from the general network location. Furthermore, previous research on political networks even equated the political identity acquired by entrepreneurs with the connections that they made with government officials through social exchanges. Obviously, this view ignores the institutional factors and the "legality" in signal transmission function behind political identity, thus failing to fully analyze the role of political networks. In addition to the political network, the informal relationship network of an enterprise should also include the relationship formed between the enterprise and relevant business stakeholders in the industry due to its being in a business network structure, and the association capital accumulated through participation in industry associations/chambers of commerce.

Based on the above, this thesis incorporates the social capital owned by the enterprise into the study and explores the influencing factors that it has on the enterprise's innovation input and the improvement of operational efficiency in the healthcare sector.

(2) In the absence of resources and legitimacy, will corporate social capital promote enterprises to invest in innovation and improve business efficiency? Previous studies on corporate social capital generally analyze it from the three dimensions of structure, relationship and cognition. However, for the social capital owned by a family enterprise in the context of the Chinese system, the division of these three dimensions not only has measurement problems, but also lacks consideration of the institutional environment. Therefore, this research introduces the institutional factors in the theory of new institutional economics into the study of corporate social capital, to consider the relationship between corporate social capital, enterprises' innovation input and operational efficiency.

(3) Will the acquisition of corporate resources play an intermediary role between corporate social capital and corporate innovation input and operational efficiency? Internal and external resources are an indispensable condition for the development of an enterprise. The social capital owned by an enterprise often affects its innovative behavior and operational efficiency by influencing the acquisition of resources required for the enterprise's development. Therefore, this research aims to use resource acquisition as an intermediary variable and study the mediating role of this variable in corporate social capital, corporate innovation input, and operational efficiency.

(4) Does the interaction between corporate social capital, institutional environment and industry competition environment affect enterprises' innovation input and operational efficiency? Institutional environment and industry competition environment serve as the situations of enterprise innovation input and operational efficiency. Analysis of the interaction between them and social capital will help to improve the understanding of the impact of innovation input situation on enterprises' decision-making and the impact of operational efficiency on enterprise improvement.

1.3 Research significance

1.3.1 Theoretical significance

The theoretical significance of this research, first and foremost, lies in that it may contribute to enrich the relevant theories of social capital, resource acquisition and innovation input, and operational efficiency.

First, based on the special research background of China, this thesis reconstructs the measurement dimension of social capital of enterprises in China's healthcare sector and

analyzes this dimension based on the different structures of enterprises in the social network, i.e., the social capital of the enterprise is divided, according to its different source, into government capital, corporate capital, and association capital.

Second, the influence path between social capital, resource acquisition and innovation input, and operational efficiency of enterprises in the healthcare sector is constructed. The study introduces social capital theory into the improvement of innovation and operational efficiency during China's transitional period. The perspective that the resources acquired by the enterprise affect its innovation and operational efficiency provides a new theoretical perspective for the improvement of the enterprise innovative behavior and operational efficiency and expands the application scope of social capital in the field of enterprise management.

Finally, the study introduces two contextual factors, institutional environment, and industry competition environment, to study the impact of social capital in the healthcare sector on corporate innovation behavior and operational efficiency in China's special institutional environment and uneven industrial development.

1.3.2 Significance for managerial practice

The significance for managerial practice of studying the relationship between social capital, resource acquisition and innovation input, and operational efficiency is mainly embodied in the fact that the study of the relationship between these variables plays an important role, whether it is for enterprises in the healthcare sector, governments, industry associations or other stakeholders.

First, under the influence of the "relation-based" culture, social capital serves as a substitute for the formal system and plays a key role in the development of enterprises, for it not only serves as an important way for enterprises to obtain resources, but also reduces the risks faced by enterprises in innovation by providing directional guidance and innovation foundation. In addition, by establishing close contact with each subject in the social network, it can also help enterprises lower transaction costs with each subject, reduce the property rights infringements suffered by enterprises due to imperfect systems and other reasons, thereby further improving enterprises' operational efficiency. Therefore, studying the mechanism of the above variables can provide an effective theoretical reference for entrepreneurs in the healthcare sector to make appropriate decisions on enterprise innovation and on how to improve operational efficiency.

Second, for stakeholders such as the government and industry associations, the research

mechanism analyzes the opportunities and challenges faced by enterprises in the healthcare sector in their innovative behavior and improvement of operational efficiency. It helps all stakeholders understand corporate social capital and then formulate corresponding policies to promote innovation, improve their operational efficiency, and build an industry platform that is conducive to the effective growth of enterprises in the healthcare sector. Moreover, it offers targeted assistance for enterprises in the healthcare sector to obtain the corresponding resources needed for innovation and operational efficiency, and to improve the institutional environment and industry environment that enterprises in the healthcare sector face in their operations.

Third, it helps to promote enterprises in China's healthcare sector to increase innovation input, improve operational efficiency, and calmly handle the greater challenges to the sector caused by all kinds of public health emergencies and China's aging population. In particular, as the world is still fighting the COVID-19 pandemic, the healthcare sector, the important part of China's medical and health system, plays an irreplaceable role. Innovation is the core driving force for an enterprise to achieve sustained and high-quality development. The typical capital-intensive and technology-intensive characteristics of the healthcare sector require the industry to pay attention not only to innovation input, but also to the improvement of operational efficiency after innovation input. Although Chinese governments at all levels have proposed to create a first-class business environment similar to that of developed countries, it is inevitable that the current system is still not perfect. Consequently, it is of great practical significance for the sustainable and high-quality development of the whole industry to study how social capital, the substitute of the formal system, influences the improvement of corporate innovation input and operational efficiency in the healthcare sector.

Last, two moderating variables, institutional environment, and industry competition environment, are introduced. On the one hand, the innovation and development of enterprises are inseparable from the institutional environment and the industry environment. Although the key period of China's economic development and transformation has been changed from a government-led market economy to a market-led economy and the healthcare sector is both capital-intensive and technology-intensive, the government still enjoys considerable institutional resources and administrative power. In this situation, the government still serves as an important medium for enterprises in the healthcare sector to obtain critical resources. On the other hand, the fairness of enterprise competition is also a key factor influencing enterprise innovation and growth. This is because when an enterprise faces an unfair competitive environment, the enterprise will pursue stability and reduce its willingness to

innovate. When the market competition is more intense and the competition environment is fairer, the competitiveness brought by enterprise innovation will reduce the risks brought by innovation, thereby promoting enterprise innovation and growth.

1.4 Research methods

This research adopts two basic research methods: literature review and empirical research. To be specific, based on literature research, after preliminary interviews and discussions, the main research content and basic framework of this study are proposed. Then the questionnaire is designed. To ensure the reliability and validity of the data obtained by the survey, this study tries to refer to the operational definitions and measurement scales that have been widely used in China and foreign countries, and then adjust and revise them in accordance with the research theme. Next, a large-scale questionnaire survey is conducted, and the survey data are analyzed through corresponding software to test the research hypotheses. Specifically, the research methods in this thesis include the following:

(1) Literature review: The previous literature research is an effective guarantee for the rationality of subsequent conceptual model establishment, research hypotheses, variable measurement and research conclusions. Through keyword search of Google Scholar, EBSCO database, CNKI database, university library collection, and others, a large number of relevant research literatures can be obtained, and then screened, selected, read and summarized. Through the previous literature research, the current research situation in this field is grasped. By looking at the insufficiency or limitations of the existing research, we can find out the research field that requires further expansion or the research problem to be revised, so as to seek the entry point of research.

(2) Questionnaire survey: On the basis of literature research, this study takes Chinese private enterprises in the healthcare sector as the research object. The survey subjects are private entrepreneurs (enterprise owners) in the healthcare sector across China and the method of random survey is adopted. The respondents are senior managers of enterprises. After collecting the questionnaires, the author judges the logic of questions included in the questionnaires, views the survey results one by one, and screens out the questionnaires that do not conform to logic and that have poor quality, in order to guarantee the reliability of survey results.

(3) Data analysis: After the preliminary selection of the questionnaires obtained by the formal survey (deletion mainly due to serious incomplete data, obvious fill-out irregularities

of reverse question design and other conditions), SPSS, STATA and other software for homology deviation test, validity analysis, relationship analysis and multiple linear regression analysis are used to conduct empirical research on effective sample. Homology deviation test was used to test the overall quality of the sample data, and exploratory and confirmatory factor analysis to verify the reliability and validity of the data structure and construct dimensions. Relationship analysis preliminarily explores the degree of influence among variables, while multiple linear regression analysis further examines the significance and effect size among private enterprises' social capital, innovation input and operational efficiency.

1.5 Research content and roadmap

1.5.1 Research content

This study focuses on the impact of private enterprises' social capital on enterprise innovation input and operational efficiency. The main content includes the following aspects:

Chapter 1: Introduction – It mainly introduces the research background, research problems, purpose and framework of this research and elaborates the research significance.

Chapter 2: Literature review – This part respectively reviews the existing research on social capital theory, RBV theory, new institutional economics theory, innovation input, and enterprise operational efficiency, and defines core concepts on this basis. At the same time, it sorts out the mechanism of corporate social capital and reviews previous research.

Chapter 3: Theoretical models and research hypotheses – Based on the existing literature research and theoretical analysis, the research hypotheses of the relationship between private enterprises' social capital and resource acquisition, innovation input, and operational efficiency is proposed, and the private enterprises' social capital and institutional environment and institutional competition degree are used as adjustment variables to construct a research model of the relationship between innovation input and operational efficiency.

Chapter 4: Research design – It mainly explains the data sources, sample selection and operational definitions of key variables, and at the same time explains the empirical methods used in the study and the process of model testing.

Chapter 5: Empirical results and discussion – This part specifically analyzes the relevant descriptive statistics and regression results and explains the robustness test of the study.

Chapter 6: Conclusions, limitations, and future research directions – Based on the detailed

analysis of the previous research hypotheses, the research results are further summarized, and the limitations of this research as well as the future research directions are summarized.

1.5.2 Roadmap

This thesis conducts research according to the following roadmap:

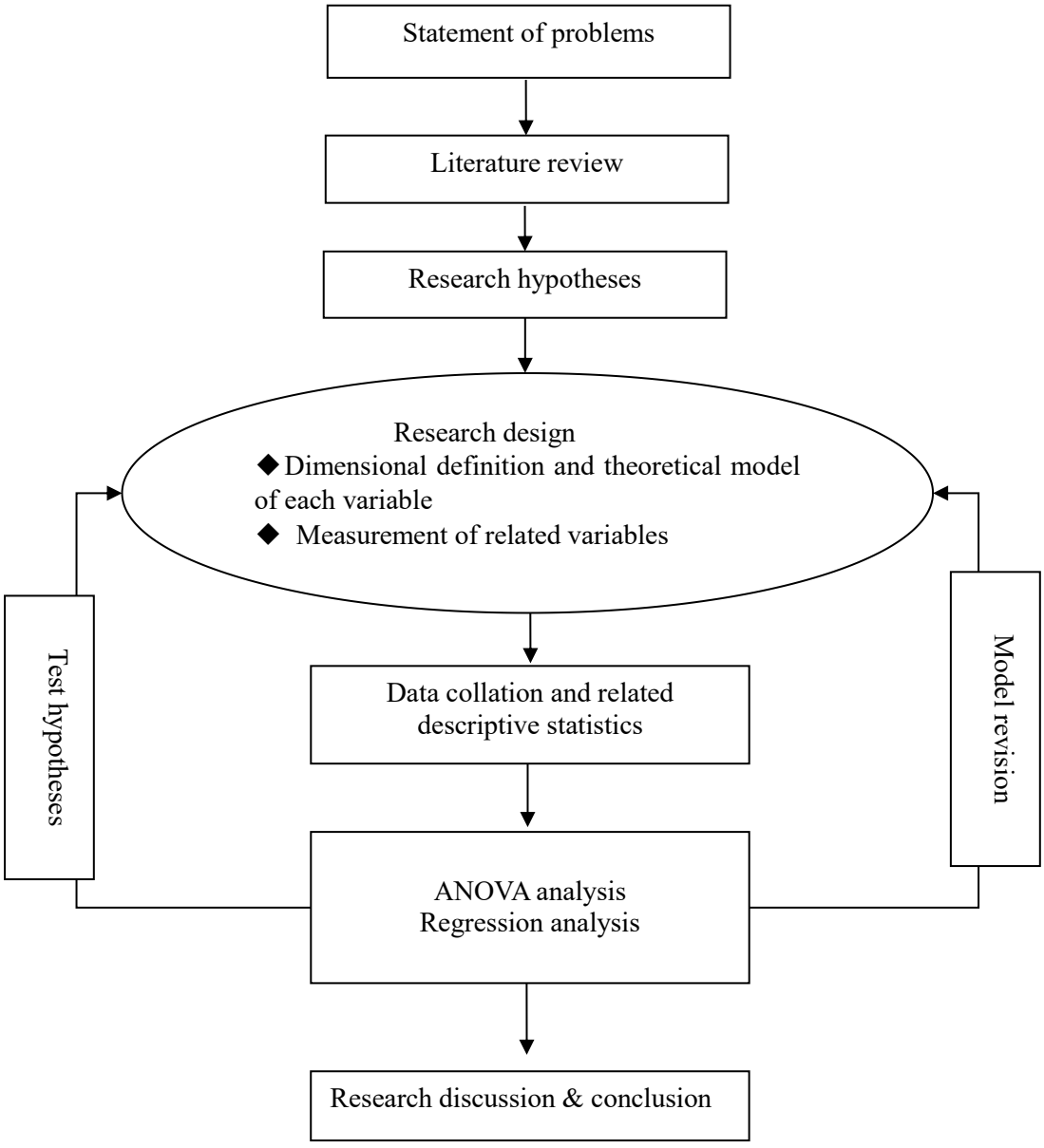

Figure 1.1 Research roadmap

1.6 Summary of this chapter

This chapter, as the introductory part of the full thesis, describes the research background of the impact of corporate social capital on corporate innovation input and operational efficiency. By taking the influence mechanism of corporate social capital on corporate innovation input

and operational performance as the research topic the chapter introduces the research purpose, which is to investigate how corporate social capital in the healthcare sector influence enterprises to make innovation input and improve their operational efficiency under the institutional environment in China and with the market competition, and to explore what is the role of resource acquisition in this process. This chapter also introduces the implications of the study for theories related to corporate social capital in the healthcare sector, resource acquisition, innovation input, and operational efficiency, as well as the practical implications for corporate innovation and management. The methods and steps taken to complete the study are presented, and finally the research content and technology roadmap of the thesis are outlined.

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Chapter 2: Literature review

2.1 A review of social-capital-related theories and research

Social capital theory is one of the theoretical foundations and the core of the research in the thesis. Therefore, it is necessary to first sort out its definition and the history of its theoretical development, and then analyze the relational network between individuals and organizations closely related to social capital, how to accumulate the social capital of individuals and organizations in China's "relational society" and "relationship" network, and the dimensions of social capital. On the basis, the social capital referred to in this thesis and its dimensions and measurement are defined.

2.1.1 Definition of social capital and its theoretical development

There has not yet been formed a unified concept of social capital in current academic circles. Different scholars have put forward their own definitions of social capital from different perspectives. Economist Glenn Loury first proposed the concept of social capital in *A Dynamic Theory of Racial Income Differences* in 1916, which distinguished physical capital, human capital, and social capital from the perspective of the impact of social structural resources on economic activity. As Loury did not conduct a systematic study of social capital, it did not attract enough attention from the theoretical community (H. M. Ma & Chen, 2012). The systematic study of social capital began with the French scholar Pierre Bourdieu, who defined social capital in the *Actes de la Recherche en Sciences Sociales*, literally *The Social Capital Essay*, in *Le Capital Social: Notes Provisoires*, literally *Collection of Social Science Research*, in 1980 as "Social capital is the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition—or in other words, to membership in a group-which provides each of its members with the backing of the collectively owned capital, a "credential" which entitles them to credit, in the various senses of the word" (Bourdieu, 1980, p. 2). The work also subdivided capital into economic capital, culture capital and social capital. Bourdieu believed that social capital is instrumental, and individuals can obtain the resources they need by participating in social organizations or striving to build social

networks. This discussion on the important role of social capital and the way to form it contains two important parts: first, the social relationship itself has become a reliable source for individuals to obtain various benefits from network members; second, social networks are not natural gifts, they are formed by individuals who need to make strategic investments (including time, money and energy) by using institutionalized corporate network relationships. Based on the above perspectives, social capital is regarded as "a collection of real or potential resources possessed by the participants' familiar, recognized and institutionalized relationship network, which is mainly composed of the identity and relationship network of members of the society or group. Such network and identity will contribute to the achievement of personal goals and can be rewarded in the same way as other forms of capital" (Bourdieu, 1985, p. 21).

With social capital growing into an important research tool and method, scholars have gradually expanded it into the field of management (Thomas & Mu, 2000). Coleman clearly put forward the concept of social capital in *Social Capital in the Creation of Human Capital* and developed it into a comprehensive concept of sociology that can be applied in management (Coleman, 1988). Coleman believed that social capital is the social structure resource owned by individuals and is composed of multiple entities with two characteristics. Its formation mechanism includes reciprocal expectations and mandatory regulations of groups (Coleman, 1990). Subsequently, Coleman conducted an in-depth study on the characteristics and forms and the formation process of social capital in his book *Foundations of Social Theory*. On the one hand, the study pointed out that social capital has the characteristics of productiveness, incomplete substitution, public goods, and non-transferability. On the other hand, Coleman creatively summarized the forms of social capital into five types: obligations and expectations, information channels, norms and effective sanctions, authority relations, multifunctional social organizations and intentionally created social organizations.

Putnam promoted the research of social capital from the individual level to the collective level on the basis of Coleman's research and applied it to political science research. Putnam in his book *Making Democracy Work: The Civic Tradition of Modern Italy* took social capital as a prerequisite for the good functioning of society, and defined it as "the characteristics of social organizations such as trust, norms and networks, which can improve the efficiency of society by promoting cooperative behavior" (Putnam, 1993, p. 195). In Putnam's view, social capital is equivalent to the "civicness" of the city or even the entire national community, i.e., the level of citizens' participation in community activities in the community. It mainly includes two major parts: one is the personal social network, through which individuals can

obtain the resources of other contacts; the second is the quantity and quality of these resources. He defined social capital as "trust, norms, and networks that can improve social efficiency through coordinated actions" (Putnam, 1993, p. 195). First, social capital is composed of a series of attitudes and values related to citizens' trust, reciprocity, and cooperation. Second, social capital is mainly reflected in the personality networks that connect friends, family, community, work, and public and private life. Third, social capital is a characteristic of social relations and social structure, which helps promote social action and get things done.

Contrary to Bourdieu, Coleman, Putnam and others, Burt understood social capital from an opposite point of view. Burt defined social capital as "the degree to which the network structure provides information and resource control to actors in the network" (Burt, 1995, p. 60). This view holds that closed networks can only provide repeated redundant resources, while the actors occupying the "structure hole" of the network can not only get more opportunities to obtain non-repetitive resources, but also control the flow of resources in this strategic position. The innovation of Burt lies in emphasizing the non-surplus in open networks, and he also proposed and verified four hypotheses about the social capital network effect (Burt, 1997). Generally speaking, network restrictions, network density, and network level have a negative relationship with social capital. There is only a positive relationship between the size of the network and social capital, because as the size of the network expands, the more opportunities for network members to occupy structural holes, the richer the social capital they have. Meanwhile, Burt did not put the social capital paradigm of closed networks and open networks in opposition but thought that the two complemented each other. On the one hand, the closed network is conducive to the formation of internal cohesion. Especially when sufficient resources within the group are effectively used by individual members, closed networks are very effective. On the other hand, when the connection goes beyond the group, the "structure hole" in the open network can bring new value to the group members or even to the entire group.

As the influence of social capital theory gradually increases, how to measure it in research has become an important task for researchers. Similar to Bourdieu's view of relational operation, Lin Nan, a Chinese sociologist, attempted to combine Marxist ontology (any form of capital is regarded as inherent in society) with rationalist epistemology (individuals try to pursue instrumental goals combined with social status), to explore the generation and effect of social capital from a personal perspective, and defined social capital as "a series of resources embedded in personal social networks formed by investing in social relations in order to obtain expected market returns, such as wealth, power, reputation, and network structures that

continue to expand through direct or indirect social relationships with individuals" (Lin, 1999, p. 470). He also distinguished three forms of social capital at the individual level—resources embedded in social structures, availability of resources, and the use of resources and summarized the four main functions of social capital. First, social capital promotes the flow of information. Second, the influence of the actors' social stakeholders on agents with important decision-making power will facilitate the achievement of the actors' goals. Furthermore, the identity behind the actor provides agents and organizations with proof of trust through social relationships and brings additional social resources to the organization. Finally, social capital strengthens identity and recognition, which is to provide members with emotional support and public recognition of certain resources. However, Lin Nan's research on social capital is mainly at the individual level. Although the resources embedded in the actor's position are mentioned, there is still no organization-level social capital, especially the social capital formed by individuals embedded in social group organizations.

Despite that there is no unified definition of social capital, researchers have basically reached the consensus that social capital is an asset that can obtain resources through the social relations of actors and can create value (Granovetter & Swedberg, 1992). Or social capital can be understood as social resources that can be operated as "capital." It can be seen that in order to obtain social capital, actors (individuals, groups, and organizations) must form a relationship network with others, and this network itself is the source of social capital (Portes, 1998). This thesis also adopts this view as the concept of corporate social capital. The following definitions of social capital use the view above.

2.1.2 Social capital and relational network

It can be seen from the above research process of social capital theory that the social relationship network is an important source and approach for individuals and organizations to obtain social capital and resources. It can also be said that social capital means that individuals and organizations obtain resources through social relations. Therefore, in the process of studying social capital, it is necessary to study the relationship network between individuals and organizations, and to further sort out the formation and function of individual and organization social capital.

Granovetter proposed in his book *Embeddedness: Social Network and Economic Action* that as a "social person" in daily communication, various relationships will be formed between us and other people who become our friends, colleagues, and relatives. All these relationships would form a network centered on the fission, and a circle network with others

will come into being. Individuals are embedded in the relationship network formed by various relationship networks, transmitting information, generating trust, establishing expectations, fulfilling specifications, and others, thereby achieving the individual and organizational goals (Granovetter, 1985). Therefore, when discussing individual social networks, the term "relationship" is worth mentioning. Different from the definition of "relationship" in Western society, which is more of a "rule", Chinese "relationship" contains the social capital of individuals and organizations, because in China resources are often exchanged through "relationship networks" (Gong, 2013).

So, what kind of social capital does this "relationship" network form, and what are the characteristics different from "rules"? It demands that we talk about the cultural root of the traditional "human relation-face" relation in China. The "human relation-face" relation originated from the traditional Confucian culture in China which emphasized the family ethical relationship with blood as the bond (Liang, 1988). On the basis of Confucian culture, Chinese scholar Fei Xiaotong proposed that through different connections among people, individuals will gradually form a self-centered pattern of difference sequence, shifting from the inside out like ripples based on their closeness and distance with others (Fei, 1985)). Through the relationship formed between family ethics, individuals can realize mutual assistance, thus achieving individual and collective goals. Therefore, in the traditional sense of China, this kind of "human relation-face" relation is an ethical relationship based on the expansion of blood, kinship, or family. This relationship is very different from that of the Western society. On the one hand, in addition to kinship, Western society enjoys the "religious belief" which is voluntary and does not require repayment. Second, unlike the ethical relationship formed by family, kinship and blood, the Western society focuses more on the "rule" formed by "contractual relationship" (Lin, 1999).

With the continuous development of economy and society, the scope of social transaction cooperation has expanded, and traditional blood and family bonds cannot adapt to the development of modern society. Based on simulating family relations, it is more common to build a relationship that adapts to modern society. People will go through relationships and pull some relationships to form "human relations", on the basis of which, individuals form trust, establish expectations and fulfill obligations (Lin, 2001). Through this "human relations", individuals exchange resources or favorable relationships (G. G. Huang & Hu, 2005). Therefore, some scholars have proposed that "human relations" is also a kind of social capital to achieve individual instrumental or emotional goals. The former mainly refers to the monetary and political resources obtained by the individual, and the latter is the honor

received by the individual.

It is generally believed that this kind of "human relations" network, though helpful for individuals to obtain resources and honor, will also reduce the group's normative and moral standards. Yet, the fact is not just a superficial phenomenon. The "human relations" between people is a long-term bond and there are both advantages and disadvantages in terms of operation norms and competition at the group level. Generally speaking, this kind of relations at the group level often unfold as a "circle" (Luo, 2012). This "circle" is not simply a xenophobic relationship, but a non-institutional mechanism formed when China's formal system is imperfect. It is used to make up for the lack of formal system and a cultural habit based on trust. Internally, the "circle" has a strong cohesion and is easy to form collective actions; externally, it enjoys strong competitiveness and is easy to win external resources (Gong, 2013). This aggregation of people with specific relationship patterns maintained by emotions, interests, and others, makes the group of the circle structure more central. In terms of the impact of the rapid development of modern networks on China's traditional realistic circles, Peng Lan pointed out that the development of the network promotes the expansion and reconstruction of individual circles. As to how people construct their own relationship circles, and how they choose to stay in or leave various relationship circles, the core considerations are related to social capital (Peng, 2019). As discussed before, according to Bourdieu, social capital is a collection of actual or potential resources through which individuals in the collective can obtain support. On the basis that social capital is not only a means of increasing individual interests, Coleman put forward that it is also an important resource for solving collective action problems (Zhou, 2003). Peng Lan also proposed that the sense of belonging and class that the circles bring to members is a kind of social capital (Peng, 2019). Lin Nan believes that the resources that people control through positions in a hierarchical structure (such as an organization) are also an expression of social capital. The position resources of social relations are usually much more useful than the personal resources of the self, because the position resources can evoke not only the resources embedded in the organization's position, but also the organization's own power, wealth and prestige (Lin, 2001).

The Chinese society is a relation-based one. From a sociological perspective, Luo Jiade called the third interest-oriented, relatively vague and non-antagonistic interpersonal relationship structure as the "circle", believing that relationships and circles are tools just like the law, and they are an inseparable part of the social governance mechanism. As for the research of the corporate circle, the existing relevant studies were mainly carried out with

entrepreneurs as the carriers (Luo, 2015).

C. N. Liu et al. (2015) put forward that the entrepreneurial circle is constituted based on the multiple formal or informal effective superposition among entrepreneurs in the social and cultural environment of continuous innovations. It is formed organically due to factors such as geographic location, values, and common needs. Su Jingqin, Zhang Caiyue and others conducted a detailed study on the formation mechanism of the entrepreneurial circle based on the Chinese context, and proposed that the entrepreneurial circle is shaped by relational agreements based on complementary emotional and instrumental needs, for the purpose of mutual benefit, information sharing, learning growth and emotional exchange (Su et al., 2017). Wu took the South Korean community as an example and found that family members form their family's social capital through community activities, and the constituent elements of these social capital, such as mutual trust, reciprocity norms and the relationship network and others in the community, will exert a positive impact on the family's quality of life (Wu, 2020).

Hence, regardless of the traditional sense or the actual situation of modern society, the relationship network is not only a social capital, but also an important approach for individuals and groups to obtain social capital.

2.1.3 The dimensions of social capital

Regarding the division of the social capital dimensions, domestic and foreign scholars have had different divisions from different perspectives, including the relationship perspective, research level perspective and social capital structure perspective.

(1) Relationship perspective: This perspective mainly concerns the relationship between individuals and organizations. Social relationship networks originally belonged to the category of sociological research, referring to all formal and informal social relationships among a group of specific people, including direct social relationships between people and indirect social relationships formed through the sharing of material environment and culture (Mitchell, 1969). Zhang conducted research from the category of social relationship networks and proposed that social capital is a relationship network in form. He believes that social networks are not only the most important ties among people, but also an important way for resource allocation (Zhang, 1999). Different from physical capital and human capital, social capital refers to the social network generated by the interaction between individuals and organizations. This kind of social network has productive characteristics, with norms, trust, and networking as the core. It affects the interrelationships and beliefs of the organizations

and individuals in the society that interact with each other in terms of both quantity and quality (Li, 2000). On this basis, some scholars have proposed that social capital is a social network formed by the interaction between individuals and organizations based on a certain relationship, with a certain social culture as the internal norm and a certain group or organizational goal as the purpose.

(2) Research level perspective: Brown (1999) mainly studied social capital from micro, meso and macro levels. This author's embedded ego perspective focuses on the potential of individuals (self) to mobilize resources in social networks. At the meso level, the research focuses on analyzing the structural characteristics of specific social networks and the way to obtain resources from the structure. Social capital analysis at the macro level is called the embedded structure perspective, whose main focus is on the embedding of social capital in the larger political and economic system or culture and norm system. In turn, the micro level refers to the face-to-face-dominated social interactions; the meso level refers to social unit organization and group units; the macro institutional level refers to the social system of a country (Brown, 1999; Shi & Wu, 2009). As Granovetter (1985) noted, three levels are interpenetrating.

(3) Perspective of social capital structure: This perspective is mainly based on a situation of network embedding, which can be divided into structural dimension, relational dimension and cognitive dimension. Granovetter and Swedberg (1992) first proposed to divide social capital into structural embedding dimension and relation embedding dimension while Uphoff and Wijayaratna (2000) divided social capital into structural social capital and cognitive social capital according to subjective and objective criteria, the two being interrelated and interdependent, making it difficult to make a clear distinction. (Nahapiet & Ghoshal, 1998) divided social capital into structural dimensions (measured by indicators such as structure holes, connection strength and network centrality), relationship dimensions (measured by means of corporate trust, cooperation, and others) and cognitive dimensions (including indicators such as values and vision). Based on the division of three-dimensionality, other authors further researched the constituent elements of three-dimensionality – structural dimension, relationship dimension and cognitive dimension – which are managerial relationship application, trust and unity (Acquaah, 2007; Kemper et al., 2013).

In summary, similar to the development of the concept of social capital, its dimensions have not yet formed a clear and unified division. Instead, researchers have discussed the constituent elements of social capital from their respective perspectives. Nevertheless, the diversification of perspectives has not affected the researchers' consensus on the constituent

elements of social capital, i.e., social capital includes basic elements such as trust, obligations and expectations, networks, norms, and structure. The dimensions of social capital are detailed in Table 2.1.

Table 2.1 Dimensions of social capital

Scholars	The specific meaning of dimensions
Nahapiet and Ghoshal, 1998	1. Structural social capital refers to the way of connection between action themes. Network jointness, network configuration forms (density, connectivity, hierarchy, and others.) and specialized organizations are the constituent elements of this dimension; 2. Relational social capital refers to assets created and utilized through relationships, while trust, norms and recognition, obligations and expectations, and identification are the constituent elements of this dimension; 3. Cognitive social capital is a representation of resources that can be obtained through common language, symbols, and cultural habits among different subjects. Common understanding, interpretation, and meaning systems are the components of this dimension.
S. L. Lv et al., 2009; Qian et al., 2009	The social capital of the structural dimension refers to the overall model of the connection between the actors. This dimension is mainly concerned with the existence of the network connection, the strength of the connection and the network structure. The social capital of the relationship dimension describes the interpersonal relationship of people developed through interactions with each other, which concerns the mutual relationship between people, such as respect, friendship and trust. The social capital of the cognitive dimension refers to resources that can promote communication. They make it possible to share expression, interpretation and meaning systems between groups, mainly including common language and common vision.
Uphoff and Wijayaratna, 2000	1. Structural social capital refers to a policy system that sets up social networks and established social roles through rules, procedures and precedents, which promotes information sharing, collective action and mobilization; 2. Cognitive social capital refers to shared norms, values, trust, attitudes and beliefs.
Brown, 1999	1. The macro level of corporate social capital is concerned with the entire organization's occupation of social capital; 2. The meso-level corporate social capital includes the availability of resources by individual companies due to their specific position in the social structure; 3. The micro-level corporate social capital concerns whether individual enterprises can obtain the required resources by establishing social relationships.
Bu, 2012	1. The micro-dimension social capital refers to the social network of managers' prioritization; 2. The meso-dimensional social capital refers to the cooperative relationship between the business operator and other organizations or individuals as a business agent; 3. Macro-dimensional social capital refers to people's coordination of their own systems and cultures for survival in a specific environment, such as common beliefs, ideals, myths, regulations and other symbolic systems, which can influence people's actions and transactions And as a whole society, the universal value standard corresponds to people's face-to-face interaction.
Tan et al., 2013	1. The structural dimension includes the closeness, the frequency and the number of connections; 2. The relationship dimension includes the trust relationship and the principle of reciprocal cooperation in the process of communication; 3. Cognitive dimensions include effective communication, similar value orientations, and conflict resolution.

2.1.4 The definition, dimension, and measurement of corporate social capital

(1) The definition of corporate social capital

With the deepening of the research of social capital theory and the improvement of its application value, scholars have gradually shifted from the analysis of individuals and

families to the analysis of corporate and even the society. Against this backdrop, those scholars focusing on the management field defined corporate social capital. In fact, there is no difference in the essence of the definition of corporate social capital and social capital. What they set apart is the research subject.

Though Coleman (1990) was the first to point out that social capital makes for the achievement of the goal of the individual or legal person (organization), the person that extends the social capital research from individual level to corporate level is Burt (1995). He took advantage of the social capital theory to analyze the internal and external relationships of high-tech enterprises positing that internal and external relationships of enterprises constitute social capital (Burt, 1995; Coleman, 1990;). Subsequently, Nahapiet and Ghoshal (1998) formally defined corporate social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit". Similarly, Gabbay and Leenders (1999) hold that corporate social capital refers to "the tangible or intangible resource, obtained through social relationship network, which can promote the realization of objectives for enterprises". Other scholars also emphasize the embedded network and resources when defining corporate social capital. Domestic scholars have fallen behind. Bian and Qiu (2000) defined corporate social capital as "capabilities of acquiring scarce resources through vertical, horizontal, and social connections by enterprises" by analyzing the multiple connections of enterprises in economic fields. J. Zhou and Ma (2008) defined corporate social capital as "the aggregate of potential and external resources that are corporate-controlled, favorable to the realization of corporate goals and target actions, as well as existent in corporate network". They also stress that only the network resources that help the achievement of corporate goals rather than constraint it is social capital. Different from this definition Liu (2006) believes that social network represented by the corporate legal person cannot become corporate social capital until it is effectively used by the corporation, so corporate social capital may be measured by the transaction cost of building and maintaining networks entailed by corporate operations. From this perspective, corporate social capital is considered as a long-term asset that can be invested in and can receive expected returns (Yao & Xu, 2008).

Other scholars explored the essence of corporate social capital from the perspective of resource acquisition. They mainly believe that social capital constitutes a kind of resource for organizations that is incorporated in the corporate structure (Fu, 2018). Yang (2003) pointed out in his research that social capital is the resource that exists in social structure and make profits by promoting specific activities like transaction and corporation among actors. Zhou

(2002) put forward that social capital refers to a kind of resource that is embedded in social structure or relationship, exists in various forms such as trust, regulation, and network, exerts a positive or negative effect on people's social behaviors and can be obtained or redirected by people's purposeful action. H. L. Lv and Zhao (2017) proposed that corporate social network is the bond of organizational relationships, the essence of which lies in the effective integration of various resources that are conducive to the development of an enterprise.

In summary, researchers basically have studied corporate social capital at a meso level. The research perspective of this thesis on social capital is also based on this level to explore the relationship between an enterprise and the government and other enterprises, and the effect of entrepreneur's political identity and business reputation and other social capital on enterprises. Therefore, corporate social capital is here defined as a long-term asset that can be invested in and can obtain expected returns, including government capital embedded in the formal system by organizations, as well as corporate capital and association capital embedded in the external business environment and industry association environment.

(2) Dimensions of corporate social capital: government capital, corporate capital, and association capital:

The division of the dimensions of corporate social capital can be analyzed from the perspective of the relationship and the characteristics of corporate social capital structure.

2.1) the perspective of the relationship: With the research of social networks being extended to the field of economics, Bian and Qiu (2000) proposed that corporate social capital can be divided into three dimensions of vertical, horizontal and social relationship capital as cultural factors should be combined with the actual situation of the country. Among them, the vertical relationship capital mainly refers to the political bonding formed between the enterprise and the government, including the higher-level leadership department, the related institutional units, or the government department that the enterprise is affiliated with. The horizontal dimension refers to the relationship built between the enterprise and other enterprises with business connections, interwoven interests, and cooperative associations. Social relationship capital refers to the non-economic relationship fostered between the enterprise and other individuals (mainly referring to the enterprise operator) and organizations, the core of which mainly lies in the information acquisition of the enterprise. Through information communication, the trust will be built up between an enterprise and other individuals or organizations, which helps the enterprise obtain resources and operational projects unofficially.

H. L. Lv and Zhao (2017) believe that the essence of corporate social relationship

networks lies in the various formal and informal communication relations between the enterprise and other related actors (financial institutions, government departments, suppliers, customers, intermediary organizations). Some scholars elaborated corporate social capital from the perspective of the entrepreneur's relationship network and believe that due to the different main bodies of the relationship network, it can be divided into the formal relationship network formed with government departments, scientific research institutions, financial institutions, and other related organizations, and the informal network of relationships built with friends and relatives (Birley, 1985; Tichy et al., 1979). Lesser (2000) divided social capital from the perspective of entrepreneurs' "dual identity". Entrepreneurs as individuals have their personal network of relationships, but at the same time, entrepreneurs as individuals are also part of the organization, so, their personal relationship network is also part of the organization's relationship network.

Some scholars have proposed the division of corporate social capital because of the relationship network of entrepreneurs or managers. Based on this perspective, Peng and Luo (2000) suggest that corporate social capital should be divided into two dimensions: business relationship and political relationship. The business relationship is formed between managers and the executives of other companies in the process of operating an enterprise, of which the business network relationship built by the director secretary and the directors of other companies is the standard form in China. The political relationship is the political connection fostered between the manager and the relevant government department personnel, the main targets of which include the direct administrative agencies and local government departments. Shu et al. (2011) agree with Peng and Luo's point of view, proposing that the essential content of entrepreneurs' social capital comprises its business and political relations. Based on the division, domestic scholars further put forward that, in addition to these relationships directly related to the operation or acquisition of resources and projects of enterprises, the relationship capital obtained by forming an association relationship with industry associations, scientific research institutions, and financial institutions should also be included (S. Y. Chen et al., 2010). J. Zhu et al., (2019) divided corporate social capital into internal social capital formed with internal directors and management, or external social capital brought about by working in related industries. Regarding the division dimension of external social capital, they believe that it can be divided into corporate association and political association in view of the formation of the relationship network.

2.2) The structure of corporate social capital. Krishna (2002) separated social capital into institutional capital and relationship capital to analyze the ways in which collective action

occurs. The division in these two dimensions corresponds specifically to Uphoff's notion of structural capital and cognitive capital. In turn, Portes (1998) believes that the difference among the source of social capital, the role of social capital, and social capital should be understood before the analysis of social capital. According to this author, social capital derives from innate altruism and acquired functionalism. In the acquired functionalism, the proposed view is that the face-to-face reciprocal exchange is based on the ability of the interacting parties to force each other to recognize the expectations, which is similar to the normative mechanism described by Coleman, (1990), Lin (1999) and Nee (1998). For example, Coleman believes that within the collective, the reward and punishment mechanism in the consensus norms restricts certain actions of network members, thereby promoting trust and cooperation among network members, reducing the possibility of "free riding", deception, or opportunistic behaviors. The regulatory mechanism proposed by Lin (1999) emphasized that social prestige enables individuals to have collectively expected resource acquisition capabilities and opportunities within a specific network, so individuals who violate this set of regulations will be punished. Nee (1998) also thinks that social norms include rewards for those who comply with the norms and punishment and sanctions for violators. Rewards mainly refer to social approval, such as social reputation and rank, while punishment mainly includes social disapproval and being excluded from the collective.

Chinese scholars Tan et al. (2013) also divided corporate social capital into three dimensions of structure, relationship, and cognition. Among them, the structural dimension includes the rapport, frequency, and the number of connections; the relationship dimension refers to the trust relationship and the principle of reciprocal cooperation in the process of communication; the cognitive dimension incorporates effective communication, similar value, and conflict resolution. J. H. Zhang and He (2013) pointed out that under the existing formal and informal institutional environment, social capital is a kind of tacit agreement between interacting entities, while Zheng and Zhang (2017) argue that "social capital" refers more to social networks, norms, trust, and solidarity at the collective or social level and is a potential, universalist, and socially useful form of capital with positive external effects.

In summary, in this thesis it is considered that corporate social capital comprises government capital, corporate capital, and association capital. Among them, government capital mainly refers to the social capital embedded in the institutionalized structure, which helps enterprises obtain resources such as government support and policy information that are conducive to the development of enterprises through formal or informal systems. Specifically, the corporate government capital is the resources brought to enterprises by the working

experience of entrepreneurs in government or semi-government organizations (previous working experience in government or state-owned enterprises) and their own identity in a formal institution (including deputies to the National People's Congress (NPC deputies), members of the National Committee of the Chinese People's Political Consultative Conference (CPPCC members), members of the Communist Party of China and members of the All-China Federation of Industry and Commerce). Corporate capital mainly refers to the social capital embedded in external business networks (such as sellers, suppliers, and other intermediary organizations) with which the trust and shared value are obtained by enterprises in reciprocal exchanges. Association capital mainly refers to the social capital of enterprises embedded in the industry network (such as industry associations and technical associations) with which enterprises can obtain the funds, techniques, and information in the business exchanges.

(3) The measurement of corporate social capital

Corporate social capital can be measured from the perspectives of relationships, corporate social structure characteristics and social resources.

3.1) The perspective of relationship: Based on the perspective of manager's relationships, social capital of entrepreneurs is measured through direct and indirect methods. Among them, the direct measurement method is mainly carried out by scoring with Likert scale. The business relationship primarily measured by the degree to which entrepreneurs or top-level managers establish relationships with their partners, financial institutions, research institutions, or managers of competitive enterprises (H. X. Zhang & Geng, 2011). Political relationships are mainly measured by the number of government agencies, regulatory units, and support institutions at different levels. Butler et al. (2003) obtained two factors of personal professional network relationships and family member network information through the factor analysis method and refined them into three indicators for measurement. The indirect measurement method introduces dummy variables to indicate that a specific relationship exists, or employs a continuous variable to measure with the specific indicator of the degree to which managers invest in building and maintaining relationships, such as hospitality expenditure or the number of business partners (Butler et al., 2003; Fung et al., 2007; H. Zhang et al., 2014).

3.2) The perspective of social structure characteristics. From the perspective of embeddedness, when conducting specific measurements on entrepreneur's social capital, some researchers believe that entrepreneur's social capital is embedded in their social network. Therefore, the measurement of structural dimensions' merits attention, and the "position

generation" method is used for measurement, with indicators of network size, network density, network heterogeneity (Ostgaard & Birley, 1996). K. Sun and Ju (2008) used the closeness, frequency of contact and familiarity among members to measure the structural dimension and the mutual trust, trustworthiness and value orientation to measure the relationship dimension of entrepreneur social capital. Although some scholars believe that it is difficult to measure trust, values and other relationship capital and cognitive capital by integrating them into the entrepreneur social capital, such discussions in empirical research have matured (Hernández et al., 2017).

3.3) The perspective of social resources: According to the Social Resources Theory (Lin & Zhao, 2005), the social status of each member in a social network determines the number of social resources he possesses. Social status is reflected by the occupations and professional titles one engages in, so as to figure out where resources come from, entrepreneurs' economic wealth, political rights, and social status, which is one of the more commonly used measurement methods.

2.2 Summary of resource-related theories and research

Another key issue of the thesis is that enterprises obtain the resources needed for development through their own social capital, and then they are stimulated to increase innovation input and improve corporate operational efficiency. This view is put forward by the author based on the core idea of RBV. Thus, this section will elaborate the theoretical research of RBV, define the concept and classification of resources and the connotation and dimension of resource acquisition involved in the thesis, and analyze the channels and mechanism of resource acquisition.

2.2.1 Resource-based view

RBV was first proposed by Penrose (1959). Combining this theory with the theory of enterprise growth, she proposed that enterprises are naturally born with expanded way of thinking, hope to use their own resources to a broader space and time to the greatest extent, and maximize their own superior resources. Wernerfelt (1984) in his publication *A Resource-Based View of the Firm*, pointed out that an enterprise, rather than a product marketing activity, is a special combination of resources where resources can be divided in tangible and intangible resources. This view has been expanded and extended by many subsequent scholars, and similar concepts such as unique capabilities, core competitiveness,

and dominant logic have emerged. On the basis of previous studies, Barney (1991) pointed out that enterprises enjoy different types of tangible and intangible resources that can be converted into capabilities if effectively integrated and used, and those resources and capabilities can be transformed into sustainable competitive advantages as long as they are valuable, rare, and difficult to imitate or be replaced.

The core idea of RBV is to regard resources as the fundamental starting point and focus for enterprises to make specific strategic decisions. According to scholars of the resource school initiated by Penrose, the enterprise is the aggregate of management service resources, and the incentive for the enterprise growth comes from the "production opportunities" of the external environment. If entrepreneurs are "able to see", "willing", and "competent" to take advantage of "production opportunities" in the external environment, the enterprise will grow in the corresponding direction. But at the same time, it must be realized that the starting point of enterprise growth is limited by resources and management services. Enterprise growth is the expansion of enterprise resources and management services, and the result of it is the formation of a unique combination of new resources and management services. Therefore, resources school advocates that enterprise innovation is an effort to open new "production opportunities" in the external environment, and the endeavor in innovation helps enterprises to form new unique resources and management service advantages. The cost of enterprise necessitates innovation is stimulated and limited not only by the "production opportunities" in the changing external environment but also by the combination of the enterprise's existing resources and management services. In other words, enterprise innovation is inspired by environmental factors or the combination of the enterprise's own resources and management services.

Chinese scholars have also studied the relationship between enterprise resources and enterprise innovation based on RBV. Through empirical research, N. Chen and Chang (2012) found that enterprises in an "innovative industry" with a higher intensity of innovation input are more likely to make innovative decisions under the pressure of the industry's general competition, but what dictated enterprise's innovation decisions was still internal factors of the enterprise, namely, enterprise resource and management service level. Higher resource levels and management service levels can also significantly promote an enterprise's innovation-decision.

2.2.2 The definition and classification of resources

The resources owned by an enterprise are the basic research unit of RBV, so it is the basic

work to analyze the meaning of resources and classify it. Enterprise resources are the source of enterprise competitive advantages and the main cause of performance differences between enterprises (Barney, 1991; Penrose, 1959; Wernerfelt, 1984), but among the many views of enterprise resource theory, there is no unified opinion on what enterprise resources are and how they should be classified. With different research starting points, scholars have made different definitions of enterprise resources in the development of the enterprise resource theory. Their main views are shown in Table 2.2:

Table 2.2 Main views on the definition of resources

Scholars	Views
Wernerfelt (1984; 1989)	Any semi-permanent tangible and intangible asset that can be considered as an advantage or disadvantage of a given enterprise
Coyne, Cool (1989)	Organizational resources comprise flow resources and stock resources
Coyne (1986)	Corporate resources include the ability of "having" and the ability of "doing"
Barney (1991)	Corporate resources are what enterprises can use when formulating and implementing their strategies
Grant (1991)	Inputs in the production process of enterprises, including equipment assets, employees' personal skills, brands, funds.
Hall (1992; 1993)	Corporate resources include tangible assets, intangible assets, and capabilities, of which intangible assets are divided into the non-human asset and human skills
Amit, Shoemaker (1993)	The stock of elements owned or controlled by enterprises, including tradable proprietary technology, financial or physical assets, human capital
Hitt, Ireland, and Hosikisson, 1995	Corporate resources are divided into seven types of resources: finance, materialization, technology, innovation, business reputation, human resources and organization
Miller and Shamsie, 1996; Das, Teng, 2000	Corporate resources are divided into property-based resources and knowledge-based resources
Fernandz, 2000	The intangible resources owned by an enterprise can be divided into human capital that relates to human, organizational capital that does not relate to human, technical capital and relational capital
Carmeli and Tishler, 2004	Corporate resources encompass tangible elements and intangible elements, and those 22 resources are divided into four categories according to whether they are related to humans and resources in the operation process of the enterprise.
Luo and Xiang, 2005	Resources generally refer to those explicit, static, tangible, and passive "objects of use" that can be fully controlled by managers
Zhu and Li, 2011	Resources acquired by enterprises are divided into proprietary-based resources and knowledge-based resources

Source: Pan (2016); Yang (2008)

By combing the views of the above scholars, we can see that there is no unified opinion on what enterprise resources are and how enterprise resources should be classified. However, in general, enterprise resources can be divided into "tangible resources" and "intangible resources".

2.2.3 The connotation and dimension of resource acquisition

(1) The connotation of resource acquisition

Amit and Schoemaker (1993) believe that the essential attribute of resources is not "ownership" but "availability". Resource acquisition, as a form of enterprise's use of external resources, has an important impact on enterprise development. All resources of an enterprise comprise resources stock and resources flow (Magnusson et al., 2006). The resources stock refers to the resources accumulated by the enterprise over a long period of time and are the basis of various business activities of the enterprise; the resources flow is the flowing part of enterprise resources, which can replace or increase the existing resources. The maintenance of sustainable competitive advantage requires that the enterprise continuously introduces new resources to make up for the shortage of existing resources (Kogut et al., 1992; Zollo & Winter, 2002; Zott, 2003). Stock and flow are indispensable for realizing the accumulation of resources because of the unavoidable depreciation. The nature and application of resources are different, and the rate of the change of the external environment in which the resources are located determines the rate of depreciation.

This research mainly focuses on the resource flow of enterprises, especially those obtained by relying on the established social relations. Based on this idea, resource acquisition is a process in which the enterprise obtains the required resources through various channels and utilizes them after identifying and confirming those it needs. Interpretation of resource acquisition from different perspectives leads to different understandings and meanings. Resource acquisition can refer to the results, efficiency, quality, and capabilities of obtaining resources.

The common definitions of resource acquisition fall into the following three categories: (1) Emphasizing the process of resource acquisition: (Wernerfelt, 1995; Greene et al., (2001) hold that enterprise resource acquisition is the process of obtaining the required resources in multiple ways on the basis of the identification, confirmation and analysis of resources by enterprises. The holders of process perspectives believe that resource acquisition is a dynamic process of searching, identifying, using, absorbing and allocating resources of different levels and multiple categories and coming from different sources. Sirmon et al. (2007) and Sirmon and Hitt (2003) proposed that resource storage, connection and leverage have an important impact on performance improvement of enterprises. They believe that resource management is a dynamic value creation process that integrates various resources to build market development capabilities. (2) Emphasizing the availability of resources, that is to say, the

possibility of obtaining resources from outside and the availability of resources are highlighted. (3) Emphasizing the effect of resource acquisition, especially on the efficiency of the enterprise. Some scholars believe that resource acquisition refers to the efficiency of obtaining key resources and the impact of the obtained key resources on enterprise development (Cai et al., 2007; Foss, 1997). In addition, Shang (2015) thinks that resource acquisition comes from collaboration between various organizations within the enterprise and external stakeholders. Enterprises obtain the relevant resources entailed by the enterprise development through resource acquisition to improve their performance. Guo and Chen (2015) proposed in the study of the impact of resource acquisition on farmers who want to start a business that the concept includes two dimensions of resource acquisition efficiency and resource acquisition effects.

This thesis defines resource acquisition mainly from the results of enterprise resource acquisition, that is, the resources the enterprise acquires that are conducive to its further innovative input and that can improve its operating performance.

(2) Dimensions of resource acquisition

Concerning the dimensions of resource acquisition, Shi (1998) stated that entrepreneurs, as the “nodes” of the enterprise and social environment, need to have the ability to obtain government administrative and legal resources, production and business resources, management and business resources as well as spiritual and cultural resources. In turn, Zhang (2006) divided resource acquisition into three dimensions of information, knowledge, and capital acquisition, according to the composition of resources. Among them, information acquisition includes the acquisition of market, technical and government policy information; knowledge acquisition refers to the acquisition of market development knowledge, technology research and development knowledge, as well as innovation and management knowledge. Resource acquisition may also be divided into the acquisition of government funds or tax incentives, financial institution loans, venture investment, and external resources through technical cooperation.

Some scholars believe that resource acquisition consists of resource purchase, resource attraction, and resource accumulation based on the ways of obtaining resources (Greene et al., 2001; Sirmon et al., 2010). Resource purchase refers to the use of financial resource leverage to obtain external information, including the purchase of material resources such as factories, devices, equipment, the purchase of patents and technologies, the recruitment of experienced employees, and the acquisition of funds through external financing. Resource attraction is the use of social capital of entrepreneurs or enterprises to draw external material resources,

technical resources, human resources, and funds. Resource accumulation mainly refers to the resources that are cultivated and formed within an enterprise by utilizing existing resources

Besides, some scholars regard resource acquisition as a result or an ability. Luo (2015) divided resource acquisition into the result of resource acquisition, which is whether the actor obtains resources and the availability of resources, and the capabilities of resource acquisition, which refers to the actor's ability to obtain useful resources. See Table 2.3:

Table 2.3 Summary of different types of resource acquisition according to different scholars

Scholars	Types of resource acquisition
Barney, 1991	The types of resources acquired by enterprises include physical capital resources, human capital resources, and organizational capital resources
Shi, 1998	The resources obtained by enterprises are divided into government resources, production and business resources, management and business resources as well as spiritual and cultural resources
Harrison et al., 2001	The types of resources acquired by the enterprise include human, financial, technical, material, organizational, business reputation and innovative resources
Zhang, 2006	There are three types of resources acquired by enterprises: information, knowledge and capital resources
Chang, 2009; Guo and Chen, 2015	Resource acquisition includes the efficiency of resource acquisition and the effect of resource acquisition
Zhu and Fei, 2010	The resources obtained by enterprises are divided into knowledge-based resources and operation-based resources
Shang, 2015	Corporate resources acquisition includes capital resources acquisition, knowledge resources acquisition and information resources acquisition
T. Lv and Qiao, 2016	The resources acquired by enterprises can be divided into two types: knowledge-based resources and operation-based resources

Starting with the type of resources, this thesis regards resource acquisition as a result. Based on the above scholars' views, the author thinks that the resources acquired by enterprises include policy resources, knowledge resources, and operation resources that enterprises obtain from the external environment using their network of relationships. Among them, policy resources mainly refer to the policy support and tax incentives gained by enterprises relying on government capital; knowledge resources are the information and skill resources obtained by enterprises on market development, new products, and services, production operations, marketing, and enterprise management; operating resources mainly include resources such as factories, equipment, technology, capital and human resources acquired by the enterprise.

2.2.4 Channels and mechanism of resource acquisition

In General, channels of resource acquisition include market transactions, cooperation, and social networks as detailed below. (1) Gaining resources through market transactions: Complying with the market mechanism, the main body of the transaction realizes the exchange and integration of resources through the market. Still, scarce resources can be obtained through market purchase. Due to trading routine, resource acquisition can continue at a lower cost and higher efficiency after market transactions are completed, which is the diffusion effect of transactions and exchanges. (2) Gaining resources through cooperation: Cooperation and alliances with other enterprises can make up for their deficiencies. Some

scarce resources for the development of enterprises are obtained from cooperation, but cooperation and alliances are premised on their ability to achieve common cooperation goals. Both competition and cooperation are a strategic choice for an enterprise, and a reasonable choice of the object of competition or cooperation can facilitate the integration of the enterprise's resources. (3) Gaining resources through social networks: An organization can obtain the resources needed for its development of the organization through the organization's formal and informal relationship network. Whether it is a formal or an informal relationship network, the organization can establish a trust relationship with the main body of the network, thus obtaining scarce resources needed for enterprise development in a cost-effective way. From the aforementioned development of social capital theory, especially Bourdieu's view of social capital, it can be seen that individual social capital consists of the social relationship itself and the quantity and quality of the resources contained in the social relationship, and the individual can obtain the needed resources through its own social relationship (J. Yang et al., 2009). Burt's "structural hole" theory reflects that individual gain resources through their position in the structural holes, and individuals can only obtain resources if they are in the corresponding structural holes (Belliveau, 1996). On this basis, Guo and Chen proposed that social relationship is a necessary condition and antecedent for resource acquisition (Guo & Chen, 2015).

2.3 Theory of new institutional economics

Based on the perspective of the new institutional economy theory, a sound system is conducive to enterprise innovation activities. But for developing countries, especially for China, whose reform and opening up have only been more than 40 years, its national system and market system are not perfect compared with the perfect market economic system of developed countries. However, China's economy is developing rapidly, the annual innovation input of medical enterprises is at a record high, and the number of listed medical companies in the capital market is increasing year by year. What replaces formal institutions to promote the innovation input of China's medical enterprises and continuously improve operational efficiency? As a result, this section will expound on the theoretical development of institutional economics and analyze which non-institutional social capital affects the production and development of enterprises from the perspective of new institutional economics.

2.3.1 Development of the theory of new institutional economics

New institutional economists, through theoretical argumentation and statistical analysis, posit that institutional factors have a significant impact on national economic growth. At the same time, they found that widely accepted social factors of the institutional environment, such as social rules, concepts, laws, and cultural systems, in which the organization is involved, will have an impact on the development of the organization. That is to say, the composition of informal institutions will also exert an effect on the development of organizations. New institutional economists put forward that institution refers to the rules and constraints that restrict organizations and individuals. The behaviors of organizations and individuals need to be proceeded legally in accordance with rules and constraints in combination with the institutional environment (Zhou, 2001). The behaviors of organizations and individuals based on rules and constraints can help them reduce the pressure brought by the institutional environment. In the actual production activities, people think more about the well-off economic development with the constraint of formal institutions but ignore the rules and ways in which informal institutions work.

The research on new institutional economics mainly involves institutions and property rights. The theory evolved from the basis of neoclassical economics which believes that there is a perfectly competitive market, there is no uncertainty, no transaction costs or information costs, and there is no need for institutions. However, many economic phenomena in reality have posed challenges to the above assumptions, and thus the new institutional economics came into being. The theory believes that market economy has not only transaction costs issues, but institutional design issues as well. The contemporary new institutional economic theory was initiated by Coase. His article published in 1937 *The Nature of the Firm* first proposed the concept of transaction costs which refer to the cost of measuring, defining, and protecting property rights. It is believed that there is uncertainty in the market and market transactions have a price, so certain institutional rules and constraints are needed to allocate resources (Coase, 1937). When the efficiency of the old institution is low, it will be replaced by the new one. However, the transition between the new and the old system is not seamless, and there is a certain imperfect period between the two (Lin, 2016). It is also believed that during this period, organizations tend to use their own capital to solve problems, and to replace the situation in which the development problem of enterprises cannot be solved due to imperfect systems during economic transition.

The institutional environment requires enterprises to act in accordance with the rules and

constraints that have been widely accepted by the public under the institutional environment, although these rules and constraints will affect the efficiency of the enterprise. However, if the enterprise does not do so, the institutional environment will have a negative impact on the enterprise development, but when its behavior is supported by the institutional environment, it will in turn promote its development. Therefore, a good institutional environment plays a role in legal support and legal protection for the development of enterprises (Wu, 2015; Zou & Dong, 2015). With a relatively complete system, the definition of social property rights is clear, and the relationship between property rights is clear, which enables market transaction entities to conduct transactions on the basis of mutual trust, and reduce the transaction costs caused by dishonest behaviors resulting from unclear products (Zhu, 2020). This is also the view of the property rights theory put forward by Coase, i.e., unclear property rights will lead to infinite transaction costs, which will not produce economic benefits, and the transaction will fail (Coase, 1991). Therefore, under the condition of more complete systems and clearer property rights, enterprises are more inclined to carry out investment activities such as innovation campaigns. Scholars like X. M. Liu et al. (2019) also proposed that the improvement of the regional institutional environment can enhance the attractiveness of regional entrepreneurship and guide innovation and development of startups. C. P. Wu and Jin (2020) found through research that if companies are bound by social norms, they tend to use their own research and development or apply patents of others by legal means. In areas with clear social norms, companies will face even greater legal and social disciplinary risks if they steal patented technology through illegal means, thus reducing the probability of infringement of corporate intellectual property rights.

At present, China has entered a new normal that the economy is inclined to stabilize or even decline after rapid economic growth. Compared with the previous high speed, Chinese economy is currently facing changes in growth rate, development mode, growth momentum, resource allocation conversion, industrial restructuring and the inclusiveness and sharing of people's well-being. With all the problems of transformation, new requirements are put forward on China's development prospects and social system (Z. B. Zhang & Zhou, 2015). However, before the formation of the new institutions, there are also situations where the old system does not adapt to the current economic development scenario and the new market system and institutional environment are not yet perfect (Arnott, 2012). This situation may create greater obstacles to the development of enterprises, especially to innovation activities and corporate development of small and medium-sized enterprises subject to more restrictions on social capital and resources.

2.3.2 Research on social capital from the perspective of new institutional economics

In the absence of formal institutional support, especially in transitional economies where legal protection is relatively weak, corporate social capital has the economic effects of "transaction cost savings". Enterprises usually seek informal institutional support through social relationships to reduce their operational risks and transaction costs. For private enterprises that are in a weak position in resource allocation and acquisition in the context of formal institutions, they tend to influence the government's allocation of economic resources through informal institutions. This kind of informal institution often helps them obtain the resources needed for development through social relation networks embedded around the enterprise, such as seeking to establish close ties with the government or officials, hiring people with political backgrounds as executives and supporting incumbent executives to compete for NPC deputies and CPPCC members.

New institutional economists argue that informal institutions, as an important element of new institutional economics, influence people's economic behavior and decisions through the establishment of values, cognitive systems as well as other ideas and consciousnesses of a spontaneous nature at the mental level. This way of subconsciously contributing to people's behaviors can be guided by the basic thinking formed at the level of ideology, cultural tradition, customs and habits, and ethics. This guiding function is invisible, non-coercive and spontaneous. It is not based on formal "rules" but on people's self-identification and social recognition. From the perspective of new institutional economics, the impact of informal institutions on people's production activities, especially economic activities, is non-directional. This non-directionality can be broadly divided into positive regulation and negative regulation (Qu et al., 2006). New institutional economists hold that since organizations are not only a product of technological demands, but also a product of institutional environment, organizational values must be aligned with broader social values to gain organizational legality, thus making their own social resource claims recognized. The institutional environment mentioned here includes formal institutional environments such as social norms and legal systems, as well as social facts that are "widely accepted" by people such as cultural expectations, concepts, and institutions. In the context in which institutions are incomplete, corporate social capital, as an informal institution that complements formal institutions, is of great theoretical and practical significance in influencing the development of enterprises.

Whether the regulation of informal institutional factors such as corporate social capital on enterprises' development is defined as positive or negative, the discussion is meaningful for

the innovation and efficiency improvement of enterprises. In order to fulfill the role of informal institutional factors such as social capital embedded around enterprises, it is necessary to understand the influence mechanism of different informal institutional elements such as social capital on the development of enterprises in each period. Therefore, the mechanisms by which informal institutions influence the production and development of enterprises can be explored at the level of ideology, cultural traditions, customs, and habits, as well as ethics.

(1) Cultural traditions

A nation or a group of people can effectively transmit their social values and become an important factor of cultural inheritance if they can summarize their social practice activities accordingly and use certain cultural inheritance as a carrier. As Douglass C. North says, only when human beings have made institutional innovations and carried out cultural transmission in the process of their own cultural inheritance, can their cultural traditions be preserved. Cultural inheritance is a gradual process and the impetus for social practice activities accessible to a country within the scope of a certain social region, and it should achieve corresponding unification with spiritual inheritance. It is reflected not only in the customs or ways of acting of a country or nation, but also in the inheritance of a particular mental outlook of a country (Qi & Zhao, 2014).

Chinese scholar Wang (2006) believes that the normalization of cultural traditions is not only the inheritance of individual and organizational thoughts, but also the transmission of certain pabulum, which in turn affects the development of individual or organizational thoughts. The development of cultural traditions is not only the development of common human beliefs, but also the development of human civilization cohesiveness, which more manifests as a process of enhancing the self-understanding ability of individuals or organizations although it has certain binding effect on the behavior of individuals or organizations and has certain influence on the development of cultural traditions. Thus, the development and normalization of cultural institutions is also the process of informal institution development, but we cannot ignore its influence on formal institutions.

(2) Customs and habits

Customs and habits are collective rules that are formed in the development process of various communities or some cultural inheritance within a group. These rules may be an existing pattern of behavior and traditions of predecessors, or they may be the embodiment of a kind of social rules. Individuals or organizations must act in conformity with certain socialized rules in order to promote the development of this process, ultimately affecting the

development of cultural customs in the process of human development (Ren & Jiang, 2006). As Fei said, “Only by learning this pattern of behavior, can we gain development among the crowd, and obtain certain achievements in institutional innovation development, which is a reflection of social development” (Fei, 1985, p. 68). Customs or “rules” are not a process of getting corresponding guarantee through legal actions and are not guaranteed by governments. They are merely a way of learning or the product of a tradition of indoctrination. They manifest as the restraint process of behaviors and evolve into a certain mandatory standardized management process. This is not the same as the regulation and restraint of the formal institution of law on social orders. The two social actions are different in strength (Zhai, 2006). The law is guaranteed by a certain degree of coercive force and is specifically implemented through national organs of authority. Whether individuals or organizations are willing to comply with the behaviors bound by laws and regulations or not, they must follow them in accordance with the requirements. Customs and habits are quite different as they are mainly based on the inner strength of individuals or organizations and are subject to social traditions and culture. They are a kind of conscious behavior that does not require specific constraints from external coercive actions, and that make individuals and organizations tend to comply through the life creeds of individuals or organizations. In the consciousness of individuals or organizations, they may not be aware of the importance of customs and the interest needs that may be obtained in the process of acting habitually. As long as adverse effects are not exerted on the behavior of individuals or organizations, they will follow habitual behaviors to obtain certain interest needs. The formation of habits generally predates the formation of informal institutions such as social capital, and there is a very necessary and intrinsic connection between habits and the communication needs in the development of individuals or organizations. Habits can be subdivided into group habits and individual habits. The formation of group habits is a specific way that social capital and other informal institutions develop. It mainly corresponds to the process of overall group-based development and exerts constraints on individuals in the group. It has an important role in guaranteeing the implementation of various management institutions within the group and has an impact on individual or organizational interactions. Thus, in the context that formal institutions are absent or incomplete, individuals or organizations often tend to act according to habits that will embed in their own surrounding network relationships.

The development of customs and habits affects interaction activities of individuals or organizations and bears a resemblance to the development of cultural traditions. They are somewhat interrelated while distinct from each other. Customs and habits are mainly the

long-term accumulation of living habits of individuals or organizations, in the process of which specific cultural traditions form. Cultural traditions, with the characteristics of group culture, mainly include the formation of overall behavior pattern and values of individuals or organizations in the process of their development, or the development of human thoughts. Customs and habits mainly play the role of carrying individual or organizational heritage in the development of individuals or organizations' pattern of behavior. There is no certain agreement in this practice. No one knows why this is done, but all tend to comply with this intrinsic constraint unanimously under the premise of intrinsic constraint. In a situation where various institutions are relative standard, customs or habitual behaviors have a certain limiting effect on the behavior of individuals or organizations and provide a certain guarantee for the implementation of various institutions.

(3) Ethics

Ethics is a broader concept, which mainly involves the spiritual morality as well as ethical concepts of individuals or organizations. From a general point of view, ethics should belong to the category of informal institutions which include social capital, and specific behavioral norms should be formed through social public opinion or social customs. From the point of view of economics, the formation of ethics is both an important element of the realization of individual values and a fundamental element of human resources. From the point of view of the development of enterprises and economic organizations, the formation and development of ethics is an important driving force of economic development. From the point of view of institutional economics, the sound development of the economy, especially the healthy development of enterprises, requires ethical and moral behaviors and their development as a basis. The process of institutional operation and development requires certain costs as a binding force, which becomes a fundamental element of the formation and development of ethics.

In Chinese history, the development models formed based on Policy of Benevolence, Great Unity and other thoughts have mainly rationalized governments' institutional expansion behavior and played a role of ensuring their legitimacy. In this process, it is necessary to base the "justice" standard on certain "legal principles" (Liu, 2005). In the implementation of traditional culture, the development of Confucian culture has further expanded the concept of family ethical relations and promoted its development in the political sphere. In this process, the implementation of ethics further catalyzes the influence degree of political psychology, realizes the authority of politics, and provides certain reasonable basic content for the government to carry out institutional arrangements. In the whole process, the market needs to

play a guiding role in the basic development and forms certain impetus for social transformation.

In the development history of different countries, the state has played a certain regulatory and management role in the process of ideological development and implemented specific reform measures to reduce the resistance to the implementation of specific reforms and decrease the corresponding impact that can be caused in the implementation of social reforms. However, in China's traditional culture, ethics, to some extent, is a driving force behind the daily behaviors of Chinese enterprises. To be specific, it is reflected as a kind of obedience psychology that is rooted in Chinese traditions. The identification with the policies promulgated by the government can prevent the development of social contradictions, reduce conflicts, and decrease the cost of driving corporate reform, thus promoting the development of enterprises.

(4) Ideology

In informal institutional arrangements, ideology plays a key role, as ideology includes, to some extent, the implementation of informal institutions such as corresponding values and ethics, as well as various informal organizational models (Wang, 1998). From the perspective of a developing country, ideology forms the theoretical basis of informal institutions. However, the establishment and setting of institutions have to face the social environment with complexity and uncertainty, and the "economic man", in order to pursue maximum interests, will constantly search for and use the weaknesses of institutions to maximize personal utility. This raises externalities and "free rider" problems. In the former case, it is more of an institutional arrangement, with rules designed according to the properties of certain public goods, but not the innovation and development of an institution. In fact, any individual or organization can do a targeted imitation in the process of institutional innovation in combination with the actual needs, thus providing support for the reduction of organizational innovation costs.

The overall social reward is always higher than the return of innovators, which is not conducive to maintaining innovators' motivation in making further innovations. The latter mainly refers to the fact that when there is an institutional innovation, the service received by members constrained by the institution is equivalent to the service received by the innovator. Therefore, the benefits to the innovator will always be lower than the benefits to society, and the motivation of social innovation will be dampened to some extent (Qi & Zhao, 2014). Both of the two scenarios apply equally in the relationship between agents and rulers, but we must realize that the existence of "free riders" and externalities that are difficult to curb will have a

serious impact on the motivation in innovating, which in turn will exert different degrees of negative effects on corporate innovation input and efficiency. In a sense, backward ideology merely defends and affirms the legitimacy of externality phenomena, instead of overcoming them.

At the same time, in the process of eliminating externalities, the optimization and reconstruction of institutional structures that are based on institutional innovation are particularly important. In this process, a new ideology will take shape, which will provide internal impetus for the sustained development of the economy. Therefore, from the perspective that the nature of an institution determines the direction of its ideological role, the role of ideology has its own limitations, and the results can be both good and bad. First, ideology can provide some support for overcoming externalities, but it cannot help to eliminate them; second, ideology can also create new externalities and exert negative effects on economic development. Therefore, in the process of using ideology, we should also evaluate its function with prudence. In addition, the limitations of the role of ideology are also reflected in the fact that the role of ideology is a kind of non-coercive constraint, an "informal constraint", and that individuals' identification with the ideology and the result of weighing personal and social costs and benefits have a direct impact on the strength of the constraint. That is to say, the extent to which an ideology deviates from the principle of individual utility maximization is an central element that influences the effectiveness of the role of ideology. Therefore, a successful ideology must not only provide strong support and evidence for the legitimacy and rationality of the existing institutional structure, but also distance itself to some degree from the rationality of the "economic man". If the ideology deviates too much from the principles of individual rational choice, then there is no point in talking about the role of ideology.

Ideology is an expression of a value or concept that exists in people's minds. From the perspective of the new institutional economics, it is more of the realization of an economic function, which is the key to the development of ideology. From the point of view of its development, ideology is an institutional arrangement and reduces the service cost management of corresponding institutional arrangements. Ideology plays an important role when complex problems appear, or when it is impossible to use rationality to effectively deal with objective things. People can use corresponding moral norms or forms of values and concepts to make corresponding judgments, thus effectively promoting the development of ideology (Duan, 2006).

Therefore, social capital and other informal institutions, as a complement to formal

institutions, need to be complemented by informal institutions based on ideology, cultural traditions, customs, and habits, as well as ethics. The balanced development and efficient integration of institutional structures in different periods of time can be ensured only if the two different forms of institution are mutually supportive, compatible, and complementary, and conflicts are reduced. Life progress and economic development in any period cannot be separated from the two institutions and exist independently (Cui & Zhou, 2006).

2.4 The concept of innovation input

This section will define the concept of corporate innovation and innovation input, clarify the composition of corporate innovation input, and lay a foundation for subsequent empirical analysis.

2.4.1 The connotation of enterprise innovation

In 1934 Schumpeter put forward the concept of innovation theory in his book *Theory of* Economic *Development*. He believes that innovation is the introduction of new production factors and production conditions that were not yet proven in the production system or a new combination of production factors and production conditions in the existing production system. For an enterprise, this "new combination" of production factors and production conditions means to implement an operation process that is different from the past while seeking to obtain corresponding results to maximize profits and achieve market monopoly. Schumpeter thinks that the motivation of enterprise innovation is to seek profits, which are spontaneously generated in the production process of the enterprise and are a kind of essential change to help the enterprise to create new value. Thus, innovation is a process of creating value by destroying dimensional characteristics, but an examination of the objective reality reveals that this kind of "creative destruction" is not a characteristic applied to all innovations. With the improvement of innovation growth theory, some researchers proposed that innovation can actually manifest in two forms: vertical innovation and horizontal innovation. In the framework of vertical innovation, new products will eventually push the old products out of the market; in the framework of horizontal innovation, new and old products can coexist in the market. These two innovation models usually alternate.

The innovation that Schumpeter proposed is divided in five types: (1) launch of a new product; (2) application of new methods of production; (3) opening of a new market; (4) acquiring of new sources of supply of raw material or semi-finished goods; (5) create and

implement new industry structure, that is, making innovation in products, processes, markets, resources allocation, and organization method depending on the innovation ability of different organizations. Innovation ability refers to the ability of an enterprise to use new ideas or ways of thinking to acquire new technologies in the production process, thereby producing new products (Burns & Stalker, 1961). Some scholars have studied innovation from the perspective of macroeconomics, and believe that innovation is a result of the promotion of human capital, infrastructure, scientific research inputs, and other production factors and science and technology (Di & Zhang, 2017; Griliches, 1979; Romer & Snyder, 1994).

In the Survey Manual on technology innovation published by the Organization for Economic Cooperation and Development (OECD) in 1992, innovation is divided into technical and non-technical innovation. J. Chen and Chen (2007) proposed that the enterprise's innovation input is essentially the investment made by the enterprise in the early stage of change, which includes innovative activities in production, sales, value creation and other auxiliary events. Zhao and Xu (2010) believe that innovation usually refers to the formation of an idea that was not existent or apparent in the past, but can be put into practice to produce new products to meet market demand. With the development of the economy and society, scholars have defined innovation differently according to different research perspectives, but overall, enterprise innovation is a holistic activity, which not just involves a step or a certain aspect, but contains the whole process from input to output. In a broad sense, enterprise innovation includes not only technical innovation, but also non-technical innovations such as operating mechanisms, management mode and market development. Some scholars explain enterprise technical innovation from the perspective of innovation ability. They hold that enterprise technical innovation depends on the ability to generate novelty in products and their production processes, which relies on the ability of enterprises to acquire different but relevant knowledge through interaction with other enterprises and organizations (Coccia, 2009). C. N. Liu et al. (2015) pointed out that the realization of enterprise innovation is a manifestation of knowledge application and creation. The enterprise actively learns and acquires the advanced technology in the external value chain and transforms and uses it to integrate it in the production and operation of the enterprise with new technology, thereby promoting the commercialization of enterprises and developing their own unique technical innovation capability.

Based on the research views of the above scholars, innovation in this thesis refers to "technical innovation" in a narrow sense, covering the creation of new products, new processes, or other technical activities.

2.4.2 The connotation and composition of enterprise innovation input

According to the above definition of enterprise innovation, innovation includes the initial input of innovation. Enterprise innovation input covers various behaviors and operation methods based on different specific innovation paths. In addition to independent research and development innovation, other innovation methods include the introduction of new technologies, new products, and services, or suitable cooperation, joint innovation, and cluster innovation. In general, there are different ways to divide the innovation input of enterprises, mainly to distinguish the essence of innovation projects, the main objects of the investment, and the content of the input elements. From the perspective of the essence of the innovation project, it can be divided into research, experiment, research, and application of results; from the perspective of the main body of innovation input, it is divided into special scientific research institutions, college research institutes, and enterprise units; it can be divided into human resource input, material input, and related capital and information resource input from the perspective of the content of the input elements. Table 2.4 presents different views of dimensions of innovation input.

Table 2.4 Summary of scholars' dimensions of innovation input

Scholars	Dimensions of innovation input
Griliches, 1979; Romer and Snyder, 1994	Innovation input includes human capital input, infrastructure input and research and development (R & D) input
Liu, 2010; J. Zhu et al., 2019	Use the proportion of enterprise R & D expenses in total enterprise assets to measure the enterprise's innovation input
J. Zhou et al., 2013	Select the R & D input intensity of enterprise to measure enterprise innovation input
S. H. Li and Gao, 2014	Enterprises' innovation input is measured by whether the enterprise conducts R & D, the enterprise's actual R & D expenditure, the proportion of R & D input in the enterprise's total assets and the proportion of R & D input in the main business income
X. Li et al., 2018; M. G. Yu and Ning, 2016	Choose the proportion of R & D input in business income to measure the enterprise's innovation input, and use the proportion of R & D investment in total assets to conduct a robustness test
W. J. Zhang et al., 2018	Measure enterprise innovation input by the amount of enterprise R & D input

Taking the measurement situation into consideration, this thesis selects the element content of innovation input as the classification standard, among which, capital input refers to the funds used by enterprises for innovation activities, including research and development funds and training funds, which are the premise and basis for ensuring the sustainable development of enterprise innovation. Human resources input mainly means the technical personnel involved in innovative R & D activities, who are the key talent for enterprises to implement innovation. In summary, the innovation input in this thesis refers to the human

resources and capital invested by the enterprise for innovation and R & D.

2.5 Summary of research on enterprise operational efficiency

This section will define the concept of enterprise operational efficiency, clarify its categories, and lay the foundation for empirical analysis in subsequent chapters.

2.5.1 Definition of enterprise operational efficiency

"Operation" includes the meaning of projecting, scheming, planning, organizing, governing and managing. Compared with management, operation focuses on the dynamic connotation of development planning, while management focuses on the proper and reasonable operation of an enterprise. In Japan and Korea, management science is generally called operating science, and is also referred to as operating and management, or business operating and management. Enterprise operation is the strategic planning and facilitation of the long-term development of an enterprise and the formulation of its vision and policy on a strategic level based on its resources and the competitive market environment in which it operates. It solves the problems facing the development and strategy of the enterprise, which is global and long-term in nature. It is the purposeful economic activity of the enterprise or the operator, and includes the planning, design, and arrangement of the economic activity of an enterprise from the internal and external environments under the guidance of the national policy according to the national planning, market demand and the needs of the enterprise itself. The concept of “efficiency”, which first appeared in physics, is the ratio of the energy input to the energy output of a machine in normal operation. Later, efficiency was introduced into the fields of economics, but its connotations generally vary in different fields. Adam Smith thought that division of labor will improve the efficiency of the enterprise, and the view was based on the needs of division and collaboration of labor after the industrial revolution at that time. As referred by Zhao et al. (2008), the efficiency theory of neoclassical economists represented by Marshall (1842 – 1924) mentions that when some equilibrium is reached between consumers and producers, it means that the resource allocation is optimal. Based on this theory Pigou (1877 - 1959) made another theoretical innovation and proposed a new theory of economics, namely welfare economics. This theory relied on the marginal utility theory to oppose the Pareto theory of efficiency. He argued that Pareto efficiency is achieved by optimizing the allocation of resources in such a way that some people do not benefit while others do not suffer, which means that the resource allocation is optimal.

Chinese scholars Zhao et al. (2008) believe that efficiency of enterprise management concerns the rational allocation of corporate resources in order to maximize the meeting of market demand and get high profits, promoting the ability of the organization to achieve the cost-benefit ratio in the best condition. Considering the comparative relationship between the input and output in the business activities of an enterprise, the higher the operational efficiency, the faster the development of the enterprise. The key to improving operational efficiency lies in whether the allocation of resources is reasonable and whether the overall benefit of the whole society and the efficiency of the enterprise can be achieved simultaneously. In general, when analyzing operational efficiency, we should study it from broad and narrow senses respectively. In the broad sense, operational efficiency of an enterprise means maximizing the use of its limited resources, that is, its input-output ratio is optimal, thus improving its own efficiency and social efficiency simultaneously. In a narrow sense, business efficiency is an important indicator for measuring the performance of an enterprise. Thus, as the core issue of research in economics, the operational efficiency of an enterprise is directly related to the rational use of resources. Although scholars of different schools and even different types of enterprises have different definitions of efficiency, in essence, operational efficiency is the relationship between input and output or cost and benefit. If considering the enterprise in the entire economic society, operational efficiency studies whether its behavior satisfies the economic and rational arrangements of the society; if considering the enterprise as a single individual, operational efficiency studies whether it can meet the requirements of pursuing profit and its development. This thesis focuses on the latter role of the enterprises and studies the market competitiveness, management level, operational status, sustainable development capability, input-output capability, and profitability of enterprises (Liu, 2018).

2.5.2 Types of operational efficiency

With the in-depth study of efficiency theory at the micro-level, Farrell (1957) conducted research on the operational efficiency of enterprises from aspects of efficiency of scale, scope and X-efficiency. Among them, the research object of scale efficiency is the change of enterprise resource input into output, and the proportional relationship between the two. According to the change direction of scale efficiency, it is divided into three states: increasing, decreasing, and constant returns to scale. The proportion of change in output is compared with the proportion of change in resource input. When the former is higher than the latter, it means increasing returns to scale. When the latter is higher than the former, it means decreasing

returns to scale. When the two are the same, the return to scale is constant. The scope efficiency research studies whether the microeconomic entities can realize the most cost-saving input in all the business portfolio they operate. By comparing the costs of the microeconomic entities of sole business and the microeconomic entities of diversified business, the scope efficiency can be divided into two types: economies and diseconomies of scope. The former means the cost of operating a diversified business is lower than the sole business at a certain level of output, and the latter is the opposite. X efficiency is used to measure the gap between actual output and maximum output, which excludes scale efficiency and scope efficiency, and adds allocation efficiency to technical efficiency. Technical efficiency examines the management ability of microeconomic entities and allocation efficiency of the allocation ability of microeconomic entities. Chinese scholar Qin (2021) found in a study of bank operating efficiency that enterprise operational efficiency can be divided into scale efficiency, range efficiency, technical efficiency, allocation efficiency and profit efficiency. Among them:

(1) Scale economy refers to the phenomenon that enterprises and companies adjust their business structure to expand their scope of business, improve marginal revenue, reduce corporate costs, and increase their own profits. In the process of business, enterprises also improve their operational efficiency by expanding their scale, so the causes of scale efficiency are as follows: firstly, from the perspective of business income, if different enterprises share similar businesses, the larger ones enjoy higher reputation and it is easier for them to conduct business and gain revenue. Secondly, when enterprises expand their scale, they will certainly increase the number of their employees. Analyzing from the perspective of business management, each employee in the enterprise needs to conduct fewer types of business, which indirectly improves the degree of specialization of the enterprise. This not only improves management efficiency, but also reduces management costs; therefore, operational efficiency will increase accordingly. Thirdly, analyzing from the aspect of risk dispersion, expanding the scale of an enterprise can improve its ability to withstand risks.

(2) Range efficiency means that firstly, when the number of employees is fixed and the scope of business is expanded, the volume of businesses handled by each employee increases, while the average cost of labor remains the same, so the input of the enterprise decreases and the output increases accordingly. Secondly, after the range of business is expanded, the enterprise uses its own advantages, influence, and existing customer resources to promote and handle its own business, in order to improve the efficiency of its own operation. Third, after expanding the range of business, the enterprise can provide systemic sales services for

customers, thus reducing service costs. In addition, the expansion of business range and the increase of product variety are conducive to the adaptation of the enterprise to market changes and risk dispersion. At a certain scale, if the average operating cost of an enterprise with an expanded business scope is lower than that of another one without an expanded business scope, the enterprise has range efficiency, otherwise it does not.

(3) Technical efficiency and allocation efficiency mainly refer to the input-output ratio between total assets and fixed assets of an enterprise, reflecting the efficiency of the allocation of assets output.

(4) Profit efficiency, which refers to the representation of enterprise profit, is a comprehensive reflection of the business effect, and the specific embodiment of its final results. Profit efficiency indicates the extent to which the real profit achieved by the enterprise is close to the optimal profit, reflecting its ability to seek profits. The business goal of an enterprise is to resist risks and maximize profits. Therefore, when studying business efficiency, measuring profit efficiency can more accurately measure the status quo of its business.

2.6 Summary

This chapter focuses on the current research of domestic and foreign scholars on social capital, resource acquisition, innovation input and operational efficiency. In accordance with the research scope of this thesis, the theories of corporate social capital, RBV and new institutional economics are sorted out for subsequent hypotheses formulation. This thesis also defines other concepts involved, such as business operation efficiency, and analyzes the dimensions, ways and mechanisms of corporate social capital and resource acquisition, the composition of innovation input and the categories of business operation efficiency. This lays the foundation for subsequent hypotheses formulation and empirical analyses.

Chapter 3: Theoretical Framework and Research Hypotheses

3.1 Theoretical framework

Based on the perspective of the theory of new institutional economics, a complete system can help to stimulate the innovation activities and improve the operational efficiency of the enterprise. However, due to the imperfect policies and systems of the Chinese market, which is transforming and upgrading itself, social capital, a substitute for a formal system, often becomes the key to enterprise innovation and efficiency improvement as the enterprise is investing in innovation and improving operational efficiency. In addition, in the actual operation of the enterprise, resources also become one of the constraints for the innovation input and further development of the enterprise.

The constraints due to imperfect systems and resources are the biggest obstacles to enterprise innovation and development. Through literature review, it is found that corporate social capital can help to influence the daily operation and innovation activities of enterprises by acquiring more scarce resources. In this case, a selected sample of private enterprises in China's healthcare sector will be investigated so as to understand their social capital, resource acquisition, innovation input and operational efficiency, and analyze the effects of their resources on the operational efficiency and innovation activities in the context of China's institutional environment and industry competition. The theoretical framework of the study is shown in Figure 3.1.

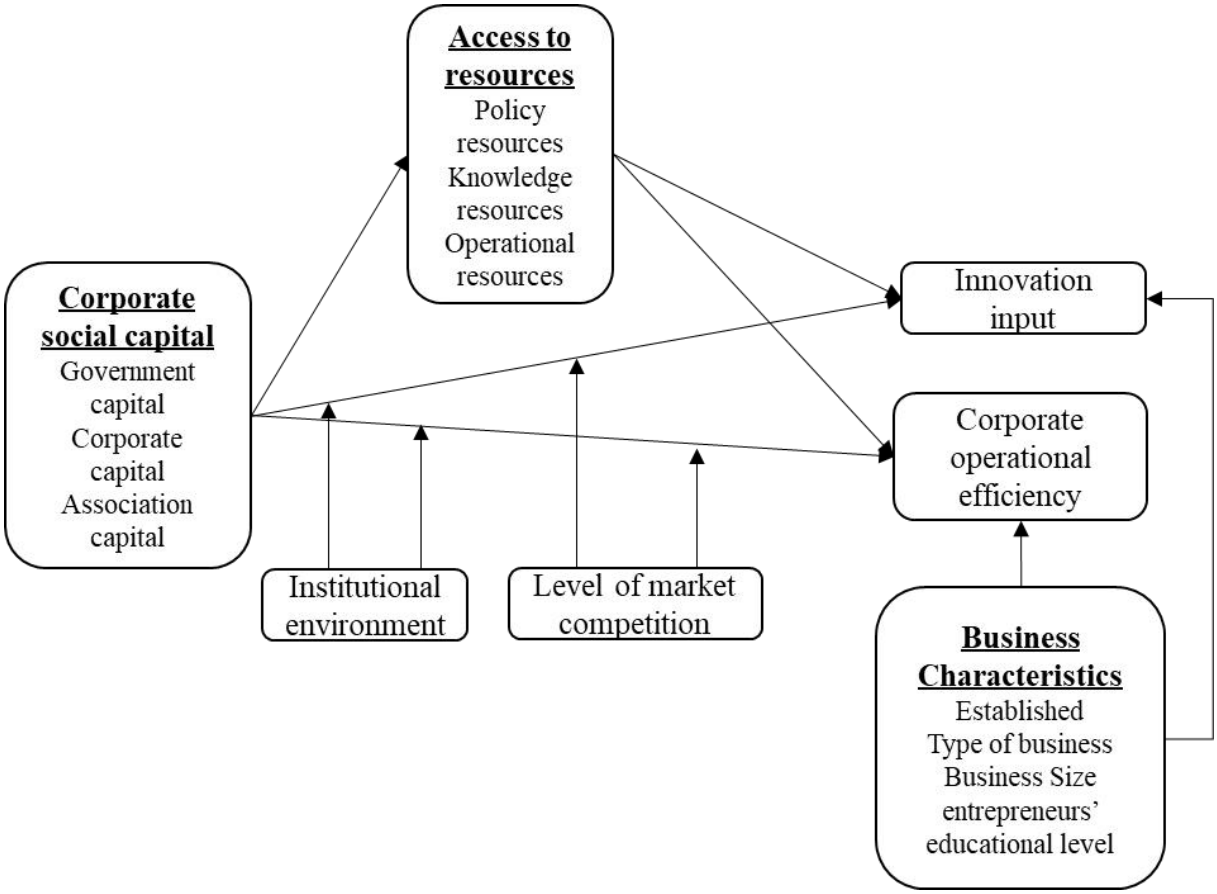

Figure 3.1 Theoretical Framework Diagram

Based on the above theoretical framework diagram, this research attempts to explain the influencing mechanisms between corporate social capital, resource acquisition, innovation input and corporate operating efficiency. First, what effect does the government, corporate and association social capital owned by enterprises have on their corporate innovation input and on operational efficiency? Second, what is the mediating role of resource acquisition in the relationship between social capital, corporate innovation input, and corporate operational efficiency? Third, what is the role of institutional environment and the intensity of market competition in regulating the relationship between social capital, innovation input, and corporate operational efficiency? Based on the above-mentioned influencing mechanisms, the study aims at shedding some light on Chinese enterprises facing an imperfect institutional environment alongside with industrial competition, in what concerns leveraging their diverse social capital to obtain the resources needed and contribute to decision-making in innovation input and operational efficiency improvement.

3.2 Research hypotheses

According to the above theoretical framework diagram, the core logic of this thesis is to study the relationship among social capital and resource acquisition, innovation input and operational efficiency of enterprises in China's healthcare sector. Based on the above impact mechanism, the thesis respectively proposes the hypotheses, including the mediating role of social capital, innovation input, corporate operational efficiency and resource acquisition in corporate social capital, innovation input and corporate operational efficiency, and how the external environment regulates the relationship among corporate social capital, innovation input and operational efficiency.

3.2.1 Social capital, innovation input and operational efficiency

(1) Social capital and innovation input

Whether for individuals or groups, China is a typical relation-based society. For individuals, people treat others differently according to the closeness of their relationship, presenting a "pattern of difference sequence". Through the closeness of relationship, entrepreneurs form a circle that is conducive to information sharing and cooperation for interests (X. M. Liu et al., 2015; Su et al., 2017). In this social background, it is an important development strategy for enterprises to establish a good relationship with the government and government officials who control scarce resources. In reality, enterprises, especially private enterprises, have been moving closer to the government since a growing number of private entrepreneurs have become NPC deputies or CPPCC members at all levels and have been actively involved in political processes (H. Li et al., 2006). The influence of political capital owned by the enterprise on its innovation can be traced back to Krueger's study of political connection in 1974. From the perspective of transaction costs, Kruger believes that enterprises can obtain greater benefits with lower cost by forming a relatively close implicit relationship with the government (Krueger, 1974). Since then, scholars in China and abroad have begun to study the influence on the enterprise of its relationship with the government. For instance, the enterprise may establish a political background by means of holding positions, donation and holding state-owned shares (Adhikari et al., 2006; Ding et al., 2015; D. S. Huang et al., 2018; Lu et al., 2012), in order to construct its own political organization network and obtain political resources or political protection for enterprise operation and development (Le & Zhang, 2018). However, the current literature has not formed a unified view on the

government social capital owned by enterprises and the resources used for innovation.

Many scholars believe that the establishment of political background requires certain rent-seeking costs and maintenance costs, which will increase the operating costs of the enterprise to some extent and produce a “resource curse” effect. Because of the occurrence of the resource curse effect, some scholars begin to study the negative effects of excessive political connections. For example, when studying the performance of private enterprises, Boubakri et al. (2008) found that enterprises with more political connections have worse performance; W. Wu et al. (2012) also found that excellent political and economic resources lead to excessive investment, lack of innovative power and excessive rent-seeking costs of enterprises. S. S. Liu et al. (2019) found that for private enterprises, political connections have a negative effect on their independent innovation, which means that enterprises with more government capital have less input in R&D and innovation. At the same time, they pointed out that in areas with higher marketization level, the innovation investment of private enterprises will be higher.

Some scholars also suggest that government social capital possessed by enterprises can help them to obtain more financial subsidies, tax discounts and financing advantages, which can promote the flexibility of their capital chain and increase R&D investment in innovation. At the same time, relying on the government can promise stable market orders and rich innovative economic resources, so the effects of the curse effect are less than the income obtained by relying on government capital (Xu & Li, 2016; Yuan et al., 2015; H. R. Zhang & Zhang, 2013). Li and Gao (2014) believe that government capital obtained by entrepreneurs through political connections can bring many resources to enterprises, such as credit support, industry access, tax preference and government subsidies, to support innovation activities. In other words, social capital possessed by entrepreneurs helps to promote innovative input. In addition, it can also help them to obtain resources including property rights protection and market orders (Guo, 2011; Liang & Feng, 2010). Z. Y. Wang et al. (2011) found that the existence of political background makes it more convenient for enterprises to get external financing, which promotes technological innovation. M. G. Yu and Zhong (2017) found that political connections promote enterprise innovation by making up for the defects of internal innovation resources. H. X. Wang and Wang (2019) found that political capital owned by enterprises will promote R&D investment, which is more obvious in private enterprises. Yang (2019) also supports the above view in her research, which stated that good political and business relationship have positive effects on enterprise innovation. Yan et al. (2019) researched the impact of different kinds of government social capital on corporate innovation

and found that government subsidies and tax incentives owned by enterprises can promote corporate innovation, but the effect of tax incentives is better than that of government subsidies. However, in the studies categorized by types of enterprise, these researchers found that for private enterprises, the effect of tax incentives on promoting innovation is greater than that of government subsidies, while for state-owned enterprises, the effect of government subsidies on promoting innovation is greater than that of tax incentives.

Corporate social and innovation input. Corporate social capital mainly refers to that embedded in external commercial networks (such as vendors, suppliers and other service intermediary organizations), and the trust and shared values gained in the reciprocal exchange between enterprises and these commercial networks (Peng & Luo, 2000).The general feature of the transition economy is the emphasis on informal private relations. Therefore, the business network relationships between enterprises are widespread in practice (X. Liu & Jiang, 2016). Business networks can help enterprises to obtain effective external resources and promote innovation, because if an enterprise has rich social networks, it is easy to form social norms that support cooperation and knowledge sharing, which can improve information processing ability and establish good relationships between enterprises and important stakeholders in the industry, and which is conducive to the understanding of the law of industry development, strategy and tactics, and professional techniques (Wang & Feng, 2018), thus promoting more innovation input (Gupta et al., 2020). In the study of the role of social relations of small and medium-sized enterprises (SMEs) on enterprise development, Gancarczyk and Gancarczyk (2018) proposed that the social capital established through the strategy of business network can enable enterprises, especially SMEs, to overcome the shortage of resources and achieve performance goals. Some scholars also suggest that the construction of business networks helps to attract the resources and capabilities of network members, increase their own innovation resources, and promote innovation (J. H. He & He, 2013; Perry-Smith & Mannucci, 2017). Generally speaking, the relationship between enterprises and suppliers provides effective information on the supply chain and high-quality raw materials and services, while the relationship between enterprises and customers enables to obtain first-hand information of customer demands, which is the direct driving force of innovation. Research shows that, relatively speaking, the influence of the business network of an enterprise is stronger than that of political network on enterprise exploratory innovation (Wang & Feng, 2018).

Overall, the effect of the business network of an enterprise on innovation is mainly reflected in the fact that the external business network can bring sustainable and stable

information and knowledge to enterprise innovation. Sheng and Hartono (2015) pointed out that the business network can bring important market information that is difficult to obtain from the external market, such as about product information, relevant information and events of market changes, and the credibility information of relevant partners. When studying the exploratory innovation of enterprises, Liu and Jiang (2016) found that the business network of an enterprise has significant positive effects. Some scholars have also found that a developed social network is helpful to alleviate financing constraint mechanisms, for a developed social network is conducive to reducing the problem of information asymmetry (Lukiyanto & Wijayaningtyas, 2020; Wu & Jin, 2020). As for organizational innovation, the most direct and main function of social capital lies in the benefits of the information and knowledge it provides. Hasan et al. (2020) used a sample of US companies and found that the corporate relationship network is conducive to improving the effectiveness of corporate research and development investment and has a positive impact on corporate innovation. For enterprises, corporate social capital is essentially the collection of social capital of entrepreneurs or senior managers, such as the members of the board of directors and the social network around them can significantly contribute to innovative activities. The impact of environmental uncertainties can be reduced by updating the directors on the immediate information about the trends of environmental events, as well as the information about the feasibility and potential of alternative research trajectories, thus reducing the riskiness of corporate innovation (Dalziel et al., 2011; Mintzberg et al., 1976). Directors of other enterprises are able to directly observe the decision-making process and sequence of the enterprise, thus enabling them to develop a more holistic view of aspects such as corporate strategy and management, so as to form innovative alternatives and solutions and reduce the uncertainties that exist in innovation activities (Beckman & Haunhschild, 2002; Kroll et al., 2007). In their study of the impact of social capital of the board on corporate innovation, Liu and Zhang (2021)found that close ties between board members and other corporate boards can improve the innovative performance of enterprises by reducing the complexity and uncertainty of innovative activities

Association social and innovation input. Industrial capital mainly refers to the social capital embedded in the industry network (including industry association and technology association), which covers technology and information obtained in commercial intercourse between enterprises and the associations of the same industry or some technology associations. As a kind of non-governmental organization, industry associations play an important role in market, technical specifications, and enterprise development. Being a cooperative network organization established among enterprises, industry associations increase the connection

between enterprises and the circulation of resources, which is conducive to the acquisition of innovative knowledge and resources, thus increasing enterprise innovation (S. Y. Chen et al., 2010; 2012). Association capital is the capital owned by enterprises or entrepreneurs by forming a certain relationship network with industry associations, and it is also an important part of corporate social capital. If the executives of the enterprise hold office in the industry association, the relationship formed through the employment network will help it to solve some problems that cannot be solved under the market mechanism or government regulation, and to obtain innovation resources from it, so as to promote technological innovation.

In recent years, the role of industry associations in national and enterprise innovation has gradually become a research focus. Through comparison of multinational cases, Pu (2017) found that industry associations or chambers of commerce function as public institutions and play an important role in leading and promoting, organizing and coordinating technological innovation, as well as supporting the construction of innovation infrastructure. By studying the role of industry associations on innovation in the UK, Andrew (2013) found that the current industry associations in the UK mainly promote innovation by building external environment, such as strengthening the close ties with incubators, technological parks and research institutions by establishing inter-enterprise networks. Andrew et al. (2015) found that industry associations play a mediating role in the construction of national innovation systems, especially in developing countries. In the research on the innovation of agricultural enterprises in China, P. Li et al. (2015) found that under the platform of industry associations, the innovation performance of agricultural enterprises is higher, which effectively promotes the coordinated development of innovation and the promotion of agricultural science and technology. When studying the effects of industry associations on patent innovation of enterprises, Yang (2018) found that industry associations have positive effects on patent innovation. In particular, compared with traditional industries, enterprises in strategic emerging industries can significantly increase the performance of patent innovation by joining industry associations. Senior managers such as directors are able to establish contacts with external partners through their own business connections. This allows enterprises to gain access to shared technology, opportunities and demands of the industry, and problems (H. L. Chen & Huang, 2006; Y. R. Chen et al., 2009; Oliver & Holzinger, 2008).

Based on the above discussion, the following hypotheses are proposed:

Hypothesis 1: Social capital owned by the enterprise positively affects the enterprise's investment in innovation, in which:

Hypothesis 1a: Government capital owned by enterprises positively affects enterprises'

investment in innovation.

Hypothesis 1b: Corporate capital owned by enterprises positively affects enterprises' investment in innovation.

Hypothesis 1c: The association capital owned by enterprises has positive effects on the innovation input of enterprises.

(2) Social capital and operational efficiency

On the one hand, the resources acquired by the enterprise through its own social capital will affect the innovation behavior of the enterprise. On the other hand, the resources acquired by the enterprise will also affect its daily operation, such as enterprise management, enterprise operation and other aspects that affect operational efficiency. Generally speaking, operational efficiency refers to the relationship between the input and output of an enterprise, and it is its comprehensive strength in terms of market competitiveness, management level, operational status, sustainable development ability, input-output ability and profitability (Liu, 2018). As the core issue of enterprise management, operational efficiency effectively measures the efficiency of the allocation and utilization of internal and external resources (Nan et al., 2015).

As detailed in previous sections, enterprises obtain the resources needed for their operation from the outside world through social capital, which may have a positive effect on enterprise operation. In terms of operational efficiency, the internal efficiency of an enterprise is determined by the extent to which it utilizes the resources it owns; giving full play to the potential of the resources it possesses is an effective way to improve internal business efficiency. In the case of institutional deficiencies, enterprises can only obtain the resources needed for operation through external social capital, in order to lay the foundation for improving operational efficiency. Some scholars propose that the capital owned by an enterprise has positive effects on its operational performance, especially on financial performance (Naidenova & Parshakov, 2013). Some Chinese scholars have also put forward that the social capital owned by an enterprise can effectively improve its operational efficiency. For example, H. Chen and Xu (2015) found that the knowledge capital owned by an enterprise has a positive role in promoting its operational efficiency. Specifically, the human capital of an enterprise directly affects and determines its efficiency in what concerns organizational action and organizational innovation, and its organizational adaptability.

The structural capital will increase the stock of knowledge assets and enhance the ability of independent innovation, while the relationship capital directly improves brand awareness and reputation and cultivates customer loyalty. Wan and Zhong (2018) propose that different

social capital will have different effects on the operational performance of enterprises, among which: (i) the institutional social capital (including the relationship capital between governments and enterprises, and the relationship capital between banks and enterprises) will have negative effects on the operational efficiency of enterprises; while (ii) the market social capital (including the relationship capital with suppliers and customers, and the relationship capital of cooperation and competition) will have positive effects on operational efficiency.

Based on the above discussion, the following hypotheses are proposed:

Hypothesis 2: The social capital owned by the enterprise positively affects the efficiency of its operations.

Hypothesis 2a: The government capital owned by the enterprise positively affects corporate operational efficiency.

Hypothesis 2b: The corporate capital owned by the enterprise positively affects corporate operational efficiency.

Hypothesis 2c: The association capital owned by the enterprise positively affects corporate operational efficiency.

3.2.2 The mediating role of resource acquisition

The innovation activities and operational activities of an enterprise can not only enable the integration of internal resources, but also enable obtaining resources from outside. As for the influence path of the capital owned by the enterprise on innovation input, on the one hand, it lies in the direct influence of corporate social capital on the innovation input, and on the other hand, it helps to obtain the resources needed for innovation and operation so as to promote operational performance.

First, in what concerns the role of resource acquisition in corporate social capital and innovation input, the social capital formed by senior managers and external stakeholders determines the level of an enterprise's access to relevant information, knowledge and capital and other resources, and then affects innovation (Z. H. Li et al., 2017; F. P. Ma & Li, 2011). Sun (2011) found that corporate social capital has positive effects on the resource acquisition of the enterprise, which in turn has positive effects on technological innovation and performance and plays a mediating role in the positive effects of corporate social capital in the performance of enterprise technological innovation. When studying the relationship between social network and the operational performance of entrepreneurial enterprises, J. Zhang et al. (2015) found that social networks have significant positive effects on operational performance by influencing its resource acquisition.

When studying the effects of the social capital of senior management team on the enterprise ability for open innovation, S. L. Sun et al. (2017) found that the internal and external social capital of the senior management team can improve innovation ability through the acquisition and effective integration of enterprise resources. Political connections promote enterprise innovation by making up for the defects of internal innovation resources (Yu & Zhong, 2017). J. Wang and Feng (2018) also proposed that business networks can help enterprises obtain effective external resources and promote innovation. Other scholars put forward that different type of social capital can obtain different resources. For example, Wan (2020) studied the influence of social capital on corporate innovation under the condition of family involvement and found that both family and non-family social capital help companies acquire complementary resources and jointly have a positive impact on business innovation.

Secondly, in what concerns the role of resource acquisition in corporate social capital and operational efficiency, Q. X. Wang and Bao (2007) found that resource acquisition plays a progressive positive role between social network of small business owners and firm growth. In turn, Guo and Chen (2015) also found that the effects of resource acquisition play a part of mediating role between new social networks and traditional social network and entrepreneurial performance. In an empirical study, Shang (2015) found that the resource acquisition of knowledge, capital and information play a mediating role between social capital and corporate performance.

Based on the above discussion, the following hypotheses are proposed:

Hypothesis 3: Access to resource acquisition mediates the relationship between enterprises' social capital and innovation input.

Hypothesis 4: Access to resource acquisition plays a mediating role between corporate social capital and operational efficiency.

3.2.3 The regulatory role of the external environment

The social capital with the government, with other organizations and associations that enterprises have will motivate them to invest in innovation and improve operational efficiency. The logic is that the social capital with which enterprises have access to the resources they need reduces risks in terms of innovation investment, which plays a certain role in promoting innovative activities. However, the extent of this effect also depends on the effective allocation of these resources. Only when the external resources are reasonably and effectively allocated to each link of innovation, can the promotion role of these resources on operational efficiency and the decision-making of innovation input be brought into full play. However,

how to allocate these resources is largely affected by the internal and external environment faced by the enterprise, especially the external environment (such as the system environment and the competition degree of the industry). Actually, the institutional environment and the competition degree of the industry will affect the number of resources the enterprise obtains from the external environment, and then the relationship between resource acquisition and innovation input will be adjusted (Dyck and Zingales, 2004; F. P. Ma and Li, 2011; S. T. Li and Qiu, 2015).

As discussed in Chapter 2, according to the theory of new institutional economics, the institutional environment is an aggregate of a series of customs, laws and regulations used to restrict social and economic activities (production, exchange, and distribution). To a certain extent, the institutional environment regulates and defines the space of the activities of the subjects of micro behavior, so as to better realize the behavioral constraints and incentives (Shao, 2015). The innovation and development of enterprises cannot be separated from a good institutional environment. Cao et al. (2014) pointed out that innovation input is positively related to the help of intermediary organizations including industry associations and accounting firms. A good legal systemic environment can not only protect the R&D and innovation activities of enterprises (S. B. Zhang & Liu, 2017), but also provide legitimate support and legal guarantee for entrepreneurs to obtain geographic capital, literacy capital and cognitive capital to help enterprises obtain the required resources, which can promote enterprise innovation and increase innovation input. Meanwhile, enterprise operation and development are closely related to the improvement of the institutional environment in what concerns laws and regulations. In the operational process, enterprises need to abide by various laws and regulations, and those enterprises that violate them are bound to fail to maintain their operation (Zou & Dong, 2015).

Based on the above discussion, the following hypotheses are proposed:

Hypothesis 5: The institutional environment positively moderates the relationship between enterprises' social capital and innovation input.

Hypothesis 6: The institutional environment positively moderates the relationship between enterprises' social capital and enterprise operational efficiency.

Market competition plays an important role in resource allocation and has a significant impact on the resources that enterprises obtain externally through social capital and the effectiveness of resource utilization. If we consider the impact of social capital on enterprises' investment in innovation and operational efficiency without taking market competition into account, the results achieved can hardly be applicable to the complex market environment.

Therefore, this thesis incorporates the degree of market competition into the model of “social capital-innovation investment and enterprise operational efficiency” to test the moderating effect of the degree of market competition on the above influence path. The Schumpeterian effect suggests that intense market competition will have a negative impact on innovation activities of enterprises. It is believed that a highly competitive external environment will make enterprises' profit rate worsen, and enterprises will have less incentive to innovate when the afterward rent they receive for innovation is reduced. However, the "escape effect" argues that competition increases the intensity of innovation activities by enterprises. Inventors are most motivated to innovate under a perfectly competitive market because of the greater expected benefits of process innovation (mainly in the form of lower costs) than that in a monopolistic market. In a monopolistic market, since there are no competitors, the result of innovation is equivalent to self-substitution of existing products, and thus enterprises in a monopolistic market environment tend to be satisfied with the status quo and are characterized by insufficient technological innovation. Conversely, in a perfectly competitive market, enterprises will actively engage in developing new products and applying new technologies to escape the brutal price competition through innovative activities.

According to S. J. Zhu et al. (2017), based on the "Schumpeter effect" and the "escape effect" (which affects the innovation activities of enterprises through profits), as the resources acquired by enterprises through social capital will affect the expected effect, it will also change with market competition. Scholars such as S. J. Zhu et al. (2017) believe that at the early stage of industrial development, the overall level of competition within the industry is low, and the profits brought by innovation enable enterprises to gain extra profits, showing the "escape effect", while in the late stage of industrial development, the benefits of innovation decrease, and enterprises will invest less in innovation, showing the “Schumpeter effect”. J. Sun and Li (2018) believed that the relationship between market competition and enterprise technological innovation is related to the degree of market competition. They found that there is an “inverted U-shaped” relation between market competition and enterprise technological innovation and development, that is, within a moderate interval, market competition will improve the enthusiasm of enterprises and their ability to innovate, which promotes development. But when the threshold is exceeded, excessive market competition will aggravate the R&D risks and discourage enterprises them from carrying out innovation activities.

The level of regional financial economic development in China plays a catalytic role in improving the level of R&D expenditure (Xie & Fang, 2011). For example, Liu et al. (2019)

found that the level of marketization has a positive effect on promoting private enterprises' innovation, that is, the higher the level of marketization, the higher the investment of private enterprises in innovation. This is because the more liberal the economic environment in which enterprises are located is, the more intense and fairer the competition among enterprises will be, and enterprises are more willing to accelerate their innovation and form their core competitiveness.

However, when the fierce competition threatens the survival of enterprises, they tend to adopt conservative business strategies and reduce their investment in innovation because continuous investment in R&D may cause trouble (He et al., 2017). In a strongly competitive market environment, the transaction costs of enterprises increase, thus reducing their willingness to conduct technological R&D. Aghion and Howitt (1992) believe that market competition may have a negative impact on enterprise performance. This is because for most enterprises, expanding production and seeking technological breakthroughs are their development priorities at present. However, if these enterprises face a particularly competitive market environment, they will be under more pressure to make R&D investments in the current period, which in turn will be detrimental to the improvement of enterprise performance. Through an empirical study, Tang (2021) finds that the more competitive the market is, the greater the financing risk and the cost pressure that enterprises face will be. X. Y. Zhang and Chen (2021) also finds in their study of the impact of government subsidies on enterprises' technological innovation that market competition negatively regulates the impact of government subsidies on enterprises' technological innovation, and market competition weakens the impact of government subsidies on enterprises' technological innovation activities.

Accordingly, the following hypotheses are proposed:

Hypothesis 7: The degree of market competition negatively moderates the relationship between enterprises’ social capital and innovation input.

Hypothesis 8: The degree of market competition negatively moderates the relationship between social capital and enterprise operational efficiency.

Based on the above assumptions, the theoretical framework of this thesis is further demonstrated as follows:

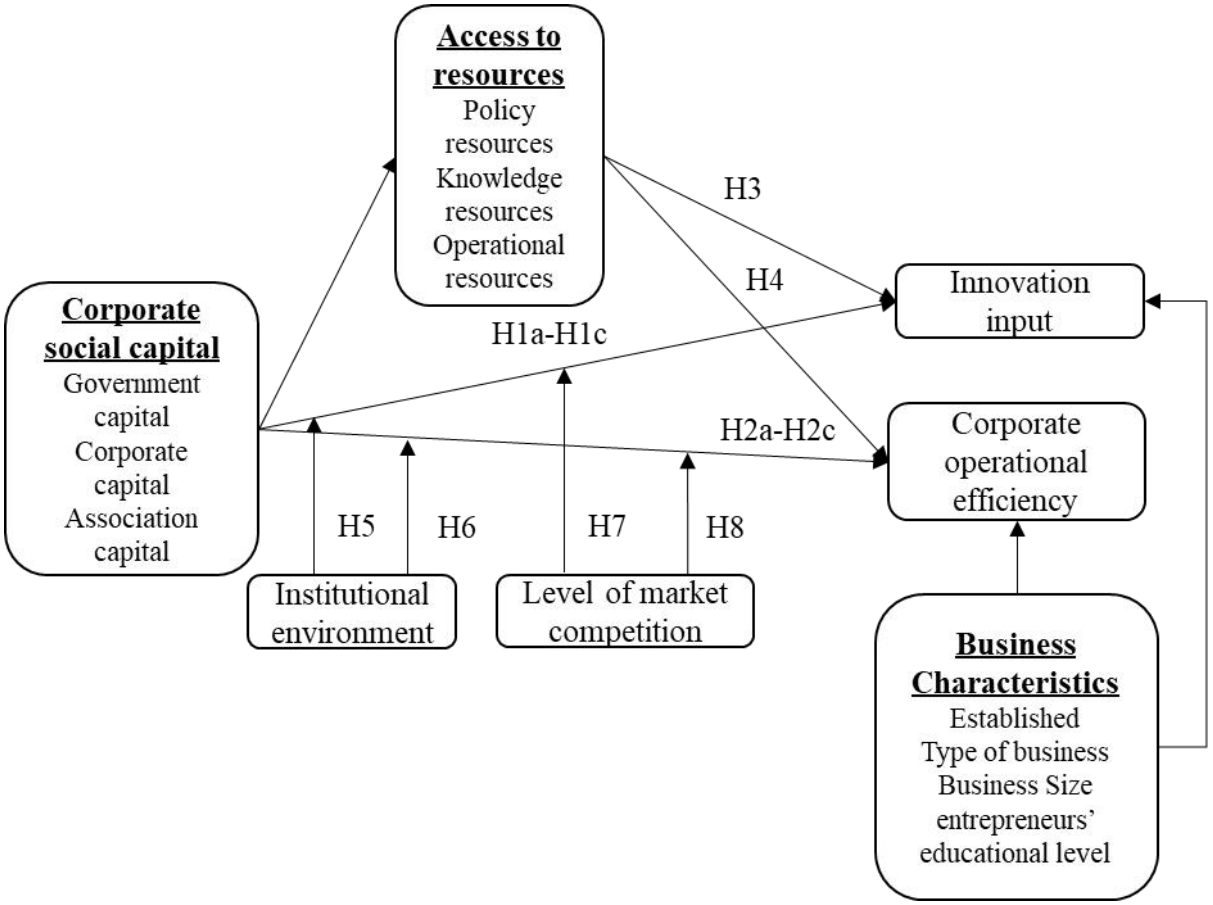

Figure 3.2 Theoretical framework diagram based on research hypotheses

3.3 Summary of this chapter

This chapter constructs a research framework and research hypotheses based on the research questions. The research framework of this thesis aims to understand the social capital owned by enterprises in China's healthcare sector, the access to resources, investments in innovation and business efficiency, and to analyze the impact of the resources owned by enterprises on their operational efficiency and innovation activities in China's institutional environment and the scenario of industrial competition. The hypotheses are proposed after sorting out relevant theories and literature. Hypothesis 1 proposes that the social capital owned by enterprises positively affects their investments in innovation. Hypothesis 2 proposes that the social capital owned by enterprises positively affects their operational efficiency. Hypothesis 3 proposes that the access to resources plays a mediating role between enterprises' social capital and investments in innovation. Hypothesis 4 proposes that resource acquisition plays a mediating role between social capital and the operational efficiency of an enterprise. Hypotheses 5 and 6 propose that the institutional environment positively moderates the relationship between

social capital, the investments in innovation and the operational efficiency of an enterprise respectively. In turn, hypotheses 7 and 8 propose that market competition negatively moderates the relationship between social capital and the investment in innovation and the operational efficiency of an enterprise, respectively. The above hypotheses provide the basis for subsequent empirical research and are represented in Figure 3.2 above.

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Chapter 4: Research Design and Questionnaire Survey

4.1 Research design

The research object of this thesis is private enterprises in China's healthcare sector. Considering that the variable scale is designed on the basis of existing research and combined with the specific problems of this study, there is no relevant database or other public information, so the required data could not be obtained from the above two channels. Given this situation, the relevant data in this study will be collected by questionnaire. Questionnaire survey is one of the important methods and tools to conduct empirical research. Its advantages are convenience and efficiency, which help to save time and effort. The most important thing is that the data that can be obtained actively is more detailed and reliable than the second-hand data and is more pertinent to the research topic.

Before the formal survey, by reading Chinese and foreign literature, this thesis preliminarily determined the test items of various variables to be measured: social capital, resource acquisition, institutional environment, market competition degree, innovation input, operational efficiency. In order to verify the hypotheses and the rationality of each item, this thesis conducted in-depth interviews with experts and scholars in the field of corporate service management and management on the overall design of the questionnaire. Finally, the interview content was summarized, and the item settings in the questionnaire were revised and adjusted to form the initial questionnaire.

Whether the design of the questionnaire is logical, and whether the selection of measurement items in the scale is appropriate, will directly affect the results of the empirical survey. Li (2004) believes that the questionnaire design should pay attention to the following four levels, namely the theoretical conception and purpose of the questionnaire, the format, the sentences, and the questionnaire words. When designing the questionnaire, it is necessary to determine the specific content and subscale composition according to the ultimate purpose of the questionnaire design; the questionnaire should not use complex, unclear or introductory sentences as much as possible, and at the sentence level, it is important to ensure that the wording of the item is accurate and clear, thus avoiding multiple meanings or implicit assumptions as much as possible; concise and clear words should be chosen and attention

should also be paid to controlling the interviewees' response bias.

There are eight basic steps to compile the scales, including determining the content to be measured, establishing the item database, determining the measurement mode, professionally reviewing the initial item database, confirming the inclusion of the items, pre-testing the items, obtaining the measured value, and optimizing the scale length. Therefore, in the process of designing the scale, this thesis carefully implemented the following steps:

First, in order to determine the content to be measured and establish the item database, this thesis put forward a preliminary measurement index system by combing past literature and combining with the author's own work experience. Through combing domestic and foreign related literature on corporate social capital, resource acquisition, institutional environment, market competition, corporate innovation input, and corporate operational efficiency as per Chapters 2 and 3, relevant measurement indicators were used for reference. At the same time, referring to the actual situation of the development of enterprises in China's healthcare sector, this thesis selected a measurement scale that has been repeatedly used by different researchers, has proved to have high reliability and validity, and is widely recognized as authoritative by the academic community.

In addition, supervisor were consulted to further improve the questionnaire items. After forming the preliminary questionnaire items, the author asked the instructor to make targeted amendments to the questionnaire under the guidance of the instructor, focusing on correcting the unclear expressions and inaccurate sentences of some items. After clarifying the logical relationship among the items, the item settings in the questionnaire were revised and adjusted, and the survey questionnaire was finally confirmed.

The questionnaire in this thesis is mainly divided into three parts. The first part is the situation of enterprise investors; the second part is the situation of the enterprise, including corporate social capital, resource acquisition, innovation input, technological innovation ability, and corporate operational efficiency; the third part is the development environment of the enterprise. The second and third parts are also where the scales of this thesis are located. The relevant measurement indicators are explained in detail in Section 4.2 "Variable Measurement". This study used the 7-point Likert scale, with 7 points for strongly agree and 1 for strongly disagree. With 7-point Likert scale as the basis for weight distribution, the higher the score, the higher the degree of agreement with the item; conversely, the lower the score, the lower the degree of agreement with the item.

The meaning of each value is as follows:

1: strongly disagree; 2: disagree; 3: slightly disagree; 4: neither agree nor disagree; 5:

slightly agree; 6: agree; 7: strongly agree.

4.2 Variable measurement

Before the questionnaire is distributed, the measurement methods of all variables involved in this thesis should be clarified first. The measurement methods of independent variables, dependent variables, mediating variables and moderator variables involved are described below.

4.2.1 Independent variable

The focus of this thesis is the impact mechanism of corporate social capital in China's healthcare sector on corporate innovation input and operational efficiency. According to the foregoing, the independent variable of this thesis is social capital, which covers the three main types of social capital that enterprises may have: government capital, corporate capital, and association capital.

Nahapiet and Ghoshal (1998) saw social capital as a resource embedded in the enterprise that individuals or social units can acquire from their relationship network. Chinese scholar Zhou (2002) believes that social capital is a kind of resource embedded in the social structure or social relations, existing in various forms such as trust, norms, and network. H. L. Lv and Zhao (2017) pointed out that the essence of corporate social network is to obtain various resources that are conducive to the development of the enterprise by integrating its network. From the perspective of the external relationship network faced by Chinese enterprises, the measurement of corporate social capital in this thesis is divided into government capital, corporate capital, and association capital according to different relationship networks as explained in Chapter 2 and 3. Previous scholars' measurement items of the three types of social capital are as shown in Table 4.1 and 4.2:

Table 4.1 Measurement items of corporate social capital

Variables	Scholars	Measurement items
Government capital	Peng and Luo, 2000	Connections with personnel from relevant government departments
	M. G. Yu et al., 2010	Whether the general manager, chairman or director is or has served as a local government official or Communist Party cadre
	S. Y. Chen et al., 2012	Whether the private entrepreneur is a NPC deputy or CPPCC member
	Li and Gao, 2014	Whether the entrepreneur has government service experience
	Lin, 2018	Extensive contact with government or industry officials at all levels
	J. Zhu et al., 2019	Past or current status of the director as the NPC deputy or CPPCC member; Past status of the director served in government departments
	X. X. Ma and Lu, 2019	Currently or once served as the government official, CPPCC member, or NPC deputy at the central, provincial, municipal, county, district, and township levels
	Wei and Li, 2020	The core executives of the enterprise have served in government departments; The core executives of the enterprise are NPC deputies or CPPCC members at the municipal level and above
Corporate capital	Peng and Luo, 2000	Connections with other enterprise executives
	Lin, 2018	Extensive contact with customers, suppliers, competitors or other enterprise executives
	J. Zhu et al., 2019	The situation where the director concurrently serves as an external director
	X. X. Ma and Lu, 2019	Professional background in production, R&D, design, human resources, management, marketing, finance, finance and law; Overseas employment experience; Part-time job situation
	X. X. Ma and Lu, 2019	The core executives of the enterprise have served or are still in banking, securities, funds and other industries; The core executives of the enterprise have served in other enterprises
Association capital	S. Y. Chen et al., 2012	Whether private entrepreneurs participate in industry guilds, industry chambers of commerce or industry associations
	Li and Gao, 2014	Once or now qualified to hold a position in an industry technical association
	Long et al., 2019	Organizational trust in the association and the sense of belonging of the association
	Zhao, 2019	Corporate executives' employment status in commerce and industry associations

Based on previous scholars' research, this study designed the measurement items of government capital, corporate capital and association capital owned by enterprises as follows:

Table 4.2 Measurement items of corporate social capital in this thesis

Variables	Items
Government capital	I or my enterprise has extensive contacts with officials from the competent government departments of the industry
	Extensive contacts with officials from other government departments
	Extensive contacts with members of relevant Party organizations
	Extensive contacts with members of the CPPCC or NPC
Corporate capital	Extensive contacts with the executives of suppliers
	Extensive contacts with the executives of competitors
	Increased interaction with customers
	Extensive contacts with executives of other enterprises
Association capital	Extensive contacts with members of the Federation of Industry and Commerce
	Extensive contacts with members of this industry association
	Extensive contacts with members of relevant technology industry associations
	Extensive contacts with members of other industry associations

4.2.2 Dependent variables

According to the foregoing, the dependent variables of this thesis are corporate innovation input and corporate operational efficiency. Based on different specific innovation paths, corporate innovation input covers various behaviors and operating methods. In addition to independent innovation on research and development, it also includes the introduction of new technologies, new products and services, or various methods suitable for mutual cooperation, linkage innovation, and cluster innovation. Previous scholars' measurement items on corporate innovation input are as follows (Table 4.3):

Table 4.3 Measurement items of innovation input and corporate operational efficiency

Variables	Scholars	Measurement items
Innovation input	M. Y. Li and Yan, 2019	Ratio of enterprise research and development expenditure to operating income
	J. Zhu et al., 2019	Proportion of research and development expenditure to total assets
	Wei, 2019	Research and development capital investment; research and development manpower investment
	Liu et al., 2019	Ratio of enterprise research and development expenditure to operating income; the number of patent applications
	R. P. Yang and Li, 2021	Proportion of research and development expenditure to operating income; proportion of research and development investment to total assets
Corporate operational efficiency	Fu et al., 2006	Main business income, net assets per share, total assets per share, return on total assets, return on equity, net profit after tax
	Nan et al., 2015	Inventory turnover, asset turnover, cash turnover, working capital turnover
	Guan and Tang, 2018	Current assets turnover, non-current assets turnover, total assets turnover

Based on previous scholars' research, in order to study corporate innovation input and operational efficiency more comprehensively, this thesis designed the measurement items of corporate innovation input and corporate operational efficiency as follows (Table 4.4):

Table 4.4 Measurement items of innovation input and corporate operational efficiency in this thesis

Variables	Items
Innovation input	More research and development funds invested
	More research and development staff
	More investment in new technology development
	More investment in new product research and development
Corporate operational efficiency	Growth speed of enterprise operating income
	Development speed of enterprise new products or services
	Growth speed of enterprise product market share
	Acceleration degree of enterprise capital turnover speed

4.2.3 Mediating variable

According to the foregoing, the mediating variable considered in this thesis is resource acquisition. Wernerfelt (1995) and Greene et al. (2001) believe that corporate resource acquisition is a process in which enterprises use multiple channels to obtain the required resources on the basis of identifying, confirming, and analyzing resources. Scholars such as Foss (1997) believe that corporate resource acquisition refers to the efficiency of the enterprise acquisition of key resources and the impact of the acquired key resources on its development. Previous scholars' measurement items on corporate resource acquisition are as follows (Table 4.5):

Table 4.5 Measurement item of resource acquisition

Variables	Scholars	Measurement items
Resource acquisition	Zhang, 2006	Capital acquisition (government funding or tax incentives, loans from financial institutions, venture investment, and funds obtained through technical cooperation); Knowledge acquisition (market development knowledge, technology research and development knowledge, and innovation management knowledge); Information acquisition (market demand information, technical information, and policy information)
	X. M. Zhu and Fei, 2010	Knowledge acquisition (from outside, enterprises can acquire the technical knowledge and skills, new product/service development knowledge and skills, marketing knowledge and skills, customer service knowledge and skills, management knowledge and skills, and the knowledge and skills for developing new markets); Operational resource acquisition (enterprises can acquire the required resource plants, installations, equipment, technical resources, capital, and human resources at a lower cost)

Variables	Scholars	Measurement items
	Shang, 2015	Capital resource acquisition (enterprises can acquire timely scientific and technological funds from the government and competent departments, reduce the financial burden through cooperative research and development with other enterprises, obtain various financial loans, financial assistance and investment from outside, and timely gain technological innovation subsidies or tax incentives); Knowledge resource acquisition (from outside, enterprises can acquire the technical knowledge and skills, new product/service development knowledge and skills, marketing knowledge and skills, customer service knowledge and skills, management knowledge and skills, and the knowledge and skills for developing new markets); Information resource acquisition (enterprises can acquire timely market information, technological development information, dynamic information of stakeholders, and macro policy information)

Given the research perspective of this thesis, corporate resource acquisition refers to the resources that are beneficial for enterprises to have more innovation input and improve operational efficiency, which can be divided into policy resources, knowledge resources and operational resources. This thesis designed the measurement items for resource acquisition as follows (Table 4.6):

Table 4.6 Measurement items of resource acquisition in this thesis

Variables	Items
Policy resources	Compared with other enterprises in the same industry, we acquire more financial subsidies from the government
	My enterprise has acquired favorable loan policy support
	My enterprise has acquired favorable tax incentive support
	My enterprise has acquired information support from the government
	My enterprise has acquired market opportunities with the support of the government
Knowledge resources	Acquiring the information and skills needed for new products and services from outside
	Acquiring the information and skills needed for enterprise operation and management from outside
	Acquiring the information and skills needed for enterprise operation from outside
	Acquiring the information and skills needed for enterprise marketing from outside
Operational resources	Compared with other enterprises in the same industry, my enterprise can acquire the operating capital needed by the enterprise at a lower cost
	Compared with other enterprises in the same industry, my enterprise can acquire more plants and equipment at a lower cost
	Compared with other enterprises in the same industry, my enterprise can acquire more technical resources at a lower cost
	Compared with other enterprises in the same industry, my enterprise can acquire labor resources at a lower cost

4.2.4 Moderating variables

According to the foregoing, the institutional environment and industry competition faced by enterprises can affect how much of the resources the enterprise acquires from the outside are allocated for innovation, which in turn will adjust the relationship between resource acquisition and innovation input. The moderator variables of this thesis are the institutional environment and the competition degree of market competition. With reference to the measurement method of Zou and Gao (2019) with regard to the institutional environment, the enterprises surveyed in this thesis also span regions due to the regional characteristics of the institutional environment. Therefore, the economic environment they face is differentiated according to provinces. The institutional environment data of each province came from the *2020 Report of China's Provincial Enterprise Operating Environment Index* (Z. Y. Wang et al., 2020). For the competition degree of market competition faced by enterprises, the measurement items used are as follows (Table 4.7):

Table 4.7 Measurement items of the competition degree of market in this thesis

Variables	Items
The competition degree of market	The market competition for my enterprise development in the past two years is very fierce

The control variables in this thesis include the establishment time, type and scale of enterprises and entrepreneurs' educational level.

4.3 Formation and distribution of the pre-survey questionnaire

In the process of designing the questionnaire, after combing out the variable items based on the literature, industry experts and professors were consulted, after which items were deleted and/or supplemented, and the wording was revised. After that, entrepreneurs familiar with the topic under study were enquired to further improve and optimize the expressions of the questionnaire.

After the formal questionnaire was completed, the author tried to distribute survey questionnaires and collected them. The research objects of this thesis are directors, managers and other senior management personnel of enterprises. Under the premise of limiting the positions of the research objects, the author distributed pre-survey questionnaires in June 2021, and finally collected 100 valid copies. The purpose of the pre-survey was to test the reliability and validity of the questionnaire before administering the final one to a larger

sample. Cronbach's alpha coefficient, KMO, Bartlett Test of Sphericity and factor analysis were used to test the reliability and validity of the collected results by using SPSS for statistical analysis.

4.4 Pre-survey data analysis

The main purpose of the pre-survey is to test the reliability and validity of the initial questionnaire items, whether the respondents' reaction deviation to the relevant items can be controlled, and whether there are items with multiple meanings or guiding questions, so that the researchers can further revise and streamline the questionnaire, and obtain the questionnaire that will eventually be applied to the formal survey (Li, 2004). According to the suggestions of previous scholars, the main indicator that can be used to test the reliability and validity of items in SPSS statistical analysis software is the Cronbach's alpha coefficient, which is widely used to measure the reliability of internal consistency in the measurement of pedagogy and psychology. The value of Cronbach's alpha coefficient ranges from 0 to 1. The closer the result is to 1, the better the internal consistency is; otherwise, the worse the internal consistency is. In research, it is generally required that the value of Cronbach's alpha coefficient is at least greater than 0.7 in order to show that the reliability and validity of the scale is reliable. In addition, before performing factor analysis on the obtained data, KMO (Kaiser-Meyer-Olkin) test and Bartlett Test of Sphericity are required to determine whether the data is suitable for factor analysis. The KMO statistic takes a value between 0 and 1. The closer the KMO value is to 1, the stronger the relationship among the variables is, and the more suitable the original variables are for factor analysis; on the contrary, the less suitable the original variables are for factor analysis. The result of Bartlett Test of Sphericity is relatively large, and its corresponding associated probability value is less than a specific significance level, then the null hypothesis should be rejected, and the relationship coefficient cannot be a unit matrix, that is, there is a relationship between the original variables, which is suitable for factor analysis (Gao & Dong, 2007). In general, the KMO value should be at least greater than 0.7, and the significance of the Chi-square value of Bartlett Test of Sphericity should be as small as possible.

4.4.1 Test conclusion of the dependent variable scale

The first step is to conduct a reliability test on the collected sample data of each item in the scale of corporate innovation input and operational efficiency according to the conventional

process. The Cronbach's alpha coefficient of the innovation input is 0.878, and that of the corporate operational efficiency is 0.852 (The test results are shown in Table b1 in Annex B) as shown in the following table.

The second step is to verify whether the corporate innovation input and operational efficiency can be tested by factor analysis. The results of KMO test and Bartlett Test of Sphericity on the data are shown in the table below. As can be seen from the table, the KMO value of corporate innovation input and operational efficiency is 0.844 (The test results are shown in Table b2 in Annex B); the result of Bartlett Test of Sphericity has passed the significance test; the KMO test value is within the reference range of a good level; and the significance probability of Bartlett Test of Sphericity is less than the standard of 0.01. Therefore, the survey data of this scale is suitable for factor analysis.

The above results show that the scale of corporate innovation input and operational efficiency in this thesis has good reliability and construct validity of internal consistency and can be used for the measurement of formal large samples.

4.4.2 Test conclusion of the independent variable scale

The first step is to conduct a reliability test on the collected sample data of each item in the scale of government capital, corporate capital, and association capital in corporate social capital according to the conventional process. The Cronbach's alpha coefficient of the government capital, corporate capital, and association capital is 0.860, 0.719, 0.828 (the test results are shown in Table b3 in Annex B).

The second step is to verify whether the corporate social capital can be tested by factor analysis. The results of KMO test and Bartlett Test of Sphericity on the data are shown in the table below. As can be seen from the table, the KMO value of corporate social capital is 0.741 (The test results are shown in Table b4 in Annex B); the result of Bartlett Test of Sphericity has passed the significance test; the KMO test value is within the reference range of a good level; and the significance probability of Bartlett Test of Sphericity is less than the standard of 0.01. Therefore, the survey data of this scale is suitable for factor analysis.

The above results show that the scale of corporate social capital in this thesis has good reliability and construct validity of internal consistency and can be used for the measurement of formal large samples.

4.4.3 Test conclusion of the intermediary variable scale

The first step is to conduct a reliability test on the collected sample data of each item in the scale of policy resources, knowledge resources, and operational resources in resource acquisition according to the conventional process. The Cronbach's alpha coefficient of the policy resources, knowledge resources, and operational resources is 0.813, 0.757,0.844 respectively (the test results are shown in Table b5 in Annex B).

The second step is to verify whether the corporate resource acquisition can be tested by factor analysis. The results of KMO test and Bartlett Test of Sphericity on the data are shown in the table below. As can be seen from the table, the KMO value of corporate resource acquisition is 0.802 (The test results are shown in Table b6 in Annex B); the result of Bartlett Test of Sphericity has passed the significance test; the KMO test value is within the reference range of a good level; and the significance probability of Bartlett Test of Sphericity is less than the standard of 0.01. Therefore, the survey data of this scale is suitable for factor analysis.

The above results show that the scale of corporate resource acquisition in this thesis has good reliability and construct validity of internal consistency and can be used for the measurement of formal large samples.

Based on the survey results and feedback, the relevant expressions of the questionnaire were further revised and improved, and a formal survey was then formed. In general, the design of the questionnaire and the selection of measurement items were reasonable. According to the survey results, the initial questionnaire was further deleted and revised, and the formal questionnaire of this thesis was determined. The main process of questionnaire formation is shown in the Figure 4.1:

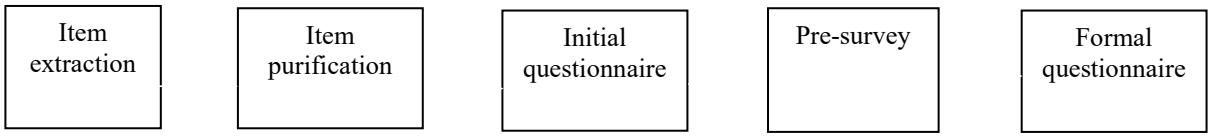

Figure 4.1 Design process of the formal questionnaire

4.5 Formal questionnaire survey

Through the above-mentioned pre-survey data analysis, the author found that the pre-survey questionnaire has good reliability and validity, all within the corresponding range, and can be used for formal survey. This thesis studies how corporate social capital in China's healthcare sector affects corporate innovation input and operational efficiency. In a typical "relational"

society, the social capital of Chinese enterprises is mainly the capital brought by the “circle” of senior managers of enterprises. Therefore, the research subjects of this thesis are mainly directors, managers, or other senior management personnel of enterprises in China’s healthcare sector. In order to ensure that comprehensive and reliable data could be obtained during the survey, the author avoided the pre-survey enterprises in the formal survey. To further improve the validity of the questionnaire, all items are required to be filled in except for those that do not need to be filled in. In February 2022, a total of 550 questionnaires were sent out, which was limited to the healthcare sector, and 211 valid ones were received, with a recovery rate of 38.36%. To guarantee the validity of the questionnaire, the author used some trap questions (namely, some dichotomous questions or questions with socially desirability), checked the collected questionnaires one by one. Questionnaires answered incorrectly or those with inconsistent answers to the same questions were directly judged to be invalid. The answer sheets filled in at abnormal time, logically inconsistent, with the same option for all questions, or obviously filled out incorrectly were also marked as being invalid.

4.6 Summary

Based on the research framework of chapter 3, this chapter adopted the questionnaire survey. According to the definition of the above concepts and the scope of the research, the independent variable, dependent variable, mediating variable, and moderator variables of the research were determined. On the basis of the previous literature review, this thesis draw lessons from domestic and foreign measurement items on corporate social capital (including government capital, corporate capital, and association capital), resource acquisition (including policy resources, knowledge resources, and operational resources), innovation input, corporate operational efficiency, institutional environment, and the competition degree of market, and thus carried out the pre-survey and the formal survey. The pre-survey questionnaire of this study was modified after interviews with experts, professors, and entrepreneurs on the basis of previous literature. The distributed questionnaires clarified that the respondents were directors, general managers, and other senior management personnel of enterprises. In the reliability and validity tests, the author found that all the subordinate items of the corporate innovation input and operational efficiency variables in the questionnaire were greater than 0.7, showing good reliability; in the construct “social capital”, the Cronbach's alpha coefficient of government capital, corporate capital and association capital was 0.860, 0.719 and 0.828 respectively; the Cronbach's alpha coefficient of policy resources,

knowledge resources and operational resources in resource acquisition was 0.813, 0.757 and 0.844 respectively. All items were greater than 0.7, so the reliability coefficients of the above variables met the test requirements. Meanwhile, corporate social capital, resource acquisition, innovation input and operational efficiency all had good reliability and validity of internal consistency, which could be used for formal large sample measurement.

According to the conclusion of the pre-survey, the formal survey process started, lasting about one month. To ensure the validity of the questionnaire and the data obtained, the survey objects were senior management personnel of enterprises in China's healthcare sector, and the quality of the collected answer sheets was strictly required. A total of 550 questionnaires were distributed in the formal survey. Finally, 211 pieces of valid data were obtained, with a recovery rate of 38.36%, which provided a guarantee for the quantity and quality of samples for subsequent research.

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Chapter 5: Data Analysis and Hypotheses Testing

5.1 Current status of innovation input and output in China's medical manufacturing industry

(1) Innovation input in China's medical manufacturing industry

In terms of China's overall corporate innovation input, based on the statistics of Guolian Securities Research Institute, during the 13th Five-Year Plan period, China's total R&D expenditure increased from 1.42 trillion yuan to 2.44 trillion yuan, and the R&D investment intensity increased from 2.06% to 2.4%. Among which, the R&D investment in the field of life sciences continued to increase rapidly, from 43.4 billion yuan in 2015 to 86.6 billion yuan in 2019, with a CAGR of 18.9%, much higher than that of 6.8% in the same period in the world. In 2020, the R&D fund of medical manufacturing industry was 78.46 billion yuan, and the R&D investment intensity was 3.13%, higher than that of the national average. The 14th Five-Year Plan set the target of an average annual increase of over 7% in the total investment of research expenditure. It is expected that by 2025, China's total R&D expenditure will reach 2.637%, higher than that of the world average (*Pharmaceutical and Biological Industry: Innovation + Globalization Start the Second Growth Curve of Medical Care* by Guolian Securities Research Institute, p.29).. This also means that China's healthcare sector will invest more R&D funds in the future. From the top-level planning of medicine and medical treatment in the five-year plans over the years since the 10th Five-Year Plan, it is not difficult to see that the magnificent development of China's healthcare sector in the past 20 years has a strong positive relationship with China's top-level matters. Therefore, the innovation input of the whole industry may rise steadily in the future.

As shown in the left part of Figure 5.1, the total R&D expenditure of China's A-share listed pharmaceutical enterprises also confirms the trend of increasing R&D investment in China's pharmaceutical industry. From the figure below, compared to 18.9 billion yuan in 2015, the total R&D expenditure in 2020 reached 69 billion yuan, an increase of 265%. After COVID-19's outbreak, the R&D expenditure of China's healthcare enterprises increased further. In 2016, the expenditure grew by 28%, but it rose 72% in the first quarter of 2021 compared with that of the first quarter of 2020.

While from the right part in the following figure, the R&D investment in China's medical manufacturing industry is also increasing year by year, with a CAGR of 11.98%. Especially since the outbreak of COVID-19 in December 2019, the R&D investment of China's pharmaceutical manufacturing industry has increased further in 2020, with a year-on-year growth of 28.72%.

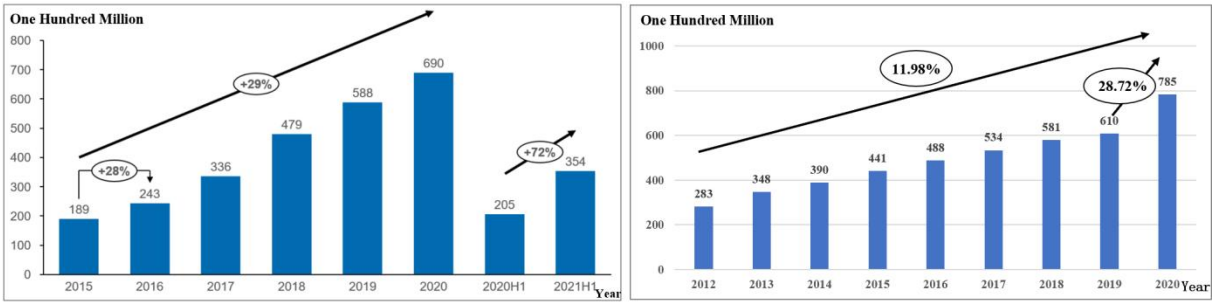

Figure 5.1 The total scale of R&D expenditure of China's A-share listed enterprises in the healthcare sector and the total scale of R&D investment of medical manufacturing enterprises (100 million yuan)

Source: Wind, 2022; Sinolink Securities Research Institute, 2022; China Statistical Yearbook, National Bureau of Statistics, 2013-2022

While from the sources of R&D funds, the R&D funds of listed companies in China's healthcare sector mainly come from the corporations themselves and the government. From the absolute and relative values of sources of funds over the years, the sources of funds of China's pharmaceutical manufacturing industry are corporate capital, government capital, overseas capital and other sources of funds in turn. The absolute and relative values of R&D funds from corporate capital have been increasing every year, from 19.5 billion yuan in 2011 to 58 billion yuan in 2019, and the share increased from 93.9% to 95.2% in 2019. Though the absolute value of funds from government subsidies continued to increase, from 1.2 billion yuan in 2011 to 2.9 billion yuan in 2019, the relative value gradually reduced, and the proportion decreased from about 6% to about 5% (See Table b7 in Annex B for more details).

(2) Innovation output in China's medical manufacturing industry

The continuous increase of innovation input has also brought some innovation output. The author will describe the output of Chinese medical manufacturing enterprises from the aspects of patent and new product development. Patent is a very important form of innovation output, which is the protection of product and process innovation from the perspective of intellectual property rights. Therefore, to some extent, patents are the basic output of innovation resources and that with the most economic value. Since 2013, the number of patent applications and invention patent applications of Chinese medical manufacturing enterprises had exceeded 10,000, and the number of effective invention patents has increased year by year (see Table b8 in Annex B for more details).

New products refer to products that are developed by new technology principle, or have obvious improvement in structure and technology, which can significantly improve product performance or expand use function, have certain effects on improving economic efficiency, and be advanced, novel and applicable in a certain region. The successful development of new products means corporate innovative output and high profit in the future. As for the number of new product development projects in China's medical manufacturing industry, it has increased rapidly in the whole industry. While from the ratio of sales revenue to development expenditure of new products, the former is roughly 10 times of the latter, indicating the high input-output ratio. New products will bring high risks to enterprise operation, but also have high profitability (See Table b9 in Annex B for more details).

5.2 Descriptive statistics of the sample

IBM SPSS 22.0 for Windows and STATA 15.0 were used for statistical analysis. SPSS is a frequently used statistical software in social science research, and the Cronbach coefficient, KMO and Bartlett Test of Sphericity, exploratory factor analysis, factor analysis, and regression analysis in SPSS were computed in this study. Since social capital, resource acquisition, corporate innovation input and corporate operational efficiency are all latent variables, causal analysis was conducted after reducing the dimension of direct variables through factor analysis before regression analysis. Normal distribution can be realized only if both the skewness value and the kurtosis value are within a certain range. However, when the absolute value of the measurement item's skewness is less than 2 and the absolute value of kurtosis is less than 5, the sample data basically present a normal distribution (statistical description of the measurement items from large sample is shown in Table b10 in Annex B).

It can be seen that the absolute value of the measurement item's skewness is less than 2, and the absolute value of kurtosis is less than 5. The absolute values of skewness and kurtosis both meet the requirements, the large sample data present a normal distribution, and the data can be subjected to exploratory factor analysis.

Regarding the basic information of senior management personnel, corporate basic situation and the development environment of the surveyed enterprises in the large sample data, the detailed analysis is as follows:

(1) Analysis of corporate senior management personnel

The descriptive statistics of senior management personnel are shown in the following table. It can be seen that in the sample data, males account for 52.13% and females for

47.87%; in terms of educational level, more than 90% of senior managers have a junior college degree or above. In terms of the previous occupation, there are only 16 senior managers who have never worked in Party or government agencies, public institutions, other institutions or enterprises, accounting for only 7.58%. Most senior managers have held senior positions in government departments, state-owned enterprises (SOEs), other institutions, or enterprises. More than half of senior managers have worked in SOEs and other private enterprises alone, accounting for 60%. In addition, there are senior managers who have held multiple positions, for instance, some of them have served not only in Party and government agencies, public institutions, but also in state-owned and collective enterprises, and even in other private enterprises. This group accounts for 16.11% of the total number. The rich working experience has accumulated a wide range of contacts for senior managers, enabling them to integrate into more "circles". With regard to the Party affiliation of senior managers, more than half of them have not joined any party. Among the other half, most of them are members of the Communist Party of China, accounting for about 46.45% of the total. However, few senior managers join the Democratic party, which is consistent with the basic national conditions of Chinese society. In the senior managers who become members of the Communist Party of China, 30% entrepreneurs held positions in party organizations. See Table 5.1:

Table 5.1 Descriptive statistics of senior managers in the survey (N=211)

Item		Frequency	Proportion
Gender	Male	110	52.13%
	Female	101	47.87%
	Total	211	100.00%
Educational level	Primary school or below	0	0.00%
	Junior middle school	0	0.00%
	High school, technical secondary school	3	1.42%
	Junior college	15	7.11%
	University	148	70.14%
	Master's degree or above	45	21.33%
	Total	211	100.00%
Previous occupation	Party and government agencies and public institutions alone	13	6.16%
	State-owned and collective enterprises alone	50	23.70%
	Foreign-funded enterprises, Hong Kong, Macau and Taiwan enterprises alone	17	8.06%
	Other private enterprises alone	81	38.39%
	None	16	7.58%
	Served in multiple organizations	34	16.11%
	Total	211	100.00%
Party affiliation	Members of the Communist Party of China	98	46.45%
	Democratic party members	3	1.42%
	None	110	52.13%
	Total	211	100%

	Item	Frequency	Proportion
Positions held in the Party	Chief and deputy secretary of the enterprise's Party committee (general branch and branch)	15	15.31%
	Deputy secretary and member of the township (sub-district) Party committee	3	3.06%
	Chairman and deputy secretary of the township neighborhood committee or village Party committee (branch)	9	9.18%
	Party committees at or above the county level	3	3.06%
	None	68	69.39%
	Total	98	100%

(2) Analysis of the enterprises' basic situation

The table below shows the basic situation of the enterprises surveyed. In terms of the time of establishment, about 80% of enterprises have been established for 5-20 years, and enterprises with more than 20 years only account for 2.84%, which is in line with China's economic development. In terms of the total number of employees, more than 60% of enterprises are between 51 and 500, and in China, more than 80% of enterprises are small and medium-sized private enterprises, which is also consistent with the actual situation of Chinese enterprises. As for enterprise participation in associations, over 60% of the enterprises joined the industrial associations in the field of their own business or technology association related to their main products, and the proportion of the enterprises that have not participated in any association is less than 30%. See Table 5.2:

Table 5.2 Descriptive statistics of the sample enterprises in the survey (N=211)

	Item	Frequency	Proportion
Time of establishment	5 years or less	31	14.69%
	5.1-10 years	93	44.08%
	10.1-15 years	46	21.8%
	15.1-20 years	35	16.59%
	20.1 years and above	6	2.84%
	Total	211	100.00%
Total number of employees	No more than 20	9	4. 27%
	21-50	35	16.59%
	51-200	84	39.81%
	201-500	52	24.64%
	501-1,000	21	9.95%
	1,000 and more	10	4.74%
	Total	211	100.00%
Participation in associations	Federation of industry and commerce	20	9.48%
	Industrial association	84	39.81%
	Technology association related to main products	51	24.17%
	Other associations	1	0.47%
	None	55	26.07%
	Total	211	100.00%

(3) Analysis of corporate development environment

From the enterprise development environment of the sample enterprises. In the factors

that affect the improvement of the corporate development environment (specific results are shown in Table b11 in Annex B), about 70% of the surveyed enterprises agree that "administrative review and approval procedures have been reduced". In recent years, from the reform of administrative review and approval system to the implementation of the Administrative Permission Law, from the reform of administrative mechanism to the reform of the science and technology, health, and cultural systems, from "do whatever you want" to "people-oriented and law-based administration", the administrative procedures have actively transformed from an all-round and regulatory type to an improved one featuring management, service, and rule of law, which is consistent with the basic situation of a reduced burden on enterprises. About 75% of enterprises believe that "capital registration has changed from paid-in to subscribed", which is an important factor in the improvement of corporate development environment. Such change of capital registration has the following three advantages: first, for enterprises, especially start-ups, it can reduce the establishment costs, thus making low costs a reality, so as to reduce the pressure on financing and realize "starting up-making money-financing" at the same time; second, in the subscribed capital system, the enterprise does not need to go to the industrial and commercial department for annual inspections every year, which reduces the burden on the enterprise and saves time; third, the policy of subscribed capital system promotes the initial establishment of corporate credit system, and the disclosure of corporate business information has reduced the information asymmetry between investors and enterprises, increased investors' trust on enterprises, and reduced the financing cost of enterprises, thereby facilitating the improvement of corporate development environment. Nearly 80% of enterprises agree that "the burden of corporate taxes and fees has been reduced".

For small and medium-sized enterprises, especially private ones, the cost is a very sensitive issue. Reducing corporate taxes and fees can effectively reduce the cost of enterprises. On March 5, 2019, Premier Li Keqiang announced in the *Government Work Report* a package of measures aimed to reduce nearly 2 trillion yuan of taxes and fees, which has won widespread attention at home and abroad. According to the statistics of China's State Taxation Administration, affected by this policy, there were 5 million newly set up private enterprises in the first three quarters of 2019, with a growth rate close to 10%. The reduction of the corporate tax burden can strengthen the foundation for the sound development of the economy.

More than 70% of enterprises agree that "financing difficulties have been eased". Although the number exceeds 50%, it is still the lowest among all factors. All enterprises face

financing difficulties, and the demand for funds grows especially as the scale of the enterprise continues to increase. In particular, facing the dual-pressure of the spreading epidemic and downward economic pressure, cash flow is the basis for the survival and development of enterprises. Relying solely on the company's own funds to expand or continue to develop will pose huge financial risks. Therefore, financing from the outside will be an effective way. According to the survey results, addressing financing difficulties for enterprises is still a problem that the government and management circles should continue to explore. In addition, about 80% of enterprises agree that "government departments have improved their service consciousness", which is basically in line with the Chinese government's goal of "transform government functions and build a service-oriented government that satisfies the people" in recent years.

From the factors affecting the poor corporate development environment (specific results are shown in Table b12 in Annex B). Viewing all the factors as a whole, the two factors that are highly recognized by the surveyed enterprises are "high cost of financing" and "lack of talent, technology and information", which over 70% of the enterprises agree on. The lack of technical talents has been a persistent development problem facing Chinese enterprises in recent years, especially in the healthcare sector, as shown by the questionnaire results of a survey to 100 enterprises in three provinces and six cities conducted by *People's Daily* in 2018 showing that the manufacturing industry faces "three difficulties" in attracting talents. As high as 73.08% of enterprises believe that the main difficulty in the current process of achieving high-quality development is "lack of technical talents". Relevant data show that the number of higher education graduates in 2021 exceeded 9 million, yet the proportion engaged in manufacturing industry was not high. The survey also showed that young people tend to "avoid" manufacturing, and structural personnel shortage, especially the lack of technical personnel, is a common problem. Since technical personnel is the basis of corporate innovation, more efforts are needed to strengthen technical talent training, so as to reduce the pressure of personnel shortage.

More than 70% of enterprises agree with "high cost of financing", which includes interest expenses and related costs of raising funds. In China, private enterprises contribute more than 80% of employment and 60% of tax revenue, but most of them are small and medium-sized enterprises (SMEs). Compared with large and medium-sized enterprises, SMEs not only have no preferential interest rate in borrowing, but also pay more floating interest. At the same time, banks mostly adopt mortgage or guarantee for the loans of SMEs. The procedures are complex, and SMEs have to pay related costs such as guarantee deposit and mortgage asset

evaluation to seek guarantee or mortgage. On the other hand, the narrow and blocked formal financing channels force many SMEs to borrow from the informal high-interest loans for their development. All of these put SMEs at a disadvantage in market competition.

About 60% of the surveyed enterprises all agree that "lack of fields and facilities" and "heavy tax burden" are the factors aggravating the poor corporate development environment. The added value brought by corporate innovation cannot catch up with the increasing rent of plants, and enterprises are currently facing the challenge posed by the online economy. Furthermore, the rise of store rent is also an important factor affecting corporate development and innovation, especially for those in the manufacturing industry which requires factory production. In China, a manufacturing powerhouse, the rise of field and facility rent is not conducive to the long-term healthy development of the industry. In addition, in the context of the persistent economic downward pressure, enterprises, especially small and medium-sized ones, face various difficulties and declining profitability, so the tax burden has become a more sensitive issue. Although China has promoted a series of tax reduction policies in terms of corporate taxes in recent years, enterprises still face considerable tax burdens, and reforms are needed to reduce the institutional transaction costs, various taxes, financing costs, and social security costs of enterprises. Only about 50% of the enterprises believe that "the access threshold is unreasonable". In recent years, local governments in China have implemented policies to resolutely eliminate various unreasonable thresholds and restrictions and create a market environment of fair competition, the case of unreasonable access threshold has been improved to some extent.

From the perspective of the main problems in market supervision (specific results are shown in Table b13 in Annex B), more than 70% of the enterprises surveyed believe that there are "overlapping functions and duplicated supervision", and over 60% of the enterprises hold that there are "unclear departmental responsibilities and mutual prevarication" in the current market supervision. Over 50% of the enterprises believe that there are problems of "unfair and arbitrary law enforcement", "light punishment and insufficient penalties", and "excessive punishment that affects development" in market supervision. In view of overlapping functions and duplicated supervision, unclear departmental responsibilities, and mutual prevarication, it is necessary to clarify the functions of departments and solve the above problems at the systemic level.

Generally speaking, the reasons for the above problems are the dislocation and absence of responsibilities of functional departments, which can be summarized as follows: first, some legal provisions, policies and regulations are not consistent, and the policy boundaries are not

clear, leading to the blurry division of department responsibilities; second, the authorities and responsibility are not clearly defined, and there are problems such as overlapping responsibilities and multi-department management in institutional settings and function allocation. Unreasonable design can easily lead to the phenomenon of prevarication at work; the third is the rigidity of authorities and responsibilities. Due to the non-standardized economic order in the market, incomplete social credit system, and insufficient flexibility of system design, it is difficult to achieve effective management of novel issues. Particularly in the context of the current economic transformation, imperfect system and insufficient flexibility, new contradictions and problems will continue to emerge. As for the unfair law enforcement and unreasonable penalties, with the continuous improvement and modification of relevant penal procedures in recent years, relevant administrative reconsideration channels for enterprises dissatisfied with law enforcement and penalties have been improved, and such problems have been gradually relieved. However, since the implementation varies from place to place, problems still exist.

5.3 Analysis of reliability and validity

Before performing hypotheses test, it is necessary to analyze the reliability and validity of the measured variables. Only by achieving considerable reliability and validity can the measurement data be accepted.

(1) Reliability analysis

Reliability denotes the consistency and stability of measurement results. The reliability analysis in this study mainly refers to the reliability coefficient α (the Cronbach's Alpha) and the Item-to-Total correlation coefficient. It is generally believed that an α coefficient above 0.7 is a relatively appropriate standard threshold (Bock et al., 2005). However, after the question items are deleted or adjusted each time, the α coefficient needs to be recalculated. First, The Cronbach's α coefficient of the overall questionnaire was 0.928. Second, based on the reliability analysis results of latent variables including government capital, corporate capital, and association capital in social capital, policy resources, knowledge resources, and operational resources in resource acquisition, innovation input and operational efficiency (for details, see Table b14 of Annex B), all the Item-to-Total overall correlation coefficients are above 0.5, while the Cronbach's α coefficient of each variable is greater than 0.7, indicating good agreement between variables and high data reliability. In conclusion, the variables established in this study have good reliability.

(2) Validity analysis

Since the scales used in this study are based on those developed by previous scholars and have been verified for multiple times, and scientific and rigorous expert discussions and revisions have been carried out during this research, good content validity has been guaranteed. Therefore, this study will use confirmatory factors to test the convergent validity and discriminant validity of sample data. The following table shows the results of factor loadings and convergent validity of this validity analysis. It can be seen from the results in the table that the absolute values of the standardized estimates are greater than 0.6 and show significance, which means that the sample data have a good measurement relationship. From the results of convergent validity, the AVE indexes of all variables are greater than 0.5 and the CR values are greater than 0.8., which shows that the sample data used for analysis this time have good convergent validity. See Table 5.3:

Table 5.3 Results of factor loadings (N=211)

Variables	Measurement item	Std. Error	z	p	Std. Estimate	AVE	CR
Government capital	GC1	-	-	-	0.691	0.547	0.828
	GC2	0.116	9.71	0.000	0.774		
	GC3	0.122	9.68	0.000	0.771		
	GC4	0.131	9.169	0.000	0.722		
Corporate capital	CC1	-	-	-	0.745	0.515	0.809
	CC2	0.109	9.035	0.000	0.678		
	CC3	0.106	9.859	0.000	0.746		
	CC4	0.102	9.345	0.000	0.703		
Association capital	AC1	-	-	-	0.771	0.648	0.88
	AC2	0.089	11.685	0.000	0.785		
	AC3	0.088	12.248	0.000	0.819		
	AC4	0.076	12.829	0.000	0.856		
Innovation input	II1	-	-	-	0.851	0.732	0.916
	II2	0.066	14.906	0.000	0.825		
	II3	0.062	16.319	0.000	0.871		
	II4	0.058	16.571	0.000	0.879		
Corporate operational efficiency	OE1	-	-	-	0.727	0.531	0.819
	OE2	0.1	9.482	0.000	0.692		
	OE3	0.1	10.551	0.000	0.771		
	OE4	0.104	9.909	0.000	0.723		
Policy resources	PR1	-	-	-	0.892	0.768	0.943
	PR2	0.052	19.645	0.000	0.896		
	PR3	0.052	19.754	0.000	0.898		
	PR4	0.05	19.187	0.000	0.887		
	PR5	0.063	16.216	0.000	0.819		
Knowledge resources	KR1	-	-	-	0.804	0.649	0.88
	KR2	0.077	13.16	0.000	0.83		
	KR3	0.075	11.169	0.000	0.727		
	KR4	0.07	13.606	0.000	0.856		
Operational resources	OR1	-	-	-	0.714	0.504	0.802
	OR2	0.118	8.948	0.000	0.704		
	OR3	0.121	9.512	0.000	0.76		
	OR4	0.133	8.562	0.000	0.669		

From the discriminant validity of the sample data, it can be seen from the data in the table below that for government capital, the square root of AVE is 0.740, greater than 0.556, the maximum value of the absolute value of the correlation coefficient between factors, indicating the good discriminant validity. For corporate capital, the square root of AVE is 0.718, greater than 0.556, the maximum value of the absolute value of the correlation coefficient between factors, indicating the good discriminant validity. For association capital, the square root of AVE is 0.805, which is greater than 0.496, the maximum value of the absolute value of the correlation coefficient between factors, indicating the good discriminant validity. For innovation input, the square root of AVE is 0.856, which is greater than 0.548, the maximum value of the absolute value of the correlation coefficient between factors, indicating the good discriminant validity. For corporate operational efficiency, the square root of AVE is 0.729, which is greater than 0.548, the maximum value of the absolute value of the correlation coefficient between factors, indicating the good discriminant validity. For policy resources, the square root of AVE is 0.876, which is greater than 0.547, the maximum value of the absolute value of the correlation coefficient between factors, indicating the good discriminant validity. For knowledge resources, the square root of AVE is 0.806, which is greater than 0.511, the maximum value of the absolute value of the correlation coefficient between factors, indicating the good discriminant validity. For operational resources, the square root of AVE is 0.710, which is greater than 0.511, the maximum value of the absolute value of the correlation coefficient between factors. The above results mean that the sample data has good discriminant validity. See Table 5.4:

Table 5.4 Results of factor loadings (N=211)

Variables	Government capital	Corporate capital	Association capital	Innovation input	Corporate operational efficiency	Policy resources	Knowledge resources	Operational resources
Government capital	0.74							
Corporate capital	0.556	0.718						
Association capital	0.381	0.446	0.805					
Innovation input	0.348	0.372	0.432	0.856				
Corporate operational efficiency	0.361	0.334	0.415	0.548	0.729			
Policy resources	0.527	0.424	0.496	0.547	0.457	0.876		
Knowledge resources	0.366	0.4	0.406	0.373	0.383	0.511	0.806	
Operational resources	0.431	0.364	0.295	0.432	0.511	0.472	0.36	0.71

It can be seen from the above results that this study confirmed that the latent variables have good validity and can be used for subsequent regression analysis.

5.4 Variable relationship analysis

Before performing regression analysis on the data, it is necessary to first verify the relationship between the variables. A good relationship is the basis for testing significance. Among the variables in this study, the independent variables (corporate social capital: government capital, corporate capital and association capital), the mediating variable (resource acquisition), and the dependent variables (innovation input and corporate operational efficiency) are all latent variables. Therefore, this study adopts the method of factor analysis to obtain the latent variables of the study through dimensionality reduction, in which the KMO values are all greater than or close to 0.7, and the cumulative explained variance ratios are all over 60% (see table b15 in Annex B for the dimension reduction result of factor analysis of each variable). In addition, social capital obtains three principal components through dimensionality reduction (see table b16 in Annex B for the loading of each variable on each factor), which are government capital, corporate capital and association capital.

Based on the above factor analysis, this research carried out relationship analysis on driving variables (corporate social capital: government capital, corporate capital, and association capital), the intermediary variable, resource acquisition, regulatory variables (institutional environment and the degree of market competition), outcome variables (innovation input and corporate operational efficiency), as well as control variables (time of establishment, type of corporate, scale of corporate, and the educational level of entrepreneur).

According to the descriptive statistical results in the following table, the mean values of government capital, corporate capital, and association capital are 4.82, 5.27, and 5.38 respectively (the overall mean values of variables are 19.27, 21.08, and 21.52). Since the three variables all have 4 corresponding question items, with a maximum score of 7 points for each item and a total of 28 points, so their scoring rates are 68.81%, 75.72%, and 76.86% respectively. This also means that most of the senior managers surveyed believe that the government capital, corporate capital, and association capital owned by the enterprise are important for corporate innovation input and operational efficiency. Similarly, the average values of policy resources, knowledge resources, and operational resources in resource

acquisition are 5.50, 5.28, and 5.21 respectively. Among them, “policy resources” has 5 questions (a full score of 35), “knowledge resources” and “operational resources” have 4 questions respectively (a full score of 28 points), so their scoring rates are 78.59%, 75.41% and 74.39%. This also indicates the importance of the policy resources, knowledge resources and operating resources obtained by the enterprise through social capital to the enterprise’s innovation input and operational efficiency.

In addition, from the perspective of the relationship between corporate social capital and resource acquisition and corporate innovation input and corporate operational efficiency, government capital, corporate capital, and association capital in corporate social capital all have significant positive relationship with corporate innovation input ($r=0.346$, $p<0.01$; $r=0.394$, $p<0.01$; $r=0.439$, $p<0.01$), and corporate operational efficiency ($r=0.361$, $p<0.01$; $r=0.333$, $p<0.01$; $r=0.428$, $p<0.01$), showing that the above relationship analysis results support hypothesis 1a-, hypothesis 1c, hypothesis 2a, and hypothesis 2c. Moreover, it can be seen from the table below that government capital, corporate capital and association capital in corporate social capital all have significant positive relationship with resource acquisition ($r=0.427$, $p<0.01$; $r=0.361$, $p<0.01$; $r=0.298$, $p<0.01$), indicating that the above relationship analysis results support hypothesis 3a- and hypothesis 3c. Finally, corporate resource acquisition also has significant relationship with corporate innovation input ($r=0.441$, $p<0.01$) and operational efficiency ($r=0.512$, $p<0.01$), which lays the foundation for subsequent research on the mediating role of resource acquisition.

Furthermore, institutional environment and degree of market competition also have significant relationship with corporate innovation input and operational efficiency, the correlation coefficients are -0.416, -0.309, 0.321, and 0.192, and the significant levels are all below 0.05. On the whole, the results of descriptive statistics are basically in line with the expectations of this research. A good relationship can facilitate a steadier regression analysis, but it is not sufficient to explain the causal relationship between variables and the possibility of mediating and moderating effects. Therefore, multiple regression analysis shall be employed. See Table 5.5:

Table 5.5 1T Mean, standard deviation and relationship (N=211)

Measurand	Mean	Standard deviation	1	2	3	4	5	6	7	8	9	10	11	12
1. Government capital	4.82	1.40	1											
2. Corporate capital	5.27	1.25	.556**	1										
3. Association capital	5.38	1.22	.401**	.469**	1									
4. Resource acquisition	5.17	1.29	.427**	.361**	.298**	1								
5.Innovation input	5.50	1.19	.346**	.394**	.439**	1								
6. Corporate operational efficiency	5.28	1.13	.361**	.333**	.428**	.512**	.740**	1						
7. Institutional environment	3.70	0.13	-.108	-.195**	-.228**	-.185**	-.416**	-.309**	1					
8. Market competition degree	5.84	0.81	.086	.050	.158*	.057	.321**	.192**	-.131	1				
9. Time of establishment	2.49	1.03	.190**	.120	.067	.217**	.058	.059	-.014	.012	1			
10. Type of corporate	0.17	0.38	.020*	-.008	-.042	.013	-.042	-.064	-.087	.025	.239**	1		
11. Scale of corporate	3.88	1.23	.225**	.175**	.138*	.202**	.127	.125	.040	.110	.482**	.207**	1	
12. Educational level of entrepreneur	5.11	0.57	.190**	.130	.210**	.136*	.228**	.237**	-.080	.059	.027	-.134	.059	1

Note: Thecorrelation coefficients in this table are non-standardized, “*” indicates P <0.05 and “**” indicates P <0.01.

5.5 Hypotheses testing and model verification

This study mainly adopted STATA15.0 for data analysis. Before conducting empirical analysis, interaction variables were zero-centered to avoid the influence of multicollinearity. A high correlation between explanatory variables leads to the potential problem of multicollinearity (MacKenzie et al., 2011). Variance inflation factor (VIF) values are used to identify multicollinearity problems (Dodge, 2008; Everitt and Skrondal, 2010). If the VIF value is less than five, then multicollinearity is not a problem for that regression analysis. The VIF test results of explanatory and control variables show that the VIFs of all variables were within 5, indicating that multicollinearity was not an issue.

5.5.1 Test for the driving effect of corporate social capital on corporate innovation input and operational efficiency

Linear regression analysis was performed on the sample data to verify the relationships between corporate social capital in the healthcare sector and both corporate innovation input and operational efficiency. According to H1, corporate social capital has a positive impact on corporate innovation input. Model 1 to Model 3 respectively show the effect of corporate government capital, corporate capital, and association capital on corporate innovation input. Since this study examines the effects of independent and mediating variables on their respective dependent variables rather than comparing the differential effects of these variables, unstandardized coefficients are reported in the regression analyses. As shown in the results of Model 1, after controlling the effects of other variables, there was a very significant positive relationship between corporate government capital and innovation input (β=.311, P<0.001), and corporate capital and association capital also positively related with innovation input in a very significant manner (β=.339, P<0.001; β=.394, P<0.01). These results confirm the driving effect of corporate social capital on innovation input. Therefore, the test results support that corporate social capital positively affects corporate innovation input, and thus H1a, H1b, and H1c were verified.

Model 4 to Model 6 verify the relationship between corporate social capital and corporate operational efficiency. Specifically, Model 4 shows a very significant positive relationship between corporate government capital and corporate operational efficiency (β=.321, P<0.001), while Model 5 and Model 6 respectively show that corporate capital and association capital had a very significant positive relationship with operational efficiency (β=.295, P<0.001;

β=.372, P<0.001). Therefore, the test results confirm that corporate social capital positively affects corporate operational efficiency, and thus H2a, H2b, and H2c were verified (See Table 5.6).

Table 5.6 Regression analysis of corporate social capital, corporate innovation input and operational efficiency (N=211)

Variables	Innovation input			Corporate operational efficiency		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant Term	-1.513*	-1.696**	-1.418*	-1.595*	-1.871**	-1.567*
	(-2.411)	(-2.785)	(-2.358)	(-2.562)	(-3.040)	(-2.595)
Established time	-.023	-.008	-.011	-.025	-.006	-.010
	(-.320)	(-.105)	(-.153)	(-.343)	(-.079)	(-.142)
Enterprise type	-.123	-.105	-.068	-.148	-.134	-.097
	(-.690)	(-.593)	(-.394)	(-.837)	(-.753)	(-.560)
Enterprise size	.036	.037	.050	.054	.062	.071
	(.599)	(.617)	(.869)	(.905)	(1.021)	(1.224)
Educational level of entrepreneur	.284*	.311**	.247*	.288*	.326**	.260*
	(2.460)	(2.754)	(2.208)	(2.513)	(2.861)	(2.322)
Government capital	.311***			.321***		
	(4.609)			(4.793)		
Corporate capital		.339***			.295***	
		(5.210)			(4.486)	
Association capital			.394***			.372***
			(6.153)			(5.793)
R^2	.152	.173	.210	.166	.155	.203
Adj-R^2	.131	.153	.190	.145	.134	.183
R^2 change	.152	.173	.210	.166	.155	.203
F-Value	7.323	8.582	10.871	8.132	7.520	10.415

Note: There are non-standardized regression coefficients in the table; the t value is included in parentheses; * means P<0.05; ** means P<0.01; *** means P<0.001.

5.5.2 Test for the mediation effect of resource acquisition

According to H3 and H4, resource acquisition plays a mediating role between corporate social capital and both innovation input and corporate operational efficiency, respectively. The test for the mediation effect of resource acquisition includes not only the verification of the direct effect of resource acquisition, but also the verification of the role of corporate social capital in resource acquisition, corporate innovation input and operational efficiency. Hence this thesis used the test for the mediation effect of resource acquisition as the method to verify above research hypotheses.

Generally speaking, considering the influence of independent variable X on dependent variable Y, if X exerts an influence on Y by influencing variable M, then M is called an intermediary variable. The following regression equations can be used to describe the relationship between variables:

$$Y = cX + e_1 \tag{5.1}$$

$$M = aX + e_2 \tag{5.2}$$

$$Y = c'X + bM + e_3 \tag{5.3}$$

In which, coefficient c of equation (5.1) is the total effect of independent variable X on dependent variable Y; coefficient a of equation (5.2) is the effect of independent variable X on intermediary variable M; coefficient b of equation (5.3) is the effect of intermediary variable M on dependent variable Y after controlling the influence of independent variable X; coefficient c' is the direct effect of independent variable X on dependent variable Y after controlling the influence of intermediary variable M; and e_1~e_3 are regression residuals. Among the test methods for mediating effect, Sobel test has higher test power than sequential test (Wen et al., 2004; MacKinnon et al., 2002), but it may be inaccurate because it is difficult to require $\hat{a}\hat{b}$ to meet the condition of normal distribution. As a result, Chinese scholars Wen et al. used Bootstrap method to replace Sobel test and modify the testing process of mediating effect accordingly.

With the new test method, this thesis will test whether resource acquisition has a mediating role between corporate social capital and both corporate innovation input and operational efficiency (Wen & Ye, 2014). To be specific: (1) Test whether the coefficient c of corporate social capital on corporate innovation input and corporate operational efficiency is significant. If significant, it should be considered according to mediating effect; otherwise, it should be considered according to the suppressing effect. However, whether it is significant or not, follow-up tests should be conducted; (2) Test whether the coefficient a of corporate social capital on resource acquisition and the coefficient b of resource acquisition on corporate innovation input and corporate operational efficiency are significant. If both are significant, the indirect effect is significant. In this case, proceeding to the next step; (3) Test, after controlling resource acquisition, the intermediary variable, whether the coefficient c' of corporate social capital, the independent variable, on corporate innovation input and corporate operational efficiency is significant, if not, indicating only mediating effect, and if it is significant, direct effect is significant (If at least one of A and B is not significant, the Bootstrap method is used to directly test H_0: ab=0. If significant, the indirect effect is significant, and the above steps shall be continued; otherwise, the indirect effect is not significant, and the analysis shall be stopped), and the next step shall be carried out under this circumstance; (4) Compare the signs of ab and c'. If they are the same, it is a partial

mediating effect. If different, it is suppressing effect.

Step 1, based on the results in 5.5.1, the coefficient c of the influence of corporate social capital on corporate innovation input is significant. Step 2, test the coefficient a of corporate social capital on resource acquisition, and the coefficient b of resource acquisition on corporate innovation input and corporate operational efficiency.

First, the significance of coefficient a of corporate social capital on resource acquisition. As shown in the table below, Model 7, Model 8, and Model 9 respectively show the influence of the established time, enterprise type, enterprise size, the educational level of entrepreneur, and corporate government capital on corporate resources acquisition. Model 7 test results show that there was a significant positive relationship between government capital and policy resources acquired by enterprises (β=.519, P<0.001). After controlling the influence of other variables, government capital could explain 32.4% of the variation in policy resources. Similarly, Model 8 and Model 9 also show that corporate government capital significantly and positively related with corporate knowledge resources and operational resources (β=.461, P<0.001; β=.477, P<0.001). After controlling the influence of other variables, corporate government capital could respectively explain 20.9% and 11.3% of the variation in corporate knowledge resources and operational resources. See Table 5.7:

Table 5.7 Regression analysis of corporate social capital and corporate resource acquisition (N=211)

Variables	Resource acquisition		
	Model 7	Model 8	Model 9
Constant Term	-.762 (-1.360)	-1.236* (-2.177)	-.980 (-1.723)
Established time	.082 (1.256)	.114 (1.697)	.112 (1.693)
Enterprise type	.009 (.057)	.030 (.184)	.070 (.427)
Enterprise size	.041 (.766)	.055 (.991)	.078 (1.415)
Educational level of entrepreneur	.077 (.751)	.143 (1.364)	.076 (.716)
Government capital	.519*** (8.622)		
Corporate capital		.461*** (7.589)	
Association capital			.477*** (7.883)
R^2	.324	.281	.293
Adj-R^2	.307	.263	.276
R^2 change	.324	.281	.293
F-Value	19.621	15.988	16.976

Note: There are non-standardized regression coefficients in the table; the t value is included in parentheses; * means P<0.05; ** means P<0.01; *** means P<0.001.

Second, the significance of the coefficient b of the influence of resource acquisition on

corporate innovation investment and corporate operational efficiency. As shown in table below, Model 11, Model 13 and Model 15 respectively show the impact of corporate social capital on innovation input after the introduction of resource acquisition as an intermediary variable. Among them, as shown in Model 11, Model 13 and Model 15, the coefficient b of resource acquisition on corporate innovation input is significant (β=.546, P＜0.001; β=.511, P ＜0.001; β=-.480, P＜0.001). In the case that the coefficient a of corporate social capital on resource acquisition and the coefficient b of resource acquisition on corporate innovation input are both significant, the next test can be conducted directly.

The third step is to test whether the coefficient c' of corporate social capital on corporate innovation input is significant under the condition of controlling the variable of resource acquisition. From the results of Model 11, Model 13 and Model 15, the coefficients c' of corporate government capital and corporate capital on corporate innovation input are no longer significant (β=.027, P>0.05; β=.104, P>0.05), which shows that resource acquisition plays an intermediary role in the relationship among corporate government capital and corporate capital and innovation input; while the coefficient c' of corporate association capital on corporate innovation input is significant (β=-.165, P<0.05). In this case, the next test can be carried out directly.

The fourth step is to compare the signs of ab and c'. Based on the values of a in the above table and the values of b and the sings of c' in the following table, they have the same signs, indicating that resource acquisition has a partial mediating effect on the relationship between corporate association capital and corporate innovation input.

From what we have been discussed above, resource acquisition shows different intermediary effects in the impact of different dimensions of social capital on innovation input, in which it plays an intermediary role in the path of corporate government capital and corporate capital and innovation input, while it plays a partial intermediary role in the path of corporate association capital and innovation input, thus hypothesis 3 was partially verified. See Table 5.8:

Table 5.8 Analysis of the mediation effect of resource acquisition on corporate social capital and innovation input (N=211)

Variables	Innovation input					
	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15
Constant Term	-1.133*	-1.097*	-1.133*	-1.064	-1.133*	-.948
	(-2.087)	(-1.988)	(-2.087)	(-1.961)	(-2.087)	(-1.752)
Established time	-.067	-.068	-.067	-.066	-.067	-.065
	(-1.048)	(-1.061)	(-1.048)	(-1.030)	(-1.048)	(-1.024)

Variables	Innovation input					
	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15
Enterprise type	-.130 (-.829)	-.128 (-.821)	-.130 (-.829)	-.120 (-.772)	-.130 (-.829)	-.102 (-.658)
Enterprise size	.016 (.299)	.014 (.257)	.016 (.299)	.009 (.164)	.016 (.299)	.013 (.252)
Educational level of entrepreneur	.247* (2.463)	.242* (2.389)	.247* (2.463)	.237* (2.377)	.247* (2.463)	.210* (2.105)
Resource acquisition	.560*** (9.570)	.546*** (7.976)	.560*** (9.570)	.511*** (7.739)	.560*** (9.570)	.480*** (7.274)
Government capital		.027 (.397)				
Corporate capital				.104 (1.598)		
Association capital						.165* (2.526)
R^2	.353	.353	.353	.361	.353	.372
Adj-R^2	.337	.334	.337	.342	.337	.354
R^2 *change*	.353	.000	.353	.008	.353	.020
F-Value	22.345	18.570	22.345	19.188	22.345	20.172

Note: There are non-standardized regression coefficients in the table; the t value is included in parentheses; * means P<0.05; ** means P<0.01; *** means P<0.001.

Similarly, when the coefficient a of the influence of corporate social capital on resource acquisition is significant, the coefficient b of the influence of resource acquisition on corporate operational efficiency is tested, and under the control of the variable of resource acquisition, the significance of coefficient c' of the influence of corporate social capital on corporate operational efficiency is tested.

As shown in the table below, Model 17, Model 19 and Model 21 respectively show the influence of corporate social capital on corporate operational efficiency after introducing the intermediary variable of resource acquisition. Among them, as shown in Model 17, 19 and 21, the coefficient b of resource acquisition on corporate operational efficiency is significant (β=.527, P<0.05; β=.526, P<0.05; β=-.482, P<0.05). In the case that the coefficient a of corporate social capital on resource acquisition and the coefficient b of resource acquisition on corporate operational efficiency are both significant, the next test can be directly carried out.

The third step is to test the significance of coefficient c' of corporate social capital on corporate operational efficiency under the control of the variable of resource acquisition. Based on the results of Model 17, 19 and 21, the coefficients c' of corporate social capital on corporate operational efficiency are no longer significant (β=.047, P>0.05; β=.053, P>0.05, which indicates that resource acquisition plays an intermediary role in the relationship among government capital, corporate capital and corporate operational efficiency; while the coefficient c' of corporate association capital on corporate operational

efficiency is significant (β=-.142, P<0.001). In this case, the next test can be carried out directly.

The fourth step is to compare the signs of AB and c'. Judging from the values of A and B in the signing form and the signs of c', the two numbers are the same, indicating that resource acquisition has a partial mediating effect on the relationship between corporate association capital and corporate operational efficiency.

In summary, resource acquisition has different intermediary effects in different dimensions of social capital on corporate operational efficiency, in which it plays an intermediary role in the path of corporate government capital and corporate capital and corporate operational efficiency, while it plays a partial intermediary role in the path of corporate association capital and operational efficiency, Thus Hypothesis 4 was partially verified. See Table 5.9:

Table 5.9 Analysis of the mediation effect of resource acquisition on the relationship between social capital and corporate operational efficiency (N=211)

Variables	Corporate operational efficiency					
	Model 16	Model 17	Model 18	Model 19	Model 20	Model 21
Constant Term	-1.256* (-2.311)	-1.193* (-2.163)	-1.256* (-2.311)	-1.220* (-2.237)	-1.256* (-2.311)	-1.095* (-2.015)
Established time	-.066 (-1.035)	-.068 (-1.060)	-.066 (-1.035)	-.065 (-1.023)	-.066 (-1.035)	-.064 (-1.012)
Enterprise type	-.155 (-.992)	-.153 (-.979)	-.155 (-.992)	-.150 (-.960)	-.155 (-.992)	-.131 (-.843)
Enterprise size	.036 (.686)	.033 (.613)	.036 (.686)	.033 (.614)	.036 (.686)	.034 (.648)
Educational level of entrepreneur	.255* (2.550)	.247* (2.441)	.255* (2.550)	.251* (2.498)	.255* (2.550)	.224* (2.233)
Resources acquisition	.551*** (9.411)	.527*** (7.700)	.551*** (9.411)	.526*** (7.929)	.551*** (9.411)	.482*** (7.270)
Government capital		.047 (.681)				
Corporate capital				.053 (.809)		
Association capital						.142* (2.174)
R^2	.352	.353	.352	.354	.352	.367
Adj-R^2	.336	.334	.336	.335	.336	.348
R^2 change	.352	.001	.352	.002	.352	.015
F-Value	22.269	18.586	22.269	18.635	22.269	19.682

Note: There are non-standardized regression coefficients in the table; the t value is included in parentheses; * means P<0.05; ** means P<0.01; *** means P<0.001.

5.5.3 Test for the moderation effect of institutional environment and the competition degree of industry

According to Hypothesis 5 and Hypothesis 6 proposed in this research, under the influence of a strong institutional environment, the driving effect of corporate social capital on corporate innovation input and operational efficiency increases. Hypothesis 7 and Hypothesis 8 stated that with strong industry competition, the driving effect of corporate social capital on corporate innovation input and operational efficiency weakens. This study adopted the hierarchical multiple regression (HMR) method to test the moderating role of institutional environment and the competition degree of industry. That is to say, in order to verify the moderating role of institutional environment and the competition degree of industry in the relationship between corporate social capital and both innovation input and corporate operational efficiency, the study needs to follow below steps: first, test the direct impact of corporate social capital on innovation input and corporate operational efficiency; second, respectively introduce institutional environment and the competition degree of industry into the regression equation with corporate social capital at the same time, and examine the impact of the two on innovation input and corporate operational efficiency; finally, introduce institutional environment, the competition degree of industry and their respective interaction terms into the regression equation with corporate social capital to test the impact of these variables on innovation input and corporate operational efficiency. If the empirical results of the first two steps are significant, and the interaction coefficient in the third step is significant, then the moderation effects of institutional environment and the competition degree of industry on the influence path of corporate social capital on corporate innovation input and corporate operational efficiency exist. In this study, since the first step has already been verified, only the latter two steps need to be tested, namely, the effects of corporate social capital, together with institutional environment and the competition degree of industry respectively, on innovation input and corporate operational efficiency, as well as the return result of their interaction items on corporate innovation input and corporate operational efficiency.

(1) Test for the moderation effect of institutional environment

According to H5, institutional environment positively moderates the relationship between corporate social capital and innovation input. The test results are shown in table below. The regression results of Model 22, Model 24, and Model 26 respectively show the effect of corporate government capital, corporate capital, and association capital, together with

institutional environment, on innovation input. Specifically, after introducing the variable of institutional environment, the driving effect of corporate government capital, corporate capital and association capital on innovation input (β=.269, P<0.001; β=2.67, P<0.001; β=.320, P<0.001) was still significant. Model 23, Model 25, and Model 27 are the regression test results after introducing corporate social capital, corporate capital, and association capital to interact with institutional environment respectively.

Based on the results of interaction items, after introducing the variable of institutional environment, the interaction term between corporate government capital and institutional environment had a significant impact on innovation input (β=1.093, P<0.01), and $\triangle R^2$ (from 0.270 to 0.291), the adjusted R^2, was greater than zero. Therefore, institutional environment has a moderation effect on the relationship between corporate government capital and innovation input. Under the moderation of a strong institutional environment, the effect of corporate government capital is significantly improved. Similarly, from Model 25 in the table below, we can see that the driving effect of the interaction term between corporate capital and institutional environment on innovation input (β=1.409, P<0.01) was still significant, and both the adjusted R^2 (from 0.270 to 0.301) and $\triangle R^2$ were greater than zero. It proves that, in the data analyzed, the moderation effect of institutional environment on the relationship between corporate capital and innovation input exists. It can be seen from Model 27 that the interaction term between association capital and institutional environment had a relatively significant driving effect on innovation input (β=1.023, P<0.05), and both the adjusted R^2 (from 0.298 to 0.312) and $\triangle R^2$ were greater than zero, which suggests that under the moderation of a strong institutional environment, the effect of corporate association capital is relatively enhanced. Therefore, it was verified that institutional environment positively moderates the relationship between corporate social capital and innovation input, so H5 was verified. See Table 5.10:

Table 5.10 Test for the moderation effect of institutional environment on the influence path of social capital on innovation input (N=211)

Variables	Innovation input					
	Model 22	Model 23	Model 24	Model 25	Model 26	Model 27
Constant Term	9.770***	9.744***	8.810***	9.106***	8.637***	9.253***
	(5.213)	(5.278)	(4.655)	(4.911)	(4.656)	(4.987)
Established time	-.027	-.021	-.012	-.011	-.015	-.005
	(-.410)	(-.317)	(-.178)	(-.169)	(-.223)	(-.070)
Enterprise type	-.237	-.233	-.216	-.238	-.181	-.192
	(-1.436)	(-1.431)	(-1.306)	(-1.472)	(-1.115)	(-1.192)
Enterprise size	.067	.060	.069	.064	.078	.078
	(1.193)	(1.097)	(1.231)	(1.172)	(1.431)	(1.444)
Educational level of entrepreneur	.231*	.239*	.264*	.255*	.213*	.205*
	(2.182)	(2.287)	(2.517)	(2.477)	(2.043)	(1.983)

Variables	Innovation input					
	Model 22	Model 23	Model 24	Model 25	Model 26	Model 27
Institutional environment	-3.004*** (-6.326)	-3.002*** (-6.417)	-2.804*** (-5.816)	-2.856*** (-6.051)	-2.695*** (-5.686)	-2.849*** (-6.013)
Government capital	.269*** (4.324)	-3.764* (-2.509)				
Corporate capital			.267*** (4.325)	-4.978** (-3.011)		
Association capital					.320*** (5.246)	-3.495* (-2.100)
Government capital × institutional environment		1.093** (2.691)				
Corporate capital × institutional environment				1.409** (3.174)		
Association capital × institutional environment						1.023* (2.293)
R^2	.291	.315	.291	.324	.318	.335
Adj-R^2	.270	.291	.270	.301	.298	.312
R^2 change	.291	.024	.291	.034	.318	.017
F-Value	13.934	13.343	13.935	13.915	15.833	14.606

Note: There are non-standardized regression coefficients in the table; the t value is included in parentheses; * means P<0.05; ** means P<0.01; *** means P<0.001.

According to H6, institutional environment positively moderates the relationship between corporate government capital and corporate operational efficiency. The moderation effect test results are shown in table below. The regression results of Model 28, Model 30 and Model 32 show that corporate government capital, corporate capital and association capital influenced corporate operational efficiency together with institutional environment. To be specific, after introducing the variable institutional environment, the driving effect of corporate government capital on corporate operational efficiency (β=0.290, P<0.001) was very significant, and the effect of corporate capital and association capital on innovation input (β=0.242, P < 0.001; β=.320, P < 0.001) was also still very significant. Model 29, Model 31, and Model 33 are regression test results when corporate government capital, corporate capital, and association capital respectively interacted with institutional environment. Based on the results of interaction terms of Model 31, after introducing the variable institutional environment, the interaction term between corporate capital and institutional environment had a relatively significant impact on corporate operational efficiency (β=.958, P<0.05), and the adjusted R^2 (from 0.195 to 0.207) and $\triangle R^2$ were greater than zero, it can be seen that institutional environment has a moderation effect on the relationship between corporate capital and corporate operational efficiency: under the moderation of a strong institutional environment, the effect of corporate capital is significantly improved. Similarly, from Model 29 and Model

33 in the table below, we can see that the driving effect of the interaction term between corporate government capital and institutional environment on corporate operational efficiency (β=0.319, P>0.05) was no longer significant. That means the moderation effect of institutional environment on the relationship between corporate government capital and corporate operational efficiency does not exist.

It can be seen from Model 33 that the interaction term between association capital and institutional environment no longer had significant driving effect on corporate operational efficiency (β=.622, P>0.05), which means that the moderation effect of institutional environment on corporate association capital and operational efficiency does not exist. Therefore, it was partially verified that institutional environment positively moderates the relationship between corporate social capital and corporate operational efficiency, so H6 was partially verified. See Table 5.11:

Table 5.11 Test for the moderation effect of institutional environment on the influence path of social capital on corporate operational efficiency (N=211)

Variables	Corporate operational efficiency					
	Model 28	Model 29	Model 30	Model 31	Model 32	Model 33
Constant Term	6.663*** (3.435)	6.655*** (3.427)	5.826** (2.932)	6.028** (3.052)	5.545** (2.864)	5.920** (3.031)
Established time	-.028 (-.402)	-.026 (-.374)	-.009 (-.127)	-.008 (-.120)	-.013 (-.187)	-.007 (-.098)
Enterprise type	-.231 (-1.356)	-.230 (-1.347)	-.216 (-1.244)	-.231 (-1.340)	-.177 (-1.046)	-.184 (-1.085)
Enterprise size	.077 (1.326)	.075 (1.292)	.085 (1.451)	.082 (1.407)	.091 (1.600)	.091 (1.602)
Educational level of entrepreneur	.249* (2.271)	.251* (2.287)	.292** (2.650)	.286** (2.609)	.237* (2.176)	.232* (2.132)
Institutional environment	-2.199*** (-4.473)	-2.198*** (-4.467)	-2.054*** (-4.058)	-2.089*** (-4.157)	-1.906*** (-3.853)	-2.000*** (-4.009)
Government capital	.290*** (4.503)	-.886 (-.561)				
Corporate capital			.242*** (3.739)	-3.325 (-1.889)		
Association capital					.320*** (5.029)	-1.999 (-1.141)
Government capital×institutional environment		.319 (.746)				
Corporate capital×institutional environment				.958* (2.028)		
Association capital×institutional environment						.622 (1.324)
R^2	.240	.242	.218	.234	.257	.263
Adj-R^2	.218	.216	.195	.207	.235	.238
R^2 change	.240	.002	.218	.016	.257	.006
F-Value	10.740	9.265	9.484	8.841	11.740	10.351

Note: There are non-standardized regression coefficients in the table; the t value is included in parentheses; * means P<0.05; ** means P<0.01; *** means P<0.001.

(2) Test for the moderation effect of the competition degree of industry

According to H7, the competition degree of industry negatively moderates the relationship between corporate social capital and innovation input. The test results are shown in the table below. The regression results of Model 34, Model 36, and Model 38 respectively show the effect of corporate government capital, corporate capital, and association capital, together with the competition degree of industry, on innovation input. Specifically, after introducing the variable of the competition degree of industry, the driving effect of corporate government capital on innovation input (β=0.294, P<0.001) was still significant, and the impact of corporate capital and association capital on innovation input (β=0.331, P<0.001; β=.369，P<0.001) was still relatively significant. Model 35, Model 37, and Model 39 are the

regression test results after introducing corporate social capital, corporate capital, and association capital to interact with the competition degree of industry respectively. Based on the results of interaction items, after introducing the variable of the competition degree of industry, the interaction term between corporate government capital and the competition degree of industry had a very significant impact on innovation input (β=-0.167, P<0.001), and the adjusted R^2 (from 0.203 to 0.218) and $\triangle R^2$ were greater than zero. It can be seen that the competition degree of industry has a moderation effect on the relationship between corporate government capital and innovation input. That is to say, under the moderation of high degree of industry competition, the effect of corporate government capital on innovation input significantly weakens.

Similarly, from Model 35 in the table below, we can see that the driving effect of the interaction term between corporate capital and the competition degree of industry on innovation input (β=0.154, P<0.05) was also relatively significant, and the adjusted R^2 (from 0.230 to 0.246) and $\triangle R^2$ were greater than zero. That means the moderation effect of the competition degree of industry on the relationship between corporate government capital and innovation input exists. That is, under the moderation of strong market competition, the effect of corporate capital on innovation input is weakened. On the other hand, it can be seen from Model 39 that the interaction term between association capital and the competition degree of industry no longer had significant driving effect on innovation input (β=-0.127, P>0.05). That suggests that the moderation effect of the competition degree of industry on corporate association capital and innovation input does not exist. Therefore, it was partially verified that the competition degree of industry negatively moderates the relationship between corporate social capital and innovation input, so H7 was partially verified. See Table 5.12:

Table 5.12 The test for the moderation effect of level of market competition on the influence path of social capital on innovation input (N=211)

Variables	Innovation input					
	Model 34	Model 35	Model 36	Model 37	Model 38	Model 39
Constant	-3.326***	-3.154***	-3.532***	-3.379***	-3.136***	-3.042***
Term	(-4.571)	(-4.350)	(-5.025)	(-4.834)	(-4.461)	(-4.348)
Established	-.006	-.006	.009	.003	.005	.002
time	(-.089)	(-.093)	(.124)	(.050)	(.073)	(.023)
Enterprise	-.138	-.127	-.120	-.098	-.086	-.075
type	(-.808)	(-.750)	(-.713)	(-.587)	(-.516)	(-.455)
Enterprise	.010	.010	.008	.005	.025	.025
size	(.165)	(.169)	(.140)	(.086)	(.444)	(.441)
Educational level of entrepreneur	.263*	.277*	.285**	.290**	.230*	.235*
	(2.374)	(2.521)	(2.647)	(2.720)	(2.143)	(2.205)
Institutional	.340***	.300***	.350***	.324***	.319***	.302***

Variables	Innovation input					
	Model 34	Model 35	Model 36	Model 37	Model 38	Model 39
environment	(4.421)	(3.828)	(4.633)	(4.287)	(4.284)	(4.052)
Government capital	.294*** (4.538)	1.311** (2.818)				
Corporate capital			.331*** (5.332)	1.268** (3.072)		
Association capital					.369*** (5.983)	1.108** (2.908)
Government capital ×Level of market competition		-.167* (-2.207)				
Corporate capital ×Level of market competition				-.154* (-2.296)		
Association capital × t Level of market competition						-.127 (-1.965)
R^2	.226	.244	.252	.271	.275	.288
Adj-R^2	.203	.218	.230	.246	.253	.264
R^2 change	.226	.018	.252	.019	.275	.014
F-Value	9.911	9.353	11.443	10.767	12.884	11.750

Note: There are non-standardized regression coefficients in the table; the t value is included in parentheses; * means P<0.05; ** means P<0.01; *** means P<0.001.

According to H8, the competition degree of the industry negatively moderates the relationship between corporate social capital and corporate operational efficiency. The test results are shown in table below. The regression results of Model 40, Model 42, and Model 44 respectively show the effect of corporate social capital, corporate capital, and association capital, together with the competition degree of industry, on corporate operational efficiency. Specifically, after introducing the variable of the competition degree of industry, the driving effect of corporate government capital on corporate operational efficiency (β=0.311, P<0.001) was very significant, and the impacts of corporate capital and association capital on corporate operational efficiency (β=0.291, P<0.001; β=0.359, P<0.001) were still very significant. Model 41, Model 43, and Model 45 are the regression test results after introducing corporate social capital, corporate capital, and association capital to interact with the competition degree of industry respectively.

Based on the results of interaction items, after introducing the variable of the competition degree of industry, the interaction term between corporate government capital and the competition degree of industry had a negative impact on corporate operational efficiency, but

the result was not significant (β=-0.116, P>0.05), so the competition degree of industry has no moderating effect on government capital and corporate operational efficiency. But from the results of interaction terms in Model 43 and Model 45 in the table below, we can see that the driving effects of the interaction term between corporate capital and the competition degree of industry and the interaction term between association capital and the competition degree of industry on corporate operational efficiency (β=-0.143, P<0.05; β=-0.190, P<0.05) were significant, and the adjusted R^2 (from 0.157 to 0.169, and from 0.198 to 0.226) and $\triangle R^2$ were greater than zero. It can be seen that the competition degree of industry has a moderation effect on the relationship between corporate capital and corporate operational efficiency, corporate association capital and operational efficiency. That suggests that under the moderation of high degree of industry competition, the effects of corporate capital and association capital on corporate operational efficiency relatively weaken. Therefore, it was partially verified that the competition degree of industry negatively moderates the relationship between corporate social capital and corporate operational efficiency, so H8 was partially verified. See Table 5.13:

Table 5.13 The test for the moderation effect of the level of market competition on the influence path of social capital on corporate operational efficiency (N=211)

Variables	Corporate operational efficiency					
	Model 40	Model 41	Model 42	Model 43	Model 44	Model 45
Constant Term	-2.597***	-2.478***	-2.923***	-2.780***	-2.481***	-2.340*
	(-3.486)	(-3.316)	(-3.973)	(-3.791)	(-3.405)	(-3.261)
Established time	-.015	-.015	.003	-.001	-.002	-.007
	(-.214)	(-.217)	(.049)	(-.018)	(-.024)	(-.098)
Enterprise type	-.157	-.149	-.143	-.123	-.107	-.091
	(-.894)	(-.852)	(-.812)	(-.700)	(-.619)	(-.535)
Enterprise size	.040	.040	.045	.042	.058	.057
	(.664)	(.668)	(.753)	(.709)	(.995)	(1.003)
Educational level of entrepreneur	.276*	.286*	.312**	.316**	.252*	.259*
	(2.436)	(2.525)	(2.764)	(2.825)	(2.263)	(2.372)
Institutional environment	.188*	.160*	.200*	.176*	.170*	.144
	(2.387)	(1.984)	(2.536)	(2.224)	(2.198)	(1.882)
Government capital	.311***	1.015*				
	(4.694)	(2.117)				
Corporate capital			.291***	1.161**		
			(4.472)	(2.682)		
Association capital					.359***	1.468***
					(5.618)	(3.756)
Government capital ×Level of market competition		-.116				
		(-1.482)				
Corporate capital ×Level of market competition				-.143*		
				(-2.034)		
Association capital ×Level of market competition						-.190**
						(-2.874)
R^2	.188	.197	.181	.197	.221	.251

Adj-R^2	.164	.169	.157	.169	.198	.226
R^2 change	.188	.009	.181	.016	.221	.030
F-Value	7.881	7.109	7.504	7.122	9.646	9.742

Note: There are non-standardized regression coefficients in the table; the t value is included in parentheses; * means P<0.05; ** means P<0.01; *** means P<0.001.

In summary, most research hypotheses proposed in this thesis have been verified. The results indicate that corporate social capital in China's healthcare sector significantly affects the innovation input and operational efficiency of an enterprise, and the resources acquired by an enterprise are an effective tool that influences corporate innovation input and operational efficiency. The effect of corporate social capital acts on the innovation input and operational efficiency of an enterprise through the resources obtained by the enterprise and plays an intermediary role in the impact mechanism. Besides, both institutional environment and the competition degree of industry affect corporate innovation input and operational efficiency. Its significance is reflected in that, under a strong institutional environment, corporate social capital exerts a stronger effect on the innovation input and operational efficiency and plays a greater role. However, with a high degree of industry competition, the effect of corporate social capital on corporate innovation investment and operational efficiency is weakened.

From a separate perspective, this research verified the driving effect of corporate social capital on innovation input, and corporate operational efficiency, the mediation effect of resource acquisition on the relationship between different dimensions of corporate social capital and both corporate innovation input and operational efficiency, as well as the moderation effect of institutional environment and the competition degree of the industry on the relationship between corporate social capital and both corporate innovation input and operational efficiency. From an overall perspective, this study verified the correctness of the model with corporate social capital in China's healthcare sector as the independent variable, resource acquisition as the mediating variable, institutional environment, and the competition degree of industry as the moderating variables, and innovation input and operational efficiency as the dependent variables. The results of research hypotheses in this thesis are summarized in the Table 5.14:

Table 5.14 Summary of the verification results of research hypotheses in this thesis

Hypothesis number	Hypothesis description	Test result
H1	The social capital owned by an enterprise has a positive impact on its innovation input	Verified
H1a	The government capital owned by an enterprise has a positive impact on its innovation input	Verified
H1b	The corporate capital owned by an enterprise has a positive impact on its innovation input	Verified
H1c	The association capital owned by an enterprise has a positive impact on its innovation input	Verified
H2	The social capital owned by an enterprise has a positive impact on operational efficiency	Verified
H2a	The government capital owned by an enterprise has a positive impact on operational efficiency	Verified
H2b	The corporate capital owned by an enterprise has a positive impact on operational efficiency	Verified
H2c	The association capital owned by an enterprise has a positive impact on operational efficiency	Verified
H3	Resource acquisition plays a mediating role between corporate social capital and innovation input	Partially verified
H4	Resource acquisition plays a mediating role between corporate social capital and operational efficiency	Partially verified
H5	Institutional environment positively moderates the relationship between corporate social capital and innovation input.	Verified
H6	Institutional environment positively moderates the relationship between corporate social capital and corporate operational efficiency	Partially verified
H7	The competition degree of industry negatively moderates the relationship between corporate social capital and innovation input	Partially verified
H8	The competition degree of industry negatively moderates the relationship between corporate social capital and corporate operational efficiency	Partially verified

5.6 Summary

Based on the data obtained from the formal survey described in Chapter 4, this chapter carried out sample descriptive statistics, exploratory factor analysis and variable relationship analysis, tested research hypotheses and validated the research model. From the results of exploratory factor analysis, the data in this thesis showed good reliability and validity. According to the results of variable relationship analysis, government capital, corporate capital, and association capital, which all belong to corporate social capital, have significant positive relationship with resource acquisition, corporate innovation input, and corporate operational efficiency. Resources acquired by enterprises play a partially intermediary role in corporate social capital, innovation input and operational efficiency. Furthermore, the institutional environment and the competition degree of industry also have significant relationship with corporate innovation input and corporate operational efficiency. From the hypotheses verification results,

it can be seen that corporate social capital can significantly promote corporate innovation input and corporate operational efficiency. Hypothesis 1 and Hypothesis 2 are supported, and the main research path is verified.

Resource acquisition plays a mediating role in the relationship between corporate social capital and both innovation input and operational efficiency; the moderation effect of institutional environment and competition degree of industry on the influence path of corporate social capital on innovation input and corporate operational efficiency is partially verified. Among them, it is verified that institutional environment positively moderates the relationship between corporate social capital and corporate innovation input.

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Chapter 6: Discussion and Conclusions

Based on the analysis and discussion of the previous empirical results, this part further expounds on the theoretical contribution of this study and its enlightenment in the practice of management. The contributions of this research are put forward, as well as the limitations and the prospects for future research.

6.1 Conclusions

Through factor analysis, relationship analysis and regression analysis this study focuses on the following questions: China is now going through an economic transition, where new industries, new business types and new business models are constantly growing. In this imperfect institutional environment, what are the important factors that affect enterprises in China's healthcare sector to invest in innovation and improve operating efficiency? Will the government capital embedded in the formal system and the enterprise capital, and the association capital embedded in the external business environment and the industry association environment affect the enterprise to carry on the innovation input and improve operating efficiency? Does corporate resource acquisition play an intermediary role between enterprise social capital and enterprise innovation input and operating efficiency? How will China's current institutional environment and industry competition affect the path of enterprise social capital, innovation input and operational efficiency? The main conclusions drawn from the above research are as follows:

6.1.1 Positive impact of enterprise social capital on enterprise innovation input and operating efficiency

From the verification of hypothesis 1, when the system is not perfect, the resources acquired by enterprises in China's healthcare sector from social networks of individuals and organizations can promote their innovation input and improve their operational efficiency. The reason is that at present, China is still a developing country, and the market economic system is not perfect, so it is difficult to acquire the resources required for corporate development through legal channels, while entrepreneurs can obtain the fund resources and

other resources required for corporate development from social networks of individuals and organizations. The above resources can reduce the cost of investment in R & D and innovation, and to ease the financial pressure on enterprises to carry out innovative activities. Besides, through the external acquisition of the necessary knowledge, operation and other resources, the risk brought by product R & D and other technical activities is reduced, which promotes the enterprise to invest the acquired resources in technological innovation, so as to improve the overall efficiency.

From the verification of H1a and H2a, corporate government capital in China's healthcare sector has a significant role in promoting the innovation input and operating efficiency of enterprises. Judging from the type of social capital owned by enterprises, government capital mainly refers to the resources brought to enterprises by the entrepreneur's work experience in government or semi-government organizations (previous work experience in government or state-owned enterprises) and their formal institutional identity (including NPC deputies, CPPCC members, Party members and members of the Federation of Industry and Commerce). On the one hand, enterprises can reduce their cost input and promote their investment in innovation through government subsidies, tax concessions and other resources obtained by government capital; on the other hand, the government also requires enterprises to invest the obtained subsidies and tax incentives into technological innovation, so as to enhance the technological innovation capability of the whole society in turn and achieve the growth of the social economy. This is also related to the background of global innovation.

With the rapid development of the new round of scientific and technological revolution, global innovation activities have entered a new explosive period, and many breakthroughs have been made in the fields of new energy, new materials, new information, and new biotechnology, which bring about the readjustment and new layout of the international division of labor and the world competition pattern. At the same time, the economic decline and the global market depression and the weak economic growth brought about by the COVID-19 pandemic have made all countries devote themselves to finding new growth points and driving forces for development. As for China, it is still facing the pains of economic transformation, where the growth mode driven by the input of population, land and resources is difficult to sustain. It is urgent to change the previous extensive development model of "three high and one low"—high input, high consumption, and high pollution with low benefit and stick to the leading role of innovation in development while realizing the effective transformation of new and old kinetic energy. Under the multiple impacts of the new round of global scientific and technological revolution, the depression of the external market

and the urgent need for internal transformation and development, China should regard scientific and technological innovation as the first driving force to lead the development.

In the practice of innovation-driven development strategy, China considers enterprises as the main body of technological innovation and constructs a set of technological innovation systems with the enterprises as its theme, market as its orientation and combining the industry, university, and research. In the process of implementation, the Chinese government has issued a series of technological innovation incentive policies with tax preferences and financial subsidies as the core to promote the technological innovation capability of enterprises, including the *Circular on Tax Policies on Promoting the Development of Venture Capital Enterprises* jointly issued by the Ministry of Finance and the State Taxation Administration in 2007, and the *Opinions on Deepening the Reform of Science and Technology System and Speeding up the Construction of National Innovation System* issued by the State Council in 2012, which directly leads to a substantial increase in China's total R & D investment.

According to the statistical bulletin of China's investment in science and technology over the years, since 2013 when China's total investment in R & D surpassed that of Japan and China has always ranked second in the world in terms of this investment. According to the *National statistical bulletin on investment in science and technology in 2020* (hereinafter referred to as the "Bulletin") released by the National Bureau of Statistics, the Ministry of Science and Technology and the Ministry of Finance, the total R & D investment in 2020 exceeded 2.4 trillion yuan, an increase of 10.2% over the previous year, and the proportion of investment reached 2.4%, and the increase reached a new high in recent 11 years. According to the data of the Bulletin, China's R & D expenditure has shown a trend of making progress while maintaining stability. First, the total amount has increased steadily. In 2020, the total amount of expenditure was about 54% of that of the United States and 2.1 times that of Japan. From 2016 to 2019, the average annual net increment of China's R & D expenditure exceeded 200 billion yuan, about 60% of the total annual increment of G7 countries, becoming the main force driving the growth of global R & D expenditure. Second, the growth rate leads the world. From 2016 to 2019, China's R & D expenditure increased by 11.8% annually, which is much higher than that of scientific and technological powers such as the United States (7.3%) and Japan (0.7%). Third, the intensity of catch-up accelerated.

Among the world's major economies, China's R & D investment intensity has increased from 16th to 12th in the world in 2016, close to the average level of OECD countries. For enterprises in China's healthcare sector, with more government capital, it is more likely for them to get more tax incentives and financial subsidies that are related to technological

innovation.

In addition, the development resources obtained by enterprises in China's healthcare sector include not only direct government subsidies and tax incentives, but also indirect policy support, scientific research project support, market position and brand effect brought by official certification, and accurate market and industry data acquired through official channels. Direct government subsidies and tax incentives can improve the financial performance and technological innovation capability of enterprises. Policy support, scientific research project support and certification of the market position of the enterprise can reflect the government's affirmation of R & D projects and the high recognition of future prospects, and strength, thus enhancing brand reputation and customer loyalty. To a certain extent, social capital with the government possessed by enterprises can avoid the information asymmetry between them and external investors and improve the investment enthusiasm of investors in R & D projects. By inspecting and supervising enterprise innovation projects, the government can alleviate the risk of adverse selection and moral hazard caused by information asymmetry on both sides of capital supply and demand, and absorb external investment, thus stimulating innovation activities and improving the business performance of enterprises.

From the verification of H1b and H1c, H2b and H2c both enterprise capital and association capital can have a significant positive impact on enterprise innovation investment and operating efficiency. Enterprise capital refers to the social capital embedded in external commercial networks (such as sellers, suppliers, and other intermediary service organizations), and the trust and shared values gained in the reciprocal exchange between enterprises and these commercial networks. Association capital is the social capital embedded in the industry network (trade associations and technical associations), including funds, technology and information obtained in business exchanges between enterprises and trade associations or some technical associations. Under the background of Chinese "relational culture", the external commercial network and industry network constitute an important relationship network for the enterprise. The effective establishment of the relationship network makes the enterprise not only get more hidden information, but also obtain favorable resources with the help of these relationships, thus improving its efficiency. First, the relationship capital can directly enhance brand awareness and reputation, help to open new markets, new customers, and cultivate the existing customers' loyalty. A good relationship between the company and customers can guide customers to pay attention to the value proposition of enterprise products, so as to increase sales volume, improve financial performance, and reduce the marketing cost by realizing secondary marketing. In addition, the relationship network with closely attached

and loyal customers can help to reduce the various uncertain risks in the internal and external environment to ensure sustainable profitability. Second, a good relationship between the company and suppliers and distributors can improve the company's profit margin by reducing procurement and sales costs. Third, more supplier resources can be obtained through other enterprises, so as to build a more secure supply system, reduce procurement costs, and improve internal operating efficiency. Fourth, the information channels can be broadened through the enterprise or association capital. The dynamics of existing competitors can be obtained to find the gap with them to formulate effective competitive strategies, reduce overall competitive risks, and improve operating capacity.

In addition, while achieving performance growth, enterprises also need to pay attention to their own risk-response ability, especially under the current circumstances of economic downturn, sudden events causing global economic turbulence, and increased uncertainty in the external market. When the cycle of technological innovation in the industry is shortened, and the speed of product upgrading is accelerated, enterprises need to think about how to improve their ability to resist risks in order to survive in the fierce competitive environment, thus achieving sustainable development. The establishment of cooperative relations or strategic alliances with customers, suppliers and distributors enable the enterprise to obtain technology, exchange information and integrate resources, which can greatly reduce transaction costs and enhance the anti-risk ability of enterprises. In particular, the technology alliance formed with suppliers or customers can reduce R & D risk, promote enterprise innovation investment, maintain, and expand enterprise competitive advantage through cooperative research and development.

6.1.2 The mediating role of resource acquisition

From the verification results of hypothesis 3 and hypothesis 4, resource acquisition plays a mediating role between enterprise social capital, innovation investment and enterprise management efficiency. That is, the social capital owned by medical enterprises needs to be transformed into the resources acquired by them, so as to contribute to the innovation investment and operational efficiency of enterprises. The more social capital medical enterprises have, the more resources they have for development. By reducing the restrictions on the acquisition of resources, the investment of enterprises in innovation research can be enhanced and the enterprise efficiency can be improved.

RBV holds that the performance of an enterprise is determined by the resources it has at its disposal, that is, that it has access to. The use of resources leads to the growth of

enterprises, which, at the same time, are limited by the resources they own. The resources owned by enterprises determine the direction and scale of their growth. By putting appropriate and diverse resources into all aspects of the production and operation the development of the enterprise can be ensured and contribute to form an efficient innovation performance. In each process from the establishment to the development and growth of the enterprise, it is needed to invest resources constantly; the enterprise develops in the process of absorbing and transforming resources. For companies, the amount of obtained resources determines whether the amount of innovation input and production efficiency can be improved, whether the product cost can be reduced, whether the product structure and product quality can be improved. Enterprises can acquire resources through the social relationship network with the government, customers, suppliers, competitors, trade associations and other stakeholders. In this study, the resources acquired by enterprises are divided into policy resources, knowledge resources and operating resources. Policy resource mainly refers to the policy support and tax preferences that enterprises obtain by relying on government capital; knowledge resource mainly refers to the information and skills acquired by enterprises, such as market development, new products and services, production operation, marketing and enterprise management; operating resource mainly refers to the plant, equipment, technology, capital and human resources acquired by enterprises.

The relationship network that the enterprise is in is the way for enterprises to obtain important resources. Especially, when the system is not perfect, it is very difficult and costly to obtain the required resources through the established ways. Therefore, the enterprise is more inclined to make up for this shortage through its relationship network. The enterprise relationship network will provide related resources to the enterprise based on trust, common language, common interests, and other reasons. The dimensions of corporate social capital, the density of relational networks, and the connections with surrounding networks will fully affect the number of ways, channels, efficiency, quantity, cost, and efficiency of obtaining resources, that is, the validity and breadth of resource acquisition, which have a direct impact on the innovation investment and operating efficiency of enterprises.

6.1.3 The moderating role of institutional environment and the degree of market competition

From the verification results of hypothesis 5 and hypothesis 6, the institutional environment has a positive moderating effect on the social capital, innovation investment and operational efficiency of medical enterprises. As an important factor to ensure financial development and

economic growth, a good institutional environment can effectively improve the enthusiasm of enterprises to carry out innovative activities and enhance their market competitiveness. As the institutional environment becomes more and more complete, enterprises are more willing to invest in innovation, and the operating efficiency is higher. A good institutional environment can protect the monopoly profits of enterprises and the exclusive rights of R & D achievements, stimulate the enthusiasm of innovative subjects to carry out innovative activities, thus speeding up the development of enterprises.

In the context of a highly complete institutional environment, intangible resources such as innovation achievements are not easy to be imitated or stolen by competitors, as the institutions in place can effectively protect innovation achievements and benefit innovators, stimulate the innovation motivation of enterprises and investors' confidence in innovation investment, and enhance product competitiveness for them to expand market share. Besides, a sound institutional environment can also reduce the risk of infringement of innovation achievements and intellectual property rights, encouraging enterprises to invest more in R & D and accelerating the growth rate of new products or services. At the same time, a good institutional environment can also improve the investment confidence of external investors and ease the financing constraints of enterprise innovation activities. The improvement of the institutional environment enables enterprises to dispel their doubts about the infringement or theft of innovation achievements by others. Thus, they are more willing to disclose the project information to external investors in detail, reducing the information asymmetry between the two sides, and reducing the risk of innovation investment. It is also beneficial for enterprises to obtain more external innovation investment, contributing to higher business performance.

A better institutional environment, strict market supervision and high information transparency can reduce the probability of enterprises using government-supported funds for fraudulent compensation and rent-seeking behavior, thus promoting enterprise innovation, and enhancing enterprise efficiency. Therefore, in a good institutional environment, the achievement of the innovation subject is more likely to be guaranteed, and the R & D risk of the enterprise is reduced, which is helpful to strengthen the positive effect of social capital on innovation investment and management efficiency.

From the verification results of hypothesis 7 and hypothesis 8, the degree of market competition has a negative moderating effect on the relationship between social capital and innovation investment and operating efficiency respectively. According to Schumpeterian Theory, when the market competition is relatively fierce, the income of enterprises obtained through technological innovation will be reduced, and at the same time, enterprises have to

bear great R & D investment and R & D risks, leading to a low enthusiasm to innovate. Therefore, under the circumstance of strong market competition, the role of corporate social capital in promoting innovation investment and business efficiency will be weakened. When the market competition is so fierce as to threaten the survival of enterprises, decision-makers often adopt conservative business strategies by reducing investment in technological innovation and avoiding risk-taking behavior. When the market competition has made enterprises to face survival crises, they often store cash to cope with market changes and competitive risks. Although increasing R & D investment can enhance the innovation ability of enterprises, in the case of extremely fierce market competition, continuous innovation investment may lead them into a dilemma. Especially for the projects with a long R & D cycle, large capital investment and high risk, in the case of fierce market competition and fast product iteration, the willingness of companies to invest in this kind of innovation will be reduced. In the long run, a conservative business strategy is not conducive to the improvement of efficiency, and it is difficult for the enterprise to obtain sustainable competitiveness.

6.2 Research contributions

Reviewing the research framework, research model and empirical results of this study, the main contributions are as follows:

First, this study seeks at not only analyzing the impact of corporate social capital on corporate innovation investment, but also examines its impact on corporate operating efficiency, improving the relevant research on the relationship between corporate social capital and corporate innovation and efficiency.

Second, with regard to the research on social capital, some studies, analyzing from the government dimension of corporate social capital, interpret entrepreneurs' political identity as the amount of social capital with the government and the relationship between the enterprise and the government, for example, whether entrepreneurs act as NPC deputies or whether they are CPPCC members. Similarly, the social capital with other organizations and the association capital are also judged by whether entrepreneurs or senior managers serve as other business executives or whether they serve in the association. The above situation only refers to the enterprise relationship network formed through the above-mentioned identity but, although no one in the enterprise serves in the above-mentioned organizations or associations, a good relationship network can still be formed through the relevant personnel in the above-mentioned entities, contributing to the enterprise obtaining the necessary resources. In

the case of getting resources without political identity, the "system hole" formed between enterprises, government personnel and NPC deputies also broadens the ways and increases the possibility for enterprises to obtain resources. According to the Civil Servant Law of the People's Republic of China (PRC), public officials are not allowed to engage in business, so entrepreneurs cannot hold corresponding positions in government agencies at the same time. According to the nomination conditions of candidates for deputies to NPC and the CPPCC, becoming the deputies requires the scale, popularity, and tax contribution of enterprises. According to an article published by People's Daily on March 23, 2022, titled *The Number of Private Enterprises Quadruples in 10 Years, from 10.857 Million in 2012 to 44.575 Million in 2021*, the newspaper obtained the data from China's State Administration for Market Regulation, that from 2012 to 2021, the number of private enterprises in China increased from 10.857 million to 44.575 million, and the proportion of private enterprises in the total number of enterprises increased from 79.4% to 92.1%. Most private enterprises are small-scale, and compared with large-scale SOEs, it is also difficult for them to obtain posts such as NPC deputies and CPPCC members (Lin, 2020). For senior managers, although they do not work in other enterprises or in relevant associations, through years of working in an enterprise, the relationship network they form with suppliers, customers, other partners, competitors, and industry associations can also provide more ways for enterprises to obtain resources.

Third, the accuracy of the conclusions can only be guaranteed by accurately measuring the innovation investment and operating efficiency of the enterprise. Existing research often directly use the enterprise's R & D expenditure or the proportion of R & D investment. When measuring the operating efficiency of an enterprise, they generally directly use the financial performance to measure the operating efficiency, such as sales income, asset turnover, and return on assets. However, limited by industry, the scale of enterprises in different industries is also different. The scale of enterprises in some industries is small, and the absolute value of their innovation investment and operating efficiency is low. On this basis, it is difficult to measure the real innovation investment and operating efficiency of enterprises. Therefore, by constructing the measurement scale of innovation investment and operating efficiency, this study compares the innovation investment and operating efficiency of enterprises with those of enterprises in the same industry, eliminating the impact of the industry.

Fourth, in this study, the external environment is divided into institutional environment and market environment and considers how corporate social capital affects the innovation investment and operating efficiency of enterprises in these two environments. In terms of the institutional environment, China's social economy is in transition, and the social capital of

enterprises may change with the development of society, so we must consider the impact of the current institutional environment on the effectiveness of corporate social capital. As for the market environment, introducing market competition environment into the path of corporate social capital, innovation investment and operating efficiency will help enterprises to better analyze the environmental pressure and make appropriate strategic adjustments after careful considering.

6.3 Management enlightenment

First, entrepreneurs or senior managers, especially those in small and medium-sized medical enterprises need to actively accumulate social capital, because rich social capital is conducive to broaden the breadth and depth of access to resources and is more conducive to increase innovation and improve efficiency. Indeed, entrepreneurs' accumulation of social capital is beneficial to obtain more resources needed for development and can strengthen the ability to cope with external risks. Through the government, other organizations or associations, enterprises can learn about relevant preferential policies and laws and regulations, and the support policies and relevant information for the industry in a certain region can also be obtained from the government to facilitate their development. Establishing a good relationship with customers and suppliers will provide a strong guarantee for the growth of the company, enhance the value of the overall value chain, and maintain or even improve profit. Establishing relations with competitors that understand the development of the industry can be beneficial in grasping market dynamics, reducing external market uncertainty and trial-and-error costs. Establishing contacts with relevant industry associations or technical organizations is helpful for enterprises to understand the development prospects or technological trends of the industry. In sum, actively expanding social relations may help enterprises to get more resources.

By constantly contacting new organizations and individuals, organizations can expand the periphery or the depth of their network, which means that they can contact and use more relationships, and that the reliability of such relationships is stronger. In turn, with the expansion and deepening of relationship networks, the enterprise accumulates more social capital. These two factors promote each other. The accumulation of social capital is the expansion and linking of relations and the development of enterprises is often inseparable from the support of various relationships. At the same time, enterprises are also in close contact with the surrounding resources every day, so they must have a clear understanding of

their own circle, industry and other structures and relationship networks, and actively take an important position in the network structure, which does not necessarily means to be the center of the whole network but rather an intermediary in a structural hole (Burt, 1995). Relationships are created and widely earned from the initiative of the business and its stakeholders. The extensive cooperative relationship is an important way for enterprises to obtain resources. At the same time, the degree and quality of the cooperation also determine the cost and efficiency of obtaining resources. In the fierce market environment, if enterprises want to survive and develop, they must know how to make rational use of their relationship network and take the initiative to maintain a good relationship with customers, suppliers, distributors, associations, universities, and government departments. From the extensive and high-quality external relationship network, enterprises can obtain important resources for their growth, including capital resources, knowledge resources, information resources, and operating resources.

Secondly, with the goal of adding value and increasing efficiency, existing incentive policies on technological innovation should be improved. First, the government needs to establish innovation-oriented policies, especially subsidies and tax breaks. On the whole, the social capital with the government owned by enterprises has a positive effect on innovation investment and operating efficiency. Today, with frequent public health risks, especially since the outbreak of COVID-19, both innovation and efficiency pose a huge challenge to the healthcare sectors of all countries in the world, especially for China, which has a population of more than 1.4 billion. It is necessary to constantly strengthen scientific research in the healthcare sector and enhance innovation and operational efficiency to realize the sustainable and high-quality development of the sector, which requires the participation of government, enterprises, and society. Therefore, when it is impossible to give up the policy means of government subsidies and tax relief in the short term, it is necessary to actively improve the policy environment, encourage and guarantee the innovation activities of enterprises from the institutional level, and consolidate the foundation of enterprise innovation.

Through the combination of government subsidies, tax concessions, intellectual property protection system, market-oriented reform and a fair market environment, a policy system that truly serves enterprise innovation can be established. The establishment of such a system is not only of great theoretical and practical significance for China to resolve major systemic public health risks that may occur at present and in the future, but also conducive to solving the realistic problem of the increasing aging population in the context of China’s changing population structure. According to the announcement in the Morning News program of

CCTV.com on October 17, 2021, the Second China Population and Development Forum held in Beijing, China on October 16, 2021pointed out that, in terms of China's elderly dependency ratio, the ratio was 11.9% in 2010 and 19.7% in 2020, an increase of 7.8% compared with 10 years ago. In terms of aging population, in 2020, there were about 260 million people aged 60 or above, 18.7% of the total population, and 36 million people aged 80 or above, 13.56% of the population aged 60 or above. The increase of elderly population puts forward higher requirements on the quantity and quality of medicine. Therefore, the research on the improvement of innovation input and operational efficiency of enterprises in China's healthcare sector is also of great practical significance for social governance.

Then, the increase of investment in innovation does not imply the improvement of enterprise efficiency. The absolute value of innovation investment encourages enterprises to improve the quantity of technological innovation rather than the quality. Different types of technological innovation incentive policies have different effects on the quantity and quality of technological innovation. Specifically, the universal policy represented by "the addition and deduction of R & D expenses" (*Enterprise Income Tax Law of the PRC and the Regulation on the Implementation of Enterprise Income Tax Law of the PRC*, and the *Notice of the Ministry of Finance, the State Taxation Administration and the Ministry of Science and Technology on Improving the Pre-tax Addition and Deduction Policies of R & D Expenditure* (Cai Shui, 2015) from the tax bulletin on the official website in November 2015 encourages enterprises to improve the quantity rather than the quality of technological innovation. The selective and supportive strategies represented by the identification of high-tech enterprises and income tax relief for high-tech enterprises (including *Enterprise Income Tax Law of the PRC* and *Announcement of the State Administration of Taxation on Issues concerning the Implementation of the Preferential Income Tax Policies regarding High-Tech Enterprises*) have both encouraged the increase of quantity and quality of technological innovation of enterprises.

In particular, the *Measures for the Administration of the Recognition of National High-tech Enterprise in 2020* enhanced cooperation and strength and improved the high-tech identification system. In what concerns the existing incentive policies for technological innovation, especially the universal type, it is necessary to increase the incentives for the quality of technological innovation, and really encourage enterprises to overcome difficulties, make up for weaknesses and catch up with the frontiers from the institutional level. As for discretionary policies, the causes of incentive failure from the source of the system should be determined, and enterprises should be guided to devote more resources and energy to

innovative activities. In addition, an in-depth analysis should be made on the impact of various policies on the innovation performance of enterprises in different industries, so as to formulate corresponding innovation incentive policies for enterprises in different industries, truly realizing the policy incentive of taking measures in accordance with local conditions and industry conditions, thus accurately and effectively promoting innovation performance in different industries.

By creating a good institutional environment, the government will help to increase the positive effect of social capital on enterprise innovation and efficiency as well as help enterprises to establish a sense of innovation and improve the efficiency of resource transformation. Judging from the results of this study, in the context of a good institutional environment, the promoting effect of corporate social capital on innovation investment and the innovative effect of social capital on operating efficiency will be enhanced. This means that the normative pressure brought by the strong external normative institutional environment will make enterprises make more active use of existing relationships and resources to carry out innovation activities and improve business efficiency. For example, since the 13th Five-year Plan, China has vigorously encouraged innovation and entrepreneurship, forming a good atmosphere of mass entrepreneurship and mass innovation, which has effectively improved the enthusiasm of enterprise innovation.

Thirdly, while accumulating social capital, enterprises should also pay attention to transforming it into enterprise resources and use the acquired resources for enterprise innovation and operating efficiency improvement, so as to achieve long-term development. This study shows that resource acquisition plays a mediating role between corporate social capital, innovation investment and operating efficiency, and enterprises can effectively improve innovation and efficiency only by transforming their capital into available resources. Therefore, how to obtain resources after the accumulation of social capital, how to use the acquired resources for innovation, and how to improve enterprise performance are also important issues for enterprises to enhance innovation and efficiency. From the verification results of the mediating effect, the institutional environment of the regions where medical enterprises are located and the market competition of the industry also affect the investment of corporate social capital in corporate innovation and the improvement of operational efficiency. In the process of innovation input and daily operation, one should pay attention to the institutional environment of the regions and the competition of the industry.

Fourth, for enterprises in China’s healthcare sector, they should seek the blue ocean market instead of being confined to the competition in the red ocean market, especially when

their current medical level lags behind that of international medical enterprises. As seen from the results of this study, the degree of market competition will negatively regulate the promoting effect of social capital on innovation investment and business efficiency. In the *Blue Ocean Strategy*, published by W. Chan Kim and Renée Mauborgne in 2005, the red sea market is depicted as follows: most companies operate according to self-imposed industry norms, in which the main purpose of the company is to surpass its competitors by introducing better or lower-cost products, so as to seize their market shares. Little room is left for enterprises to achieve substantial growth and profitability in a fiercely competitive market. Unlike those in the red ocean, blue ocean competitors fundamentally rebuild their competitiveness in the product category. They design new products and services, increase the perceived value of products, and reduce costs, so as to respond to the unmet needs of customers, thus creating a market space without competition, releasing new customer demand in the new market, and promoting the high growth of enterprises themselves. In addition, in the case of a low degree of competition, enterprises are more inclined to invest the resources obtained through social capital into the fields of enterprise innovation and efficiency improvement.

6.4 Research limitations

Although this study has strived to make the above contributions the following limitations should be noted:

First, this study collected sample data through a questionnaire survey having obtained a total of 211 valid questionnaires from enterprises in the healthcare sector. The sample needs to be reconsidered in terms of size, industry, and scope.

Second, the setting of the questionnaire scale: although the scales used in this study have been drawn from authoritative research in China and abroad and experts in related fields have been consulted, which provides reliability and validity, the measurement of the questionnaire is still quite subjective. Besides, in this study, the mediating variable, namely, resource acquisition is defined according to RBV rather than according to the dynamic capability view, which is also an important factor affecting enterprise innovation and efficiency improvement. Hence, further research is needed on how the dynamic resource acquisition ability of enterprises may affect their innovation and operating efficiency.

Third, the obtained data: as this study uses cross-sectional data, it is impossible to observe the dynamic change process of the investment of corporate social capital on enterprise

innovation or on the mechanism of operational efficiency improvement in different time intervals. Besides, China's institutional environment and market environment are in a process of continuous change. Cross-sectional data cannot reflect the different effects of the changes of institutional environment and market environment on the relationship between social capital, innovation investment and operating efficiency. In the future, we can consider using panel data to further study the dynamic change process and dynamic mechanism of social capital, and analyze which factors determine the speed and direction of corporate social capital from the perspective of the process. It should also be tried to explore the continuous impact of corporate social capital on innovation investment and operating efficiency, whether there is a change from positive to negative, and under different institutional environments and different market competition, the different effects of corporate social capital on innovation and efficiency.

Fourth, the control variables: the social capital of an enterprise is mainly accumulated through the social circle cultivated by entrepreneurs, so the entrepreneurs themselves are also an important element that affects social capital accumulation. This study introduces the entrepreneur's educational background as a control variable, but the entrepreneur's age and working experience are also factors that affect social capital accumulation. Therefore, it is also possible to further improve the impact of individual factors on corporate social capital accumulation.

6.5 Chapter summary

At the end of this study, this chapter mainly summarizes the discussion on the results of the research hypotheses put forward in Chapter 3. Based on the research conclusions, the contribution of the research is pointed out. In addition, according to the hypotheses verification, this chapter puts forward some enlightenment that may be useful for management from the point of view of the government and the enterprises. At last, it summarizes the problems and limitations of the research and brings about suggestions for the follow-up research.

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Annex A

Questionnaire on social capital, innovation investment and operational efficiency for private enterprises

I. Information about the main sponsors

1.Your gender is: (1) Male□ (2) Female□

2. Your year of birth:_____

3. Your highest academic qualification is.

A. Primary school and below□ B. Middle school□ C. High school or junior college□

D. College□ E. University□ F. Postgraduate□

4. Your current position in the business is:

A. Chairman/Executive Director or Director B. General Manager

C. Deputy General Manager D. Secretary to the Board of Directors

E. Chief Financial Officer F. Department Chief or other, and please fill it here_____

5. At present, what is the industry in which your business is engaged? (Select up to three main industries, please fill in the number of industry)

Major business 1 ( ) **Major business 2** ( ) **Major business 3** ( )

(1) Agriculture, forestry, animal husbandry and fishery	(2) Mining	(3) Manufacturing
(4) Electricity, gas, water production and supply	(5) Construction	(6) Wholesale and retail trade
(7) Transport, storage and postal services	(8) Accommodation and catering	
(9) Information transmission, computer services and software industry	(10) Financial sector	(11) Real estate
(12) Rental and business services	(13) Scientific research, technical services and geological survey industries	
(14) Water, environment and public facilities management	(15) Residential services other services	
(16) Health, social security and social welfare industries	(17) Education	(18) International organizations
(19) Public administration and social organizations	(20) Culture, sports and recreation	

6. Before starting your private business, did you work in any of the following organizations or enterprises: (You can choose more than one, if none please skip)

A. Party and government organs and institutions□

B. State-owned and collective enterprises□

C. Foreign-invested, Hong Kong, Macao and Taiwan enterprises□

D. Other private enterprises□

7. A. Do you belong to any of the following organizations?

(1) Communist Party of China (CPC)□

(2) Democratic Party □

(3) Did not join these organizations □

B. If you are a member of the Communist Party of China, do you hold positions in any of the following party organizations? (If not, please skip to the next question.)

a. Head or deputy secretary of an enterprise party committee (general branch or local branch)□

b. Deputy secretary or member of a township (street) party committee□

c. Serving as the head or deputy secretary of an urban residents committee or village party committee (branch) □

d. Serving on a party committee at the county level or above □

e. Did not serve as a member □

8. Have you ever held a position in the following grassroots organizations or government departments?

A. Serving as a director or deputy director in a village party committee or an urban residents committee □

B. Serving in a township (street) party committee □

C. Serving in a government department □

D. Did not serve in any of these organizations □

9. A. (1) You have served as a deputy to the National People's Congress for sessions and a member of the Chinese People's Political Consultative Conference. (If no, please skip to the next question)

(2) What is the highest level of NPC or CPPCC member you have served?

a. Township level □

b. District/County level □

c. Prefecture/City level □

d. Provincial level □

e. National level□

B. (1) Are you or your business a member of any of the following federations or associations?

a. Federation of Industry and Commerce □ b. Industrial associations □

c. Associations of technology related to the main product of the enterprise□

d. Member of other associations (please specify it here) _____

e. Not affiliated with a federation or association□

(2) At which level of FICCI do you hold a position? (If the position held involves more than two levels, please tick the highest level)

a. County/County-level □ b. Prefecture/City level □

c. Provincial level □ d. National level □ e. Did not hold a position □

II. Enterprise situation

10. How long has it been since your business was registered as a private enterprise?

A. 5 or less B. 5.1-10 years C. 10.1-15 years D. 15.1-20 years E. 20.1 years and more

11. The type of your business currently registered is:

A. One-person company□

B. Sole proprietorship□

C. Partnership□

D. Limited liability company□

E. Joint stock company□

12. What was the total number of employees in your company last year?

A. 20 and less B. 21-50 C. 51-200 D. 201-500 E. 501-1,000 F. 1,000 and more

13. What is the percentage of your personal source of funding when you register your private business?

A. Accumulation from individual business _____%

B. Inheritance_____%

C. Gifts from friends and family _____%

D. Bank loan_____%

E. Private lending_____%

F. Restructured assets of state-owned and collective enterprises_____%

G. Other (please specify it) _____ _____%

14. Production and performance of your enterprises in the last year:

Production and operation indicators	Sum of money	Production and operation indicators	Sum of money
Revenues	_____million	Total cost	_____million
Enterprise technology innovation, process transformation investment	_____million	Investment in new product development	_____million
Total assets	_____million	Asset-liability ratio	_____%

15. Currently, the proportion of intangible assets such as technology and brands in the total capital of your business is _____%

A. 0-10% B. 10.1-20% C. 20.1-30% D. 30.1-40% E. 40.1-50% F. 50.1-60% G.60.1% and above

16. (1) The government subsidies received last year accounted for _____% of your business's total revenue.

A. 0-10% B. 10.1-20% C. 20.1-30% D. 30.1-40% E. 40.1-50% F. 50.1-60% G.60.1% and above

(2) What percentage of the total revenue of your business was earned through incentives last year _____?

A. 0-10% B. 10.1-20% C. 20.1-30% D. 30.1-40% E. 40.1-50% F. 50.1-60% G.60.1% and above

(3) The financing amount obtained by your enterprise through enterprise relationship channels last year accounted for ___.

A. 0-10% B. 10.1-20% C. 20.1-30% D. 30.1-40% E. 40.1-50% F. 50.1-60% G.60.1% and above

17. What do you think is the extent to which the institutional environment for enterprise development has improved over the past two years?

(1) much□ (2) rather much□ (3) hard to say□ (4) did not change a bit □ (5) very bad□

18. Please tick the following options that best describe the status quo of the resources your business received from both the upstream and the downstream of the value chain last year. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree)

Access to resources from both the upstream and the downstream of the value chain	1	2	3	4	5	6	7
A. New technical or product resources were obtained from suppliers	□	□	□	□	□	□	□
B. New sources of raw materials were obtained from suppliers	□	□	□	□	□	□	□
C. New customer resources were acquired from old customers	□	□	□	□	□	□	□
D. New technical or product resources were acquired from customers	□	□	□	□	□	□	□
E. New market resources were acquired from cooperation with competitors or other enterprises	□	□	□	□	□	□	□

19. Please tick the following options according to the situation of the relationship between your business and external stakeholders last year. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree)

Your enterprise's relationship with external stakeholders	1	2	3	4	5	6	7
A. Extensive contact with officials of the government departments in charge of the industry	□	□	□	□	□	□	□
B. Extensive contact with officials in other government departments	□	□	□	□	□	□	□
C. Extensive contact with members of relevant party organizations	□	□	□	□	□	□	□
D. Extensive contact with members of the CPPCC or NPC	□	□	□	□	□	□	□
E. Extensive contact with the executives of your suppliers	□	□	□	□	□	□	□
F. Extensive contact with the executives of your competitors	□	□	□	□	□	□	□
G. More frequent interaction with your clients	□	□	□	□	□	□	□
H. Extensive contact with executives of other enterprises	□	□	□	□	□	□	□
I. Extensive contact with members of Federation of Industry and Commerce	□	□	□	□	□	□	□
J. Extensive contact with members of the trade association of your industry	□	□	□	□	□	□	□
K. Extensive contact with members of relevant technical associations	□	□	□	□	□	□	□

L. Extensive contact with members of other industrial associations	□	□	□	□	□	□	□

20. Please tick the following options according to the access to resources of your business last year. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree)

The access to resources of your enterprise	1	2	3	4	5	6	7
A. My enterprise received more financial subsidies from the government compared to other companies in the same industry.	□	□	□	□	□	□	□
B. My enterprise is supported by a favorable lending policy.	□	□	□	□	□	□	□
C. My enterprise is supported by favorable tax incentives from the government.	□	□	□	□	□	□	□
D. My enterprise gets the information it needs from the government to support its operation.	□	□	□	□	□	□	□
E. My enterprise has gained a head start in the market with government support.	□	□	□	□	□	□	□
F. The information on and the skills for market development essential to the operation of my enterprise are obtained from external sources.	□	□	□	□	□	□	□
G. The information on and the skills for developing new products and services are acquired externally.	□	□	□	□	□	□	□
H. The information on and the skills for management are acquired externally.	□	□	□	□	□	□	□
I. The information on and the skills for running the enterprise are acquired externally.	□	□	□	□	□	□	□
J. The information on and the skills for marketing are obtained from outside	□	□	□	□	□	□	□
K. Compared with other companies in the same industry, my enterprise has access to the capital it needs for operation at a lower cost.	□	□	□	□	□	□	□
L. Compared with other companies in the same industry, my enterprise can obtain more production facilities such as plants and equipment at a lower cost.	□	□	□	□	□	□	□
M. Compared with other companies in the same industry, my enterprise has access to more technical resources at a lower cost.	□	□	□	□	□	□	□
N. Compared with other companies in the same industry, my enterprise has access to labor resources at a lower cost.	□	□	□	□	□	□	□

21. Compared with the innovation input of other companies in the same industry, please tick the following options according to the status quo of your company (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree).

Innovation input	1	2	3	4	5	6	7
A. More funds invested in R&D	□	□	□	□	□	□	□
B. Having more R&D staff	□	□	□	□	□	□	□
C. More investments in developing new technology	□	□	□	□	□	□	□
D. More investments in developing new products	□	□	□	□	□	□	□
E. More investments in new equipment	□	□	□	□	□	□	□

22. Please tick the following options that best describe your enterprise's status of operation last year compared with other companies in the same industry (1=very low, 2=comparatively low, 3=somewhat low, 4=fair, 5=somewhat high, 6=comparatively high, 7=very high).

Operation indicators	1	2	3	4	5	6	7
A. Profit margin of the enterprise	□	□	□	□	□	□	□
B. Return on assets of the enterprise	□	□	□	□	□	□	□
C. Return on equity of the enterprise	□	□	□	□	□	□	□
D. Market share of the enterprise	□	□	□	□	□	□	□

23. Please tick the following options that best describe your enterprise's growth of some operation indicators compared with other companies in the same industry (1=very slow, 2=slower, 3=somewhat slow, 4=fair, 5=somewhat fast, 6=faster, 7=very fast).

Growth of operation indicators	1	2	3	4	5	6	7
A. Growth of business revenues	□	□	□	□	□	□	□
B. Development of new products or services	□	□	□	□	□	□	□
C. Growth in the market share of your products	□	□	□	□	□	□	□
D. The acceleration of liquidity	□	□	□	□	□	□	□

24. Compared with other companies in the same industry, please tick the following options to measure your company's technological innovation capability last year. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree)

Technological innovation capacity	1	2	3	4	5	6	7
A. Having filed more patent applications	□	□	□	□	□	□	□
B. Having issued more patent licenses	□	□	□	□	□	□	□
C. Having developed more new products	□	□	□	□	□	□	□
D. Having developed more new technologies	□	□	□	□	□	□	□

E. Having a higher return on R&D investment	□	□	□	□	□	□	□

25. Compared with other companies in the same industry, please tick the following options to measure your company's operating capacity last year. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree)

Operating capacity	1	2	3	4	5	6	7
A. Having a higher quality of managerial staff	□	□	□	□	□	□	□
B. Having an improved operational management system	□	□	□	□	□	□	□
C. Boasting more efficient financial management	□	□	□	□	□	□	□
D. Having a higher credit rating	□	□	□	□	□	□	□

III. Development environment of enterprises

26. A. Please tick the following factors that influence the business development environment in a positive way according to your knowledge. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree)

Factors affecting the favorable business development environment	1	2	3	4	5	6	7
A. Streamlined administrative approvals	□	□	□	□	□	□	□
B. The transition of the Capital Registration System from a paid-in register system to a subscription registration system	□	□	□	□	□	□	□
C. Reduced burden of corporate taxes and fees	□	□	□	□	□	□	□
D. Financing challenges have been eased	□	□	□	□	□	□	□
E. Increased service awareness of government departments	□	□	□	□	□	□	□
F. Other factors_____	□	□	□	□	□	□	□

B. Please tick the following factors that adversely affect the business development environment according to your knowledge. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree)

Factors that adversely affect the development environment of enterprises	1	2	3	4	5	6	7
A. Unreasonable access threshold	□	□	□	□	□	□	□
B. High cost of financing	□	□	□	□	□	□	□
C. Lack of talent, technology, and information	□	□	□	□	□	□	□
D. Lack of space and facilities	□	□	□	□	□	□	□
E. Heavy tax burden	□	□	□	□	□	□	□

F. Other factors_____	□	□	□	□	□	□	□

C. Please tick the options that best describe the main problems in market regulation according to your knowledge (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree).

Factors that adversely affect the development environment of enterprises	1	2	3	4	5	6	7
A. The existence of cross-cutting sectoral functions and duplication of regulation	□	□	□	□	□	□	□
B. There is a lack of clarity and interdependence in sectoral responsibilities.	□	□	□	□	□	□	□
C. There is a problem of unfair and selective enforcement.	□	□	□	□	□	□	□
D. There is a problem of lenient penalties and insufficient discipline	□	□	□	□	□	□	□
E. There is a problem of excessive penalties that affect the development of enterprises.	□	□	□	□	□	□	□
F. Other problems_____	□	□	□	□	□	□	□

27. Please tick the options that best describe the degree of market competition in the last two years during the development of your enterprise according to your knowledge. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=fairly, 5=somewhat agree, 6=agree, 7=strongly agree)

Level of market competition	1	2	3	4	5	6	7
The market competition in the past two years during the development of my enterprise has been very fierce.	□	□	□	□	□	□	□

If you have further comments or suggestions, please write them below.

_____

_____

We thank you again for your cooperation!

Survey collation records

Name of Investigator: _____ Date of Investigation: ____

Investigation Reviewer: _____ Reviewed on: _____

Name of coder: _____ Coded on: _____

Code Reviewer: _____ Reviewed on: _____

Name of entry clerk: _____ Entry on: _____

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Annex B

Table b1 Cronbach's alpha coefficient of corporate innovation input and operational efficiency

Dependent variables	Items	Item content	Cronbach's alpha coefficient
Innovation input	II1	More research and development funds invested	0.878
	II2	More research and development staff	
	II3	More investment in new technology development	
	II4	More investment in new product research and development	
Corporate operational efficiency	OE1	Growth speed of enterprise operating income	0.852
	OE2	Development speed of enterprise new products or services	
	OE3	Growth speed of enterprise product market share	
	OE4	Acceleration degree of enterprise capital turnover speed	

Table b2 Results of KMO test and Bartlett Test of Sphericity of corporate innovation input and operational efficiency

KMO sampling adequacy quantity		0.844
Bartlett Test of Sphericity	Approximate chi-square value	463.587
	Degree of freedom	28
	Significance	0.000

Table b3 Cronbach's alpha coefficient of corporate social capital

Independent variables	Items	Item content	Cronbach's alpha coefficient
Government capital	GC1	I or my enterprise has extensive contacts with officials from the competent government departments of the industry	0.860
	GC2	Extensive contacts with officials from other government departments	
	GC3	Extensive contacts with members of relevant Party organizations	
	GC4	Extensive contacts with members of the CPPCC or NPC	
Corporate capital	CC1	Extensive contacts with the executives of suppliers	0.719
	CC2	Extensive contacts with the executives of competitors	
	CC3	Increased interaction with customers	
	CC4	Extensive contacts with executives of other enterprises	
Association capital	AC1	Extensive contacts with members of the Federation of Industry and Commerce	0.828
	AC2	Extensive contacts with members of this industry association	
	AC3	Extensive contacts with members of relevant technology industry associations	
	AC4	Extensive contacts with members of other industry associations	

Table b4 Results of KMO test and Bartlett Test of Sphericity of corporate social capital

KMO sampling adequacy quantity		0.741
Bartlett Test of Sphericity	Approximate chi-square value	556.868
	Degree of freedom	66
	Significance	0.000

Table b5 Cronbach's alpha coefficient of corporate resource acquisition

Intermediary variables	Items	Item content	Cronbach's alpha coefficient
Policy resources	PR1	Compared with other enterprises in the same industry, we acquire more financial subsidies from the government	0.813
	PR2	My enterprise has acquired favorable loan policy support	
	PR3	My enterprise has acquired favorable tax incentive support	
	PR4	My enterprise has acquired information support from the government	
	PR5	My enterprise has acquired market opportunities with the support of the government	
Knowledge resources	KR1	Acquiring the information and skills needed for new products and services from outside	0.757
	KR2	Acquiring the information and skills needed for enterprise operation and management from outside	
	KR3	Acquiring the information and skills needed for enterprise operation from outside	
	KR4	Acquiring the information and skills needed for enterprise marketing from outside	
Operational resources	OR1	Compared with other enterprises in the same industry, my enterprise can acquire the operating capital needed by the enterprise at a lower cost	0.844
	OR2	Compared with other enterprises in the same industry, my enterprise can acquire more plants and equipment at a lower cost	
	OR3	Compared with other enterprises in the same industry, my enterprise can acquire more technical resources at a lower cost	
	OR4	Compared with other enterprises in the same industry, my enterprise can acquire labor resources at a lower cost	

Table b6 Results of KMO test and Bartlett Test of Sphericity of corporate resource acquisition

KMO sampling adequacy quantity		0.802
Bartlett Test of Sphericity	Approximate chi-square value	501.376
	Degree of freedom	78
	Significance	0.000

Table b7 Sources of R&D funding of enterprises in China's healthcare sector

Year	Government capital		Corporate capital	
	Absolute value	Ratio	Absolute value	Ratio
2011	127,310.30	6.10%	1,958,925.00	93.90%
2012	180,560.40	6.47%	2,608,510.40	93.53%
2013	204,243.00	5.96%	3,223,941.80	94.04%
2014	196,646.20	5.08%	3,676,105.10	94.92%
2015	208,934.40	4.78%	4,162,680.50	95.22%
2016	223,677.30	4.62%	4,621,319.00	95.38%
2017	206,069.00	3.92%	5,050,937.10	96.08%
2018	228,177.00	3.96%	5,536,163.00	96.04%
2019	292,811.20	4.80%	5,802,766.70	95.20%

Source: China Statistical Yearbook, National Bureau of Statistics, 2012-2020

Table b8 Statistics of Innovation output of China medical manufacturing industry

Year	Number of patent applications		Number of valid invention patents/number
	Total number of applications / number	Number of invention patent applications /number	
2012	14976	9050	15058
2013	17124	10475	19558
2014	19354	12620	24799
2015	16020	10019	31259
2016	17785	10483	37463
2017	19878	10886	41673
2018	21698	11494	45766
2019	23400	11883	47910
2020	29107	14633	56786

Source: China Statistical Yearbook, National Bureau of Statistics, 2013-2021

Table b9 Input and output of new product development in China's medical manufacturing industry

Year	Number of new product development projects	New product development expenditure (ten thousand yuan)	Sales revenue of new products (ten thousand yuan)
2012	19925	3,082,346.60	29,286,008.90
2013	26523	3,645,005.60	36,061,673.80
2014	24414	4,079,308.40	43,018,345.30
2015	22106	4,279,485.10	47,362,674.50
2016	25320	4,978,805.70	54,227,526.50
2017	28584	5,886,028.00	57,132,497.70
2018	31679	6,520,596.00	63,670,361.00
2019	36098	7,325,193.00	66,734,598.70

Source: China Statistical Yearbook

Table b10 Statistical description of the measurement items from large sample (N =211)

Measurand	Variable dimension	Variable items	Mean	Standard deviation	Skewness		Kurtosis	
					Value	Standard error	Value	Standard error
Social capital	Government capital	GC1	5.42	1.3068	-0.997	0.118	0.577	0.236
		GC2	4.371	1.3083	-0.255	0.118	-0.18	0.236
		GC3	5.413	1.2864	-1.006	0.118	0.705	0.236
		GC4	4.915	1.2471	-0.483	0.118	0.126	0.236
	Corporate capital	CC1	4.862	1.2896	-0.58	0.118	-0.003	0.236
		CC2	4.437	1.3238	-0.303	0.118	-0.133	0.236
		CC3	4.176	1.4404	-0.178	0.118	-0.48	0.236
		CC4	4.063	1.5211	-0.035	0.118	-0.575	0.236
	Association capital	AC1	4.878	1.3067	-0.529	0.118	0.007	0.236
		AC2	5.308	1.322	-0.739	0.118	0.241	0.236
		AC3	5.275	1.3078	-0.944	0.118	0.879	0.236
		AC4	4.603	1.4125	-0.38	0.118	-0.398	0.236
Resource acquisition	Policy resource	PR1	4.094	1.3601	-0.278	0.118	-0.322	0.236
		PR2	4.695	1.3463	-0.506	0.118	-0.257	0.236
		PR3	4.937	1.2284	-0.43	0.118	0.213	0.236
		PR4	4.96	1.2023	-0.503	0.118	0.088	0.236
		PR5	4.592	1.2787	-0.28	0.118	-0.363	0.236
	Knowledge resource	KR1	5.225	1.2062	-0.634	0.118	0.319	0.236
		KR2	5.15	1.2313	-0.501	0.118	-0.218	0.236
		KR3	5.188	1.2281	-0.562	0.118	-0.216	0.236
		KR4	5.202	1.243	-0.587	0.118	0.072	0.236
	operational resource	OR1	4.646	1.3508	-0.153	0.118	-0.656	0.236
		OR2	4.545	1.4222	-0.152	0.118	-0.773	0.236
		OR3	4.641	1.3391	-0.292	0.118	-0.484	0.236
		OR4	4.427	1.4473	-0.222	0.118	-0.602	0.236
Innovation input		II1	5.134	1.2512	-0.87	0.118	0.989	0.236
		II2	5.026	1.3743	-0.527	0.118	-0.102	0.236
		II3	5.07	1.3442	-0.619	0.118	0.165	0.236
		II4	5.223	1.2573	-0.877	0.118	1.044	0.236
Corporate operational efficiency		OE1	4.739	1.231	-0.398	0.118	-0.131	0.236
		OE2	4.793	1.2647	-0.293	0.118	-0.264	0.236
		OE3	4.756	1.2949	-0.407	0.118	0.082	0.236
		OE4	4.765	1.3039	-0.377	0.118	-0.084	0.236

Table b11 Statistics of factors affecting the improvement of corporate development environment (N=211)

	Item	Frequency	Proportion
Administrative review and approval procedures have been reduced	1 = Strongly disagree	4	0.94%
	2 = Disagree	9	2.11%
	3 = Slightly disagree	32	7.51%
	4 = Neither agree nor disagree	72	16.90%
	5 = Slightly agree	152	35.68%
	6 = Agree	115	27.00%
	7 = Strongly agree	42	9.86%
	Total	426	100.00%
Capital registration has changed from paid-in to subscribed	1 = Strongly disagree	2	0.47%
	2 = Disagree	5	1.17%
	3 = Slightly disagree	12	2.82%
	4 = Neither agree nor disagree	83	19.48%
	5 = Slightly agree	140	32.86%
	6 = Agree	141	33.10%
	7 = Strongly agree	43	10.09%
	Total	426	100.00%
Tax burden on enterprises has been reduced	1 = Strongly disagree	2	0.47%
	2 = Disagree	8	1.88%
	3 = Slightly disagree	28	6.57%
	4 = Neither agree nor disagree	53	12.44%
	5 = Slightly agree	141	33.10%
	6 = Agree	135	31.69%
	7 = Strongly agree	59	13.85%
	Total	426	100.00%
Financing difficulties have been eased	1 = Strongly disagree	5	1.17%
	2 = Disagree	18	4.23%
	3 = Slightly disagree	32	7.51%
	4 = Neither agree nor disagree	92	21.60%
	5 = Slightly agree	129	30.28%
	6 = Agree	108	25.35%
	7 = Strongly agree	42	9.86%
	Total	426	100.00%
Government departments have improved service consciousness	1 = Strongly disagree	1	0.23%
	2 = Disagree	2	0.47%
	3 = Slightly disagree	11	2.58%
	4 = Neither agree nor disagree	73	17.14%
	5 = Slightly agree	115	27.00%
	6 = Agree	142	33.33%
	7 = Strongly agree	82	19.25%
	Total	426	100.00%

Table b12 Statistics of factors affecting poor corporate development environment (N=211)

	Item	Frequency	Proportion
Access thresholds are unreasonable	1 = Strongly disagree	12	2.82%
	2 = Disagree	59	13.85%
	3 = Slightly disagree	84	19.72%
	4 = Neither agree nor disagree	100	23.47%
	5 = Slightly agree	100	23.47%
	6 = Agree	61	14.32%
	7 = Strongly agree	10	2.35%
	Total	426	100.00%
Financing costs are high	1 = Strongly disagree	10	2.35%
	2 = Disagree	29	6.81%
	3 = Slightly disagree	41	9.62%
	4 = Neither agree nor disagree	86	20.19%
	5 = Slightly agree	134	31.46%
	6 = Agree	96	22.54%
	7 = Strongly agree	30	7.04%
	Total	426	100.00%
Lack of talent, technology, and information	1 = Strongly disagree	17	3.99%
	2 = Disagree	21	4.93%
	3 = Slightly disagree	35	8.22%
	4 = Neither agree nor disagree	61	14.32%
	5 = Slightly agree	128	30.05%
	6 = Agree	107	25.12%
	7 = Strongly agree	57	13.38%
	Total	426	100.00%
Lack of fields and facilities	1 = Strongly disagree	21	4.93%
	2 = Disagree	38	8.92%
	3 = Slightly disagree	58	13.62%
	4 = Neither agree nor disagree	95	22.30%
	5 = Slightly agree	108	25.35%
	6 = Agree	81	19.01%
	7 = Strongly agree	25	5.87%
	Total	426	100.00%
The burden of taxes and fees is heavy	1 = Strongly disagree	16	3.76%
	2 = Disagree	28	6.57%
	3 = Slightly disagree	62	14.55%
	4 = Neither agree nor disagree	95	22.30%
	5 = Slightly agree	117	27.46%
	6 = Agree	74	17.37%
	7 = Strongly agree	34	7.98%
	Total	426	100.00%

Table b13 Main problems in market supervision (N=211)

	Item	Frequency	Proportion
There are problems of overlapping functions and duplicated supervision	1 = Strongly disagree	11	2.58%
	2 = Disagree	26	6.10%
	3 = Slightly disagree	50	11.74%
	4 = Neither agree nor disagree	76	17.84%
	5 = Slightly agree	146	34.27%
	6 = Agree	99	23.24%
	7 = Strongly agree	18	4.23%
	Total	426	100.00%
There are problems of unclear departmental responsibilities and mutual prevarication	1 = Strongly disagree	12	2.82%
	2 = Disagree	39	9.15%
	3 = Slightly disagree	47	11.03%
	4 = Neither agree nor disagree	63	14.79%
	5 = Slightly agree	126	29.58%
	6 = Agree	100	23.47%
	7 = Strongly agree	39	9.15%
	Total	426	100.00%
There are problems of unfair and arbitrary law enforcement	1 = Strongly disagree	25	5.87%
	2 = Disagree	48	11.27%
	3 = Slightly disagree	68	15.96%
	4 = Neither agree nor disagree	94	22.07%
	5 = Slightly agree	91	21.36%
	6 = Agree	79	18.54%
	7 = Strongly agree	21	4.93%
	Total	426	100.00%
There are problems of light punishment and insufficient penalties	1 = Strongly disagree	19	4.46%
	2 = Disagree	38	8.92%
	3 = Slightly disagree	78	18.31%
	4 = Neither agree nor disagree	88	20.66%
	5 = Slightly agree	110	25.82%
	6 = Agree	70	16.43%
	7 = Strongly agree	23	5.40%
	Total	426	100.00%
There are problems of excessive punishment that affects development	1 = Strongly disagree	29	6.81%
	2 = Disagree	46	10.80%
	3 = Slightly disagree	66	15.49%
	4 = Neither agree nor disagree	120	28.17%
	5 = Slightly agree	86	20.19%
	6 = Agree	58	13.62%
	7 = Strongly agree	21	4.93%
	Total	426	100.00%

Table b14 Reliability test results of large sample (N =211)

Measurand	Variable dimension	Variable item	Item-to-Total overall correlation	The α value after deleting this item	Cronbach's α coefficient
Social capital	Government capital	GC1	.610	.801	.827
		GC2	.672	.774	
		GC3	.689	.765	
		GC4	.648	.787	
	Corporate capital	CC1	.641	.750	.807
		CC2	.564	.787	
		CC3	.665	.737	
		CC4	.624	.757	
	Association capital	AC1	.547	.684	.746
		AC2	.577	.668	
		AC3	.544	.686	
		AC4	.507	.694	
Resource acquisition	Policy resources	PR1	.586	.777	.810
		PR2	.574	.780	
		PR3	.627	.765	
		PR4	.573	.781	
		PR5	.628	.764	
	Knowledge resources	KR1	.590	.639	.736
		KR2	.559	.658	
		KR3	.530	.676	
		KR4	.517	.685	
	operational resources	OR1	.615	.752	.801
		OR2	.614	.751	
		OR3	.653	.731	
		OR4	.585	.770	
Innovation input		II1	.523	.729	.764
		II2	.566	.707	
		II3	.569	.704	
		II4	.594	.691	
Corporate operational efficiency		O E1	.636	.771	.817
		O E2	.590	.792	
		O E3	.684	.749	
		O E4	.643	.768	

Table b15 Dimensionality reduction results of factor analysis of large sample (N=211)

Measurand	KMO value	Significance probability	Eigenvalue	Cumulative explained variance ratio
Social capital	.862	.000	1239.581	68.659
Resource acquisition	.655	.000	120.415	63.30
Innovation input	.851	.000	589.680	79.906
Corporate operational efficiency	.788	.000	281.186	64.658

Table b16 Factor loadings of variables in each dimension of social capital (N=211)

Variables	1	2	3
GC1	.118	**.725**	.213
GC2	.129	**.737**	.347
GC3	.155	**.790**	.209
GC4	.135	**.814**	.101
CC1	.154	.232	**.780**
CC2	.252	.384	**.575**
CC3	.122	.135	**.850**
CC4	.186	.214	**.721**
AC1	**.759**	.311	.144
AC2	**.843**	.025	.177
AC3	**.833**	.095	.242
AC4	**.875**	.189	.097