

**Social Capital, Organizational Learning and Enterprise
Performance: An Empirical Study on Pharmaceutical Companies
in China**

OUYANG Jingbo

Thesis submitted as partial requirement for the conferral of the degree of
Doctor of Management

Supervisor:

Prof. Virginia Trigo, Professor, ISCTE University Institute of Lisbon

Co-Supervisor

Prof. JIANG Hong, Professor, Southern Medical University

March, 2019



Instituto Universitário de Lisboa

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– Spine–

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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: 

Date: Mar. 6th, 2019.

Name: Ouyang Jingbo

作者申明

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Abstract

With the transformation and upgrading of China's industrial structure, the market-driven restructuring of the global pharmaceutical value chain and the innovation-led structuring of the pharmaceutical industry have led to increasingly fierce competition among pharmaceutical enterprises and the challenge is choosing to survive or to die. In order to meet these challenges, it is necessary for pharmaceutical enterprises to deeply carry out organizational learning. Therefore, what is the effect that various types of social capital have in promoting intra-organizational and inter-organizational learning in Chinese pharmaceutical enterprises? Which types of organizational learning should be adopted to achieve collaborative innovation and improve innovation performance of Chinese pharmaceutical enterprises, thus promoting their overall performance and sustainable development?

Combining empirical research with case study, including normative research, and from the perspective of exploratory learning and exploitative learning, this thesis makes a comprehensive and in-depth study of the impact of social capital on enterprise performance in Chinese pharmaceutical enterprises, theoretically explores the connections between the main research variables, constructs a theoretical model, and puts forward the hypotheses of this study. After validation, the main conclusions are drawn as follows: (1) External social capital is conducive to exploratory learning of pharmaceutical enterprises, while internal social capital is favorable for exploitative learning of pharmaceutical enterprises. (2) Exploratory learning of pharmaceutical enterprises plays a positive role in improving the ability of exploitative learning, but exploratory learning and exploitative learning have different impact on different aspects of enterprise performance. (3) Organizational learning plays an intermediary role between social capital and business performance of pharmaceutical enterprises.

Keywords: social capital; organizational learning; social network; corporate performance

JEL: M12; M54

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Resumo

Com a transformação e melhoria da estrutura industrial da China, a que se junta a reestruturação da cadeia de valor da indústria farmacêutica, mais orientada para o mercado e para a inovação, o desafio está entre sobreviver ou morrer e, para tal, as empresas desta indústria deverão introduzir na sua estrutura interna formas de aprendizagem organizacional contínua. Que efeito têm os diferentes tipos de capital social na aprendizagem intra e inter organizacional no caso das empresas farmacêuticas na China? Que tipos de aprendizagem organizacional devem ser adoptados para se conseguir melhorar a inovação nessas empresas e assim promover o seu desempenho e desenvolvimento sustentável?

Esta tese procura responder a estas perguntas através de um estudo empírico e da análise de um caso para, a partir da perspectiva das aprendizagens incremental e exploratória, estudar o impacto do capital social no desempenho das empresas farmacêuticas chinesas escolhidas como objeto de estudo. Teoricamente exploraram-se as relações entre as variáveis da pesquisa e elaborou-se um modelo conceptual a partir do qual se propuseram as hipóteses. Os principais resultados revelam que: (1) o capital social externo afeta positivamente a aprendizagem exploratória das empresas estudadas enquanto que o mesmo sucede com a influência que o capital social interno tem na aprendizagem incremental; (2) A aprendizagem exploratória desempenha um papel positivo na capacidade de melhorar a aprendizagem incremental mas ambos os tipos de aprendizagem têm impactos diferentes no desempenho das empresas estudadas; (3) a aprendizagem organizacional, refletida na interação entre as aprendizagens exploratória e incremental desempenha um papel mediador no desempenho das empresas objeto da amostra.

Palavras-chave: capital social; aprendizagem organizacional; redes de relacionamento; desempenho organizacional

JEL: M12; M54

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摘要

随着我国产业结构的转型升级，市场驱动的全球医药价值链的重构和创新驱动的行业结构化，金字塔分层式竞争日益激烈，生存或退出，如何从医药大国向医药强国消费转型？这就要求企业进行深入地学习。因此，如何利用不同的社会网络，动员各种社会资本促使我国医药企业进行内部和企业间的组织学习，如何通过不同类型的社会资本来实现组织间知识转移和转化并采取与之相匹配的组织学习方式，达到创新协同，提升中国医药企业的创新绩效从而带动企业综合绩效增长，实现企业健康可持续发展？

本文以实证研究与案例研究相结合，其中规范性研究，从探索式学习和利用式学习的视角，对中国医药企业社会资本影响企业绩效的机理进行了较为全面深入的研究，从理论上对相关变量之间的互动关系进行了探索，构建了理论模型，并提出了本文的研究假设。经过验证后主要得到如下结论：（1）外部社会资本有利于医药企业的探索式学习，而内部社会资本有利于医药企业的利用式学习。（2）医药企业的探索式学习有利于提高企业的利用式学习能力，但是探索式学习与利用式学习对不同的企业绩效具有不同的影响。（3）组织学习在社会资本和医药企业绩效之间具有中介作用。

关键词：社会资本；组织学习；社会网络；企业绩效

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How time flies! More than four years have passed before I know it. Looking back over the past four years through the journey of substantial and fruitful doctoral study, life and research practice, all sorts of feelings are now well up in my mind. Today, I can say proudly that I have successfully walked through the arduous yet delightful time. Although my thesis is still far from being perfect, there is no way I could have finished it without my supervisors' meticulous guidance, my classmates' generous help and my painstaking efforts.

I wish first to express my deep thanks to my supervisor Professor Virginia who offered me meticulous guidance and warmhearted support through the whole process of my thesis writing from research direction, thesis proposal, research design, research framework, questionnaire design, case study to thesis writing and finalization. Although she is fully occupied with her daily work, she still takes time to carefully review and comment on my thesis, sometimes deeper into midnight. In particular, this continues to happen even on her overseas business trip. Therefore, I'm immensely grateful for what she has done for me! Her solid and professional advice has massively contributed to the continuous improvement of my thesis. Her tireless zeal in teaching and rigorous scholarship has deeply impressed me. I am also particularly indebted to Professor Nelson for his professional guidance in and valuable suggestions to the thesis framework and questionnaire design, I feel very warm and touched!

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弹指一挥，转眼近五年。回顾四年多来读博期间的点点滴滴，感慨万千。经历了艰苦与快乐的学习、生活与实践，如今终于交上了一份答卷。虽然论文还未至完美，但凝聚了导师悉心的指导、同学们的无私帮助和自己艰苦的努力。

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Contents

Chapter 1: Introduction	1
1.1 Research background	1
1.1.1 Current situation and future development trend of global pharmaceutical industry.....	1
1.1.2 Overview of the development of pharmaceutical enterprises in China.....	3
1.1.3 Overall situation of the top 100 pharmaceutical companies in China.....	5
1.1.4 Sources of competitive advantage for the growth of Chinese pharmaceutical enterprises.....	9
1.2 Research problems	11
1.3 Research significance	13
1.3.1 Theoretical significance	14
1.3.2 Practical significance.....	14
1.3.3 Research contribution.....	15
1.4 Research methods.....	16
1.4.1 Normative research	16
1.4.2 Empirical test.....	16
1.4.3 Case study	18
1.5 Research framework and technical route	18
Chapter 2: Literature Review	19
2.1 Literature review of corporate social capital.....	19
2.2 Literature review on organizational learning	21
2.2.1 Connotations of organizational learning	21
2.2.2 Definition of organizational learning	22
2.2.3 Types of organizational learning	27
2.2.4 Theory of exploitative learning and explorative learning.....	30
2.3 Enterprise performance	37
2.3.1 Definition of enterprise performance	37
2.3.2 Dimensions of enterprise performance	37
2.4 Literature review on the relationships among social capital, organizational learning and enterprise performance	39
2.4.1 Relationship between social capital and organizational learning.....	39

2.4.2 Relationship between social capital and enterprise performance.....	43
2.4.3 Relationship between organizational learning and enterprise performance....	45
2.5 Limitations of existing research	47
Chapter 3: Research Hypotheses and Variables Measurement	51
3.1 Theoretical framework	51
3.1.1 Internal social capital and external social capital.....	51
3.1.2 Two modes of organizational learning: exploratory learning and exploitative learning.....	53
3.1.3 Conceptual model.....	54
3.2 Research hypotheses	55
3.2.1 Impact of social capital on organizational learning.....	55
3.2.2 Impact of organizational learning on enterprise performance.....	57
3.3 Variable measurement.....	60
3.3.1 Definition of social capital and its measurement	61
3.3.2 Definition and measurement of organizational learning	63
3.3.3 Measurement of control variables	64
3.3.4 Measurement of enterprise performance	64
3.4 Data collection.....	65
Chapter 4: Data Description and Control Variable Test	67
4.1 Sample descriptive Statistical Analysis.....	67
4.2 Factor analysis and reliability test	67
4.2.1 External corporate social capital	69
4.2.2 Internal corporate social capital	70
4.2.3 Exploratory learning.....	71
4.2.4 Exploitative learning	71
4.2.5 Enterprise performance	71
4.3 Analysis of the influence of control variables.....	73
4.3.1 Sample test according to the ownership nature of surveyed enterprises.....	73
4.3.2 Sample test according to industry classification	77
4.3.3 Sample test according to assets size.....	77
4.3.4 Sample test according to business performance of surveyed enterprises in 2018	85
Chapter 5: Hypothesis Test and Result Analysis	95
5.1 The relationships among external social capital, internal social capital, exploratory learning, exploitative learning, comprehensive performance and new product performance	95

5.1.1 The relational model regarding social capital, organizational learning and enterprise comprehensive performance.....	96
5.1.2 The relational model regarding social capital, organizational learning and new product performance	97
5.2 Model Test.....	97
5.3 Results of SEM analysis.....	98
Chapter 6: Case Study	105
6.1 Research design.....	105
6.1.1 Research method	105
6.1.2 Case selection	105
6.1.3 Case investigation	106
6.1.4 Collection of data	106
6.1.5 Methods to improve reliability and validity	106
6.2 ZGJK group — A synergistic growth model relying mainly on internal social capital and exploitative learning, and supplemented by external social capital and exploratory learning.....	107
6.2.1 Introduction to case company background.....	107
6.2.2 Internal and external social capital and organizational learning	108
6.2.3 Case summary	123
6.3 Summary	125
Chapter 7: Research Summary and Prospect	131
7.1 Research conclusions	132
7.1.1 Research conclusion 1	132
7.1.2 Research conclusion 2	133
7.1.3 Research conclusion 3	134
7.2 Theoretical contributions and practical significance.....	135
7.2.1 Theoretical contributions.....	135
7.2.2 Recommendations for the industry	137
7.3 Practical significance.....	139
7.4 Research limitations and future research direction	140
Bibliography.....	142
Webliography	151
Other Reference.....	153
Appendix 1: Questionnaire.....	155
Appendix 2: Interview Outline.....	171

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List of Tables

Table 1-1 Gross output value of pharmaceutical industry as percentage of GDP (2011-2016)	5
Table 1-2 Number change of pharmaceutical enterprises in different segments of sales revenue in ten years (2005-2015)	6
Table 1-3 Distribution of sales revenue of top 100 Chinese pharmaceutical enterprises in 2016	7
Table 2-1 Classification of corporate social capital	22
Table 2-2 Definitions of organizational learning along time	25
Table 2-3 Types of organizational learning	31
Table 2-4 Summary of research on explorative learning and exploitative learning	35
Table 2-5 Empirical studies on organizational learning and enterprise performance	48
Table 4-1 Basic statistical data of sampled enterprises	68
Table 4-2 Exploratory factor analysis of external corporate social capital	69
Table 4-3 Exploratory factor analysis of internal corporate social capital	72
Table 4-4 Exploratory factor analysis of enterprise exploratory learning	74
Table 4-5 Exploratory factor analysis of enterprise exploitative learning	75
Table 4-6 Exploratory factor analysis of enterprise comprehensive performance	76
Table 4-7 Variance analysis based on the ownership nature of surveyed enterprises (ANOVA)	78
Table 4-8 Multiple comparisons of differences in exploratory learning between enterprises with different ownership nature	79
Table 4-9 Variance analysis based on the industry categories of surveyed enterprises (ANOVA)	80
Table 4-10 Multiple comparisons of differences in financial performance between enterprises from various industry categories	81
Table 4-11 Variance analysis based on the total assets of surveyed enterprises (ANOVA)	87
Table 4-12 Multiple comparisons of differences in external social capital, organizational learning and new product performance between enterprises with different assets scale	88
Table 4-13 Variance analysis based on the total assets of surveyed enterprises (ANOVA)	92
Table 4-14 Multiple comparisons of differences in exploratory learning among enterprises with different business performance	93
Table 5-1 Correlation coefficient of research variables and discriminatory validity test	95

Table 5-2 Sorting order for variables according to factor load size	98
Table 5-3 Groups of items of variables	99
Table 5-4 Conclusion of structural equation model test	101
Table 5-5 Results of hypotheses test	102

List of Figures

Figure 1-1 Sales of global pharmaceutical market from 2000 to 2019	2
Figure 1-2 Variations and growth rate of gross industrial output of China's pharmaceutical enterprises from 2011 to 2016.....	4
.....	5
Figure 1-3 Comparison of growth rate of gross industrial output of Chinese pharmaceutical industry and GDP growth rate in the same period (2011- 2016)	5
Figure 1-4 Sales revenue growth of top 100 pharmaceutical enterprises from 2011 to 2015....	6
(Unit: 100 million yuan).....	6
Figure 1-5 Market concentration of top 100 pharmaceutical enterprises in China (2011-2016)	8
Figure 1-6 Distribution of the subcategories of top 100 pharmaceutical enterprises in 2005, 2010 and 2015	8
Figure 1-7 Research technical route	17
Figure 2-1 Key conditions for the definition of organizational learning	24
Figure 2-2 Organizational learning process	29
Figure 2-3 Organizational learning framework in transitional economy	38
Figure 2-4 Conceptual model concerning relationship between social networks, exploratory learning and exploitative learning	44
Figure 3-1 Research conceptual model	55
.....	96
Figure 5-1 Relationship between social capital, organizational learning and enterprise comprehensive performance	96
Figure 5-2 Relationship between social capital, organizational learning and new product performance.....	97
Figure 5-3 Structural equation model regarding the relationship between social capital, organizational learning and enterprise comprehensive performance	100
.....	100
Figure 5-4 Structural equation model regarding the relationship between social capital, organizational learning and new product performance	100
Figure 6-1 Theoretical model of this study	107

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Chapter 1: Introduction

1.1 Research background

China's pharmaceutical industry has become one of the fastest growing industries in China, with an annual growth rate of 15% (Southern Medicine Economic Research Institute, 2017). As any other organization, pharmaceutical enterprises are essentially a collection of resources and capabilities. The resources of pharmaceutical enterprises include not only tangible resources such as land, labor and capital, but also intangible resources such as knowledge and technology. More and more people have realized that the key resources that can form the core competitiveness and maintain the sustainable competitive advantage of enterprises are no longer the traditional tangible resources such as land, labor and capital, but the intangible resources such as knowledge and technology (Prahalad & Hamel, 1990; Barney, 1991). Among them, the knowledge, especially tacit knowledge grasped by pharmaceutical enterprises, is the most crucial source of the core competence of enterprises. The ability of pharmaceutical enterprises to absorb, transfer, transform and apply knowledge is the key factor of giving these enterprises a very competitive edge over rivals (Grant & Robert, 1996). People even argue that today's pharmaceutical enterprises are essentially the "warehouse of producing and applying knowledge" (Winter, 1988). The source of sustaining and creating competitive advantage is knowledge (Nonaka, Toyama, & Konno, 2000), which is true for a country or region, for individuals, and also for profit-oriented organizations. This study will focus on knowledge acquisition, absorption, transformation and application as important sources to help pharmaceutical enterprises to create and maintain sustainable competitive advantage. However, the key problem is how and where to acquire knowledge, and how to convert acquired knowledge into organizational capability through organizational learning and further create value more effectively.

1.1.1 Current situation and future development trend of global pharmaceutical industry

1.1.1.1 Market size and growth rate of global pharmaceutical industry

With the development of the world economy, the growth of the total population, the increasing number of aging population and the growing awareness of people's health concept,

as well as the advancement of urbanization in newly developed countries and the continuous improvement of medical insurance systems in various countries, the global pharmaceutical market shows a sustained growth trend. According to the statistics of IMS Health Inc. (2016), the global drug sales increased from 79.36 billion dollars to 103.45 billion dollars in 2010-2015, with an annual composite growth rate of about 5.4%, which is higher than the global economic growth rate in the same period. It is predicted that the annual composite growth rate of global drug sales will reach 4-5% between 2015 and 2019 (see Figure 1-1).

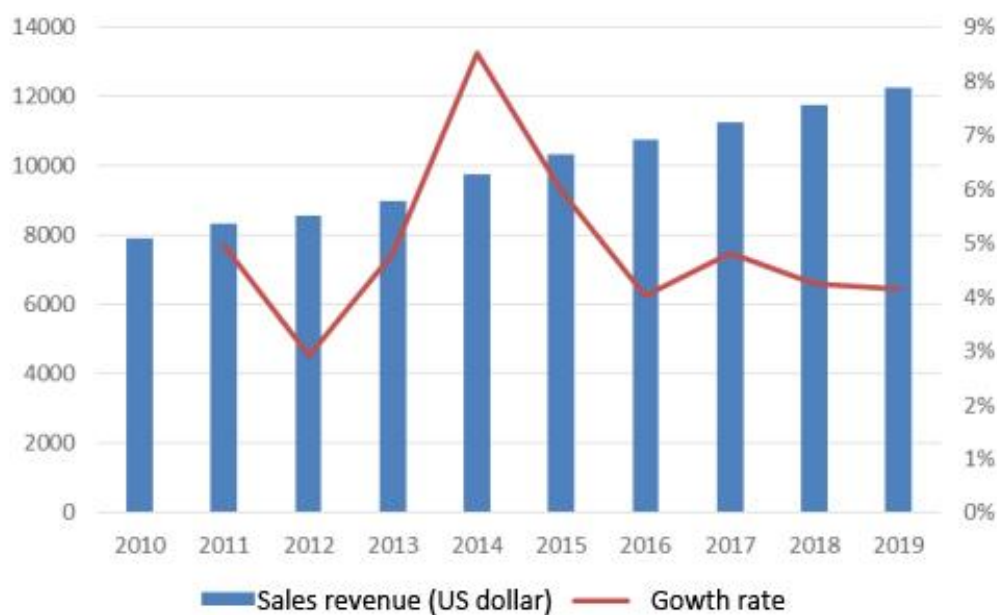


Figure 1-1 Sales of global pharmaceutical market from 2000 to 2019

Source: IMS Health Inc. (2016)

According to the statistics of IMS Health Inc. (2016), an authoritative pharmaceutical consultancy group, the growth rate of global pharmaceutical industry sales has surpassed global GDP growth in recent years. IMS Health Inc. (2016) forecasts that the global pharmaceutical market will present three major characteristics: the growth of developed countries' pharmaceutical market will slow down due to the expiration of patent drugs and the new round of budget crunch; the emerging countries' pharmaceutical market will contribute to 50% of the growth of the global pharmaceutical market; innovative drugs will lead to new treatments and therapeutic methods. By 2019, the overall sale revenues of the global pharmaceutical market will reach about \$1.3 trillion. The U.S. share of global drug sales will fall from 41% in 2005 to 33.7% in 2016, and the market share of European countries will also fall from 20% to 15%. In contrast, the share of emerging countries led by China has increased significantly, from 12% in 2005 to 29% in 2016 (IMS Health Inc, 2016). Emerging countries remain the key drivers of

growth in the global pharmaceutical industry.

1.1.2 Overview of the development of pharmaceutical enterprises in China

1.1.2.1 Analysis of current situation of top 100 pharmaceutical enterprises in China

In 2016, the total industrial output value of pharmaceutical enterprises above the designated size reached 3.1676 trillion yuan (see Figure 1-2), registering an increase of 10.7% from a year earlier and a decrease of 0.6 percentage points over the previous year; the profit of the pharmaceutical industry was 320.1 billion yuan, up 15.8% from a year earlier and increasing 3.5 percentage points over the same period last year (Southern Medicine Economic Research Institute, 2016 (see Figure 1-3); Southern Medicine Economic Research Institute, 2017). The proportion of the total output value of the pharmaceutical industry in GDP is increasing (see Table 1-1). However, there are some prominent problems as follows: the bottom-up social and commercial network is still underdeveloped; the overall ability of organization learning and technological innovation is weak; the investment in R&D is low; the high-quality talents are in shortage; innovation system remains to be improved; the product structure needs to be upgraded urgently; some drugs for critical and frequently occurring diseases as well as high-end diagnostic equipment still rely on imports; the production of biotechnological drugs is small in scale; the development level of pharmaceutical preparation is low; the new technologies for pharmaceutical preparations and packaging materials are inadequately developed and applied; industrial concentration is low; the pharmaceutical enterprises scattered everywhere are large in number but small in size; the serious low-level redundant construction results in excessive competition, waste of resources and environmental pollution; the guarantee level of drugs safety and quality needs to be improved, and the quality consciousness of enterprises needs to be urgently strengthened. Under this background, how to overcome the above problems and seize the opportunities has become the key to achieve sustainable development and obtain the core competitiveness.

The methods of acquiring and maintaining internal and external social capital of an organization need to change with the organizational strategies and market environment; different strategic directions and market strategies yield different combinations of organizational learning modes. New changes in the industry environment and intensifying industry competition set specific requirements for the utilization of various social resources and organizational learning ability. In order to integrate various social resources and organizational learning ability, it is necessary to deeply explore the matching mechanism of different types of

social resources and organizational learning modes and then re-examine the positioning of corporate strategy.

China is the world's second largest drug producer after the United States, capable of producing more than 1300 kinds of chemical medicine totally weighing up more than 800,000 tons (Southern Medicine Economic Research Institute, 2017). Despite this, only 60 types of China-made drugs have strong international competitiveness, which shows China is still a big but not strong drug producer. At present, the independent innovation ability and production technology level of Chinese pharmaceutical enterprises are still low. Most of the pharmaceutical enterprises start business from technological imitation. Due to the lack of the use of external capital, the organizational learning of enterprises has been in the primary stage. Simple imitation, replication and improvement of drugs already on the market put Chinese pharmaceutical enterprises at a disadvantage in the global competition. According to "The guidance of the Thirteenth Five-Year Development Plan for Pharmaceutical Industry (2016-2020)", the industry scale should achieve the target of annual average growth rate of more than 10%, and in terms of technological innovation, the growth of R&D investment should achieve the target of 2%.

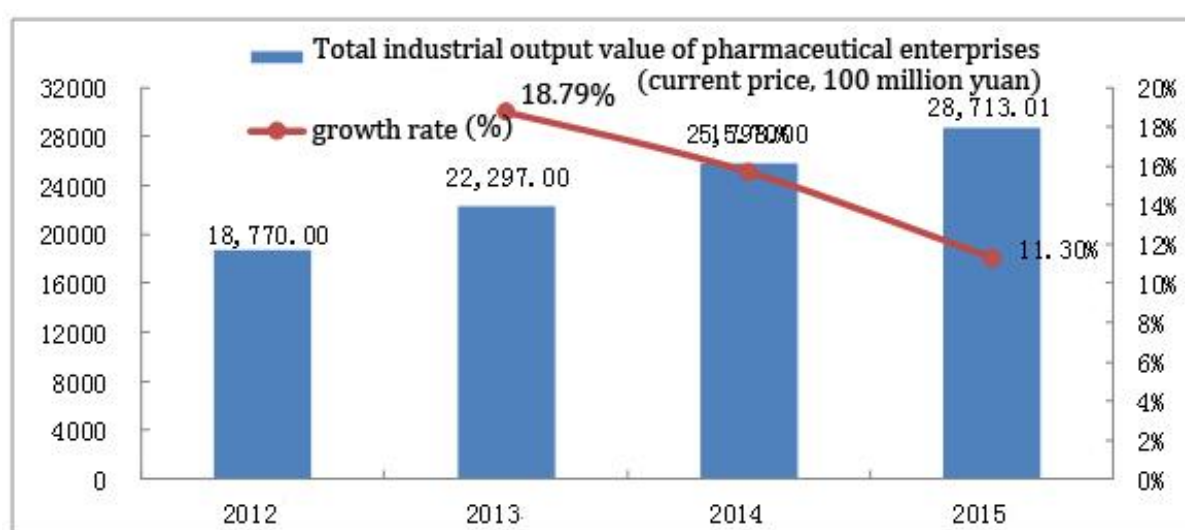


Figure 1-2 Variations and growth rate of gross industrial output of China's pharmaceutical enterprises from 2011 to 2016

Sources: Southern Medicine Economic Research Institute (2016)

Therefore, new requirements are put forward for the independent innovation ability of Chinese pharmaceutical enterprises. Knowledge has become the main driving force for productivity improvement and economic growth. Knowledge acquisition, creation and absorption can help build strong dynamic competitiveness for organizations. How to acquire

internal and external knowledge and social capital leading to such acquisitions in a more rapid and effective way and meanwhile match it with an efficient organizational learning mode has become the key to the growth of pharmaceutical enterprises.

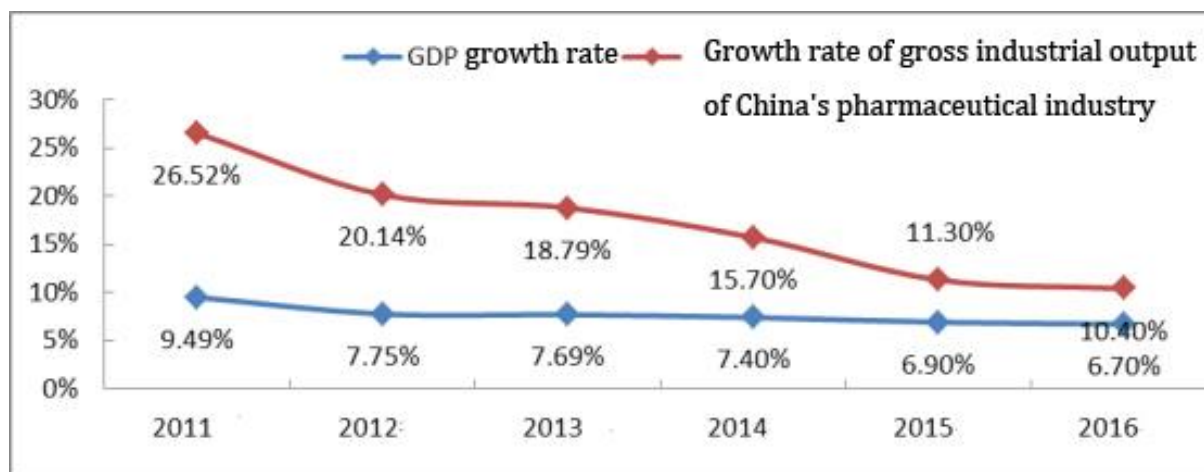


Figure 1-3 Comparison of growth rate of gross industrial output of Chinese pharmaceutical industry and GDP growth rate in the same period (2011- 2016)

Sources: Southern Medicine Economic Research Institute (2017)

Table 1-1 Gross output value of pharmaceutical industry as percentage of GDP (2011-2016)

Year	2011	2012	2013	2014	2015	2016
Percentage of GDP	3.23%	3.51%	3.79%	4.05%	4.24%	4.4%

Source: Southern Medicine Economic Research Institute (2017)

1.1.3 Overall situation of the top 100 pharmaceutical companies in China

The top 100 pharmaceutical enterprises in China are the main force of pharmaceutical manufacturing industry. Among the 5500 pharmaceutical manufacturing enterprises, the large-scale pharmaceutical enterprises accounting for less than 2% of the total have generated nearly a quarter of the total industrial sales revenue and profits. In contrast, 82% of the pharmaceutical enterprises with sales of less than 500 million yuan each have only contributed to a quarter of the total industrial sales revenue. In 2017, China's top 100 pharmaceutical enterprises generated 1.3085 trillion yuan in main business income, accounting for 47.8% of the sales revenue of China's pharmaceutical industry. Six of the top ten pharmaceutical enterprises reported sales revenue of more than 20 billion yuan respectively (Southern Medicine Economic Research Institute, 2017) (see Figure 1-4).

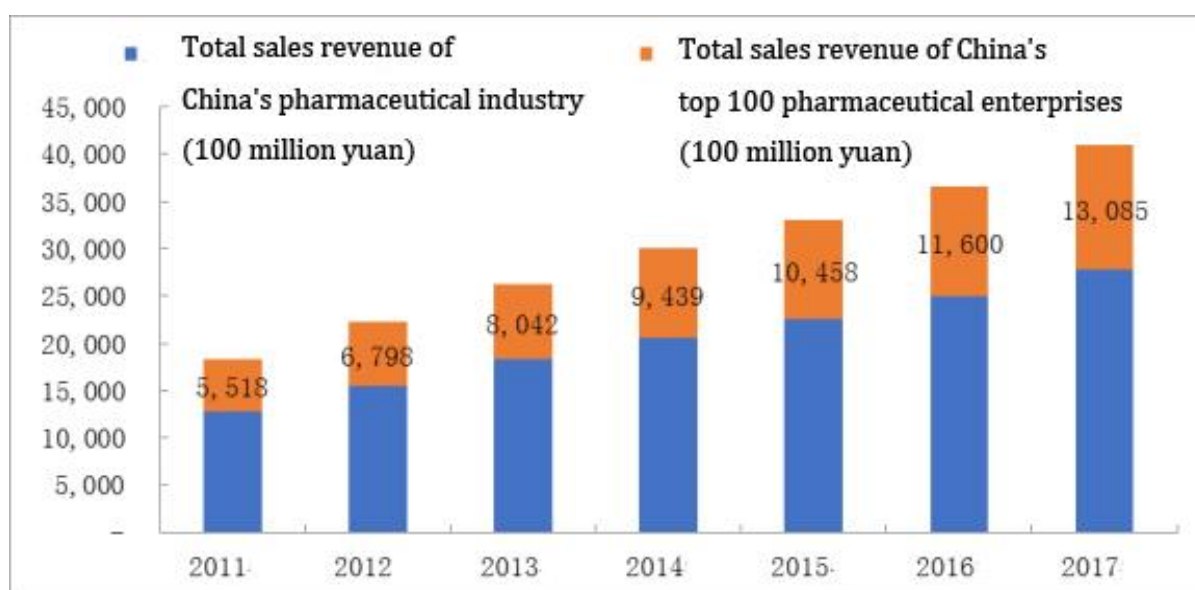


Figure 1-4 Sales revenue growth of top 100 pharmaceutical enterprises from 2011 to 2015
(Unit: 100 million yuan)

Source: Southern Medicine Economic Research Institute (2017)

Note: Considering the continuity and comparability of data, this analysis is based on the pharmaceutical enterprises in China including the registered subsidiaries of multinational pharmaceutical enterprises in China.

1.1.3.1 The changing trend of sales revenue of the top 100 pharmaceutical enterprises (2005 -2015)

In 2016, the total sales revenue of the top 100 pharmaceutical enterprises in China reached 1.16 trillion yuan. According to the changes of sales revenue in ten years among the top 100 pharmaceutical enterprises (see Table 1-2) (Southern Medicine Economic Research Institute, 2016), we can see that in 2005 a majority of the top 100 pharmaceutical enterprises (55%) had sales revenue of less than one billion yuan. In 2015, the sales revenue of most of the top 100 pharmaceutical enterprises (42) had ranged between two billion and five billion yuan.

Table 1-2 Number change of pharmaceutical enterprises in different segments of sales revenue in ten years (2005-2015)

Year	≥10 bn yuan	5~10 bn yuan	2~5 bn yuan	1~2bn yuan	<1bn yuan
2005	0	4	11	30	55
2010	5	21	48	26	0
2015	12	23	42	23	0

Source: Southern Medicine Economic Research Institute (2016)

Note: Considering the continuity and comparability of data, this analysis is based on the pharmaceutical enterprises in China including the registered subsidiaries of multinational pharmaceutical enterprises in China.

In 2010, the sales revenue of five pharmaceutical enterprises for the first time exceeded

ten billion yuan. By 2015, there were 12 pharmaceutical enterprises whose sales revenue was more than ten billion yuan, of which five had generated sales revenue of over 20 billion yuan. The sales revenue of 23 pharmaceutical enterprises was between 5 billion and 10 billion yuan. With rapid expansion of the top 100 pharmaceutical enterprises, the structural effect of the industry caused by market competition is gradually emerging (see Table 1-3). Therefore, innovative development is urgently needed.

1.1.3.2 Increasing concentration of top 100 pharmaceutical enterprises

The market concentration of pharmaceutical enterprises in China has gradually increased. The market shares the top 100 pharmaceutical enterprises in China, or known as market concentration rate, has seen a constant rise, from 38.9% in 2005, 44.20% in 2011 to 47.20% in 2016 (Southern Medicine Economic Research Institute, 2017) (see Figure 1-5). It is anticipated that with the acceleration of industrial integration, especially the industry reshuffle driven by quality consistency evaluation of generic drugs and introduction of dual-invoice system, as well as the strengthening of M&A and restructuring of enterprises, the market concentration of top 100 pharmaceutical industry will be further increased. Structured industry and innovation-driven development will become two major trends in the future development of pharmaceutical industry.

Table 1-3 Distribution of sales revenue of top 100 Chinese pharmaceutical enterprises in 2016

Sales revenue	Number of pharmaceutical enterprises	Proportion of the total (%)
≥10 bn yuan	16	20.20%
5~10 bn yuan	22	8.30%
2~5 bn yuan	45	6.60%
1~2bn yuan	17	1.50%

Source: Southern Medicine Economic Research Institute (2017)

1.1.3.3 Analysis on the distribution of the subcategories of top 100 pharmaceutical enterprises

Among the top 100 pharmaceutical enterprises in 2015, there were 53 chemical pharmaceutical enterprises, 39 traditional Chinese medicine enterprises and four biopharmaceutical enterprises (Southern Medicine Economic Research Institute, 2016).

Compared with 2005 and 2010, the number of chemical pharmaceutical enterprises decreased, while the number of traditional Chinese medicine enterprises and biopharmaceutical enterprises increased (see Figure 1-6).

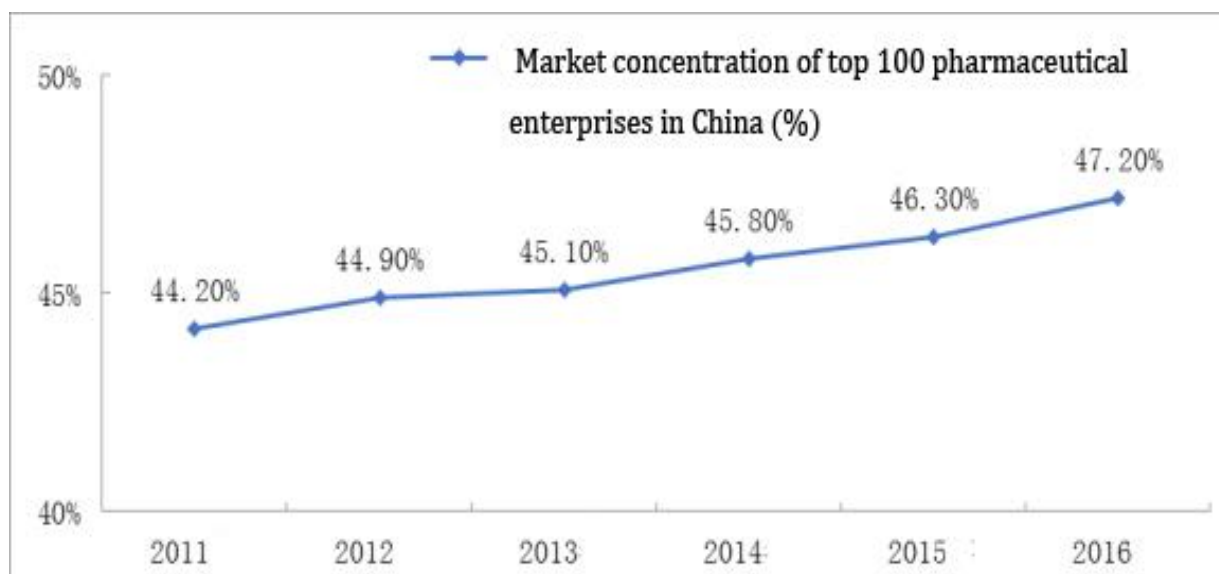


Figure 1-5 Market concentration of top 100 pharmaceutical enterprises in China (2011-2016)

Source: Southern Medicine Economic Research Institute (2017)

Note: Considering the continuity and comparability of data, this analysis is based on the pharmaceutical enterprises in China including the registered subsidiaries of multinational pharmaceutical enterprises in China.

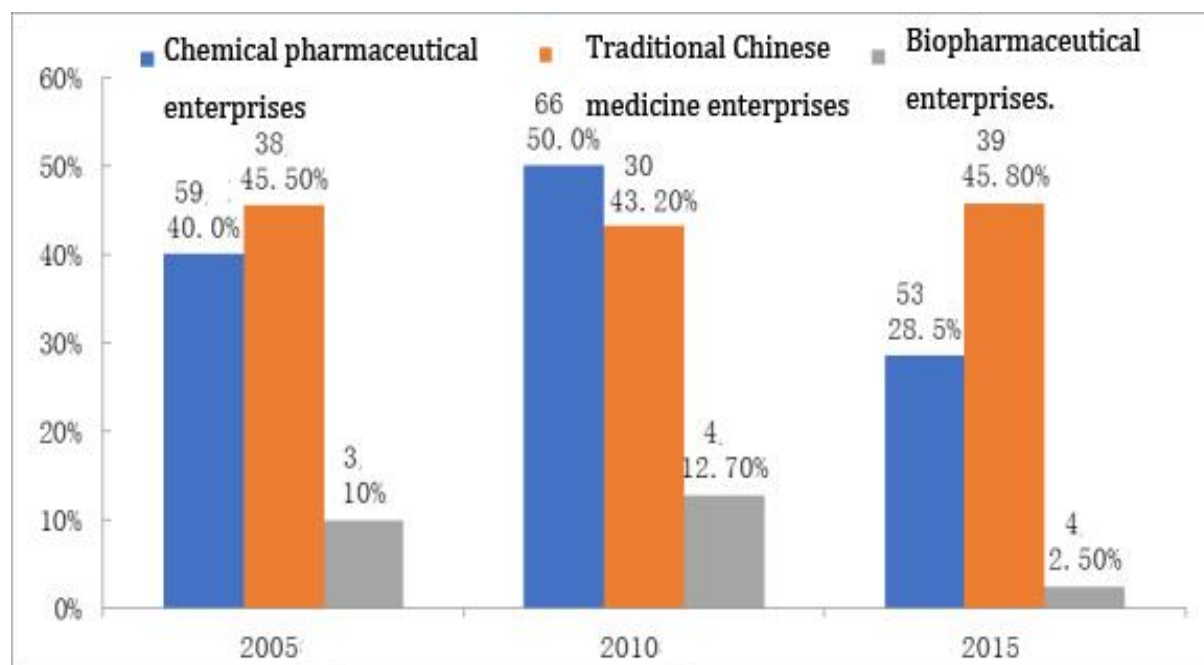


Figure 1-6 Distribution of the subcategories of top 100 pharmaceutical enterprises in 2005, 2010 and 2015

Source: Southern Medicine Economic Research Institute (2016)

Note: Considering the continuity and comparability of data, this analysis is based on the pharmaceutical enterprises in China including the registered subsidiaries of multinational pharmaceutical enterprises in China.

1.1.4 Sources of competitive advantage for the growth of Chinese pharmaceutical enterprises

1.1.4.1 Ways of acquiring corporate social capital by pharmaceutical enterprises

"Social network" refers to the relatively stable relationship system formed by interactions among individual members of society, which has become one of the important ways for people to communicate with each other, acquire information and display themselves. It is also the main way for enterprises to acquire and utilize knowledge. Social network analysis (SNA) investigates the structure of the members of a team from three levels: team leaders, core members and non-core members. In a time of knowledge-driven economy, a networked society is emerging rapidly. For both individuals and organizations, cooperation and common development are the main theme of this era. It is also the case with enterprises. In a dynamic environment, any do-it-alone behavior will eventually lead an enterprise towards failure. Today it is far from enough for enterprises to compete with opponents simply depending on their internal resources. Therefore, they must integrate all the available resources, including internal and external resources, to bring into full play the collaborative effect of resources.

It is proved that a good social network can improve the efficiency of knowledge creation, transfer and distribution. For example, the external knowledge accounts for about one third of the total knowledge required by enterprises for innovation. Therefore, when faced with new problems, enterprises must effectively integrate internal and external knowledge to solve these new problems. For instance, universities and research institutes have played an increasingly important role in enterprise technological innovation. They not only cultivate high-caliber talents with innovative consciousness and ability, but also provide knowledge for technological innovation, and even some of them have directly participated in technological innovation activities. However, it is difficult to transfer some exclusively-owned or commercially sensitive knowledge in implicit and encrypted form. In order to transfer this knowledge, it is necessary to establish close, trusted and lasting relationship with the individuals or enterprises possessing the knowledge. Knowledge transfer between enterprises often depends on how frequently and how well the concerned enterprises interact with each other. The long-term and sustained interaction between enterprises not only promotes the transfer of explicit knowledge, but also accelerates the transfer of tacit knowledge and skills. The closer the relationship between an enterprise and the outside world is, the stronger its knowledge absorption ability is, and the more opportunities there are for learning and acquiring knowledge. Moreover, successful innovation cannot be achieved without some tacit factors, especially tacit knowledge, which

can only be derived from outside through social network. Embeddedness theory in social network analysis holds that any action of actors is not isolated, but interrelated. The connections between them form the channels for information and resources transfer. The structure of network relationship often plays a decisive role in action opportunities and results. Some researchers found that the intensity of interactions among employees, network density and trust have a positive impact on knowledge sharing behavior. Other studies have shown that knowledge sharing becomes easier in a relatively decentralized organizational structure. Actors' knowledge sharing behaviors and characteristics are interrelated and interacted with their social network in which they operate, thus forming the social network of the pharmaceutical industry community.

1.1.4.2 Organizational learning and enterprise performance of pharmaceutical enterprises

Organizational learning is an effective way for enterprises to convert knowledge into core competitiveness and improve business performance. At the time of knowledge-driven economy, enterprises are confronted with the problem of how to transform crucial intangible resources such as knowledge into their core competence and further promote business performance and enterprise development. Every enterprise is a node in the cooperative network system and its actual networking capability will directly affect the innovation performance of the enterprise, which has aroused the interests of scholars, and therefore the enterprises' networking capability and innovation performance have been gradually studied. However, the research on the impact of the path and mechanism on these two factors is still rare. Organizational learning may be an effective mechanism to achieve this goal. Senge (1990) pointed out that the only source of future competitive advantage is the knowledge that an organization possesses and the ability to learn faster than its competitors. Drucker (1993) also believed that enterprises can get huge returns from knowledge investment, which will gradually become the competitive advantages of enterprises. Therefore, it is crucial for an organization to have the ability to learn, acquire and accumulate knowledge. With such ability, the organization can transform the individual knowledge into organizational knowledge and develop its ability to adapt to the environment through continuous learning. Continuous organizational learning will increase the accumulation of organizational knowledge, and further convert this knowledge into organizational memory in order to realize the process of creating value through knowledge.

Enterprises need to use social networks to integrate the required knowledge resources. In addition, the rise and development of social network theory provides a new perspective for

understanding innovation activities. The application of social network analysis in the field of innovation begins with the finding of the impact of innovation network formed by inter-firm alliance on innovation performance. Relevant studies found that the position of an organization in the network is positively correlated with its innovation performance. At the same time, enterprises playing connecting role between different firms can transfer knowledge and information among multiple enterprises. This position advantage is conducive to enterprise innovation and can be further transformed into enterprise competitive advantage. In addition, social network analysis has many applications in individual innovation. However, how organizations can break through their limit of learning ability to learn from more excellent organizations is a problem and challenge faced by organizations. Meanwhile, organizational learning can help enterprises build consensus among members, strengthen their identification with the organization and unite the members as one towards common goals, ultimately increasing the accumulation of internal social capital and forming the best learning team.

Therefore, more attention should be paid to how pharmaceutical enterprises should effectively use the relationships formed by cooperation with others to acquire and integrate knowledge and other resources, and how to transform acquired knowledge resources into core competitiveness through effective organizational learning, so as to improve organizational performance. In recent years, many pharmaceutical enterprises in China have attempted to improve their business performance by establishing enterprise groups, by mergers and acquisitions, reorganization and diversified business, but most of them produce very little effect or have lost momentum. The real reason is that most pharmaceutical enterprises have generally paid little attention to the cultivation of independent innovation ability and core competitiveness. The changes of economic situation and macro-policy environment at home and abroad have put forward higher requirements for the adaptability and dynamic competitiveness of pharmaceutical enterprises; especially, most pharmaceutical enterprises in China are still at an early stage of development. In order to maximize the benefits with the least resources, it is necessary for pharmaceutical enterprises to make good use of the available resources, flexibly use the internal and external social capital in the social network as well as improve and optimize the organizational learning mode, so as to enhance the business performance. This is the main theme of this thesis.

1.2 Research problems

China's pharmaceutical industry has great potential for development, but the industry

competition is fierce; therefore, how should the industrial structural evolution and innovation-driven strategy be balanced?

Like the entrepreneurs in other industries, the entrepreneurs of pharmaceutical enterprises have also noticed the huge wealth effect created by the social capital and therefore they all try every means to acquire more social capital. In order to promote the further development of enterprises, they establish enterprise social networks to obtain more scarce resources and market opportunities, and constantly accumulate social capital and strengthen organizational learning. But it is also noted that there is no guarantee that strong social capital and better organization learning will certainly result in good business performance, as evidence by the facts that when some enterprises are experiencing rapid development, some remain stagnant or even retrogress.

Taking a specific example, Kunming Pharmaceutical Corp., a large pharmaceutical backbone enterprise in the Chinese pharmaceutical industry located in Kunming with a registered capital of 58.18 million yuan, upholds the concept of collaborative innovation and consolidation of value chain, but it eventually failed in the acquisitions of other pharmaceutical enterprises. As another example, despite its strong brand marketing channels and rich social capital, Haier Pharmaceutical Cop., located in Qingdao, invested more than 90 million yuan to build a large pharmaceutical company as the only national-level marine drug pilot base in China but is struggling to survive. Therefore, more social capital does not ensure better organizational learning; however, good organizational learning will inevitably lead to rapid development of enterprises. Then what is the rationale for this phenomenon? If we just combine equity with organizational learning from an overall perspective and explore their impact on enterprise performance, there is still much research to be done in order to fully explain the phenomenon.

From the practical point of view, faced with fierce competition of the global market, pharmaceutical enterprises have increased their investment in knowledge acquisition and transformation, and carried out various organizational learning activities. However, China is a country with a pharmaceutical industry still at its early stage of development. Most of China's pharmaceutical enterprises use their own network and social capital to study and imitate the foreign advanced methods and technologies of drugs production. The simple imitation, duplication and improvement of existing knowledge and technologies, known as exploitative learning, makes it difficult for Chinese pharmaceutical enterprises to make knowledge innovation (exploratory learning) which can lead to spiraling increase of knowledge (Nonaka, Toyama, & Konno, 2000). With the rapid development of China's economy and the arrival of the big health industry, higher requirements are put forward for the independent innovation

ability of pharmaceutical enterprises. This requires pharmaceutical enterprises not only to maximize the value of existing knowledge through exploitative learning, but also to constantly create new knowledge through exploratory learning. From the theoretical point of view, some scholars currently focus more on the relationship between organizational learning and enterprise performance but fail to consider the matching of different ways of organizational learning and different types of social capital, and the possible impact of different combinations on enterprise performance. In fact, the relationship between social capital and organizational learning is not linear; and some unique impact mechanism and path dependence may exist.

For this reason, based on the existing research results - that is, pharmaceutical enterprises can effectively access and mobilize the resources needed, especially knowledge, to improve their business performance - this study aims at exploring the impact mechanism among social capital, organizational learning and business performance. Further, by differentiating exploratory learning and exploitative learning, the study examines the differences in their roles between social capital and business performance, thus demonstrating that the specific kinds of knowledge acquired by pharmaceutical enterprises through different forms of social capital can be effectively transformed into the core competence and market dynamic competitiveness of enterprises only by adopting a matching learning mode.

This study mainly focuses on the following research problems:

(1) What are the differences between exploratory learning and exploitative learning in the utilization of internal and external social capital of pharmaceutical enterprises in China?

(2) How does exploratory learning and exploitative learning affect the comprehensive performance and innovation performance of pharmaceutical enterprises respectively?

(3) How to achieve knowledge transfer and transformation among organizations through different types of social capital and matching organizational learning methods, so as to improve the innovation performance and comprehensive performance of Chinese pharmaceutical enterprises?

1.3 Research significance

Owing to the fierce market competition, social capital has become the unfailing driving force for the survival and development of enterprises. Social capital can help enterprises gain more insight into and access resources with potential value and enterprise characteristics, thus generating some heterogeneous capabilities that are difficult to be imitated and surpassed by competitors. Therefore, the research on the relationship between corporate social capital,

organizational learning and business performance can not only promote the further development of technological innovation theory, but also has a strong guiding significance for the growth of all organizations in general and pharmaceutical enterprises in particular.

1.3.1 Theoretical significance

Considering the current importance of big data, depending only on enterprise internal resources has been insufficient to stand the severe market test. In order to survive the fierce competition, it is necessary for enterprises to make full use of external resources. Those organizations with close ties with entities such as universities, government, customers, research institutes or suppliers have been proved to succeed. However, in the fast-growing pharmaceutical industry there is still insufficient empirical research on the relationship between corporate social capital, organizational learning and corporate performance.

How to improve the competitiveness of pharmaceutical enterprises through corporate social capital has become a topic of concern to academic and business circles. The traditional development mode of enterprises has shifted towards a brand new type of mode featuring openness, cooperation, networking and dynamic integration. Based on the data gleaned from the questionnaire survey among Chinese pharmaceutical enterprises, and the systematic review of the relevant research literature on social capital, this study proposes a conceptual model assuming that social capital can promote enterprise performance by positively influencing organizational learning and a quantitative analysis of it is conducted.

1.3.2 Practical significance

Although the theory of social capital is still being hotly debated and it is hard to find a common ground among theoretical circles, in the pharmaceutical industry activities related to social capital have been actively carried out.

The enlightenments from this study business practice are as follows: Nahapiet and Ghoshal (1998) asserted that differences in business performance can partially reflect the ability of enterprises to acquire and utilize social capital. Our study aims at proving that investment in the internal and external social capital can help improve enterprise performance. Efforts should be made to establish internal and external networks, including connections with enterprises inside and outside the industry, and actively promote the balanced allocation of external and internal social capital so as to help enterprises grasp existing knowledge and expand new areas of knowledge. In order to promote exploratory learning and exploitative learning,

pharmaceutical enterprises should make efforts to create an atmosphere in favor of organizational learning

Pharmaceutical enterprises should offer opportunities for employees to enhance social interaction, share common vision and participate in decision-making, so that they can increase mutual trust and have the opinions and ideas align with each other. Specifically, and as subjects of this research, pharmaceutical enterprises should recognize the importance of exploratory learning and exploitative learning and, in order to survive and develop sustainably, they should consciously promote the balance between exploratory learning and exploitative learning. If the level of exploitative learning of a pharmaceutical enterprise is relatively low, the enterprise should take measures to carry out exploratory learning so as to achieve higher enterprise performance. Conversely, if the level of exploratory learning and exploitative learning in a pharmaceutical enterprise are both high, such organizational learning may negatively affect enterprise performance. This is because exploratory learning and exploitative learning are intrinsically different. When the level of exploratory learning and exploitative learning exceeds a certain limit, excessive innovation may occur, which makes it impossible for pharmaceutical enterprises to effectively manage and develop sustainably.

1.3.3 Research contribution

This study aims to contribute to both theory and practice in the following three aspects:

(1) Based on the literature review of the relationships among corporate social capital, organizational learning and business performance, we develop a conceptual model concerning social capital, organizational learning and business performance using China's pharmaceutical enterprises as subjects, put forward the research hypotheses and discuss the relationships among them, which may enrich the research results regarding social capital, and may have certain reference significance and value for qualitative and quantitative research on social capital of pharmaceutical enterprises in particular.

(2) Previous studies have mainly separately analyzed the impact of different organizational learning methods on the performance of pharmaceutical enterprises from a static perspective, thus neglecting the interactions among various organizational learning modes. Therefore, it is difficult to fully explain the actual impact of organizational learning on their performance. For this reason, this study explores the combined effect of different organizational learning methods on the performance of pharmaceutical enterprises, in an attempt to make up for these shortcomings.

(3) With Chinese pharmaceutical enterprises as research objects, this study discusses how various dimensions of social capital of pharmaceutical enterprises affect their business performance through different organizational learning modes thus realizing the integration of social capital, organizational learning and technological innovation research, expanding the research and application fields of organizational learning, and enriching organizational learning theory.

1.4 Research methods

Normative research, empirical tests and case study are used in combination in this study.

1.4.1 Normative research

Normative research is mainly used in the first and second chapters. Firstly, based on the review of relevant foreign and Chinese literature, the study summarizes the main research results relating to corporate social capital and organizational learning, analyses the limitations of existing research; secondly, on the basis of the latest research results of social capital theory and organizational learning theory, the relationship between the two is explored; thirdly, from the perspective of exploratory learning and exploitative learning, we study the impact mechanism of social capital on the performance of pharmaceutical enterprises, theoretically explores the interactions between relevant variables, constructs the theoretical model, and puts forward the research hypotheses. The aim is not only to collect facts but to understand in which ways technological innovation performance of China's pharmaceutical companies can be improved.

1.4.2 Empirical test

This method is mainly used in the third, fourth and fifth chapters. Firstly, a questionnaire is distributed, the data collected and statistically processed using RI386 3.5.2 software. The research hypotheses in the conceptual model are empirically tested by correlation analysis, principal component factor analysis and structural equation modeling analysis; secondly, according to the results of theoretical analysis, the financial data of listed pharmaceutical companies in China are collected from online public databases, and the collected data are processed and compiled into standard samples to study the mediating roles of exploratory learning and exploitative learning in the relationship between social capital and business

performance of pharmaceutical enterprises by grouping test and multiple regression analysis.

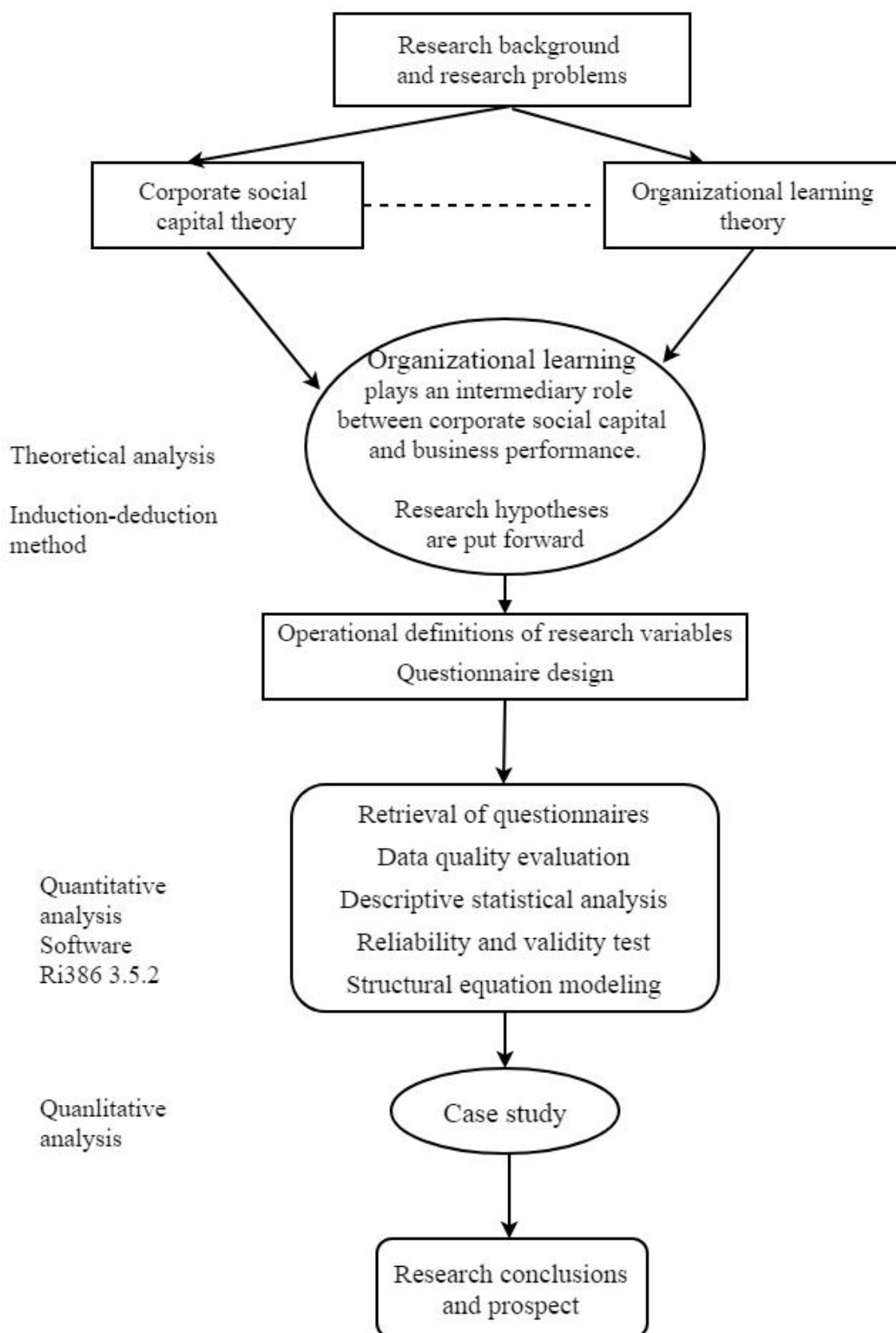


Figure 1-7 Research technical route

1.4.3 Case study

This method is used in the sixth chapter. Using the strategic planning of a typical Chinese pharmaceutical enterprise as a case study, the thesis studies the value integration in the early, middle and late stages of growth after the strategic planning is formulated, compares the innovation performance and comprehensive performance before and after M&A, and examines the impact of exploratory learning and exploitative learning on business performance respectively when they are used in combination with different kinds of social capital.

1.5 Research framework and technical route

Based on the latest research results and first-hand survey data, the study uses various research methods to carry out in-depth analysis on corporate social capital, organizational learning and technological innovation performance. The technical route in this study is shown in Figure 1-7. This thesis is organized in seven chapters: introduction, literature review, research hypothesis and variable measurement, data description and control variable test, hypotheses test and result analysis, case study, and research summary and prospect.

Chapter 2: Literature Review

2.1 Literature review of corporate social capital

There is still no set and commonly agreed view as to the classification and dimensions of corporate social capital in academic circles. Early foreign research studied social capital respectively from individual perspective (Burt, 1992; Lin, Fu, & Hsung, 2002) and from group perspective (Coleman & James, 1988; Bourdieu, Ronsin, & Chatenay, 1993).

The book *Economic Behavior and Social Structure: Embeddedness* published in 1985 is a classic work on embeddedness theory, which has been most cited by many scholars. In subsequent studies, Granovetter (1985) further classified embeddedness into two types: relational embeddedness and structural embeddedness. Among them, relational embeddedness refers to the fact that the economic action of an individual actor is embedded in the network formed by his interaction with others, and the factors in his individual network will have an important impact on his economic decision-making and action. Structural embeddedness refers to that the network in which an actor is embedded is also connected with other social networks, which together makes up the network structure of the whole society.

Nahapiet and Ghoshal (1998) divide social capital into structural social capital, relational social capital and cognitive social capital. Structural social capital refers to how the actors in a network are connected, which consists of elements such as network connectivity and network configuration (e.g. density, connectivity, hierarchy) and specialized organization; relational social capital refers to those assets created and leveraged through relationships, including elements such as trust, norms and recognition, obligations and expectations, and identification; cognitive social capital refers to sources that can be acquired by common languages and codes and cultural habits among parties, which includes common languages and codes, shared interpretations and systems of meanings.

Woolcock (1998) divide social capital into bonding, bridging and linking social capital. The corporate social capital includes social norms, social values, situations, strategic vision and relationships embedded in the network formed by the actors. Paul and Kwon (2002) adopted a dichotomous classification method, which combines micro-level and meso-level corporate social capital as "external corporate social capital" (private goods), because it derives from an

individual's external social connections and its function is to help actors obtain external resources; while macro-level corporate social capital is called "internal corporate social enterprise" (public goods), because it is generated from the relationship between actors (groups) within an enterprise and its function is to enhance the level of collective action of groups. Paul and Kwon (2002) believe that corporate social capital consists of the elements such as network ties, norms, trusts, social belief and rules.

Chinese scholar Zhang (1990) categorized corporate social capital into three types: social capital between workers, social capital between workers and managers, and social capital between managers. However, the classification method focuses only on the internal links within enterprises but ignores the enterprise's external links with other enterprises. Bian and Qiu (2000) divided corporate social capital into three levels, namely, the vertical connections, horizontal connections and social connections. The vertical connections refer to the connections between enterprises and superior bodies, local government and subordinate enterprises. The horizontal connections of enterprises refer to the connections between enterprises and other enterprises, which exist in various forms such as business relationship, cooperative relationship, debtor-creditor relationship and shareholding relationship. The social interactions and connections can bring social capital to enterprises because they are often the channels through which enterprises can communicate with outside world, build trust with other enterprises, acquire scarce resources and seize business opportunities.

Based on Paul and Kwon's (2002) concepts, social capital is divided into two categories: individual social capital and collective social capital. The former refers to external social capital or private goods; apart from personal relationship and the resources contained in these relationships, it also includes the resources brought about by the position occupied by individuals in social network. The latter refers to internal social capital or public goods, which includes not only the social connections and mutual trust within a group, but also the structural mode of the group that can promote collective action and create resources.

Some scholars contend that corporate social capital belongs to intangible resources, which include network resources, relational resources and specific capacity resources. Other scholars argued that at different stages of enterprise management, corporate social capital respectively takes the form of relational capital, institutional capital and brand capital. The structural social capital comes from the stable and indirect relationship formed in the social structure and it focuses on the acquisition of opportunities; the relational social capital derives from the direct relationship formed in the process of contacts, interactions and exchanges within and between enterprises, and its core is the ability to influence and mobilize.

Corporate social capital is categorized into hierarchical social capital and business social capital according to different social network mechanisms. Hierarchical social capital refers to resources derived from the relationships with government departments (e.g., administrative department, tax bureau, and financial institutions) and the ability to mobilize these resources. Business social capital is associated with market mechanism. With the deepening of economic transformation, enterprises will inevitably make frequent contacts with market players such as business counterparts, upstream and downstream partners, and news media, thus forming a social network based on division of labor and collaboration. Therefore, business social capital is defined as the comprehensive ability to mobilize such network resources.

Corporate social capital is variously classified according to definitions of different scholars. The classifications and constituent elements of corporate social capital have laid a foundation for exploring the formation and impact mechanism of corporate social capital. The main research results are shown in Table 2-1.

2.2 Literature review on organizational learning

2.2.1 Connotations of organizational learning

A review of decades of research on organizational learning shows that the development of organizational learning research is divided into four stages: the first stage is the embryonic stage (1960s-1970s). At this stage, the theory of individual learning psychology was used to study organizational learning. Most of the studies are concept descriptions based on case studies. The research objects are mainly focused on senior leaders in traditional organizations such as government departments, education departments and business departments. Psychological learning models such as behavioral methods, cognitive theory and stimulus-response were mostly used in studies.

The second stage is the stage of development (1980s). Many researchers broadly applied mature psychological theories such as stimulus-response theory, cognitive theory and social learning theory to the study of organizational learning. Scholars had begun to explore some practical organizational learning problems. The research object was also shifted to enterprises, and team and organizational learning had been given attention.

The third stage is the stage of theory expansion and integration (1990s). At this stage, using the theory of psychology alone had become insufficient to study organizational learning. Therefore, the theories in other disciplines such as anthropology, political science and

economics had been gradually introduced into the research field of organizational learning, and meanwhile some important management theories such as "knowledge management" and "learning organization" also emerged. More research objects had been involved and more attention had been paid to team and organizational learning.

Table 2-1 Classification of corporate social capital

	Dimensions of corporate social capital	Classification basis and shortcomings
Zhang (1990)	Social capital among workers, social capital between workers and managers, social capital between managers	Categorize according to the internal links of enterprise but ignore the external connections of enterprise
Nahapiet and Ghoshal (1997)	Structural social capital, relational social capital and cognitive social capital	Classify according to the characteristics of elements of corporate social capital; the classification is not clearly defined.
Bian and Qiu (2000)	Vertical relationship, horizontal relationship and social relationship	According to the characteristics of the relationship network of enterprises; the entrepreneur social capital is regarded as the corporate social capital
Paul and Kwon (2002)	Internal corporate social capital, external corporate social capital	Divide according to the scope of corporate social capital; the classification lacks scientific enterprise theory as the basis.

The fourth stage is the maturity stage (from the 21st century to the present). The interdisciplinary research on organizational learning has been broadly conducted and the research subjects have been extended to network organization, learning groups and learning environment. Scholars have worked extensively with the impact of organizational learning on knowledge creation and enterprise performance and conducted in-depth research on network-based organizational and team learning.

2.2.2 Definition of organizational learning

Organizational learning has rich connotations and therefore it is variously defined by scholars from different perspectives. At present, there is no consensus on the definition of organizational learning.

From a process perspective organizational learning is considered as a cycle process. The

environment will affect the cognition of individuals within the organization, and then affect their beliefs, change the types of individual choices, and finally change the mode of organizational decision-making and influence the behavior of the organization. The results of this behavior will feedback to the environment around the organization. Argyris and Schon (1978) argued that organizational learning is a process of detecting and correcting errors. The organizational learning is a process of continuous acquisition, improvement and application of knowledge; it also includes the adjustment and improvement of organizational learning rules and codes of conduct.

Morgan and Ramirez (1984) define organizational learning from the perspective of learning style. They believe that organizational learning means when faced with same problems, members of organizations tend to solve problems together through common learning. Some scholars define organizational learning from the perspective of stimulus-response in traditional psychology. For example, Meyers (1990) thinks that organizational learning refers to the ability of enterprises to observe, evaluate and act under the stimulus of internal and external environment.

Since the 1990s, scholars have begun to pay attention to how organizations process knowledge and information. For example, Huber (1991) divided the process of organizational learning into four parts: knowledge acquisition, information diffusion, information interpretation and organizational memory. Senge (1990) argued that organizational learning has helped people continuously improve their ability to create what they want to create. The behavioral change should be divided into the actual behavioral change and possible behavioral change. The relationships between cognitive change, potential behavioral change and actual behavioral change are shown in Figure 2-1.

However, an analysis of recent studies on organizational learning shows that numerous definitions of organizational learning have been proliferating in the literature, as shown in Table 2-2, and the views are also very diverse. Shrivastava (1983) sorted out the relevant research and divided the scholars' views on the definition of organizational learning into four categories: adaptation, assumption sharing, development of knowledge base and institutionalized experience effects. But even though different scholars have different views, there are still overlapping and consistent ideas among them.

(1) Organizational learning is an organizational process (view of process). It influences the mental models, norms, values and behaviors of an organization through individual learning and sharing of knowledge, beliefs and assumptions (Watkins, 1993).

(2) Organizational learning has changed the frame of reference of the organization, so the

behavior change occurs after the organization revises its theory-in-use (Argyris, Allyn, & Bacon, 1990).

(3) The results of organizational learning are shared by all and integrated into the theory-in-use of organizational processes (Senge, 1990).

(4) Organizational learning is closely related to experience. The organizational learning, unlearn or relearn are all built up on past experience (Shrivastava, 1983).

(5) Organizational learning is constructed in the organizational mechanism, including formal or informal information communication, sharing, planning and control (Stable & Ealtd, 1998; Dominguez, Mallen, Chiva, & Lapiedra, 2016)

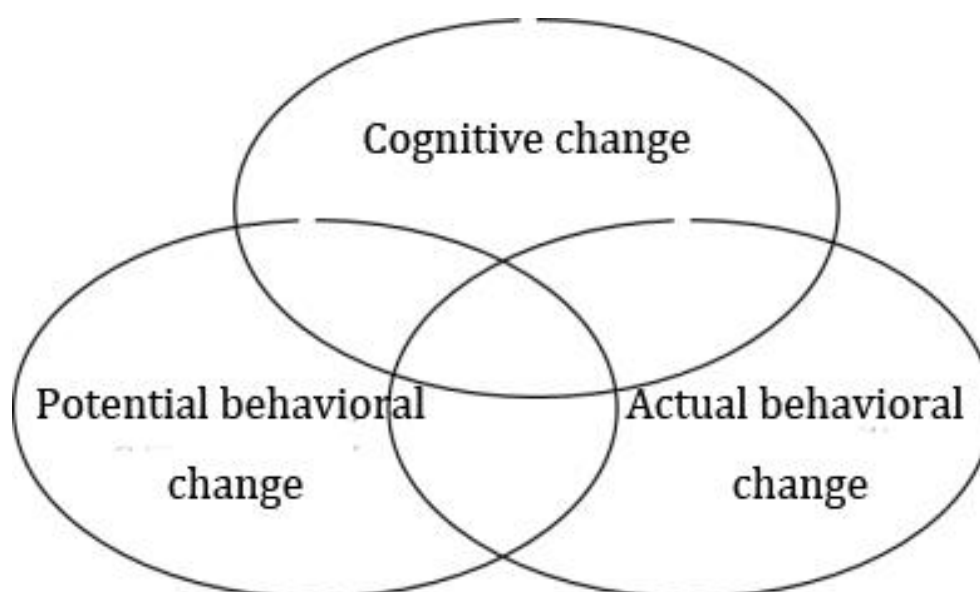


Figure 2-1 Key conditions for the definition of organizational learning

Source: Tsang (1997)

For organizations, having a faster and more effective organizational learning ability than competitors are the best weapons to cope with the swiftly changing global environment and to maintain competitive advantages. This is because the changes of environment and the rapid development of technology make the organizational environment full of changes and uncertainties. In order to adapt to the environmental changes, organizations must enhance their competitiveness through learning. Therefore, the organizational learning has become increasingly important. We can see that all the above studies emphasize the organization's adaptation to the external environment. However, many researchers have expressed different opinions.

Table 2-2 Definitions of organizational learning along time

Scholar(s)	Definition
Argyris and Schon (1978)	Organizational learning is a process of discovering and correcting errors.
Levitt and March (1988)	Organizational learning is an organizational norm that reflects on the past organizational behavior, and then forms a new guiding behavior.
Stata (1989)	Organizational learning refers to a kind of learning by sharing insights, knowledge and mental models based on past knowledge and experience.
Sengel (1990)	Only through individual learning organization can organization learn. Although individual learning does not necessarily lead to organization learning, yet organizational learning will never happen without individual learning.
Huber (1991)	Organizational learning is a process involving knowledge acquisition, information distribution, information interpretation and organizational memory.
Cook and Yanow (1993)	Organizational learning represents a formal or informal process of collective exploration and practice in an organization, which is a cultural phenomenon.
Kim(1993)	Organizational learning is an ability that helps organizations take effective action.
Dodgson (1993)	Organizational learning is a way to establish, organize and supplement knowledge and improve routine procedures based on specific cultural background and business activities. Through this way, skills of employees, the adaptability and efficiency of the organization can be improved.
Senge (1994)	Organizational learning is a process by which managers seek to improve the ability and motivation of organizational members to understand and manage organization and organizational environment so that they can make decisions on how to continuously improve organizational efficiency.
Edmondson and Moingeon (1998)	Organizational learning is a process in which members of an organization actively use relevant information to plan their

Scholar(s)	Definition
Stable and Ealtd (1998)	own behaviors in order to improve the ability of the organization to adapt to the external environment. Organizational learning refers to a process by which the organizational knowledge is changed through data processing so as to promote the innovation of organizational structure and process and discover new methods to achieved sustained success in the new environment.
Chen and Ma (2000)	Organizational learning is a process in which an organization constantly strives to change or redesign itself to adapt to the changing external environment. It is also a process of organizational innovation.
Wong (2001)	Organizational learning is a process of continuous acquisition, improvement and application of knowledge; it also includes the adjustment and improvement of organizational learning rules and codes of conduct.
LeBrasseur (2002)	Organizational learning is a new way to adjust the foundation of organizational culture, including organizational mission and values.
Chen (2003)	Organizational learning is defined as not only the evolutionary process of the social system utilizing the material and energy of the external environment, but also the process in which the actors understand and transform the information to create information cycling movements.
Yu, Fang, and Ling (2004)	Organizational learning is a spiraling social interaction process in which the new knowledge and behaviors continuously generated and acquired by individuals, teams and organizations are interpreted, integrated and institutionalized in order to realize an organization's vision or adapt to changes in the environment.
Jerez, Cespedes, and Valle (2005)	Organizational learning is the ability of an organization to process knowledge.
Wang (2005)	Organizational learning is defined as an ongoing process of innovation involving individuals, groups and the whole organization to acquire information and knowledge and thus form its core competitiveness.

Source: Bontis, Crossan, and Hulland (2002); Uotila, Maula, Keil, and Zahra (2009)

For example, the Argyris and Schon (1978)'s learning model of tends to extend organizational knowledge beyond organizational boundaries. Therefore, organizations and environments can mutually promote each other, and good organizations need to actively develop and sell products that they believe have good market prospects instead of producing products according to the results of market research; organizations need to learn how to influence their own living environment and actively create environments that can help increase their competitiveness (Hanssen & Snow, 1996). As far as the physical environment for human survival is concerned, the key role of organizational learning in the sustainable development of global economy and the reversal of global climate change is emphasized from the humanistic perspective. It is also believed that organizational learning aims not only to change the cognition and behavior of its members as well as the organization itself, but also to actively change that of external stakeholders so as to achieve dynamic matching between the organization and the external environment. That is to say, the participants of organizational learning include not only the members of the organization and the organization itself, but also the external stakeholders of the organization.

Dominguez et al., (2016) argued that organizational learning ability can further promote the learning process in the working environment. Therefore, it not only has a positive impact on organizational performance, but also on its innovation. Besides, this ability can also be seen as a key element related to improvisation of organizational efficiency and the potential for innovation and long-term development. On the other hand, organizational learning ability plays an important role as a strategic tool to ensure the long-term sustained success of organizations (Dominguez et al., 2016). Peris, Devece, and Navarro (2018) further pointed out that companies with the greatest competitiveness and the potential to adapt to environmental change must to a large extent promote linkages between various types of open innovation and human resources policies. By collaborating with other enterprises committed to renewing their own capabilities, the technical know-how and new ideas can be developed from existing experience, knowledge and common potential, and organizational practices. But equally important is that competitors, environment, partners and other related companies also play an indispensable role in this process (Peris et al., 2018).

2.2.3 Types of organizational learning

From regarding organizational learning as the passive adaptation of the learners to the environment, to emphasizing that organizational learning also includes the active adaptation of the learners to the environmental changes, and then to thinking that the organization can actively

control the environmental changes through self-reflection and self-change, the theoretical circles' understanding of organizational learning has undergone a gradual evolution process.

The representative theory is Argyris and Schon's (1978) single-loop learning, double-loop learning and relearning theory evolving from 1970s to 1990s. March's dual-model theory of exploitative learning and explorative learning is a widely accepted and used classification method of organizational learning in recent years. In addition, different organizational learning activities can reflect the attitudes of focus enterprises towards various resources (Kim & Atuahene, 2010; Zhao, Li, Lee, & Chen, 2011; Yi, Liu, He, & Li, 2012). Therefore, organizational learning can be used as a "gearbox" to change the effectiveness of capturing management relationships. For example, new firms in emerging economies do not seem to carry out a myriad of exploratory innovations.

2.2.3.1 Single-loop learning, double-loop learning and relearning theory

Based on whether organizational learning can change existing values and norms, Argyris and Schon (1978) divided organizational learning into two levels: one is "single-loop learning" - the self-adaptive process of the organization, and the other is "double-loop learning" - the adaptation of the organization to the external environment.

Organizational learning usually takes place when there is a wide gap between output and expectation. At this time, the organization will detect, collect and correct errors (Argyris & Schon, 1978), which will lead to the change of organizational theory-in-use. If this change does not involve the norms that govern organizational action, it is called single-loop learning or adaptive learning. Most organizational learning today falls into this category. Scholars argue that the main purpose of adaptive learning is to routinize and formalize the past behaviors of the organization, so that the organization can use the established patterns, methods and rules to improve the correctness of decision-making when solving problems (Bennis & Nanus, 1985). Therefore, it is a process in which an organization increases its ability to adapt to external changing environments and maintain stability through information gathering and experiments (Argyris & Schon, 1978).

Conversely, if this error detection, collection, and correction action results in a change in the organization's norm rather than a real-time response to environmental events, it is called double-loop learning or generative learning (Foxman & Bateson, 1973; Sinkula, Baker, & Noordewier, 1997). Different from adaptive learning whose purpose is to maintain organizational stability, generative learning gives priority to sustainable development of organizations, aiming at increasing the survivability of the organization in uncertain

environments (Chakravarthy, 1982). Generative learning occurs when organizations are willing to question existing assumptions (e.g., organizational mission, customers, capabilities or strategies) (Slack, Chamber, & Johnston, 2010) and then adjust organizational policies, objectives and potential norms (Senge, 1990). The generative learning aims to develop complex rules and new causality and improve organizational performance and effectiveness through reform, innovation, restructuring and redefining of problems (Bennis & Nanus, 1985).

The third type of organizational learning is the triple loop learning, or known as relearning put forward by Argyris and Schon (1978) and Sinkula, Baker, and Noordewier (1997), which has been mentioned in many scholars' research. This type of learning further enables organizations to examine how to learn and how organizational members should reflect on factors affecting learning effectiveness in the past, and thus further develop new methods of learning and collecting information so as to achieve the best learning effect.

Theory of action is an intermediary theory developed by Argyris and Schon (1978) to explain individual or organizational actions and learning process. It holds that the action theory is developing in the process of learning, or in other words, the learning results in the continuous adjustment of action theory (Argyris & Schon, 1978; Argyris, Allyn, & Bacon, 1990).

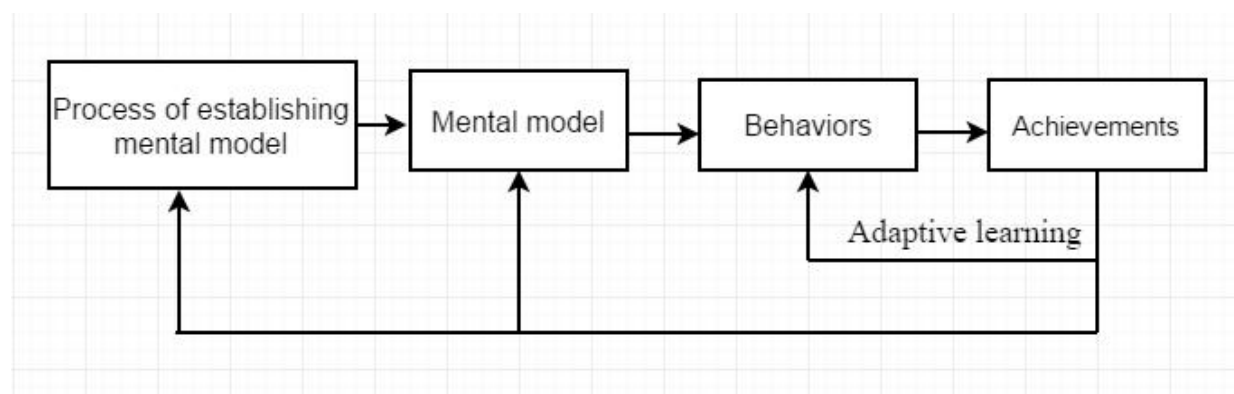


Figure 2-2 Organizational learning process
Source: Wright, Filatotchev, Hoskisson, and Peng (2005)

The "single-loop learning" focuses on the rule change and solves the problems in regard to organizational insight and principles; "double-loop learning" is concerned with not only change of rules, but also changes of the basic insights and principles of the organization, while "relearning" aims to achieve the desired internal self-concept and actively make organization more adaptable to external environment. Wright, Filatotchev, Hoskisson and Peng (2005) further proposed the relationship between "single-loop learning", "double-loop learning" and "relearning", as shown in Figure 2-2. "relearning" is to examine and analyze the learning process of the first two stages, and then learn how to learn.

2.2.3.2 Maintenance, adaptive, transitional and creative learning

According to Meyers (1990), organizational learning refers to the ability of an organization to observe, evaluate and respond to stimulus generated by its internal and external environment in a cumulative, interactive and purposeful way. Therefore, organizational learning can be divided into four categories: maintenance learning, adaptive learning, transitional learning and creative learning.

2.2.3.3 Implemental learning, improving learning and integrating learning

Some scholars also proposed three types of learning: implemental learning, improving learning and integrating learning. According to the organizational competition approach, divide organizational learning into two dimensions and four types, namely, experimental learning, continuous improvement, benchmarking learning and improvement of ability, to help understand, diagnose and describe organizational characteristics (Yeung, Ulrich, Nason, & Von, 1999).

2.2.4 Theory of exploitative learning and explorative learning

As mentioned above, researchers have proposed many types of organizational learning, as shown in Table 2-3. Although they vary in form, they almost all share the same characteristics: none of them extend beyond the realms of meaning of exploitative learning and explorative learning.

2.2.4.1 Definition of exploitative learning and explorative learning

When it comes to the organization's adaptation to the environment, March (1991) proposed two modes of adaptation, namely exploitative learning and explorative learning.

Exploitative learning refers to the further development and utilization of existing strategies, rules and other knowledge by organizations (March, 1991). It is a process of guiding and shaping the cognition and behaviors of groups and individuals of an organization (Crossan, White, & Ivey, 1999). In the process of exploitative learning, information and knowledge transfer from organization to collective entity and finally to individual. Therefore, exploitative learning is a targeted search method, which emphasizes focus and avoids change (McGrath, 2001). This learning activity takes many forms, such as refinement, selection, production, efficiency, implementation, execution, and other ways of applying existing knowledge in the knowledge base (Helfat, 1994). In the process of exploitative learning, the organization carries out in-depth study and refinement of the existing knowledge, transforms the knowledge of the

organization into that of the organizational members, and ultimately affects the individual's cognitive and behavioral patterns. The exploitative learning is essentially to make full use of the knowledge already mastered by the organization and implement the established rules (Holmqvist, 2003). It is actually a relatively simple learning mode, as Senge (1990) put it, which is just an adaptive learning that can help organizations gradually adapt to small changes in the environment. Although it is a simple learning mode, taking place only in the internal organization, so that all relevant groups and individuals can learn and grasp the existing knowledge of the organization, this learning mode is indispensable to any organization (Yu et al., 2004). It can bring basic survivability and adaptability to the organization. In the process of employing the knowledge and norms of team work, exploitative learning also gives the organization an insight into the key elements of team work. When the knowledge of team work becomes more and more perfect, the organization's team work efficiency and performance will be constantly improved.

Table 2-3 Types of organizational learning

Scholar (s)	Types of organizational learning
March and Olsen (1975)	Complete organizational learning cycle and incomplete organizational learning cycle
Argyris and Schon (1978)	Single loop learning, double loop learning and Relearning
Hedberg (1981)	Adaptive learning, turnover learning and turnaround learning
Meyers (1990)	Maintenance learning, adaptive learning, transitional learning and creative learning
Senge (1990)	Adaptive learning, creative learning
March (1991)	Exploitative learning, explorative learning
Lyles (1992)	Experience-based learning, imitative learning, creative learning
Fulmer and Robert (1994)	Maintenance learning, shock learning, anticipatory learning
Snell and Chak (1998)	Single loop learning, double loop learning, triple loop learning
Pedler (1997)	Implemental learning type, improving learning type, integrating learning type
Yeung, Ulrich, Nason and Glinow (1999)	Experimental learning, continuous improvement, benchmarking learning and improvement of ability

Source: Zuo et al. (2018); Zhang (2006)

Explorative learning refers to the process in which organizations actively seek new strategies, discover new rules and create new knowledge (Crossan, White, & Ive, 1999). It is also a process in which individual knowledge is passed on to groups and ultimately integrated and formalized by organizations. In this learning process, knowledge and information flow from

individual members of the organization to the group and finally to the organization. Explorative learning includes search, tweaking, risk-taking, experimentation, flexibility, development, or innovation. Knowledge generated from such activities is often quite different from that in the existing knowledge base of the organization. Explorative learning is a process of creating knowledge, in which the members of an organization integrate their own knowledge and experience into group knowledge, and then transform it into organizational knowledge. Explorative learning is a kind of higher level learning, which can help organizations change some basic action postulate (Argyris & Schon, 1978). As Senge (1990) put it, explorative learning is actually a kind of generative learning, which can generate new knowledge and new rules. Explorative learning helps organizations absorb new knowledge and information, thereby changing established behaviors and thinking patterns (Yu et al., 2004). Explorative learning also has many concrete manifestations in enterprise management: for example, enterprises search information through various channels, adjust and integrate organizational cognition, and try and test various action plans.

2.2.4.2 The impact and balanced use of the two organizational learning modes

Since March (1991) proposed exploitative and explorative learning modes in 1991, many scholars have studied and analyzed the impact and balanced application of the two modes in different research fields, as shown in Table 2-4. Most of these studies pertain to organizational learning. It can be seen that the dual-mode theory has a great impact on organizational learning research. The previous discussion on the process model of organizational learning suggests that the dual-mode learning theory has provided an overall framework for the proposal of organizational learning model. For example, the research of previous scholars, which is conducted in the framework of the dual-mode learning theory, studies the two learning modes in a deep-going way. R&D activities with obvious characteristics of explorative learning, such as experiment, information collection and information analysis, can significantly improve the performance of enterprises, but carry greater risks and consume a lot of resources. Educational training and information transfer have obvious characteristics of exploitative learning, which can improve the performance of enterprises steadily with less risk, but organizations often face the growth bottleneck.

In terms of the relationship between the two basic learning modes, March (1991), who proposed the two types of organizational learning, argues that exploratory learning and exploitative learning compete for organizational resources, so it is often difficult for organizations to use them concurrently. However, many researchers believe that the relationship

between explorative learning and exploitative learning should be seen as complementary rather than contradictory in the process of enterprise development. There is also a view that the relationship between the two is mutually transformational. Tushman and Michael (1997) argue that some companies can adapt well to new situations and challenges, while others suffer a heavy defeat. A key difference between successful adaptation and total failure is whether a company can carry out exploratory learning activities while continuously improving existing norms and current performance. Too few exploratory learning activities will result in organizational rigidity. It is of great significance for the long-term development of enterprises to carry out diversified explorations whenever appropriate. In their study on organizational learning in economic transformation period, Dixon, Meyer and Day (2007) proposed the framework of organizational learning in transitional economy (see Figure 2-3) and analyzed the progressive relationship between explorative learning and exploitative learning.

More and more scholars think that the two learning modes are complementary. Some scholars argue that it is not impossible to strike the balance between the two learning modes. They contend that March (1991) and other scholars believe that the two basic learning modes cannot be balanced mainly because their research horizon is too narrow, focusing only on the learning situation of an organization at a specific time and place. They have empirically proved that organizations are fully capable of effectively balancing the two basic learning modes by applying different learning modes in different departments, different time and different places. Modern organizations have to cope with increasingly complex and highly dynamic environment (Eisenhardt & Brown, 1998). In order to effectively adapt to the changing environment, an organization must keep changing, or continuously carry out exploratory activities (March, 1991), including the search for new organizational rules, as well as ways to discover new technologies, business opportunities, new procedures and new products.

Enterprise innovation, or exploratory behavior, has attracted great attention in current organizational research and management research because they are important sources for organizations to gain core competitiveness (McGrath, 2001). However, exploratory activities also bring about high uncertainties. March (1991) believes that, compared with the utilization and redevelopment of the existing knowledge, there is great uncertainty in exploring and creating new knowledge, which is reflected in the uncertainty of the amount of revenue and time-to-revenue. Business activities that are expected to profit over a longer period of time may not be rewarded in the short term. Many enterprises find that trying out new ideas, finding new markets and new "means-results" relationships will cost time and resources, and the effect of

such activities is often difficult to assess, and the ultimate return is unpredictable. If enterprises invest too many resources in exploratory learning, they will soon find that their investment cannot get immediate returns, which will easily lead to cash flow disruption.

Compared with exploratory learning, exploitative learning can get faster, more direct and clearer performance. Exploitative learning is a targeted search, which focuses the organization's resources, attention and actions on specific programs, and with the increase of experience in these programs, the performance of this program is getting better and better (Block & MacMillan, 1993). Exploitative learning can improve the current performance of enterprises, make enterprises focus more on certain business areas, cultivate core competence and reduce change and risk. However, the limitations of exploitative learning are obvious. March (1991) pointed out that under the circumstances of drastic changes in the environment and fierce competition in the industry, exploitable learning would do little to help organizations better adapt to environment, and the sustainable development of organizations will be threatened.

In terms of research on the complementarity of the two learning modes, China's scholars draw different conclusions. For example, by combining corporate social capital and social networks, some scholars found that exploitative learning helps organizations carry out progressive technological innovation, while exploratory learning helps organizations achieve breakthrough technological innovation, both of which can bring innovation and creativity to the development of enterprises.

2.2.4.3 Limitations of two types of organizational learning

Although March's (1991) empirical learning theory, especially the view that organizational learning can be divided into two types: exploitative learning and explorative learning, has been widely accepted by scholars, his organizational learning theory is still criticized. For example, Crossan, White, and Ivey (1999) argue that March (1991)'s concept of organizational learning is too narrow, simple and abstract. On the one hand, March's (1991) theory of organizational learning emphasizes the adjustment and learning of organizational behavior in a series of choices and decision-making processes.

On the other hand, on the basis of the stimulus-response theory, it pays more attention to the organization's response to external environmental stimuli and past performance but ignores the complex cognitive process of the organization as an explanatory system and such issues as communities of practice, dialogue (Isaacs & Tang, 1994), and organizational memory (Walsh & Ungson, 1991).

Table 2-4 Summary of research on explorative learning and exploitative learning

Scholar(s)	Research object(s)	Samples and research methods	Role of two kinds of learning modes	Definition of exploitative and explorative learning	Concurrent use/intermittent balanced use	Dualization/specialization	Conclusion
Beckman (2006)	Work team and organization	Young high-tech enterprises (interview, survey)	Dependent variable	Different levels of learning	Concurrent use	Dualization is the best	Entrepreneurial team is more likely to influence the implementation of explorative and exploitative strategy than mature companies.
Miller, Zhao, and Calatone (2006)	Individual and organization	Individual-based simulation	Dependent variable	Differences in learning efficiency (e.g. fast and slow)	Concurrent use	Specialization: used at different level of system; dualization: used in the whole system	Direct learning and potential knowledge transfer among people exist.
Perretti and Negro (2006)	Work team	Hollywood Movies (1929-58)	Dependent variable	Explorative and exploitative learning in team design (Proportion of new members)	Intermittent balanced use	Specialization: explorative learning only	There is a U relationship between decision-maker position, organizational hierarchy and team design

Social Capital, Organizational Learning and Enterprise Performance

Rosenkopf (2006)	Organization	American Software Companies in 1990-2001	Dependent variable	Differences in alliance functions and structure and contributions in different time and fields	Concurrently use between alliance partners; intermittent balanced use within organization	Dualization between alliance partners; specialization within organization	The company can deploy both alliance strategy and intermittent balanced alliance strategy at the same time.
Siggelkow and Rivkin (2006)	Organization	Individual-based simulation	Independent variable	Interdependence and differences among different levels of the organization can reduce the impact of explorative learning in all aspects.	Intermittent balanced use: focus on explorative learning	Specialization: explorative learning only	Explorative learning can be weakened only when cross-level dependency is low
Taylor and Greve (2006)	Individual and work team	Comic books published in 1972-96	Dependent variable	How do teams use knowledge for radical or value-added innovation?	Concurrent use	Dualization is better	Both influence low performing innovation and high performing innovation.
Wadhwa and Kotha (2006)	Inter-organization	American communications equipment manufacturer (1989-99)	Independent variable	Enterprise venture capital is an explorative action	Intermittent balanced use	Specialization: explorative learning	High involvement significantly improve the knowledge generated from venture capital

Source: Gupta and Shalley (2006)

Although March (1991) proposed theory of exploratory learning and exploitative learning, the specific learning content, learning process or learning elements of these two types of organizational learning are still unclear. Crossan, White, and Ivey (1999) put forward the integrated model of organizational learning - 4I model, which integrates different levels of learning activities carried out in an organization, and vividly reflects the two learning processes of exploratory learning and exploitative learning, as well as the relationship between them.

2.3 Enterprise performance

2.3.1 Definition of enterprise performance

With a long history, the term “enterprise performance” is usually expressed as a set of indicators used to measure the efficiency and effectiveness of enterprises, or simply, business achievements or results. It can be improved through the improvement or change of management concepts, methods and skills. The enterprise performance reflects the business outcomes under the interaction between enterprises and the internal and external environment. Different enterprises often formulate different performance indicators. Essentially, enterprise performance is a multidimensional concept. At present, scholars understand enterprise performance from three perspectives: firstly, enterprise performance is viewed as the result of enterprise operation, which can be measured quantitatively, including state of operation, enterprise competitiveness and business results; secondly, enterprise performance includes not only business results, but also various business practices related to business outcomes; thirdly, the behavioral process prior to the corporate objectives should also be seen as an important part of corporate performance.

2.3.2 Dimensions of enterprise performance

The performance of start-up businesses includes two dimensions: growth and profitability, which can be measured by sales growth rate, profit margin, return on assets and other measurement indicators. Davies and Brady (2000) adopted subjective performance measurement method and divide enterprise performance into two parts: management performance and market performance. Management performance includes such indicators as product (or service) quality, new product (or service) development, and customer satisfaction; market performance includes sales growth rate, market share, profitability and other indicators. Therefore, they should be combined to comprehensively reflect corporate performance. Sirmon,

Hitt, Ireland, and Gilbert (2011) believe that the relationship between growth performance and financial performance is complementary. Effective growth is conducive to achieving the financial performance and in turn better financial performance also provides more resources and guarantees for enterprises to cultivate and develop core competitiveness.

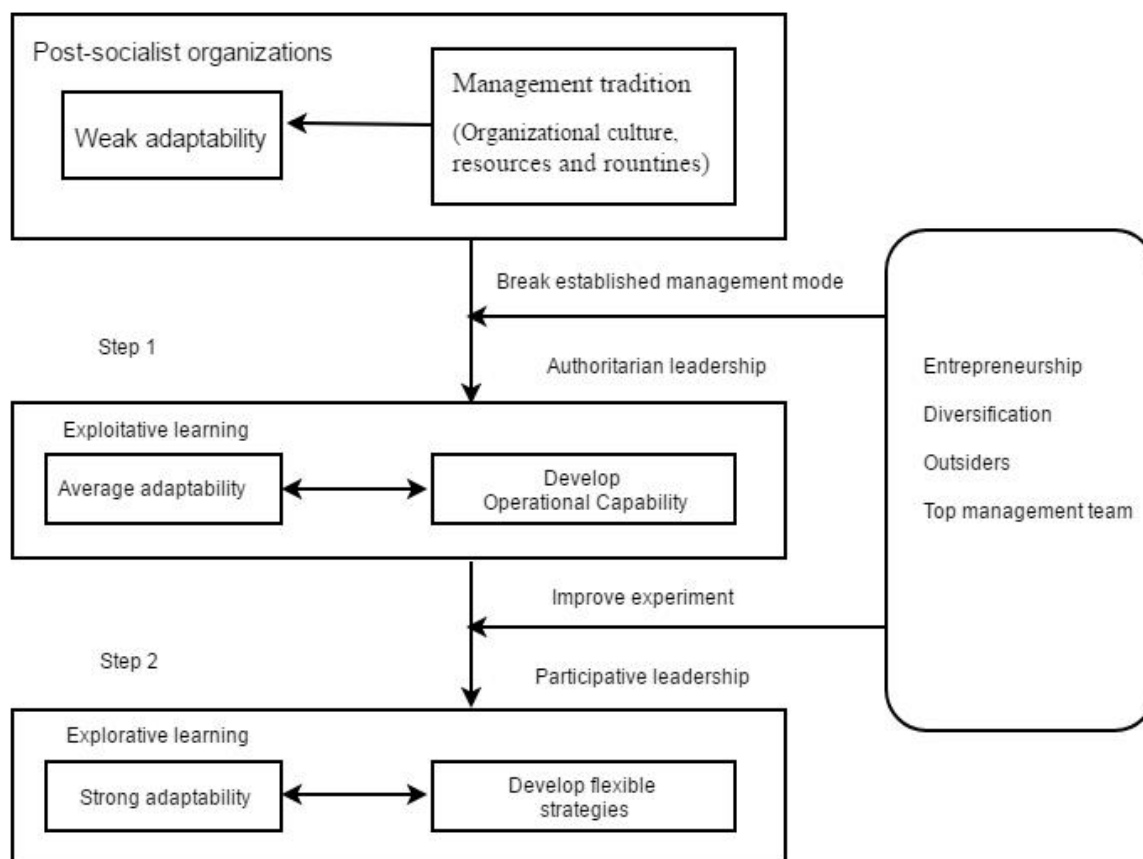


Figure 2-3 Organizational learning framework in transitional economy

Source: Dixon, Meyer and Day (2007)

Because of the big uncertainty of new ventures, it is difficult to evaluate their business performance and meanwhile evaluation deviation easily occurs when the general performance evaluation method is used. Van (1999) proposed to evaluate the financial performance and growth performance of new enterprises by calculating growth based on the financial data of enterprises. The entrepreneurs' satisfaction can be used to evaluate entrepreneurship performance, because entrepreneurs' satisfaction may directly affect their entrepreneurship decision-making, as well as the work efficiency of entrepreneurs and their employees and business partners. The commonly used performance indicators for start-ups include sales level, sales change rate, sales income, net profit, investment income, asset income and equity income.

Van (1999) believe that economic performance and enterprise growth should be examined in evaluating the performance of new enterprises. Organizational financial performance in economic performance focuses on profitability indicators; operational performance is watchful of market share, product quality and other indicators of business operations.

To sum up, the performance dimensions of enterprises mainly include comprehensive performance and financial performance. In our study it is considered that enterprise performance includes two dimensions: comprehensive performance and innovation performance (new products development performance). Comprehensive performance reflects the current operating conditions of new enterprises and innovation performance reflects the innovation level of new enterprises. The two performance indicators are mutually dependent and complement each other. Some scholars who study Chinese enterprises suggest using questionnaires to collect data from managers on performance evaluation to evaluate enterprise performance. The reasons are as follows: (1) although senior managers of small unlisted enterprises are generally unwilling to offer commercially-sensitive financial data, it seems feasible to measure the business performance of these enterprises according to market performance, market share, sales growth and profits. (2) There is a high correlation between managers' subjective evaluation of enterprise performance and actual business performance, which has been supported by some academic research. Therefore, evaluating enterprise performance from subjective perspective is convincing enough.

2.4 Literature review on the relationships among social capital, organizational learning and enterprise performance

2.4.1 Relationship between social capital and organizational learning

The concept of organizational learning is borrowed from individual learning. It is generally believed that organizational learning refers to the purposeful use of learning processes and methods at the individual, group and organizational levels. When new cognitive achievements and thinking modes are shared by all members of the organization, absorbed by organizational culture and consolidated and developed in the process of organization development, learning in common sense becomes organizational learning. Therefore, organizational learning reflects the exchanges and fusion of knowledge, beliefs, methods and ideological understanding among individuals and groups within and outside the organizations. Social capital is widely defined as the benefits of social members obtained from various social networks. The main function of

social capital is to acquire extensive, timely and relevant information resources through closely-knit social networks (Coleman & James, 1988). The organizational social capital refers to the resources generated from social networks formed among its members. Therefore, social capital is the essential carrier of organizational learning. Organizational social capital is a very important strategic resource of an organization. By fully exploiting and utilizing social capital, it can bring into full play the role of organizational learning and improve individual and enterprise performance. In recent years, more and more research has proved that social capital plays an important role in organizational learning (Uzzi, 1996; Hansen, 1999).

2.4.1.1 Research on the impact of internal social capital on organizational learning

Burt (1992) regards social capital as a structural hole, which brings more opportunities to acquire key knowledge. In the strong relationship network, the frequent contacts between members of an organization provide them adequate opportunities and time to communicate, thus allowing them to acquire more comprehensive and deeper knowledge from each other, and speeding up the dissemination of knowledge, which creates a good condition for exploitative learning. Jones and Macpherson (2006) argues that general trust based on uniform behavioral norms not only promotes deeper knowledge exchanges within an organization, but also reduces the employees' intention to acquire new knowledge, beliefs and ideas from outside the organization. This is because employees have become accustomed to communicating under common values and mutual expectations. Grant and Robert (1996) also holds a similar view. He believed that without common cognitive reference framework, individuals could not have a good understanding and exchanges of some specific knowledge. Therefore, the common knowledge background among individuals is the key to promote organizational learning.

Paul and Kwon (2002) point out that the most immediate benefit from social capital is information. Social capital helps promote access to broader information resources and improves information quality, relevance and timeliness. The company's ability is mainly to integrate and replicate new knowledge across departments through the process of organizational learning. The social structure within an organization can provide important information to managers based on which they can know how to design organizational units so that organizational knowledge can be effectively used and shared among units (Kogut & Zander, 1992).

Reagans and Zuckerman (2001) found that social capital helps R&D teams make more intensive social network interactions, thus improving productivity. Social capital brings about two positive results. The first is that social capital increases the efficiency of actions. Some scholars believe that the social capital in a highly trusted form will reduce the possibility of

speculation and the cost of supervision process, thus reducing transaction costs. The second is that social capital helps to improve efficiency and creativity. In particular, researchers have found that social capital promotes cooperation and thus promotes the development of creative organizations (Nahapiet & Ghoshal, 1998).

Chinese scholars Xie and Mao (2008) argue that organizational social capital provides an effective implementation mechanism for organizational learning. The adaptive social capital is conducive to exploitative learning while innovative social capital is favorable for explorative learning. In order to create more value, enterprises must vigorously carry out organizational learning and effectively integrate and manage two types of social capital.

From the above discussion about relationships between internal social capital, knowledge acquisition and organizational learning, it can be seen that the internal social capital has remarkable impact on organizational learning.

2.4.1.2 Research on the impact of external social capital on organizational learning

In recent years, more and more empirical studies have proved that inter-organizational social capital contributes positively to organizational learning. Inkpen (1998) holds that inter-organizational learning is a process of acquiring new knowledge and building new capabilities based on newly acquired knowledge. The acquisition of new knowledge from business partners is determined by two factors: the knowledge protection consciousness of business partners and the tacit knowledge of business partners. The ability to apply and construct new knowledge is associated with the absorptive capacity, while the latter is largely determined by whether the knowledge of alliance partners is mutually relevant and whether the concept of corporate culture of top managers in cooperative enterprises is consistent and mutually compatible. This definition provides guidance on how to improve the effectiveness of inter-organizational learning, but it fails to consider the performance of inter-organizational learning. Nahapiet and Ghoshal (1998) believe that inter-organizational learning is the process of creating new intellectual capital through the integration and exchanges of existing intellectual capital among enterprises. Intellectual capital includes (i) human capital; (ii) structural capital which refers to the organization's intangible assets and includes leadership, strategy, culture, organizational rules and procedures, management systems and measures; and (iii) customer capital. This definition can be applied in the inter-organizational learning. The difference lies in the level of actors who establish new intellectual capital. Some scholars point out that social capital can help the integration and exchange of intellectual capital by providing more ways of exchanging intellectual capital and integrating ability. Because exchanges and integration are crucial to the

construction of all new resources, especially knowledge, social capital is conducive to the establishment of new intellectual capital. Thus, social capital can improve organizational learning through cooperation.

It has been found that there is a significant correlation between social capital and the degree of inter-organizational resource exchange. Inter-organizational resource exchange has a significant positive impact on the creation of intellectual capital and product innovation. Based on the idea that social capital contributes positively to the exchange and integration of intellectual capital, research showed that because knowledge, capabilities or business experience in various organizations are different, establishing social capital can help organizations have more access to different knowledge, and transfer more efficiently and acquire technical knowledge. In other words, in order to acquire external knowledge from its business partners, an enterprise, apart from its own ability to acquire and identify valuable knowledge, must interact frequently and closely with its partners and show willingness to share information. Because these interactions derive from direct or indirect connections between organizations, organizations should establish and effectively use these connections in the social network so as to gain more access to relevant resources, knowledge and information (Ahuja, 2002). In addition, knowledge transfer networks formed by close ties between alliance partners can effectively reduce the operating costs and differentiate their products (Hoskisson, Hill, & Kim, 1993). Yli, Autio, and Sapienza (2001) studied the impact of social capital embedded in important customer relationships on knowledge acquisition and development in American high-tech joint ventures and found that social interactions can help companies increase the depth, breadth and efficiency of knowledge exchange. The creation and accumulation of corporate social capital requires frequent interactions and cooperation between enterprises and their external stakeholders to form strong ties; in addition, the increasing of corporate social capital needs to break through the closed strong relationship network and establish ties with external enterprises (or known as weak relationships) in order to expand the existing social relationship networks. The strength of network relationship has different impact on knowledge and information transmission, which determines different learning modes.

In the study of how technology-based university research promotes innovation, two types of social networks have been analyzed, namely open social networks and closed social networks, and it has been pointed out that social networks can be divided into strong and weak networks according to the strength of relationships. On the basis of this theory, the following relational model between social network and exploratory and exploitative learning has been put forward as per Figure 2-4 (Vera & Crossan, 2004).

To sum up, the impact of social capital on organizational learning is reflected in two aspects: first, social capital plays a "linking" role; by developing connections with external networks, organizations can acquire key knowledge resources for future development; second, social capital plays an "adhesive" role; by establishing trust and norms within the organization, internal employees can learn from each other and work together to achieve the goal of the organization. But at present, many studies regard organizational learning as an abstract whole to explore the impact of social capital on it. It is necessary to make an empirical study of the relationship between social capital and organizational learning.

2.4.2 Relationship between social capital and enterprise performance

Sociologists first used social capital to explain social phenomena such as community and family relations, emphasizing that the use of friends, colleagues and general interpersonal relationships can contribute to the increase of personal social capital and wealth (Burt, 1992). At the organizational level, abundant social capital not only reduces the time required for information collection and improves the opportunities and efficiency of knowledge exchange (Bourdieu, Ronsin, & Chatenay, 1993; Gulati, 1998; Paul & Kwon, 2002), but also strengthens cohesion among organizations and improves the integration efficiency of network resources (Ring & Ven, 1992; Zaheer, Mcevily, & Perrone, 1998).

Baker and Sinkula (1999) believes that the accumulation of social capital will have an impact on the economic performance of the organization. By leveraging inter-organizational social capital, organizations can minimize transaction costs, maximize transaction value (Dyer, 1997), and promote knowledge sharing (Gulati, 1998). Through the establishment of social capital, organizations can obtain the necessary resources through the links of social networks (Paul & Kwon, 2002), which may be tangible assets such as raw materials, products, or intangible assets such as experience, knowledge, technology.

Social capital emphasizes a network of strong, crisscross inter-organizational relationships that can provide the basis for trust building, cooperation and collective action among partners (Nahapiet & Ghoshal, 1998). Therefore, if an organization can manage inter-organizational social capital effectively, it can enhance its competitive advantage by increasing "relationship rent" (Dyer, 1997). Leonardbarton (1995) also pointed out that if an organization can "leverage" its "relational capability", it can strengthen its "organizational capability" and help improve its competitive advantage.

Enterprises can use their own unique relationship assets and network to build long-term and good business relationship with acquaintances, external suppliers or partners (Van, 1999).

Effectively using the relationship capital can reduce the risk and uncertainty of enterprise operation; creating an environment for cooperation with stakeholders not only helps enterprises easily acquire useful information, enhance the mutual complementation of resources and capabilities among cooperative partners, but also further expands the scope of resources and enhances the competitive advantages (Nahapiet & Ghoshal, 1998; McElroy, 2002).

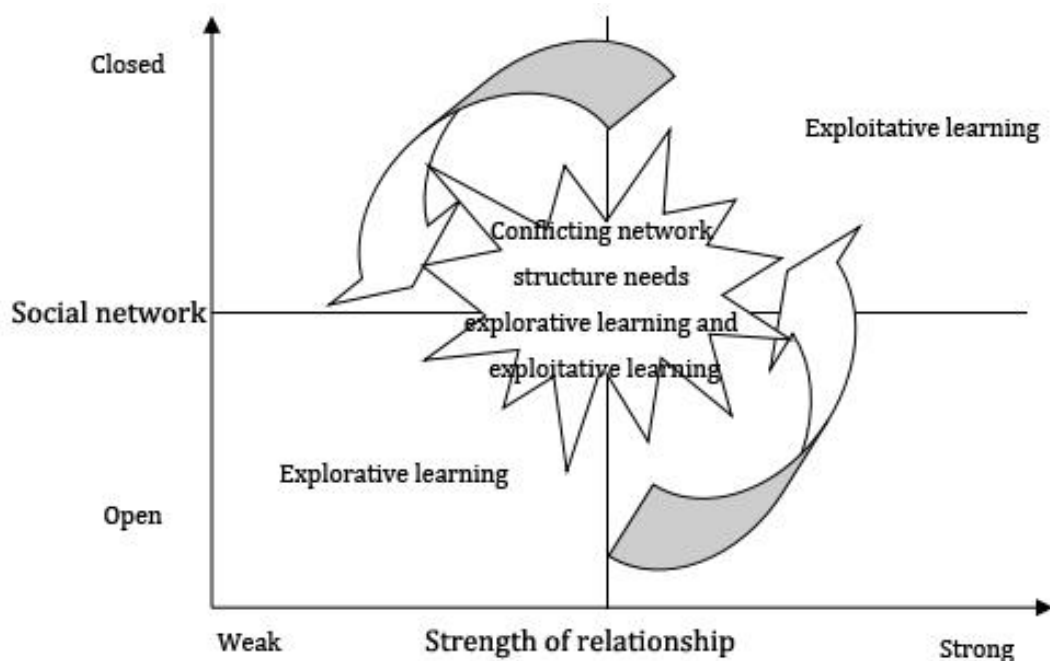


Figure 2-4 Conceptual model concerning relationship between social networks, exploratory learning and exploitative learning
Source: Vera and Crossan (2004)

Granovetter and Mark (1985) first divides the enterprise's social relationships into two types: strong relationship and weak relationship. Different types of social relationships in social networks have effects on different corporate performance: weak relationships are positively correlated with the performance of new products, while strong relationships are positively correlated with the overall performance of enterprises. The contribution of weak relationship to enterprise performance is mainly manifested in information advantage, namely providing various new and non-repetitive information, such as new product technology and market information and new policy information, which have a direct impact on new product performance, such as market share of new products. In the short term, the direct impact on the overall performance of enterprises is not obvious, because the conversion of information into overall performance takes time and is also influenced by many other factors. In contrast, the strong relationship contributes to corporate performance through advantages of direct resource

acquisition. As we all know, because of its short establishment time and lack of a strong credit foundation, it is difficult for newly-established enterprises to obtain various necessary resources for survival and growth from different channels. However, thanks to the strong relationship, newly-founded enterprises can acquire all kinds of resources such as technology, capital and market, by virtue of their mutually close ties, frequent contacts and multiple social relations. In the short term, it can directly promote the overall performance of startups. In addition, establishing strong relationships with industry leaders, such as forming strategic alliances, can bring new enterprises powerful intangible assets, rapidly improve the credit base of enterprises in short time, help enterprises obtain various resources from social networks, and thus greatly promote the overall performance of enterprises (Uzzi, 1996). Uzzi (1996) argues that enterprises must establish a balanced social network that includes both strong and weak relationships. A single weak or strong social network will have negative effect on the survival and development of enterprises, but he does not point out how to achieve this balance.

2.4.3 Relationship between organizational learning and enterprise performance

The relationship between organizational learning and corporate performance has been highly debated. Although it is easy to assume that organizational learning can promote corporate performance, as many researchers argue (Senge, 1990). Recent empirical studies on organizational learning and corporate performance are shown in Table 2-5.

The research on whether organizational learning contributes positively to firm performance can be traced back to Adam Smith's (1776) division of labor theory. Smith pointed out in *The Wealth of the Nations* that internal division of labor can lead to the rapid accumulation of employees' experience and knowledge in a specific field, which determines the improvement of labor productivity of enterprises, and then affects the growth of enterprises. Barney (1991), Prahalad and Hamel (1990) discussed the relationship between learning and competitive advantage from the perspective of resources, capabilities and knowledge.

Although many learning theories hold that organizational learning is the source of competitive advantage, Cannon and Edmondson (2005) argued that there is no clear definition of how an organization gains competitive advantage through learning. Moreover, few empirical studies support the view that learning can help organizations gain competitive advantage. So how does organizational learning improve the competitive advantage of the organization and then the performance of the organization? According to most of the current studies, organizational learning can improve organizational innovation ability and corporate performance by improving employee satisfaction and organizational commitment. Yu et al.

(2004) reached similar conclusions. Meanwhile, many studies have proved that organizational learning can indeed improve employees' organizational commitment (Yu, Lu, & Wang, 2002). The organizational learning can improve the innovation ability of an organization, and further promote enterprise performance, which is the only source of sustainable competitive advantage of an organization. Xie (2006) empirically confirmed that organizational learning can indeed improve enterprise performance by improving organizational technological innovation and management innovation.

Some research shows that organizational learning has a direct impact on organizational performance. Bell, Whitwell, and Lukas (2002) examined the influence of the market orientation and learning orientation on the performance of the enterprises and found that the market orientation and learning orientation are interrelated and have a positive impact on corporate performance. Through an empirical study on relationship between market orientation and organizational learning, Vijande et al. (2005) analyzed the influence of market orientation and learning orientation on business performance. Vijande et al. (2005) assumed that market orientation can stimulate higher-level organizational learning, thereby enhancing the organization's sustainable competitive advantage. Empirical results show that there is a correlation between organizational learning, market orientation and corporate performance. Learning orientation can stimulate the company's market behavior and strengthen the company's long-term relationship with strategic clients. Yu et al. (2004) also found that only inter-organizational learning can improve enterprise performance to a certain extent, while other forms of organizational learning (including exploratory learning and exploitative learning) cannot do so.

To sum up, there is a complex relationship between organizational learning and corporate performance. There are two important reasons for the controversy over the relationship between organizational learning and performance. The first is about the different paradigms of organizational learning. In the view of Senge (1990), organizational learning does not automatically take place in every enterprise. Only when the organization provides the necessary conditions can the members of the organization carry out organizational learning. Therefore, organizational learning can bring unique competitive advantages to the organization. Scholars represented by March (1991) argued that organizational learning is an activity that any organization can carry out at any time, and does not necessarily require the efforts of the organization and its members.

Therefore, the organizational learning does not necessarily bring competitive advantages to the organization. Secondly, most of the researchers arguing that organizational learning can

improve corporate performance have narrowly understood the concept of organizational learning, and have not even noticed that organizational learning includes two basic learning modes: exploratory learning and exploitative learning (March, 1991). These two learning modes have different effects on enterprise performance in different organizations and even in the same organization using them in a balanced way. In order to effectively improve the performance of enterprises, organizations must manage and balance their own learning modes (Crossan, White, & Ivey, 1999).

2.5 Limitations of existing research

There are, however, some limitations in the existing research including:

1. To the best of our knowledge research on the relationship between social capital and organizational learning has not focused on the pharmaceutical industry. Foreign and Chinese research on different social capital and different types of organizational learning concentrating in the pharmaceutical industry could not be found.

2. Social capital and organizational learning of pharmaceutical enterprises has been studied separately without much attention paid to their relationship; when discussing the relationship between social capital and organizational learning, the internal impact mechanism between the two has never been examined; in addition, there is almost no research as to how different types of social capital and different kinds of organizational learning modes should be matched to promote the innovation of pharmaceutical enterprises.

3. We could also not find in-depth studies on how different types of social capital and different kinds of organizational learning modes should be matched, that is, what kind of social capital has a positive impact on what types of organizational learning modes; the existing studies measure social capital and organizational learning only separately rather than simultaneously, and meanwhile fail to select suitable measurement methods according to their different matching relationships.

Therefore, based on the concept of exploratory learning and exploitative learning, this study will explore how different types of social capital affect corporate performance through different organizational learning modes, and how they match each other in the specific context of pharmaceutical enterprises. We are also interested in knowing which kind of social capital will have a positive impact on what type of learning mode in an effort to find out the collaborative innovation path so as to promote corporate performance?

Table 2-5 Empirical studies on organizational learning and enterprise performance

Scholar(s)	Measurement indicators	Dependent variable	Research methods	Research results
Morgan and Ramirez (1984)	Learning commitment, shared vision, open mind	Market performance	Exploratory factor analysis and multiple regression analysis	Organizational learning has a positive impact on market performance
Hult and Ferrell (1997)	Organizational learning culture	Innovation ability	Multiple regression analysis	Organizational learning culture plays a positive role in innovation ability
Tushman and Michael (1997)	New product input	Survival performance	Time series analysis	Experience learning is positively correlated with survival performance of new products
Garcia and Calantone (2002)	Learning commitment, shared vision, open mind, internal sharing	Enterprise performance	Confirmatory factor analysis	Organizational learning plays a positive role in enterprise innovation and performance
Tippins and Sohi (2003)	Information acquisition, information distribution, collective interpretation, organizational memory	Enterprise performance	Confirmatory factor analysis	Organizational learning plays an intermediary role in the relationship between it and corporate performance
Chen and Zheng (2005)	Discovery, invention, selection, implementation, promotion, feedback, knowledge base	Performance	Correlation coefficient analysis	Organizational learning ability has a positive impact on performance
Vijande, Pérez, González, and Casielles (2005).	Learning commitment, shared vision, open mind	Business performance	Confirmatory factor analysis	Learning orientation has no positive impact on business performance

Social Capital, Organizational Learning and Enterprise Performance

Dai, Li, and Zhang (2006)	Learning commitment, common vision, open-minded, knowledge sharing in organizations	Enterprise business	Questionnaire survey	Learning orientation has a positive impact on enterprise performance
Keskin (2006)	Learning orientation	Organizational performance		Mediating effect
Xie et.al(2006)	Learning commitment, shared vision, open mind	Organizational performance	Confirmatory factor analysis	Learning orientation improves enterprise core competence through innovation
Panayides (2007)	Organizational learning	Enterprise business		Full mediating effect
Law and ngai (2008)	Knowledge sharing and learning	Organizational performance		Full mediating effect
Zeng, He, and Chen (2010)	Learning commitment, shared vision, open mind	Financial performance and market performance	Multiple regression analysis and structural equation model	In manufacturing enterprises, organizational learning does not directly affect enterprise performance, but indirectly has a significant positive impact on enterprise performance through the intermediary effect of organizational innovation.
Yuan and li (2011)	Learning intention, new product development, manufacturing technology, marketing skills	Financial performance and innovative output	Structural equation model	Inter-organizational learning has a direct positive effect on innovation output and financial performance of cooperative enterprises.

Source: Chen and Zheng (2005); Geng, Liu, and Yang (2012); Spicer, Sadlersmith, and Chaston (2001); Zhao, Li, Lee and Chen (2011)

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Chapter 3: Research Hypotheses and Variables Measurement

From the previous literature review, most studies focus on the relationship between external social capital and technological innovation performance of enterprises, but neglect the study of internal social capital of enterprises. Meanwhile, most of the research on organizational learning focuses on the impact of organizational learning on the organizational performance from the perspective of process but ignores the research on organizational learning from the perspective of knowledge characteristics and innovation mode. Most importantly, they fail to explore how different types of social capital affect corporate performance through different kinds of organizational learning modes.

As an important relationship resource of an organization, the accumulation of social capital in quantity and quality will help the knowledge integration of enterprises, thus improving their core competence and creating competitive advantages. Therefore, with social capital, organizational learning and performance as key research variables and from the perspective of internal and external social capital, we analyse their impacts on two critical components of organizational learning, that is, exploratory learning and exploitative learning (March, 1991), and then how they affect corporate performance. Based on the analysis of the theoretical background of the main variables, the conceptual model and research hypotheses are put forward.

3.1 Theoretical framework

3.1.1 Internal social capital and external social capital

Enterprises often need to exchange a large number of internal and external resources in order to complete the entire business activities. Strategic networks are becoming increasingly important for the creation of competitive advantages of enterprises (Liu, Xie, & Lan, 2004). The concept of social capital is interpreted as the behavior of exchanging resources in the network structure. Nahapiet and Ghoshal (1998) defined 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. Bian and Qiu (2000) regards social capital as a social network formed on the basis of trust and cooperation among people, and

views social network as the most important relationship between people and an important way of resource allocation.

In the study of the relationship between social capital and SME performance, previous scholars classified the types of social capital according to social network as well as informal and formal links in alliance partners (e.g., direct business links, professional associations, trade associations, social clubs). Chen and Li (2001) and Zhang and Lin (2004) divide social capital into three dimensions: vertical relationship capital, horizontal relationship capital and social relationship capital, in which vertical relationship capital refers to the relationship between enterprises and clients and suppliers; horizontal relationship capital refers to the relationship between enterprises and competitors and other enterprises; social relationship capital refers to the relationship between enterprises and universities, research opportunities, governments, financial institutions and other external organizations.

Since organizations have both internal and external networks, social capital can be subdivided into internal and external social capital. The former comes from the relationships between the members within an organization, while the latter is generated from the relationships between the organization and external stakeholders, partners and even competitors. Internal social capital, also known as "bonding" social capital, is the ability of employees working together for common goals to gain benefits from within the enterprise. External social capital, also known as "Bridging" social capital, is a kind of ability to gain benefits from the outside of enterprises. Resources acquired from external network relationships help enterprises obtain market information, increase their brand influence, control and power (Paul & Kwon, 2002).

In view of this, we define the internal social capital of an enterprise as the informal relationship among its members (units), which can promote the close social interactions among its members (units), thus contributing to the exchange of information and other resources within the enterprise and creating a common vision, norms and values among different functional departments. Through various internal interpersonal networks, enterprises can obtain real and valuable information from familiar and trusted departments at a lower cost, and at the same time reduce the cost of information acquisition. By effectively integrating the key information, enterprises can create tacit knowledge that cannot be imitated by organizations, thus improving the performance of enterprises.

The definition of social capital by Bian and Qiu (2000) is adopted in this study, which divides social capital into three types, namely, corporate vertical links, corporate horizontal links and corporate social links. In the context of China, the vertical links refer to the connections between enterprises and their parent company, local government departments and

subordinate enterprises. The vertical connections are mainly oriented towards superior units with the aim of absorbing scarce resources from them. Horizontal links refer to the connection between enterprises and other enterprises, which take various forms such as business relationship, collaborative relationship, loan relationship and shareholding relationship. In the period of China's economic transformation, enterprises can develop more horizontal links in order to acquire more useful resources and information. Corporate social links refer specifically to the social networks owned by the enterprises and their managers. They often serve as the bridges linking enterprises with the outside world in order to build trust with other enterprises and acquire scarce resources and business projects.

3.1.2 Two modes of organizational learning: exploratory learning and exploitative learning

Organizational learning is classified into exploratory learning and exploitative learning and exploratory learning refers to the elimination of existing knowledge and the search for new knowledge to create new customer value, which emphasizes search, attempt, risk-taking and innovation. Exploitative learning refers to refining and digging deeper into existing knowledge, thereby expanding and enriching the existing customer value, which focuses on improvement, implementation, efficiency and adaptation. This view is now widely accepted by scholars.

Exploratory learning and exploitative learning have long been hotly discussed in the field of organizational learning. Exploratory learning favors the spirits of discovery, experimentation, adventure and innovation, while exploitative learning values the practices of knowledge refinement, execution, efficiency and selection. The fundamental difference between them lies in the attitude towards the existing knowledge of the organization: exploratory learning tends to break away from the existing knowledge of the organization, aiming at creating a new field of knowledge; exploitative learning is based on the existing knowledge of the organization, aiming at making full use of them. In summary, March's (1991) classification method according to the learning characteristics and objectives fully reflects the social nature of learning itself to create value for the organization. This classification method is more objective, complete and convincing.

Scholars have long regarded the two learning modes as contradictory, but they are actually complementary. Enterprises should use them concurrently or in a balanced way. Knott (2002) pointed out that Toyota successfully carried out two kinds of learning activities simultaneously: exploitative learning reduces the learning curve costs, while exploratory learning empowers the company to continuously introduce new products and innovations. As a result, the focus of

research in various fields has shifted from whether exploratory learning and exploitative learning are complementary to how to make them complement each other, but most of the studies are highly uncertain.

In this study, the exploitative learning refers to the further development and utilization of existing strategies, rules and other knowledge, which is a process of guiding and shaping the cognition and behaviors of groups and individuals, and is a relatively simple and normative learning mode, also known as normative learning. It is an organization-to-individual, top-down organizational learning approach. Exploratory learning refers to the process in which organizations actively seek new strategies, discover new rules and create new knowledge. In this process, knowledge is absorbed from individuals and groups and finally institutionalized. It involves a process of knowledge creation and is a high-level and innovative learning approach (innovative learning). It is an individual-to-organization, bottom-up organizational learning approach.

3.1.3 Conceptual model

From the literature review, it is found that the existing research on organizational learning mainly focuses on the mechanism, mode and process of learning and its impact on corporate performance. However, organizational social capital provides an intrinsic realization path and an effective dynamic mechanism for organizational learning. Burt (1992) and Uzzi (1996) argue that organizational learning is mainly determined by the structure of social capital (i.e. the connections between individuals inside and outside the organization) because the structure of social capital directly affects employees' chances of identifying and accessing heterogeneous knowledge of other groups inside and outside the organization. The influence of social capital structure on organizational learning is manifested in different strength of network relationship resulting in different organizational learning modes.

This study adopts social capital, organizational learning and corporate performance as the three main variables. Meanwhile, in order to make the study more systematic and accurate, the internal capital and external capital are comprehensively studied and the impact of two kinds of social capital on organizational learning and enterprise performance are explored separately. Organizational learning is an abstract concept. Therefore, it is improper to study the effect of social capital on it from an overall point of view. Through the above analysis, this study divides organizational learning into exploratory learning and exploitative learning and examines the impact of internal and external social capital on different types of organizational learning modes and corporate performance. On this basis, the conceptual model is constructed, as shown in

Figure 3-1.

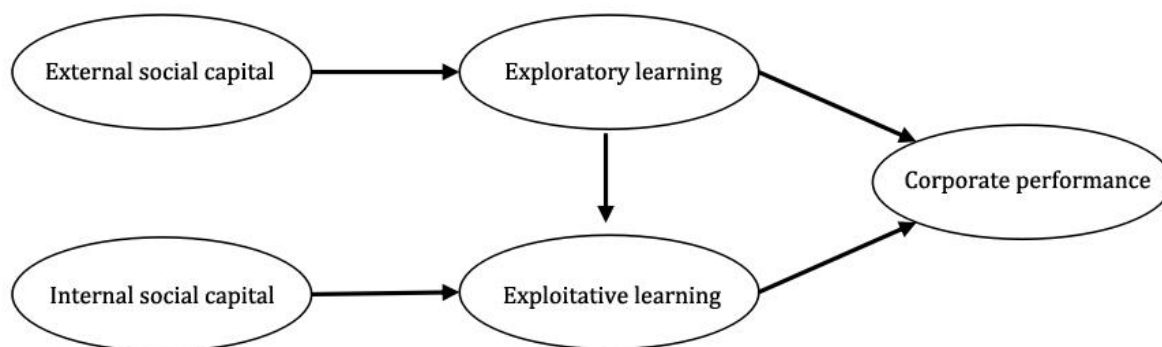


Figure 3-1 Research conceptual model

3.2 Research hypotheses

3.2.1 Impact of social capital on organizational learning

More and more studies have proved the important role of social capital in organizational learning (Hansen, 1999; Uzzi, 1996). Nahapiet and Ghoshal (1998) pointed out that social capital promotes the creation of intellectual capital by influencing the integration and exchanges of existing explicit and tacit knowledge in an organization, thus helping to acquire various kinds of benefits, such as the privileges to acquire knowledge. It has also been argued that networks give companies access to knowledge, resources, markets and technology. Social capital represents the ability of actors to gain benefits through social networks and members of social structures.

A review and analysis of the existing literature suggests that social capital can promote organizational learning to a certain extent. In fact, according to the business practices of pharmaceutical enterprises, the more abundant social capital individuals or organizations have, the more resources they can obtain. Therefore, social capital can basically promote the development of individuals or organizations.

H1: There is a significant positive correlation between social capital and organizational learning in pharmaceutical enterprises.

3.2.1.1 Impact of internal social capital on organizational learning

Research has shown that internal social capital can significantly affect the generation, acquisition and utilization of knowledge, the transfer of knowledge as well as the exchange and integration of resources among different departments within the organization (Yli, Autio, &

Sapienz, 2001). Social networks promote the sharing of knowledge within organizations and different departments can acquire systematic and integrated knowledge through inter-departmental networks. In the era of knowledge economy, the tacit knowledge of an organization has become increasingly more important than its explicit knowledge, which has become a key source of competitive advantage. In the process of new product development and supply chain management, close interactions must be built among different departments within an organization as well as between the organization and the upstream and downstream enterprises, which requires the coordination and integration of knowledge among different groups and organizations. At the same time, the common knowledge can help different groups integrate their own knowledge with others' knowledge to solve new problems arising in cooperation together.

It can be seen that Western theories and existing empirical studies on social capital and organizational learning all believe that social capital within an enterprise can promote the exchanges and integration of resources between departments and employees within a department. There is a positive correlation between internal social capital and organizational learning. Social capital within an enterprise has a positive impact on knowledge sharing and transfer, thereby improving the performance of organizational learning. If frequent and efficient interactions can take place among different departments, especially departments with different functions, more innovative knowledge as result of collision of ideas and thoughts will be generated, which will produce a positive effect on products, technology and organizations, and also promote organizational learning. In fact, it is very consistent with the connotation of organizational explorative learning.

Therefore, the following hypothesis is put forward:

H1-1: There is a significant positive correlation between internal social capital and organizational exploratory learning in pharmaceutical enterprises.

3.2.1.2 Impact of external social capital on organizational learning

Knowledge creation and accumulation of enterprises are not only determined by internal factors of enterprises, but also influenced by other enterprises and knowledge creation departments outside enterprises. The research confirms that knowledge transfer and creation among enterprises depend on the quality and quantity of their interactions (O'Hagan & Green, 2004). The closer the relationship between an enterprise and the outside world is, the stronger its knowledge absorption ability is, and the more opportunities there are for learning and acquiring knowledge. In a sense, external corporate social capital involves three kinds of social

connections: first, the horizontal connections with other enterprises; the vertical connections with different links of the supply chain; third, the relationship networks with customers. These external social connections, market power, trust and other factors will affect the enterprise's acquisition and utilization of knowledge, contributing to product innovation and technological differentiation (Yli, Autio, & Sapienza, 2001). Woolcock (1998) concluded that enterprises occupying the central position in the networks can obtain more and high quality resources, information, knowledge, which will be conducive to exploratory learning.

Intra-organizational interactions and learning aims basically to dig deeper into existing knowledge and make full use of it. The main reason is that it is easy for employees with common cultural concept and values in the same organization to share and learn the unique knowledge. In contrast, the interactions with other organizations will generate a lot of new knowledge and ideas. This is a typical exploratory learning. Therefore, it is believed that external social capital plays a very important role in promoting exploratory learning.

Therefore, the following hypothesis is put forward:

H1-2: The external social capital of pharmaceutical enterprises is positively correlated with exploratory learning.

3.2.2 Impact of organizational learning on enterprise performance

As a form of social organization, the fundamental purpose of business operation is to improve enterprise performance and create value, and the value-creating ability is largely determined by the imperfectly imitative learning ability. Organizational learning can not only bring the changes of knowledge, beliefs and behaviors of an organization, but also enhance its growth and innovation ability. Enterprise competitiveness is the result of an accumulated organizational learning, which is a process of coordination of knowledge and technology, and transfer of the organization's values. Therefore, it can be said that organizational learning helps to improve enterprise performance and is an important source of driving force for organizational development and value creation.

Therefore, the following hypothesis is put forward:

H2: There is a significant positive correlation between organizational learning and corporate performance in pharmaceutical enterprises.

3.2.2.1 Exploitative learning and exploratory learning

Bontis et al. (2002) introduced the concepts of "knowledge stock" and "knowledge flow". This author believes that there are two types of knowledge flow (exploratory learning and

exploitative learning) and knowledge stock (dynamic and static). The interactions between knowledge stock and knowledge flow form a cycle of knowledge creation. According to the definitions of previous scholars as mentioned before, exploratory learning aims essentially to search and discover various kinds of new knowledge, which greatly expands the knowledge stock of enterprises. The greater the knowledge stock is, the easier it will be to use exploitative learning, because the purpose of exploitative learning is to refine, standardize and formalize the current knowledge, so that it can be fully utilized by organizations (McGrath, 2001). Previous scholars found that the wider the knowledge stock, the more likely some existing knowledge is to overlap with new knowledge acquired by exploratory learning, the more it can promote exploitative learning, and the easier it is to convert new knowledge into enterprise's own knowledge and be used by enterprises. It can be seen that exploratory learning constantly promotes the internalization of new knowledge through exploitative learning.

Therefore, the following hypothesis is put forward:

H2-1: There is a significant positive correlation between organizational exploratory learning and exploitative learning in pharmaceutical enterprises.

3.2.2.2 Impact of exploitative learning on enterprise performance

Exploitative learning aims at improving and perfecting existing products and services, which will have an effect on the short-term financial performance of enterprises, but the impact on profits and costs is not significant. The main benefits include the steady improvement of organizational performance, gradual innovation and the continuous improvement of dynamic capabilities in a stable development environment (Lane & Lubatkin, 1998). Peng (1999) conducted a study on 108 newly-built joint ventures in Jiangsu Province and found that exploitative learning is positively correlated with the overall financial performance of enterprises. Because exploitative learning is mainly used to improve and perfect existing mature products, it can improve enterprise performance by improving short-term overall financial performance. Jiang and Zhao (2006), through empirical research on new enterprises in Jiangsu and Guangdong province, found that the exploitative learning has a direct positive impact on short-term overall financial performance.

It can be seen that the impact of exploitative learning on performance is mainly reflected in short-term financial performance and long-term overall financial performance. Of course, the improvement of existing products or services, the expansion of existing markets and the improvement of existing internal management will contribute to non-financial performance to some limited degree, such as the improvement of organizational competitiveness and the

strengthening of organizational culture. Through deeply digging into the existing knowledge, organizations can also increase or create market opportunities. In a stable environment, keeping existing processes and business models unchanged may help enterprises maintain their existing advantages (Davies & Brady, 2000), and they can replicate their successes by copying past experience.

Therefore, the following hypothesis is put forward:

H2-2: Exploitative learning is positively correlated with comprehensive performance (financial and non-financial) in pharmaceutical enterprises.

3.2.2.3 Impact of explorative learning on enterprise performance

Learning from existing experience may improve organizational performance in the short term, but it will weaken the motivation and ability to learn new technologies and knowledge for long-term development. Exploratory learning aims at the "pursuit of new knowledge". Confronted with the drastic environment changes, the exploratory learning ability become a key factor affecting the success of an organization. Therefore, in contrast to exploitative learning, exploratory learning is matched with the breakthrough development strategy of the organization, which can create value for the organization in the complex and changing development environment.

Research has shown that exploratory learning is used to acquire relatively broad and general new knowledge, new ideas and new methods. The main purpose of exploratory learning is to develop brand-new products and markets to gain the first-mover advantages, thus greatly improving the sales revenue and market share of new products. As a result, the organization can achieve breakthrough innovation, high-speed performance growth and high adaptability and dynamic competitiveness in a rapidly changing environment. Atuahene (2003) surveyed 208 new enterprises in a high-tech park in Guangdong province, and found that exploratory learning is positively correlated with new product performance. Castells and Jiang (2006) also found that exploratory learning has a direct positive impact on new product performance.

Therefore, the following hypothesis is put forward:

H2-3: Exploratory learning has a significant positive correlation with the performance of new product development in pharmaceutical enterprises.

3.2.3 The mediating role of organizational learning

As a sociological concept, social capital has been heavily studied in the field of management. Many studies have showed that social capital has a positive impact on organizational performance and technological innovation. But thus far, the impact mechanism

or process of the social capital on corporate performance is still unclear. Some scholars regard this process as a "black box" while many attempts have been made to uncover this black box, but no clear conclusions have been drawn. Corporate social capital improves the performance of technological innovation by reducing transaction costs within enterprises as well as between enterprises and external organizations. Zhang (2006) studied the relationship between corporate social capital and technological innovation and put forward the conceptual model and theoretical hypothesis that corporate social capital affects technological innovation performance; through questionnaire survey among 210 enterprises in China and multiple regression analysis, he deeply analyzed how corporate social capital affects technological innovation performance through resource acquisition.

With 133 enterprises in Beijing and Guangzhou as research objects, Chen et al. (2008) conducted an empirical study on whether and how internal social capital affects core competence through knowledge integration. The results show that internal social capital influences core competence through knowledge integration and knowledge integration plays a mediating role between internal social capital and core competence. Xie, Ge, and Wang (2008) carried out an empirical study on the relationship among social capital, organizational learning and organizational innovation among enterprises in the Pearl River Delta region of China. The results suggest that the internal social capital of an organization has a significant direct impact on organizational learning, and the external social capital has a significant direct impact on technological innovation.

As discussed previously, we can see that social capital may affect corporate performance through an intermediary variable. Based on a large number of literature analysis, we believe that organizational learning is probably the key mediating variable.

Therefore, the following hypotheses are put forward.

H3-1: Exploitative learning plays an intermediary role in the relationship between internal social capital and comprehensive performance in pharmaceutical enterprises.

H3-2: Exploratory learning plays an intermediary role in the relationship between external social capital and new product performance in pharmaceutical enterprises.

3.3 Variable measurement

According to the conceptual model and research hypotheses, the variables to be measured in the questionnaire include the relationship quality between enterprises and clients (e.g., trust, satisfaction and commitment), the social interactions between enterprises and clients (e.g.,

interaction intensity and quality), and the cognition between enterprises and clients (e.g., the organizational distance, shared vision and conflict). There are four main sources of variable measurement items in this study: firstly, directly use the measurement items that have been widely used in the relevant literature; secondly, revise items extracted from existing scales in the literature according to the actual needs of this study; thirdly, derive from the analysis of relevant theories or research conclusions; fourthly, develop according to the results of field interviews in this study. In order to conduct the comparative analysis with the existing research conclusions, the measurement items of each variable in this study are mainly borrowed from existing scales and modified according to Chinese management mode and culture.

In this study, the variables are measured based on typical seven-point Likert scale.

In the questionnaire survey, the self-reports from respondents are likely to be distorted by social desirability bias, thus reducing the reliability and validity of the questionnaire. Social desirability bias is a type of response bias that is the tendency of survey respondents who are affected by established social values and norms to answer questions in a manner that will be viewed favorably by others. In order to prevent response deviations caused by social desirability bias, the following measures have been taken: (1) Before conducting the investigation and research, literature review is extensively conducted to deeply analyze the factors affecting the research variables, so as to ensure that relevant variables have a clear operational definition and measurement indicators; (2) The measurement items which have been proved to be effective or relatively mature by researchers are extracted and used in the scale design; meanwhile, neutral words are used to be compatible with Chinese culture and language habits so as to fit the research subjects; (3) Multiple reversed items are used for cross-test to ensure the authenticity of the collected data and meanwhile the number of questions should be properly controlled so that the patience of the respondents is not put to the test; (4) The questionnaire was completed on condition of anonymity in order to ease the pressure of the respondents and reduce the influence of social desirability bias.

3.3.1 Definition of social capital and its measurement

According to Yli, Autio, and Sapienza (2001), this study divides corporate social capital into external social capital and internal social capital and measures it from social interactions (interaction intensity and interaction quality), relationship quality (trust, satisfaction and commitment) and cognition (organizational distance, conflicts and shared vision).

3.3.1.1 Measurement of social interactions

Social interaction between enterprises and clients refers to how frequently and well the two sides exchange knowledge. The social interaction can be divided into two dimensions: interaction quality and interaction frequency. The interaction quality between enterprises and clients refers to the timeliness and reliability of knowledge and information exchange. Interaction frequency refers to the degree to which the enterprises exchange knowledge and closely communicate with their customers in different ways. Yli, Autio, and Sapienza (2001) argued that social interaction can be measured from close contact and individual contacts between enterprises and clients.

On the basis of previous literature, this study measures social interaction from two aspects: the intensity and quality of interaction between enterprises and clients.

3.3.1.2 Measurement of relationship quality

Uzzi (1996) argue that the trust between enterprises and clients is built when the two sides can mutually benefit from collaboration and one side does not profit at the cost of the other's interest. There have been many studies on the measurement items of inter-organizational trust scale.

In terms of satisfaction measurement, three items are used to measure the satisfaction of employees in service enterprises from the individual level. These three terms are: (1) we feel very happy in the process of cooperation with our current partners; (2) we are generally satisfied with the cooperation between the two sides; (3) we are not happy in the cooperation with our current enterprises. Three items have been used to measure the relationship between suppliers and customers: (1) As a stable customer of the supplier, I enjoy a good relationship with it; (2) I am pleased with the supplier's efforts to maintain a good relationship with me; (3) I am satisfied with my relationship with the supplier.

3.3.1.3 Cognition measurement

Nahapiet and Ghoshal (1998) hold that the cognition between enterprises and customers refers to a cognitive paradigm between both sides, such as whether they have similar cultures, stances and views. According to the previous research, the cognition between enterprises and customers is mainly measured from three dimensions: organizational distance, shared vision and conflict. Shared vision between enterprises and customers refers to the degree of recognition of each other's goals, values, beliefs and expectations in the process of interaction. There are divergent views as how to measure shared vision. The main reason is that

organizational vision involves a wide range of issues at different levels within an organization and between different organizations. Previous studies used four items to measure shared vision within an organization. Based on the measurement methods used by previous scholars, shared vision is measured from four aspects: business practices, organizational culture, shared goals and shared understanding of doing business.

3.3.2 Definition and measurement of organizational learning

Exploratory learning and exploitative learning of an organization are related to its existing capabilities, resources and operating processes, but irrelevant to competitors or industry levels. Exploratory learning mode may be suitable for some enterprises while exploitative learning may be appropriate for other enterprises. Bierly and Daly (2001), and Ahuja (2002) regard exploratory learning and exploitative learning as two distinct dimensions of learning behavior, rather than two endpoints of a single dimension. This study develops 36 items based on a seven-point Likert scale to measure how enterprises allocate efforts and resources in exploratory learning and exploitative learning to create a learning environment. These items are used to measure the degree of importance of developing new technology, entering new product or service markets by implementing new innovative programs, and improving the efficiency of existing product or service markets to enterprises. Generally speaking, this study believes that these items can accurately reflect the connotations of the two concepts of "exploration of new possibilities" and "utilization of old resources".

3.3.2.1 Measurement of exploratory learning

Exploratory learning means organizations focus more efforts on new tacit knowledge while divert them from existing knowledge. Exploratory learning is intended to explore and test new technologies, new markets and entrepreneurial opportunities. That is to say, all internal and external business activities should be conducted from the perspective of innovation. Therefore, the exploratory learning can be measured from three aspects: (1) develop new markets, new products or services; (2) closely keep track of and develop new technologies; (3) create the environment in favor of exploratory learning. The scale, which is used to measure the degree of explorative learning, is based on a seven-point Likert scale with scores ranging from "1" representing "extremely disagree" to "7" representing "extremely agree". The higher the score, the more the respondent agrees the statement.

3.3.2.2 Measurement of exploitative learning

If the organization cannot survive in the present moment, then it is meaningless to anticipate future development. The short-term competition requires enterprises to make full use of existing knowledge. The exploitative learning aims to “develop and utilize existing knowledge” and apply the proven experience in mature or new product markets (Davies & Brady, 2000). Therefore, the exploitative learning can be measured from three aspects: engage with the existing market, products or services, track the existing technology and create the environment for exploitative learning. The scale, which is used to measure the degree of exploitative learning, is based on a seven-point Likert scale with scores ranging from "1" representing "extremely disagree" to "7" representing "extremely agree". The higher the score, the more the responder agrees the statement.

3.3.3 Measurement of control variables

The research variables in this study include corporate social capital, organizational learning and corporate performance. The first two variables are situation-dependent and therefore easier to change with the change of conditions. Therefore, in order to make the study more scientific and accurate, this study designs some control variables, such as the ownership nature of the organization, industry category, company scale, office location, age and position of the respondents in the company, and the growth rate of enterprise performance in 2018. Among them, the size of the company is measured from two aspects: the total assets and the number of employees. The measurement items of these control variables are extracted and revised from the existing scale items in authoritative literature and the research results of previous studies.

3.3.4 Measurement of enterprise performance

Some scholars use objective operation data to measure organizational performance, while others use subjective self-reporting questionnaires. Different researchers have confirmed the advantages of objective measurement method, but because objective data regarding performance is difficult to match properly in cross-organizational research, and anonymous answers also make it difficult to use objective data. Therefore, this study decides to adopt the subjective self-reporting of managers to measure corporate performance. The performance scale used in this study is based on the research results of Chinese scholar Xie (2006). According to other variables and conceptual model in this study, this study divides enterprise performance into financial performance, non-financial performance and new product

performance. The performance measurement mainly refers to the data comparison between the organization and its competitors on the measured items in the past three years.

The operational definitions and measurement items of these three dimensions are presented as follows:

1. Financial performance: refers to the quantitative comparative analysis and evaluation of the profitability, asset quality, debt risk and business growth of an enterprise in a certain period of time.

2. Non-financial performance: Many studies believe that non-financial performance indicators are leading indicators, which can do what traditional accounting indicators cannot do, for example, providing information that can help predict future performance. The greatest advantage of non-financial performance indicators is to predict future performance.

3. New product performance: mainly refers to the achievements of the company in product innovation.

3.4 Data collection

Questionnaire recovery rate and quality of questionnaire filling have always been the focus of quantitative research. With Chinese pharmaceutical enterprises as the research objects and based on China's national conditions, the questionnaire was sent to respondents not by mail as it is widely used in other countries, but by personal direct contact. Each respondent was given a small gift (Customized souvenir worth 50 yuan) for their questionnaire response and therefore the questionnaire recovery rate and response quality is high. The respondents were required to complete the questionnaire within 30 minutes on the spot or online. The time of questionnaire filling for sampling survey is generally limited to 20 - 45 minutes, which ensures the quality of questionnaire survey. In addition, with the joint effort of industry associations, alumni associations, relatives and friends, 508 questionnaires were sent out and 448 questionnaires were collected.

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Chapter 4: Data Description and Control Variable Test

4.1 Sample descriptive Statistical Analysis

The questionnaire survey was mainly conducted among middle and senior managers of surveyed enterprises, and 508 questionnaires are retrieved. In order to ensure the validity of the research data, the collected data samples are screened according to the following criteria: (1) eliminate the questionnaires completed by respondents having worked for less than one year in the surveyed enterprises; (2) get rid of the samples that are not completed according to specified requirements or are responded incorrectly; (3) reject the questionnaires whose number of unanswered items is greater than 3.

After sample screening, 448 questionnaires have been considered valid, with the questionnaire validity rate at 88.1%. Among the valid samples, 58.7% of the surveyed enterprises have a total asset of between 50 million yuan and 1 billion yuan. Nearly half of the polled enterprises are private enterprises. More than 90% of the investigated enterprises were in good operation in 2018. The sampled enterprises are mainly from the central and Eastern regions off China, 94.4% of which have less than 100 employees. The specific descriptive statistics are shown in Table 4-1 below.

4.2 Factor analysis and reliability test

Factor analysis mainly tests whether the scales in the questionnaire have good internal consistency, and whether the structure of each factor and its corresponding scale is consistent with the estimated structure of the actual data. By exploratory factor analysis, the items that meet the following criteria are excluded: (1) the load of the scale in the corresponding structural variables is less than 0.4; (2) the load of the scale between two different factors is more than 0.3. According to the criteria, the results of exploratory factor analysis and the reliability of each factor are presented (Cronbach α value).

Table 4-1 Basic statistical data of sampled enterprises

	Categories of relevant information	Sample size	Percentage
Total assets	Less than 5 million yuan	15	3.3
	5-10 million yuan	64	14.3
	10 to 50 million yuan	88	19.6
	50-100 million yuan	152	33.9
	100-1000 million yuan	111	24.8
	More than 1 billion yuan	18	4.0
Subsector	Manufacture of chemical pharmaceutical raw materials	41	9.2
	Manufacture of chemical preparations	81	18.1
	Manufacture of Chinese herbal medicine	57	12.7
	Manufacture of Chinese traditional patent medicine	26	5.8
	Biopharmaceutical manufacturing	31	6.9
	Manufacture of health materials and medical supplies	55	12.3
	Manufacturing of pharmaceutical equipment	68	15.2
	Medical instruments and equipment manufacturing	32	7.1
	Pharmaceutical industry	57	12.7
	Ownership of the property	State-owned enterprises (including state holding)	70
Private enterprises (including private holding)		218	48.7
Joint-ventures		116	25.9
Wholly-foreign-funded		26	5.8
Others		18	4.0
Business performance in 2018 compared with 2017	Profits have risen sharply	156	34.8
	A small increase in profits	146	32.6
	Roughly flat	108	24.1
	Small loss	34	7.6
Location of surveyed enterprises	Heavy loss	4	0.9
	Northeast region	35	7.8
	Central region	86	19.2
	Eastern region	292	65.2
	Western region	35	7.8
Number of employees	Less than 10	232	51.8
	10-99	191	42.6
	100-299	23	5.1
	More than 300	2	0.4
Post of respondents	Senior managers	83	18.5
	Middle managers	190	42.4
	Basic level managers	122	27.2
	Ordinary staff	51	11.4

4.2.1 External corporate social capital

External social capital includes eight factors: social interaction intensity, social interaction quality, relationship-trust, relationship-satisfaction, relationship-commitment, cognition-organizational distance, cognition-conflict and cognition- shared vision. The factor analysis results confirm the eight hypothesized factors and 38 measurement items are finalized for the scale. The overall measure of sampling adequacy (MSA) is 0.88, and the overall Bartlett's test χ^2 value is 3526.46 (df= 561, $P < 0.01$). The inter-item correlation is significant at level of 0.01, which meets the requirements of factor analysis. The Cronbach α value of each factor is greater than 0.8, reporting a high reliability. The results are shown in Table 4-2.

Table 4-2 Exploratory factor analysis of external corporate social capital

Scales regarding external corporate social capital (ESC)	Factor loading	Explained variance
Social interaction intensity (ESI) Cronbach $\alpha=0.84$		80%
1. We hold regular meetings with our partners to discuss the business conditions.	0.82	
2. We often send staff to partners to understand the situation.	0.97	
3. There are many forms of informal exchanges between us and our partners.	0.99	
4. We often work with partners to solve product/service problems.	0.97	
5. We have frequent contacts with employees at different levels in our partners.	0.69	
Relationship-trust (EGT) Cronbach $\alpha=0.82$		59%
1. In the long-term cooperation, both sides know each other's weak points but will not take advantage of the other's weakness.	0.66	
2. Our business dealings are established on an equal footing.	0.71	
3. Our business dealings will not damage each other's interests	0.73	
4. When faced with difficulties, we and our partners never conceal information about products, technologies or services.	0.84	
5. We and our partners are always willing to share information about products, technologies or services.	0.84	
6. The information we exchange with our partners is very reliable	0.81	
Relationship-satisfaction (EGS) Cronbach $\alpha=0.88$		75%
1. We feel very happy in the process of cooperation with our partners.	0.85	
2. We are satisfied with the results achieved through cooperation.	0.87	
3. We and our partners have maintained a stable relationship.	0.88	
4. There are few conflicts between us and our partners in the process of cooperation.	0.88	
5. We are satisfied with the efforts made by our partners in the process of cooperation.	0.88	
6. Our partnership fits in with our expectations.	0.83	
Relationship-commitment (EGC) Cronbach $\alpha=0.89$		71%

1. We and our partners are committed to maintaining long-term relationships.	0.85	
2. We and our partners remain true to the partnership.	0.88	
3. We and our partners have an emotional attachment to our cooperative relationship.	0.92	
4. We will do what we can do for each other.	0.90	
5. Both sides are willing to make extra efforts to help each other achieve their goals.	0.85	
6. It is worth the ongoing effort at maintaining our partnership.	0.65	
Cognition-organizational distance (ECD) Cronbach $\alpha=0.92$		81%
1. The corporate culture of partners is very different from that of our company.	0.91	
2. The internal management mode of partners is very different from that of our company.	0.97	
3. The strategic orientation of our partners is very different from that of our company.	0.96	
4. The business practices of our partners are very different from ours.	0.75	
Cognition-conflict (ECC) Cronbach $\alpha=0.83$		62%
1. In the course of cooperation, conflicts never occur between the two sides because of different opinions.	0.66	
2. In the process of cooperation, the two sides never conflict because of uneven distribution of interests.	0.80	
3. There is no conflict between us and our partners in business dealings.	0.92	
4. When there are disagreements between the two sides, they often seek solutions to the problems together.	0.87	
5. Both sides have been working hard to take measures to prevent possible conflicts.	0.63	
Cognition-shared vision (ECS) Cronbach $\alpha=0.879$		42%
1. We share common goals with our partners.	0.88	
2. We share business values with our partners	0.99	
3. We agree with our partners on each other's business philosophy.	0.88	
4. We agree with our partners on social responsibility	-0.05	
5. We share the same view with our partners on the way of pursuit of interests	-0.08	
6. We agree with our partners on the development direction of product or service.	-0.07	

4.2.2 Internal corporate social capital

Internal corporate social capital includes six factors: social interaction intensity and quality, relationship-trust and satisfaction, relationship-commitment, cognition-organizational distance, cognition-conflict and cognition-shared vision, and 37 measurement items are included in the scale. The overall measure of sampling adequacy (MSA) of the factor analysis is 0.91, and the overall Bartlett's test χ^2 value is 4471.77 (df = 528, P < 0.01). The inter-item correlation is

significant at level of 0.01, which meets the requirements of factor analysis. The Cronbach α value of each factor is greater than 0.8, reporting a high reliability. The analysis results are shown in Table 4-3.

4.2.3 Exploratory learning

Enterprises' exploratory learning includes four factors: new markets, products and services, new technology and exploratory learning environment. The factor analysis result confirms the hypothesized four factors and 17 measurement items are included in the scale. The overall measure of sampling adequacy (MSA) is 0.90, and the overall Bartlett's test χ^2 value is 1943.67 (df = 136, $P < 0.01$). The inter-item correlation is significant at a level of 0.01, which meets the requirements of factor analysis. Except for the factor of new products and services whose Cronbach α value is 0.66, the Cronbach α value of other three factors is greater than 0.7, reporting a high reliability. The results are shown in Table 4-4.

4.2.4 Exploitative learning

The enterprise's exploitative learning includes four factors: the existing market, the existing products and services, the existing technologies and the exploitative learning environment. The factor analysis result confirms the four hypothesized factors and 17 measurement items are included in the scale. The overall measure of sampling adequacy (MSA) is 0.91, and the overall Bartlett's test χ^2 value is 2324.17 (df=136, $p < 0.01$). The inter-item correlation is significant at a level of 0.01, which meets the requirements of factor analysis. The Cronbach alpha value of each factor is greater than 0.7, which has high reliability. The results are shown in Table 4-5.

4.2.5 Enterprise performance

The enterprise performance variable consists of three factors: financial performance, new product performance and non-financial performance. Twelve measurement items are included in the scale. The overall measure of sampling adequacy (MSA) is 0.93, and the overall Bartlett's test χ^2 value is 1754.27 (df=66, $p < 0.01$). The inter-item correlation is significant at a level of 0.01, which meets the requirements of factor analysis. Except for the factor of non-financial performance whose Cronbach alpha value is 0.64, the Cronbach α value of other factors is greater than 0.7, reporting a high reliability. The results are shown in Table 4-6.

Table 4-3 Exploratory factor analysis of internal corporate social capital

Scales regarding internal corporate social capital (ISC)	Factor loading	Explained variance
Social interaction intensity and quality (ISIQ) Cronbach $\alpha=0.92$		57%
1. Different departments often hold regular meetings to discuss the company's operating conditions.	0.52	
2. Departments often send staff to other departments to understand the situation.	0.69	
3. There are various forms of frequent informal exchanges between departments.	0.75	
4. Different departments often work together to solve product/service problems.	0.78	
5. Interaction between employees at different levels in different departments is very frequent.	0.78	
6. The exchange of information among departments is very timely.	0.80	
7. The information exchanged between departments is very important.	0.84	
8. Different departments often work together in product/service development	0.84	
9. Different departments often share their customer resources.	0.81	
10. Different departments value the ideas exchanges in order to reach consensus.	0.71	
Relationship-trust and satisfaction (IGTS) Cronbach $\alpha=0.93$		58%
1. Oral commitment and written instructions are equally effective in department interactions.	0.80	
2. In the long-term cooperation, different departments know each other's weak points but will not take advantage of the other's weakness.	0.80	
3. Different departments will not damage each other's interests.	0.78	
4. When facing difficulties, departments can help each other.	0.80	
5. The information exchanged between departments is very reliable.	0.78	
6. Departments feel very happy in the process of cooperation.	0.79	
7. All departments have achieved satisfactory results in cooperation.	0.76	
8. There are few conflicts in the process of cooperation among departments.	0.75	
9. All departments are satisfied with the joint efforts in the process of cooperation	0.71	
10. The relationships among departments fit in with expectations.	0.72	
Relationship-commitment (IGC) Cronbach $\alpha=0.91$		66%
1. All departments are committed to maintaining long-term relationships.	0.87	
2. All departments stay true to the partnership.	0.93	

3. Departments have emotional attachment to their daily cooperative relationships.	0.89	
4. Departments will do what they can do for each other.	0.79	
5. All departments are willing to make extra efforts to help each other achieve their goals.	0.50	
Cognition-organizational distance (ICD) Cronbach $\alpha=0.92$		78%
1. The internal culture of different departments is very different.	0.84	
2. The internal management modes of different departments are quite different.	0.95	
3. The behavioral norms of different departments are quite different.	0.85	
Cognition-conflicts (ICC) Cronbach $\alpha=0.88$		72%
1. Departments never conflict because of different opinions in the process of cooperation.	0.78	
2. In the process of cooperation, departments never conflict because of uneven distribution of interests.	0.88	
3. Conflicts never occur in interactions between departments	0.91	
4. When conflicts arise among departments, they often seek solutions to problems together.	0.88	
5. All departments have been working hard to take measures to prevent possible conflicts.	0.80	
Cognition-shared vision (ICS) Cronbach $\alpha=0.88$		68%
1. All departments have common goals and pursuits	0.75	
2. All departments share the same value orientation	0.92	
3. Different departments identify with each other's behaviors	0.89	
4. All departments share the same views on social responsibility	0.71	

4.3 Analysis of the influence of control variables

According to the size of total assets and the nature of ownership, this study makes a comparative analysis of the research variables and studies whether there are significant differences in the average score of social capital, organizational learning and corporate performance among enterprises with different asset sizes and ownership nature.

4.3.1 Sample test according to the ownership nature of surveyed enterprises

According to the nature of ownership, the surveyed enterprises include state-owned enterprises (including state holdings, State-owned shares are major shareholders), private enterprises (including private-holdings, private shares are major shareholders), joint ventures,

wholly foreign-owned and others. The test results of the differences between the five categories are shown in Table 4-2. The results of ANOVA analysis show that there is significant difference between those five groups in exploratory learning ($F = 5.06, P < 0.05$) and new product performance ($F = 3.00, P < 0.05$), but no significant difference in other variables (see Table 4-7).

Table 4-4 Exploratory factor analysis of enterprise exploratory learning

Scales regarding enterprise exploratory learning (ERL)	Factor loading	Explained variance
New market (ERNM) Cronbach $\alpha=0.89$		63%
1. Constant search for high-risk and potential market or product information.	0.78	
2. Keep collecting information that help the enterprise enter new markets and technology field.	0.95	
3. Continuous search for information that will divert the enterprise from the current market or products.	0.97	
4. Constant search for information about new market and product technologies.	0.83	
5. Retrieve uncommon and unrecognizable market demand information and problem solutions.	-0.10	
New products and services (ERNPS) Cronbach $\alpha=0.94$		86%
1. We attach great importance to the study of new product or service models.	0.91	
2. We often carry out R and D activities in many different areas.	0.94	
3. We often try to research and develop patented and unique products	0.97	
4. We have a wide range of products and services	0.96	
5. We often launch new products or services.	0.92	
6. We often experiment with new products and services in potential markets.	0.86	
New technologies field (ERNT) Cronbach $\alpha=0.86$		62%
1. Search, identify and track knowledge in new technologies/services field	0.74	
2. Create or acquire knowledge of new technologies/services needed	0.79	
3. Disseminate and share created or acquired knowledge in new technology/service areas within the company	0.84	
4. Apply the knowledge created or acquired in new technology/service areas to different scenarios	0.78	
Exploratory learning environment (ERLE) Cronbach $\alpha=0.93$		87%
1. The ordinary staff and managers of our enterprise will all contribute to the development strategy of the enterprise.	0.91	
2. Our employees are often involved in collective decision-making.	0.97	
3. Individual opinions of employees will be taken into account when making decisions in our company.	0.98	
4. Working proposals offered by different departments are often adopted in planning	0.88	

Table 4-5 Exploratory factor analysis of enterprise exploitative learning

Scales regarding exploitative learning (EIL)	Factor loading	Explained variance
Existing market (EIEM) Cronbach $\alpha=0.89$		64%
1.Focus on searching for information about the current market/product of the enterprise	0.68	
2.Focus on searching for market and product information that will enable enterprises to achieve better performance	0.78	
3. Focus on finding common and proven solutions and methods.	0.92	
4.Emphasize on utilizing knowledge related to existing products and market	0.84	
5.Focus on accumulating effective solutions to current market/product problems	0.76	
Existing products and services (EIEPS) Cronbach $\alpha=0.93$		78%
1. We have invested a lot of resources in a few areas of technology.	0.84	
2. We often collect information about product preferences of existing customers.	0.91	
3. We frequently make minor improvements to and adaptations of the existing products.	0.92	
4. We often experiment with our products and services in our existing market	0.87	
Existing technologies (EIET) Cronbach $\alpha=0.91$		73%
1.Search, identify and track knowledge in existing technology/service fields	0.74	
2.Create/acquire the required knowledge in existing technology/service areas	0.91	
3.Disseminate and share created/acquired knowledge in existing technology/service areas within the company	0.91	
4.Apply knowledge created/acquired from existing technology areas to different scenarios	0.84	
Exploitative learning environment (EILE) Cronbach $\alpha=0.91$		72%
1.Our company pays attention to conveying company policy to every employee.	0.82	
2.Our company pays attention to publicizing the established strategy to its employees in various forms.	0.96	
3.Our company pays attention to giving a clear direction of work tasks and objectives.	0.88	
4.Our company often provides training for its employees in enterprise concepts and regulations.	0.73	

Table 4-6 Exploratory factor analysis of enterprise comprehensive performance

Scales of enterprise comprehensive performance (PER)	Factor loading	Explained variance
Financial performance (FPER) Cronbach $\alpha=0.87$		60%
1. The company's profit margin compared with competitors	0.47	
2. The growth rate of the company's sales compared with its competitors	0.82	
3. Return on investment (ROI) of a company compared with its competitors	0.94	
4. The company's market share compared with competitors	0.90	
5. The company's cash flow compared with competitors	0.66	
New product performance (NPPER) Cronbach $\alpha=0.94$		85%
1. Compared with competitors, the success rate of new services/products of the company	0.89	
2. The profit growth rate of the company's new products compared with its competitors	0.96	
3. The growth rate of the company's new product market share compared with its competitors	0.96	
4. Compared with competitors, the company's new product sales growth rate	0.89	
Non-financial performance (NFPER) Cronbach $\alpha=0.64$		67%
1. Compared with competitors, the company's market expansion	0.76	
2. Compared with competitors, the company's customer satisfaction	0.84	
3. Compared with competitors, the company's employee satisfaction	0.88	
4. Compared with competitors, the company's social image	0.78	

Therefore, on the basis of ANOVA's preliminary analysis, this study further conducts multiple comparisons of the differences between those five groups in exploratory learning and new product performance according to different nature of ownership (see Table 4-8). From the results of multiple comparisons, we can see that in terms of financial performance, joint ventures and wholly foreign-owned enterprises have better financial performance than state-owned (including state-owned holding) enterprises and private enterprises. There is no significant difference in financial performance between the private enterprises and the state-owned enterprises. Meanwhile, there is no difference in financial performance between joint ventures and wholly foreign-owned enterprises. It can be seen that the financial performance of enterprises wholly or partially funded by foreign capital is significantly better than those

without foreign ownership background, which reflects to a certain extent that enterprises with foreign ownership pay more attention to financial returns.

4.3.2 Sample test according to industry classification

The surveyed enterprises are sampled from a wide range of sub-sectors of the pharmaceutical industry, including manufacture of chemical raw materials, manufacture of chemical preparations, manufacture of Chinese herbal medicine, manufacture of finished traditional Chinese herbal medicine, biopharmaceutical manufacturing, manufacture of health materials and medical supplies, manufacture of pharmaceutical equipment, medical instruments and equipment manufacturing and pharmaceutical industry. The test results of the differences among the seven categories of enterprises in external social capital, internal social capital, exploratory learning, exploitative learning, financial performance, new product performance and non-financial performance are shown in Table 4-9. The results of ANOVA analysis show that there is significant difference only in financial performance among different sub-sectors of pharmaceutical Industry ($F = 1.96, P < 0.05$) (see table 4-10).

4.3.3 Sample test according to assets size

According to the total assets, the surveyed enterprises are categorized into six groups: less than 5 million yuan, 5-10 million yuan, 10-50 million yuan, 50-100 million yuan, 100 -1000 million yuan and more than 1 billion yuan (1 RMB = 0.1315 Euro, on March 20, 2019). The test results of the differences between the six groups in external social capital, internal social capital, exploratory learning, exploitative learning, financial performance, new product performance and non-financial performance are shown in Table 4-11. The results of ANOVA analysis show that there are significant differences in external social capital ($F = 4.35, P < 0.05$), exploratory learning ($F = 10.96, P < 0.05$), exploitative learning ($F = 2.59, P < 0.05$), new product performance ($F = 11.1, P < 0.05$), and but there are no significant differences in other research variables.

Therefore, on the basis of ANOVA's preliminary analysis, this study further makes multiple comparisons of the specific differences among enterprises with various asset sizes in external social capital, exploratory learning, exploitative learning and new product performance (see Table 4-12). In terms of external social capital, enterprises with small asset size have more social capital than those with large asset size.

Table 4-7 Variance analysis based on the ownership nature of surveyed enterprises
(ANOVA)

		Sum of squares	DoF	Mean square	F value	Significance level
External corporate social capital	Inter-group comparison	2.68	4	0.67	1.74	0.14
	Intra-group comparison	170.56	443	0.39		
	Overall	173.24	447			
Internal corporate social capital	Inter-group comparison	5.10	4	1.28	1.33	0.26
	Intra-group comparison	426.50	443	0.96		
	Overall	431.60	447			
Exploratory learning	Inter-group comparison	32.50	4	8.12	5.06	0.00
	Intra-group comparison	398.56	443	1.61		
	Overall	431.06	447			
Exploitative learning	Inter-group comparison	1.75	4	0.50	0.57	0.69
	Intra-group comparison	289.05	443	0.88		
	Overall	290.80	447			
Financial performance	Inter-group comparison	3.00	4	0.75	0.67	0.62
	Intra-group comparison	495.90	443	1.12		
	Overall	498.90	447			
New product performance	Inter-group comparison	43.80	4	10.96	3.01	0.02
	Intra-group comparison	1615.40	443	3.65		
	Overall	1659.20	447			
Non-financial performance	Inter-group comparison	7.80	4	1.96	1.65	0.16
	Intra-group comparison	526.10	443	1.19		
	Overall	533.90	447			

Table 4-8 Multiple comparisons of differences in exploratory learning between enterprises with different ownership nature

Ownership nature (Inter-group comparison)		Mean Difference	Standard deviation	Significant level	95% Confidence interval	
					Minimum value	Maximum value
	Private	0.28	0.21	0.66	-0.29	0.85
State-owned enterprises	Joint-venture	0.22	0.23	0.87	-0.41	0.85
	Foreign-owned	0.35	0.35	0.85	-0.60	1.31
	Others	1.08	0.40	0.06	-0.02	2.18
Private enterprises	State-owned	-0.28	0.21	0.66	-0.85	0.29
	Joint-venture	-0.06	0.18	0.99	-0.54	0.42
	Foreign-owned	0.07	0.32	0.99	-0.79	0.93
	Others	0.80	0.37	0.20	-0.22	1.82
Joint-ventures	State-owned	-0.22	0.23	0.87	-0.85	0.41
	Private	0.06	0.32	0.99	-0.42	0.54
	Foreign-owned	0.13	0.33	0.99	-0.77	1.03
	Others	0.86	0.39	0.17	-0.19	1.91
Foreign-owned enterprises	State-owned	-0.35	0.35	0.85	-1.31	0.60
	Private	-0.07	0.32	0.99	-0.93	0.79
	Joint-venture	-0.13	0.33	0.99	-1.03	0.77
	Others	0.73	0.47	0.52	-0.54	2.00
Others	State-owned	-1.08	0.40	0.06	-2.18	0.02
	Private	-0.80	0.37	0.20	-1.82	0.22
	Joint-venture	-0.86	0.39	0.17	-1.91	0.19
	Foreign-owned	-0.73	0.47	0.52	-2.00	0.54

Table 4-9 Variance analysis based on the industry categories of surveyed enterprises (ANOVA)

		Sum of squares	DOF	Mean square	F value	Significance level
External corporate social capital	Inter-group comparison	6.2	8	0.33	0.85	0.56
	Intra-group comparison	391.30	439	0.39		
	Overall	397.50	447			
Internal corporate social capital	Inter-group comparison	13.10	8	1.63	1.71	0.09
	Intra-group comparison	418.60	439	0.95		
	Overall	431.70	447			
Exploratory learning	Inter-group comparison	6	8	0.75	0.44	0.89
	Intra-group comparison	737.80	439	1.68		
	Overall	743.80	447			
Exploitative learning	Inter-group comparison	2.76	8	0.35	0.53	0.84
	Intra-group comparison	288.04	439	0.66		
	Overall	290.80	447			
Financial performance	Inter-group comparison	17.20	8	2.15	1.96	0.05
	Intra-group comparison	481.70	439	1.10		
	Overall	498.90	447			
New product performance	Inter-group comparison	14	8	1.75	0.47	0.88
	Intra-group comparison	1645	439	3.75		
	Overall	1659	447			
Non-financial performance	Inter-group comparison	7.60	8	0.95	0.79	0.61
	Intra-group comparison	526.30	439	1.20		
	Overall	533.90	447			

Table 4-10 Multiple comparisons of differences in financial performance between enterprises from various industry categories

Industry categorizations (Inter-group comparison)		Mean	STD	Significant level	95% Confidence interval	
		differ			Minimum	Maximum value
		ence			value	
Manufacture of chemical pharmaceutical raw materials	Manufacture of chemical preparations	0.06	0.59	1.00	-0.42	0.55
	Manufacture of Chinese herbal medicine	-0.07	0.63	1.00	-0.58	0.45
	Manufacture of finished traditional Chinese herbal medicine	-0.13	0.77	1.00	-0.77	0.50
	Biopharmaceutical manufacturing	-0.17	0.73	0.99	-0.77	0.43
	Manufacture of health materials and medical supplies	-0.06	0.64	1.00	-0.57	0.47
	Manufacture of pharmaceutical equipment	-0.01	0.61	1.00	-0.51	0.49
	Medical instruments and equipment manufacturing	-0.11	0.73	1.00	-0.70	0.49
	Pharmaceutical industry	-0.17	0.63	0.98	-0.69	0.35
Manufacture of chemical preparations	Manufacture of chemical pharmaceutical raw materials	-0.06	0.59	1.00	-0.55	0.42
	Manufacture of Chinese herbal medicine	-0.13	0.53	0.56	0.31	0.99
	Manufacture of finished traditional Chinese herbal medicine	-0.20	0.69	0.76	0.37	0.98
	Biopharmaceutical manufacturing	-0.23	0.65	0.76	0.30	0.92
	Manufacture of health materials and medical supplies	-0.11	0.54	0.55	0.33	1.00
	Manufacture of pharmaceutical equipment	-0.07	0.51	0.49	0.34	1.00
	Medical instruments and equipment manufacturing	-0.17	0.64	0.70	0.36	0.99
	Pharmaceutical industry	-0.23	0.53	0.67	0.20	0.77
Manufacture of Chinese herbal	Manufacture of chemical pharmaceutical raw materials	0.07	0.63	1.00	0.58	0.58
	Manufacture of chemical preparations	0.13	0.53	0.56	-0.99	0.31

Industry categorizations (Inter-group comparison)		Mean	STD	Significant level	95% Confidence interval	
		differ			Minimum	Maximum
		ence			value	value
medicine	Manufacture of finished traditional Chinese herbal medicine	-0.07	0.73	0.67	0.53	1.00
	Biopharmaceutical Manufacturing	-0.10	0.69	0.67	0.46	1.00
	Manufacture of health materials and medical supplies	0.02	0.58	0.46	0.49	1.00
	Manufacture of pharmaceutical equipment	0.05	0.55	0.40	0.51	1.00
	Medical instruments and equipment manufacturing	-0.04	0.68	0.60	0.51	1.00
	Pharmaceutical industry	-0.11	0.58	0.58	0.37	1.00
Manufacture of finished traditional Chinese herbal medicine	Manufacture of chemical pharmaceutical raw materials	0.13	0.77	1.00	-0.50	0.77
	Manufacture of chemical preparations	0.20	0.69	0.76	-0.98	-0.37
	Manufacture of Chinese herbal medicine	0.07	0.73	0.67	-1.00	-0.53
	Biopharmaceutical manufacturing	-0.03	0.82	0.70	0.64	1.00
	Manufacture of health materials and medical supplies	0.08	0.73	0.52	0.69	1.00
	Manufacture of pharmaceutical equipment	0.12	0.71	0.46	0.71	1.00
	Medical instruments and equipment manufacturing	0.03	0.81	0.64	0.69	1.00
Biopharmaceutical manufacturing	Pharmaceutical industry	-0.04	0.73	0.63	0.56	1.00
	Manufacture of chemical pharmaceutical raw materials	0.17	0.73	0.99	-0.77	0.43
	Manufacture of chemical preparations	0.23	0.65	0.76	0.30	0.92
	Manufacture of Chinese herbal medicine	0.10	0.69	0.67	-1.00	0.46
	Manufacture of finished traditional Chinese herbal medicine	0.03	0.82	0.70	-1.00	-0.64
	Manufacture of health materials and medical supplies	0.12	0.73	0.45	0.68	1.00

Industry categorizations (Inter-group comparison)		Mean	STD	Significant level	95% Confidence interval	
		differ			Minimum	Maximum
		ence			value	value
Manufacture of health materials and Medical supplies	Manufacture of pharmaceutical equipment	0.16	0.71	0.39	0.70	0.99
	Medical instruments and equipment manufacturing	0.06	0.81	0.58	0.69	1.00
	Pharmaceutical industry	-	0.73	0.57	0.56	1.00
		0.00				
	Manufacture of chemical pharmaceutical raw materials	0.06	0.64	1.00	-0.47	0.57
	Manufacture of chemical preparations	0.11	0.54	0.55	-1.00	-0.33
	Manufacture of Chinese herbal medicine	-0.02	0.58	0.46	-1.00	-0.49
	Manufacture of finished traditional Chinese herbal medicine	-0.08	0.73	0.52	-1.00	-0.69
	Biopharmaceutical manufacturing	-0.12	0.73	0.45	-1.00	-0.68
		Manufacture of pharmaceutical equipment	0.04	0.56	0.42	0.50
Manufacture of pharmaceutical equipment	Medical instruments and equipment manufacturing	-0.06	0.68	0.62	0.50	1.00
	Pharmaceutical industry	-0.12	0.58	0.60	0.36	1.00
	Manufacture of chemical pharmaceutical raw materials	0.01	0.61	1.00	-0.49	0.51
	Manufacture of chemical preparations	0.07	0.51	0.49	-1.00	-0.34
	Manufacture of Chinese herbal medicine	-0.05	0.55	0.40	-1.00	-0.51
	Manufacture of finished traditional Chinese herbal medicine	-0.12	0.71	0.46	-1.00	-0.71
	Biopharmaceutical manufacturing	-0.16	0.71	0.39	-0.99	-0.70
	Manufacture of health materials and medical supplies	-0.04	0.56	0.42	-1.00	-0.50
	Medical instruments and equipment manufacturing	-0.10	0.66	0.44	0.44	1.00

Industry categorizations (Inter-group comparison)		Mean	STD	Significant level	95% Confidence interval	
		differ			Minimum	Maximum
		ence			value	value
Medical instruments and equipment manufacturing	Pharmaceutical industry	-0.16	0.55	0.29	0.29	0.97
	Manufacture of chemical pharmaceutical raw materials	0.11	0.73	1.00	-0.49	0.70
	Manufacture of chemical preparations	0.17	0.64	0.70	-0.99	-0.36
	Manufacture of Chinese herbal medicine	0.04	0.68	0.60	-1.00	-0.51
	Manufacture of finished traditional Chinese herbal medicine	-0.03	0.81	0.64	-1.00	-0.69
	Biopharmaceutical manufacturing	-0.06	0.81	0.58	-1.00	-0.69
	Manufacture of health materials and medical supplies	0.06	0.68	0.62	-1.00	-0.50
	Manufacture of Pharmaceutical Equipment	-0.10	0.66	0.44	0.44	1.00
Pharmaceutical industry	Pharmaceutical industry	-0.06	0.68	0.62	0.50	1.00
	Manufacture of Chemical Pharmaceutical Raw Materials	0.17	0.63	0.98	-0.35	0.69
	Manufacture of chemical preparations	0.23	0.53	0.67	-0.77	-0.20
	Manufacture of Chinese Herbal Medicine	0.11	0.58	0.58	-1.00	-0.37
	Manufacture of Finished Traditional Chinese Herbal Medicine	0.04	0.73	0.63	1.00	0.56
	Biopharmaceutical Manufacturing	0.00	0.73	0.57	-1.00	-0.56
	Manufacture of Health Materials and Medical Supplies	0.12	0.58	0.60	-1.00	-0.36
	Manufacture of Pharmaceutical Equipment	0.16	0.55	0.29	-0.97	-0.29
	Medical Instruments and Equipment Manufacturing	-0.06	0.68	0.62	0.50	1.00

Specifically, enterprises with assets of less than 5 million yuan have significantly outperformed those with assets of 50 million yuan to 100 million yuan ($p < 0.05$) and 100 million yuan to 1 billion yuan ($p < 0.05$). Enterprises with assets of 50 million to 100 million yuan ($p < 0.05$) and enterprises with assets of 100 million to 1 billion yuan ($p < 0.05$) have obvious advantages over enterprises with assets of more than 1 billion yuan. The advantages of enterprises with assets of 5 million to 10 million yuan and 10 million to 50 million yuan over other groups in external social capital are not obvious.

In terms of organizational learning, when the asset size is less than 1 billion yuan, the lower the asset size, the more obvious the advantages of exploratory learning. Enterprises with assets of more than 1 billion yuan have advantages over those with assets of 5 million to 10 million yuan, 50 million to 100 million yuan and 100 million to 1 billion yuan in exploratory learning, and the difference is significant at level of 0.05 respectively. Enterprises with assets of less than 5 million have obvious exploratory learning advantages over enterprises with assets of 5 million to 10 million yuan, 10 million to 50 million yuan, 50 million to 100 million yuan and 100 million to 1 billion yuan, and the difference is significant at the level of 0.10, 0.05, 0.05 and 0.05 respectively. Enterprises with assets of 5 million to 10 million yuan have obvious advantages over those with assets of 50 million to 100 million yuan in exploratory learning ($p < 0.05$). With regard to exploitative learning, enterprises with assets of 50 million to 100 million yuan have obvious advantages over enterprises with assets of 5 million to 10 million yuan ($p < 0.10$).

In terms of new product performance, the advantages of economies of scale become even more noticeable when the assets scale reaches more than 50 million yuan. Enterprises with assets of more than 1 billion yuan have advantages over those with assets of 5 million to 10 million yuan, 10 million to 50 million yuan, 50 million to 100 million yuan and 100 million to 1 billion yuan in the performance of new products, and the difference is significant at the level of 0.10, 0.05, 0.05 and 0.05 respectively. The enterprises with assets of 50 million to 100 million yuan have obvious advantages over those with assets of 5 million to 10 million yuan and 10 million to 50 million yuan in new product performance but underperform those with assets of 50 million to 100 million yuan in new product performance, and the difference is all significant at the level of 0.05. Enterprises with assets of less than 5 million yuan have advantages over those with assets of 10 million yuan to 50 million yuan and 50 million yuan to 100 million yuan in new product performance, and the difference is significant at the level of 0.05 respectively.

4.3.4 Sample test according to business performance of surveyed enterprises in 2018

In the last part of the questionnaire, the business performance of the surveyed enterprises in 2018 is compared with that in 2017. The business performance is divided into five levels: a substantial increase in profits, a small increase in profits, roughly flat, small losses and huge loss. Table 4-13 reports the test results of the differences among the enterprises with different business performance in external social capital, internal social capital, exploratory learning, exploitative learning, financial performance, new product performance and non-financial performance. The results of ANOVA analysis show that there are significant differences in exploratory learning among different levels of business performance ($F = 2.78, P < 0.05$), while there are no significant differences in other variables among enterprises with different asset size.

Therefore, on the basis of ANOVA's preliminary analysis, this study further makes multiple comparisons of the specific differences in enterprise exploratory learning among enterprises with different asset scale (see Table 4-14). Groups 1, 2, 3, 4 and 5 represent a substantial increase in profits, a small increase in profits, roughly flat, a small loss and a huge loss respectively. Compared with 2017, there are significant differences in exploratory learning between enterprises whose business performance is roughly flat and those whose business performance suffered a small loss or saw a small increase in 2018.

Table 4-11 Variance analysis based on the total assets of surveyed enterprises (ANOVA)

		Sum of squares	DOF	Mean square	F value	Significance level
External corporate social capital	Inter-group comparison	8.12	5	1.62	4.35	0.00
	Intra-group comparison	165.11	442	0.37		
	Overall	173.23	447			
Internal corporate social capital	Inter-group comparison	2.79	5	0.56	1.57	0.17
	Intra-group comparison	157.74	442	0.36		
	Overall	160.53	447			
Exploratory learning	Inter-group comparison	82.10	5	16.41	10.96	0.00
	Intra-group comparison	661.70	442	1.50		
	Overall	743.80	447			
Exploitative learning	Inter-group comparison	8.26	5	1.65	2.59	0.03
	Intra-group comparison	282.54	442	0.64		
	Overall	290.80	447			
Financial performance	Inter-group comparison	6.00	5	1.19	1.07	0.38
	Intra-group comparison	493.00	442	1.12		
	Overall	499.00	447			
New product performance	Inter-group comparison	185.00	5	37.01	11.10	0.00
	Intra-group comparison	1474.00	442	3.34		
	Overall	1659.00	447			
Non-financial performance	Inter-group comparison	12.40	5	2.49	2.11	0.06
	Intra-group comparison	521.50	442	1.18		
	Overall	533.90	447			

Table 4-12 Multiple comparisons of differences in external social capital, organizational learning and new product performance between enterprises with different assets scale

Research variable	Asset size (Inter-group comparison)	Mean difference	Standard deviation	Significant level	95% Confidence Interval			
					Minim um value	Maxi mum value		
External social capital	Less than 5 million yuan	5-10 million yuan	0.37	0.26	0.28	-0.13	0.87	
		10 to 50 million yuan	0.40	0.25	0.17	-0.08	0.89	
		50-100 million yuan	0.54	0.24	0.01	-0.07	1.02	
		100-1000million yuan	0.48	0.25	0.05	0.00	0.97	
		More than 1000 million yuan	0.03	0.31	1.00	-0.58	0.64	
	5-10 million yuan	10 to 50 million yuan	-0.03	0.15	1.00	-0.25	0.32	
		50-100 million yuan	-0.17	0.13	0.42	-0.43	0.09	
		100-1000million yuan	-0.11	0.14	0.85	-0.39	0.16	
		More than 1000 million yuan	0.34	0.24	0.30	-0.13	0.81	
		10 to 50 million yuan	50-100 million yuan	-0.14	0.12	0.54	-0.37	0.10
			100-1000million yuan	-0.08	0.13	0.94	-0.33	0.17
			More than 1000 million yuan	0.37	0.23	0.18	-0.08	0.82

Social Capital, Organizational Learning and Enterprise Performance

	50-100 million yuan	100-1000million yuan	0.06	0.11	0.97	-0.16	0.28
		More than 1000 million yuan	0.51	0.22	0.01	0.07	0.95
	100-1000million yuan	More than 1000 million yuan	0.45	0.23	0.04	0.01	0.90
		5-10 million yuan	0.51	0.77	0.27	-0.38	2.62
		10 to 50 million yuan	0.45	0.75	0.09	-0.11	2.81
	Less than 5 million yuan	50-100 million yuan	0.98	0.72	0.00	0.61	3.44
		100-1000million yuan	1.10	0.73	0.12	-0.17	2.71
		More than 1000 million yuan	1.53	0.93	0.79	-2.65	1.01
		100-1000 million yuan	1.23	0.44	0.98	-0.63	1.08
New product performance	100-1000million yuan	100-1000 million yuan	-0.29	0.40	0.01	0.13	1.69
		100-1000 million yuan	0.12	0.42	1.00	-0.67	0.97
		More than 1000 million yuan	0.55	0.71	0.00	-3.34	-0.55
		50-100 million yuan	0.25	0.36	0.06	-0.02	1.38
	10 to 50 million yuan	100-1000 million yuan	-1.27	0.38	1.00	-0.82	0.67
		More than 1000 million yuan	0.44	0.69	0.00	-3.52	-0.81
		100-1000 million yuan	0.13	0.33	0.01	-1.41	-0.10
	50-100 million yuan	More than 1000 million yuan	-1.39	0.66	0.00	-4.15	-1.54
	100-1000 million yuan	More than 1000 million yuan	-2.09	0.68	0.00	-3.42	-0.76

(Continued) Table 4-12 Multiple comparisons of differences in external social capital, organizational learning and new product performance between enterprises with different assets scale

Research variable	Asset size (Inter-group comparison)	Mean difference	Standard deviation	Significance level	5% Confidence interval		
					Minimum value	Maximum value	
Exploratory learning	Less than 5 million yuan	5-10 million yuan	0.98	0.51	0.06	-0.02	1.98
		10 to 50 million yuan	1.10	0.50	0.02	0.12	2.07
		50-100 million yuan	1.53	0.48	0.00	0.58	2.48
		100-1000 million yuan	1.23	0.49	0.00	0.26	2.19
		More than 1000 million yuan	-0.29	0.62	0.98	-1.52	0.93
	5-10 million yuan	10 to 50 million yuan	0.12	0.29	0.99	-0.46	0.69
		50-100 million yuan	0.55	0.27	0.03	0.03	1.07
		100-1000 million yuan	0.25	0.28	0.79	-0.30	0.80
		More than 1000 million yuan	-1.27	0.48	0.00	-2.20	-0.34
		50-100 million yuan	0.44	0.24	0.09	-0.03	0.91
	10 to 50 million yuan	100-1000 million yuan	0.13	0.26	0.98	-0.37	0.63
		More than 1000 million yuan	-1.39	0.46	0.00	-2.29	-0.48
		100-1000 million yuan	-0.31	0.22	0.35	-0.74	0.13
		More than 1000 million yuan	-1.82	0.45	0.00	-2.70	-0.95
	50-100 million yuan	100-1000 million yuan	-0.31	0.22	0.35	-0.74	0.13
		More than 1000 million yuan	-1.82	0.45	0.00	-2.70	-0.95
100-1000 million yuan	More than 1000 million yuan	-1.52	0.45	0.00	-2.41	-0.63	
	More than 1000 million yuan	-1.52	0.45	0.00	-2.41	-0.63	
Exploitative	Less than 5 million yuan	5-10 million yuan	0.09	0.33	1.00	-0.57	0.75
		10 to 50 million yuan	-0.22	0.33	0.93	-0.86	0.42

Social Capital, Organizational Learning and Enterprise Performance

learning	50-100 million yuan	0.37	0.32	0.91	-0.84	0.40	
	100-1000 million yuan	0.40	0.32	1.00	-0.65	0.61	
	More than 1000 million yuan	0.54	0.41	0.98	-0.60	1.00	
	10 to 50 million yuan	0.48	0.19	0.18	-0.68	0.07	
	5-10 million yuan	50-100 million yuan	0.03	0.17	0.10	-0.65	0.03
		100-1000 million yuan	-0.03	0.18	0.96	-0.47	0.25
		More than 1000 million yuan	-0.17	0.31	1.00	-0.50	0.72
		50-100 million yuan	-0.11	0.16	1.00	-0.31	0.30
	10 to 50 million yuan	100-1000 million yuan	0.34	0.17	0.50	-0.13	0.53
		More than 1000 million yuan	-0.14	0.30	0.34	-0.17	1.01
		100-1000 million yuan	-0.08	0.15	0.32	-0.08	0.49
	50-100 million yuan	More than 1000 million yuan	0.37	0.29	0.28	-0.15	0.99
	100-1000 million yuan	More than 1000 million yuan	0.06	0.30	0.89	-0.36	0.80

Table 4-13 Variance analysis based on the total assets of surveyed enterprises (ANOVA)

		Sum of squares	DOF	Mean square	F value	Significance level
External corporate	Inter-group	4	1.75	0.44	1.13	0.34
	Intra-group	443	171.49	0.39		
	Overall	447	173.24			
Internal corporate	Inter-group	4	0.33	0.08	0.23	0.92
	Intra-group	443	160.20	0.36		
	Overall	447	160.53			
Exploratory learning	Inter-group	4	18.20	4.56	2.78	0.03
	Intra-group	443	725.60	1.64		
	Overall	447	743.80			
Exploitative learning	Inter-group	4	3.21	0.80	1.24	0.30
	Intra-group	443	287.59	0.65		
	Overall	447	290.80			
Financial performance	Inter-group	4	6.50	1.62	1.46	0.21
	Intra-group	443	492.40	1.11		
	Overall	447	498.90			
New product performance	Inter-group	4	24.50	6.12	1.66	0.16
	Intra-group	443	1634.70	3.69		
	Overall	447	1659.20			
Non-financial performance	Inter-group	4	5.10	1.27	1.06	0.38
	Intra-group	443	528.90	1.19		
	Overall	447	534.00			

Table 4-14 Multiple comparisons of differences in exploratory learning among enterprises with different business performance

Research variable	Business performance (Inter-group comparison)		Mean difference	Standard deviation	Significant level	95% Confidence interval		
						Min value	Max value	
Exploratory learning	A substantial increase in profits	A small increase in profits	0.15	0.21	0.86	-0.26	0.86	
		Roughly flat	0.26	0.22	0.50	-0.18	0.70	
		Small loss	-0.54	0.34	0.17	-1.20	0.13	
		Loss rate	0.31	0.91	0.99	-1.46	2.09	
	A small increase in profits	A substantial increase in profits	0.15	0.21	0.86	-0.26	0.86	
		Roughly flat	0.11	0.23	0.96	-0.34	0.55	
		Small loss	-0.69	0.34	0.04	-1.35	-0.02	
	Roughly flat	Loss rate	0.17	0.91	1.00	-1.61	1.94	
		A substantial increase in profits	0.26	0.22	0.50	-0.18	0.70	
		A small increase in profits	0.11	0.23	0.96	-0.34	0.55	
	Small loss	Small loss	-0.80	0.35	0.02	-1.48	-0.11	
		Loss rate	0.06	0.91	1.00	-1.73	1.84	
		A substantial increase in profits	-0.54	0.34	0.17	-1.20	0.13	
		A small increase in profits	-0.69	0.34	0.04	-1.35	-0.02	
	Loss rate	Roughly flat	-0.80	0.35	0.02	-1.48	-0.11	
		Loss rate	0.85	0.95	0.72	-1.00	2.70	
		A substantial increase in profits	0.31	0.91	0.99	-1.46	2.09	
		A small increase in profits	0.17	0.91	1.00	-1.61	1.94	
			Roughly flat	0.06	0.91	1.00	-1.73	1.84
			Small loss	0.85	0.95	0.72	-1.00	2.70

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Chapter 5: Hypothesis Test and Result Analysis

5.1 The relationships among external social capital, internal social capital, exploratory learning, exploitative learning, comprehensive performance and new product performance

According to the theoretical assumptions in this study, we need to examine the relationships between external social capital, internal social capital, exploratory learning, exploitative learning, comprehensive performance and new product performance. Generally, exploratory learning and exploitative learning play an intermediary role between social capital and enterprise performance. Specifically, exploitative learning plays an intermediary role in the relationship between internal social capital and enterprise's comprehensive performance, while exploratory learning plays an intermediary role in the relationship between external social capital and enterprise's new product performance. Therefore, it is necessary to construct two structural equation models to test.

Table 5-1 Correlation coefficient of research variables and discriminatory validity test

Research variable	External social capital	Internal social capital	Exploratory learning	Exploitative learning	Comprehensive performance
Internal social capital	0.15				
Exploratory learning	0.49	-0.07			
Exploitative learning	0.10	0.43	-0.13		
Comprehensive performance	0.14	0.35**	-0.16	0.59	
New product performance	0.44	-0.12	0.86	-0.29	-0.22

Table 5-1 shows the correlation coefficient and the square root of the Average Variance Extracted (AVE) value of the main research variables such as external social capital, internal

social capital, exploratory learning, exploitative learning, comprehensive performance, and new product performance. The square root of AVE value is used to test whether there is satisfactory discrimination among the research variables. The discrimination validity test is a data analysis process through which the square root of AVE value of each variable is compared with the correlation coefficient between these variables. If the square root of the average variance extraction value of each variable is larger than the correlation coefficient between the variables, the variables are considered to have satisfactory discriminatory validity. It can be seen from the table that the square root of AVE value of each variable in this study is larger than its correlation coefficient, so the variables are considered to have good discriminatory validity and can be further tested. All variables are significantly correlated with each other at the level of 0.05, which supports the theoretical hypothesis in this study to some extent. However, the logical relationship between these variables needs to be further tested by structural equation models.

5.1.1 The relational model regarding social capital, organizational learning and enterprise comprehensive performance

As shown in Figure 5-1, exploratory learning and exploitative learning play an intermediary role between social capital and enterprise comprehensive performance. External social capital has an impact on enterprise's comprehensive performance through exploratory learning, while internal social capital has an impact on enterprise's comprehensive performance through exploitative learning.

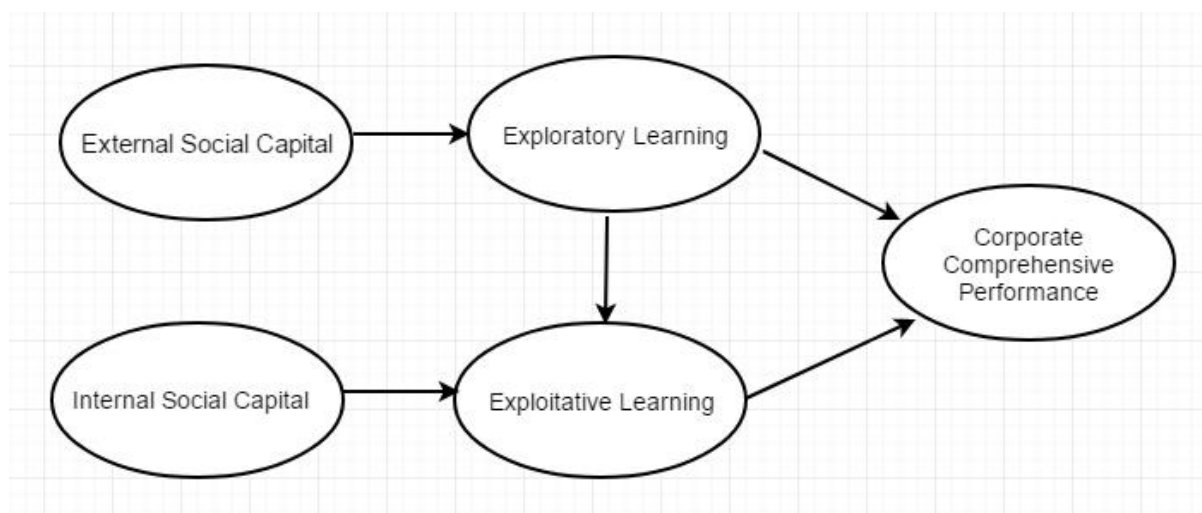


Figure 5-1 Relationship between social capital, organizational learning and enterprise comprehensive performance

5.1.2 The relational model regarding social capital, organizational learning and new product performance

As shown in Figure 5-2, exploratory learning and exploitative learning play an intermediary role between social capital and enterprise's new product performance. External social capital has an impact on enterprise's new product performance through exploratory learning, while internal social capital has an impact on enterprise's new product performance through exploitative learning.

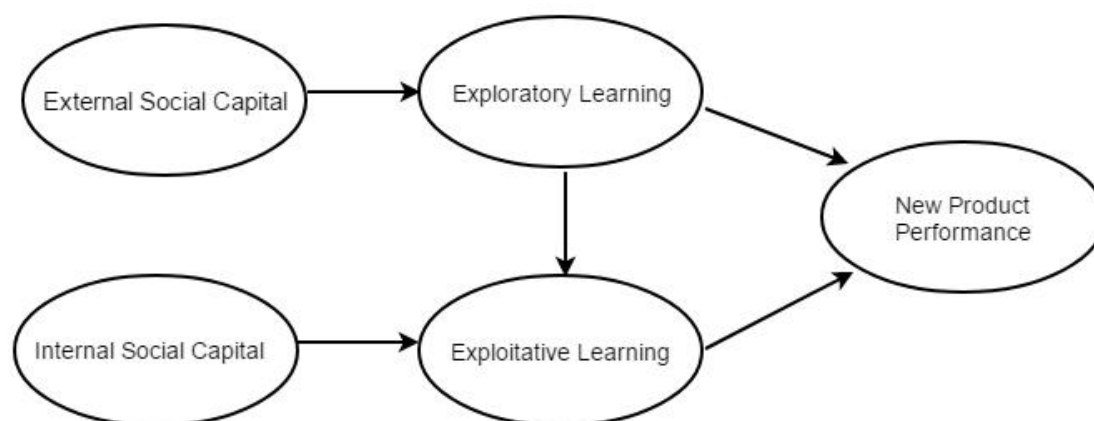


Figure 5-2 Relationship between social capital, organizational learning and new product performance

5.2 Model Test

The reliability of each measurement model is good, but the focus of this study is not the measurement model, but the structural model. Because the measurement model in this study has many factors and measurement items. If the measurement model is directly constructed based on the original items, the large number of estimated parameters will cause the model not to be identified. Based on the above model identification and the focus on structural model (rather than the focus on measurement model), this study uses structural equation packaging strategy to reduce the number of estimated parameters in the measurement model so as to improve the statistical power and stability of structural model. Previous studies have shown that structural equation packing strategy only affects the measurement model, but does not affect the relationship between structural models (Little, Cunningham, Shahar, & Widaman, 2002). The test results for structural models are stable and good.

The packing process is as follows:

Firstly, factor analysis is performed on each variable, and the items are ranked from high

to low according to the load size. The results are as follows (Table 5-2).

Table 5-2 Sorting order for variables according to factor load size

Variable	Sorting order for items according to factor load size (from high to low; from left to right)													
External social capital	C4	C5	D1	D2	C6	D3	E1	E3	E5	E2	E4	D5	D4	D6
	C3	C2	G2	G3	G4	C1	E6	G1	H6	G5	H5	H4	A5	A2
	A1	A4	A3	F4	H1	H3	F1	H2	F2	F3				
Internal social capital	J2	L2	L5	M1	K1	L1	L3	L4	J3	K6	M2	M3	J1	J4
	K4	K5	K2	J5	K3	O2	I5	P1	O3	I4	M4	I3	N1	O1
	O4	M5	N3	O5	N2	I2	P2	P3	I1	P4				
Exploratory learning	S3	S4	S5	S2	W3	S1	W2	Q2	S6	W1	Q3	W4	Q4	Q1
	U2	Q5	U1	U4	U3									
Exploitative learning	T2	T3	R1	R2	T4	T1	R3	X2	X3	R4	V1	V2	X1	V3
	R5	V4												
Comprehensive performance	Y4	Y3	Y12	Y2	Y5	Y11	Y10	Y13	Y1					
New product performance	Y7	Y8	Y6	Y9										

All items of each variable are categorized into three groups respectively, as shown in Table 5-3.

According to the above packaged measurement model, this study uses statistical analysis software R i386 3.5.2 to carry out structural equation model test. The test results are shown in Figure 5-3 and Figure 5-4. The specific parameters estimated by the two structural equation models are listed in Table 5-3 below. The structural equation model 1 examines the relationship among social capital, organizational learning and enterprise comprehensive performance. The fitting index of the model show the model has good fitting degree. Similarly, the structural equation model 2 examines the relationship among social capital, organizational learning and new product performance. The fitting index also meets the requirements, so the fitting degree of the structural equation model 2 is satisfactory.

5.3 Results of SEM analysis

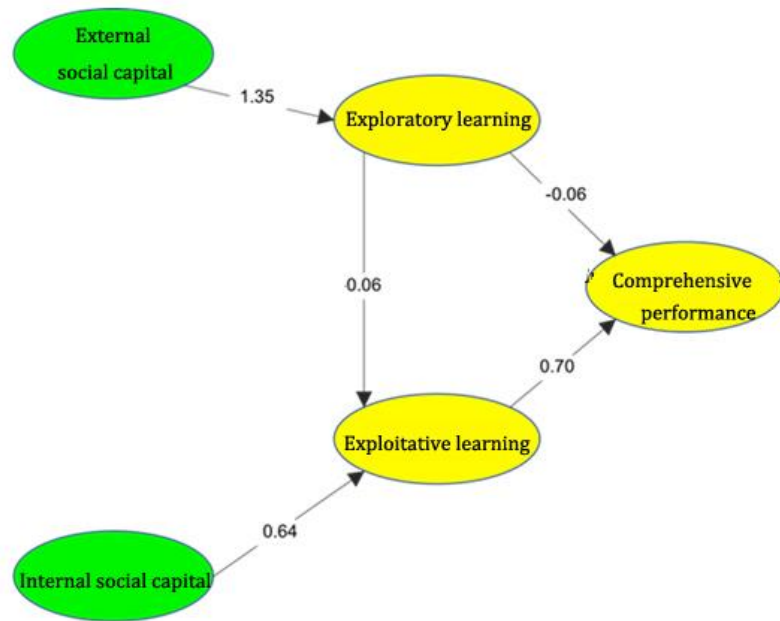
The path coefficients of SEM 1 and SEM 2 show that external social capital has a significant positive effect on exploratory learning (See Table 5-5), which supports the theoretical hypothesis of this study. The relationship network formed by the vertical connections of an enterprise in the industrial chain and the horizontal connections between the enterprise and other organizations such as strategic alliance, cooperative R&D enterprises,

industrial cluster enterprises, governments and universities has knowledge spillover effect. Meanwhile, the relational network is also an important prerequisite for enterprises to absorb knowledge, obtain new products and market information, and create environment for exploratory learning.

Table 5-3 Groups of items of variables

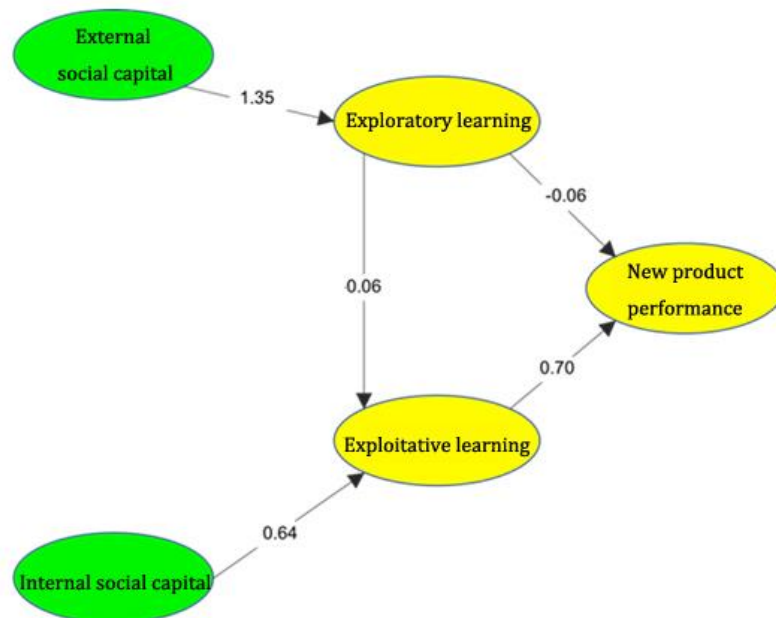
Variable	Sorting order for items according to factor load size (from high to low; from left to right)
External social capital	Group 1 (a1): C4 D3 E1 D5 D4 G3 G4 G5 H5 A2 A3 H3
	Group 2 (a2): C5 C6 E3 E4 D6 G2 C1 H6 H4 A1 F4 F1 F3
	Group 3 (a3): D1 D2 E5 E2 C3 C2 E6 G1 A5 A4 H1 H2 F2
Internal social capital	Group 1 (b1): J2 L1 L3 M3 J1 J5 K3 I4 M4 M5 N3 P3 I1
	Group 2 (b2): L2 K1 L4 M2 J4 K2 O2 O3 I3 O4 O5 P2 P4
	Group 3 (b3): L5 M1 J3 K6 K4 K5 I5 P1 N1 O1 N2 I2
Explorative learning	Group 1 (c1): S3 S1 W2 W4 Q4 U4 U3
	Group 2 (c2): S4 W3 Q2 Q3 Q1 U1
	Group 3 (c3): S5 S2 S6 W1 U2 Q5
Exploitative learning	Group 1 (d1): T2 T1 R3 V2 X1
	Group 2 (d2): T3 T4 X2 V1 V3
	Group 3 (d3): R1 R2 X3 R4 R5 V4
Comprehensive performance	Group 1 (e1): Y4 Y11 Y10
	Group 2 (e2): Y3 Y5 Y13
	Group 3 (e3): Y12 Y2 Y1
New product performance	Group 1 (f1): Y7
	Group 2 (f2): Y8
	Group 3 (f3): Y6 Y9

The results of model estimation also show that the internal social capital of enterprises has a positive effect on exploitative learning, which supports the theoretical hypothesis of this study. Internal social capital is mainly embodied in the formation of information sharing network among various departments and employees within an enterprise, which provides conditions for knowledge sharing within the enterprise.



Chi-Square=390.695, df=84, P-value=0.00000, RMSEA=0.09

Figure 5-3 Structural equation model regarding the relationship between social capital, organizational learning and enterprise comprehensive performance



Chi-Square=353.965, df=84, P-value=0.00000, RMSEA=0.080

Figure 5-4 Structural equation model regarding the relationship between social capital, organizational learning and new product performance

Table 5-4 Conclusion of structural equation model test

Impact path	Model 1 (enterprise comprehensive performance)	Model 2 (new product performance)	Hypothesis supported or not?
External social capital-> Exploratory learning	1.35(12.54)	0.45(4.36)	Supported
Internal social capital-> Exploitative learning	0.40(10.13)	0.64(9.98)	Supported
Exploratory learning-> Exploitative learning	0.06(-2.02)	0.06(-1.99)	Supported
Exploratory learning-> comprehensive performance	-0.06(-1.9)	—	Not supported
Exploratory learning-> new product performance	—	1.32(31.92)	Supported
Exploitative learning-> comprehensive performance	0.70(14.25)	—	Supported
Exploitative learning-> new product performance	—	-0.45(-8.22)	Not supported
Model goodness of fit index:			
CFI	0.96	0.97	
TIL	0.95	0.96	
RMSEA	0.09	0.08	
χ^2/df	4.65	4.21	

Note: ** P < 0.01, * P < 0.05; the standardized regression coefficients are shown in the table, and the figure in bracket refers to T value.

Besides, enterprises with more internal social capital have created an organizational atmosphere that promotes the social exchange behaviors and encourages the free airing of views, which provides conditions for the exchange and integration of dispersed knowledge within enterprises, facilitates the exploitative learning, standardizes the existing knowledge, and makes full use of existing products and services.

Table 5-5 Results of hypotheses test

No.	Hypothesis	Supported or not
H1	H1: There is a significant positive correlation between social capital and organizational learning in pharmaceutical enterprises.	Supported
H1-1	H1-1: There is a significant positive correlation between internal social capital and organizational exploratory learning in pharmaceutical enterprises.	Supported
H1-2	H1-2: The external social capital of pharmaceutical enterprises is positively correlated with exploratory learning.	Supported
H2	H2: There is a significant positive correlation between organizational learning and corporate performance in pharmaceutical enterprises.	Supported
H2-1	H2-1: There is a significant positive correlation between organizational exploratory learning and exploitative learning in pharmaceutical enterprises.	Supported
H2-2	H2-2: Exploitative learning is positively correlated with comprehensive performance (financial and non-financial) in pharmaceutical enterprises.	Supported
H2-3	H2-3: Exploratory learning has a significant positive correlation with the performance of new product development in pharmaceutical enterprises.	Supported
H3	H3: Organizational learning plays an intermediary role in the impact of social capital on enterprise performance in pharmaceutical enterprises.	Partially supported
H3-1	H3-1: Exploitative learning plays an intermediary role in the relationship between internal social capital and comprehensive performance in pharmaceutical enterprises.	Supported
H3-2	H3-2: Exploratory learning plays an intermediary role in the relationship between external social capital and new product performance in pharmaceutical enterprises.	Supported

After the analysis of two models, the positive effect of exploratory learning on exploitative learning is also substantiated. New knowledge and information acquired from exploratory learning is an important source of enterprise's knowledge accumulation. The enterprises' innovative initiatives in market and products are based on the knowledge converted from exploratory learning and exploitative learning. Exploratory learning provides the basis for exploitative learning to utilize knowledge.

By comparing the analysis results of two models, we can find that exploratory learning and exploitative learning have different effects on different aspects of enterprise performance.

In terms of the first model, the comprehensive performance is a combined effect of financial performance and non-financial performance. The exploratory learning of enterprises has no significant impact on the comprehensive performance, while exploitative learning can substantially improve comprehensive performance. In terms of the second model, after replacing the research variable “comprehensive performance” with “new product performance”, we draw the opposite conclusion: exploratory learning has a positive effect on the new product performance, while exploitative learning has no effect on the new product performance. Because exploratory learning mainly focuses on unplanned activities such as exploring cutting-edge technology and developing new products and markets, while exploitative learning aims at the improvement of existing products and services. Therefore, the exploratory learning has contributed mostly to the success of new products and services. By contrast, exploitative learning mainly helps maintain the existing market share of enterprises and ensures sales returns, so it has played a significant positive role in financial performance (profits and sales revenue) and non-financial performance (employee, customer satisfaction and social image).

A further analysis of the intermediary path shows that in the second model, the external social capital has significant impact on exploratory learning while exploratory learning has a significant impact on new product performance. Therefore, the impact path “external social capital->exploratory learning->new product performance” is formed, with exploratory learning playing an intermediary role between external social capital and new product performance. In addition, external social capital has a positive impact on the new product performance through exploratory learning. The intermediary effect is $1.35 \times 1.32 = 1.78$. Similarly, the internal social capital has a significant impact on exploitative learning while exploitative learning has a significant impact on comprehensive performance. Therefore, the impact path “internal social capital->exploitative learning-> comprehensive performance” is formed, with exploitative learning playing an intermediary role between internal social capital and comprehensive performance. In addition, internal social capital has a positive impact on the comprehensive performance through exploitative learning. The intermediary effect is $0.64 \times 0.70 = 0.448$.

Therefore, hypotheses H3-1 and H3-2 are supported, and organizational learning plays a mediating role between social capital and corporate performance. It is worth noting that exploratory learning has a positive effect on exploitative learning, so in the first model, although exploratory learning has no significant direct impact on comprehensive performance, it can indirectly affect it through exploitative learning, and the indirect effect is $0.06 \times 0.70 = 0.042$. Exploitative learning plays a mediating role between exploratory learning and enterprise's comprehensive performance, which means that exploitative learning plays a crucial role in

converting innovation results produced by exploratory learning into actual financial performance. It also means that enterprises should attach importance to the role of exploitative learning in the industrialization of innovative achievements.

Chapter 6: Case Study

6.1 Research design

6.1.1 Research method

In social science, case study has been one of the important research methods of theoretical construction. The management field is no exception. The majority of the management ideas and theories are derived from the comprehensive study of cases. However, since the 1960s, studies on management have begun to explain corporate behaviors by way of standardized and scientific research methods, which has had a certain impact on the acceptability (legitimacy) of the conclusions of case study. Currently, mainstream studies in the field of management are dominated by a large-sample quantitative research methods which is widely accepted and recognized by scholars because of the effectiveness and reliability of its measuring tools. It is not until recent years that some scholars started to question this empirical research method of pure mathematical verification, and proposed better options of research such as the adoption of a compromised approach that combines quantitative and qualitative research.

The quantitative positivist approach focuses on the collection and mathematical analysis of statistics horizontally, while case study focuses more on vertical dimensions such as time. In this sense, case study is closer to reality, thus being increasingly valued by scholars.

6.1.2 Case selection

In this case study, the selection of cases mainly adopts the method of targeted sampling. The purpose of this study is to examine the influence of the social capital and organizational learning in pharmaceutical enterprises, which form of social capital influences exploratory organizational learning and which form influences exploitative organizational learning. In light of that, we suggest the following criteria for the case selection:

(1) Operation for over ten years. It takes time to accumulate social capital, so operation for a long enough time can better reflect the impact of social capital on organizational learning.

(2) Pharmaceutical enterprises with strong comprehensive performance or strong performance in new products and rich experience in organizational learning. Given that one of the focal points of the study is to examine the impact of organizational learning on the

comprehensive performance of pharmaceutical firms or the performance of new products, we must choose cases with strong comprehensive performance or strong new products as well as rich experience in organizational learning.

(3) Pharmaceutical enterprises with a relatively typical growth and evolution process. Through observations on the internal evolution, it is possible to have a clearer picture of the process of social capital establishment, and the state of corresponding organizational learning, which helps us better understand and sort out the influence of social capital and organizational learning.

Therefore, this case selects ZGJK Group as a case study, and uses ZGJK Group as the case, focusing on internal social capital and utilization learning, supplemented by external social capital and exploration and learning, using collaborative growth model.

6.1.3 Case investigation

This case mainly uses literature, interview and direct observation methods for in-depth research and data collection. The author led two assistants to conduct a 60-minute interview with the founders, senior leaders and the corporate university leaders of ZGJK Group, and visited the company for first-line observation. For specific issues, please refer to the Appendix Survey Outline.

6.1.4 Collection of data

As mentioned above, to ensure the validity of the case study, it is proposed to carry out triangulation through different data sources and evidence chains. In this case study, data are collected mainly through the following channels:

(1) Literature. Researchers collect relevant statistics materials, written materials related to social capital and organizational learning, internal corporate publications, rules and regulations of the case enterprise.

(2) Interviews. Interviews with the founders, senior leaders and the corporate university leaders of ZGJK Group.

(3) Direct observations. Researchers visit the company to investigate in person.

6.1.5 Methods to improve reliability and validity

In the course of the study, researchers use the following methods to improve the reliability and validity:

6.1.5.1 Establish a theoretical model

The theoretical model shown in Figure 6-1 is the basis of this study. Only by designing the theoretical model, researchers are able to set the research objectives, determine the methods to collect materials and the specific issues to be investigated with reasonable accuracy.

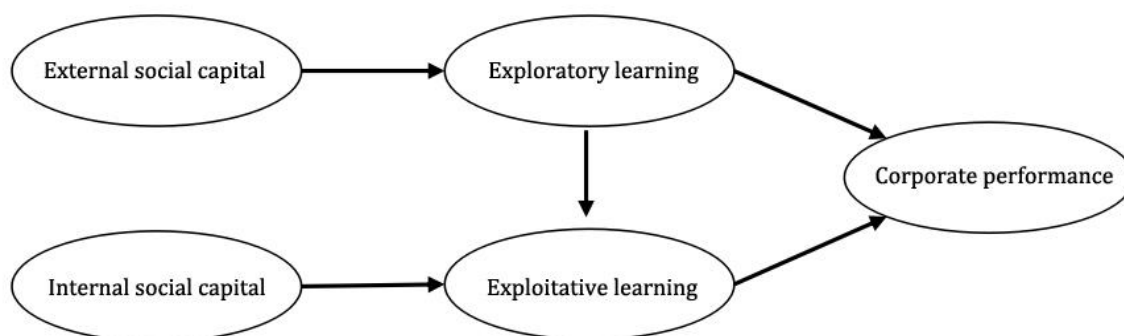


Figure 6-1 Theoretical model of this study

6.1.5.2 Case study protocol

Yin (2010) argued that case study protocol can improve the reliability of case studies. The protocol includes research purposes, data collection procedures, research report outlines, and case study issues. This study also uses a case study protocol, and the researcher designed a case investigation plan.

6.2 ZGJK group — A synergistic growth model relying mainly on internal social capital and exploitative learning, and supplemented by external social capital and exploratory learning

6.2.1 Introduction to case company background

6.2.1.1 Company background

ZGJK Group is a listed company specializing in diversified industries including pharmacy and health food, and featured by modernized, cross-industry and collectivized development. It is also a national high-tech enterprise, national innovative enterprise and top hundred enterprise in the province where it operates. The group owns JK and JL, and has built a development pattern with traditional Chinese medicine manufacturing as the core industry, health food as an emerging industry, and other businesses as supplement.

6.2.1.2 Development history

ZGJK Group has a clear strategic goal for its development in the coming years, namely to improve the life quality experience of mankind by way of inheritance and innovation in the pharmaceutical and health-care field. It aims to build itself into a global service provider of pharmaceutical and health value chain and a comprehensive business group in pharmaceutical and health industry by taking the traditional Chinese medicine industry chain as the main body, the health of consumer as an extension and the special chemical medicine as supplement, focusing on researching, marketing and capital operation, seizing the industrial opportunities and policies at state and local levels, and devoted to fostering the core values of “quality, innovation, inclusiveness and excellence”.

6.2.2 Internal and external social capital and organizational learning

In the four stages of its development, and amid changes in the market environment, the adjustment to the overall management strategy brought by leadership transition has helped formed distinct evolution characteristics throughout the organizational learning process in ZGJK Group: in the early stage featured by sellers’ market and fledging technologies, ZGJK Group tended to rely on relationship networks (especially the government) to build support for organizational learning, and secondly sought cooperation with research networks but relatively less support from business networks, because it was in the stage of direct technology introduction. Moreover, this stage is more of exploitative learning though it was ostensibly about exploratory learning. In the medium and late stage, as the market competition grew fiercer and expanded into other markets, technologies became more and more mature, and ZGJK Group gradually shifted its reliance on the cooperation with business networks and began to pay attention to the use of competition and cooperation relationship with its rivals and partners, and at the same time tried to achieve further improvement and development of organizational learning through the cooperation with relationship networks and research networks. In this stage, in addition to strengthening exploitative learning that it has long valued, and internalizing knowledge and capabilities such as technologies and management to improve corporate performance, ZGJK Group also started to explore exploratory learning and established an institute of technology. Specific social capital and organizational learning contents are mainly reflected in the following aspects.

6.2.2.1 Innovation-driven — Late-mover advantages of combination of external social capital and organizational exploratory learning need further enhancement

6.2.2.1.1 Relationship networks

In the first two stages of development, relationship networks especially the engagement of government played an all-important role in the organizational learning of ZGJK Group, during which the first generation of leaders also played a part.

The successful introduction of new strategic investors transformed ZGJK Group from a state-owned company to a private listed company. In the events that served as key milestones in its technologies and corporate development, the political talents and individual charisma of ZGJK Group's leaders played an exceptionally core role. In other words, the high-intensity and high-quality interactions between its leadership and the government enabled ZGJK to grasp many political information and policy opportunities. These technical and managerial turning points, in turn, provided fundamental supports for ZGJK's later pursuit of cooperation with business networks and research networks, justifying that "relationship is productivity". Thanks to its state-owned background, the company quickly embedded such resources and imparted relevant knowledge to each department, achieving good outcomes and feeling the pleasure of "great trees are good for shade".

6.2.2.1.2 Research networks

In terms of research networks, ZGJK Group has actively forged cooperation with major universities and national research institutions, forming an extensive ZGJK Group has established technology and development edges through its early relationship networks, and at the same time held on to and gradually strengthened its research networks, pushing its organizational learning to new heights.

In specific collaborations, ZGJK mainly follows the model of carrying out exploratory learning with research network units at first, and then shifting to exploitative learning within the company, which enhances its capability of knowledge transfer, absorption, assimilation and utilization. Since 2002, ZGJK Group has followed the ideas of introduction, digestion, absorption, innovation and industrialization, and actively utilized domestic resources for cooperation in technology research and development (R&D) and industrialization. Throughout the process, ZGJK Group has ensured constant investment in research. The company insisted on investing no less than 5% of its sales revenue into technology development every year, and spending massively on state-of-the-art testing instruments and pilot equipment in the world to ensure that the company has top R&D capabilities. In general, in terms of research networks,

ZGJK Group is vigorously developing its own R&D, while making full use of social resources, and taking a diverse approach of university-industry-research cooperation.

(1) Joint Research and Development

ZGJK is exploring the possibility of cooperating with the Institute of Industrial Economics of Jinan University and Sun Yat-sen Business School will cooperate with Wuzhou University and Guangxi University of Chinese Medicine after it opens up the corporate university. Wuzhou Pharmaceuticals of ZGJK Group has vigorously followed the strategy of “independent innovation, high-tech company” in its development, thus establishing a number of leading technological platforms including an autonomous region-level technology R&D center, the Guangxi Pharmaceutical Academy of Engineering, the Guangxi Medicine Purification Technology Research Center, the Guangxi Hundred-Billion R&D Center, an academician workstation, and the ZGJK Health Industry Research Institute.

(2) Co-Founded Laboratories

Since 2006, the company has established three laboratories (research centers) with universities and research institutes: the “ZGJK Group R&D Center” co-founded with Guangxi University of Chinese Medicine, the “Post-Doctoral Research Center” co-founded with China's National Postdoctoral Affairs Management Committee, and the “Guangxi Pharmaceutical Industrial Institute of Engineering” co-founded with the General Office of the Guangxi District Government.

6.2.2.1.3 Talent exchange and training

ZGJK Group has established talent exchange and training systems with universities such as Sun Yat-Sen University, South China University of Technology, Jinan University and Guangdong University of Foreign Studies and has set up a number of MBA bases with universities to train talents for the company. Moreover, the company regularly invites domestic and foreign experts to give lectures, so as to improve the level of managerial and technical personnel.

However, these collaborations were not sufficient enough in terms of its depth and sustainability to touch on the fundamental and innovative researches related to the industry. Specific training objectives and evaluation criteria for performance were not stated when carrying out talents training and exchanges with external social capital. Joint R&D and co-founded laboratories failed to live up to expectations. Breakthroughs couldn't be made on the basis of existing products. In the late 2007 when the company was in its prime, sales and profits surged, ZGJK didn't seized the opportunity to increase investment in long-term basic R&D, and

failed to shift to breakthrough R&D from progressive R&D in time. As a result, more follow-up and introduction of international new technologies led to an emphasis on the externalization of tacit knowledge and the improvement of process flow on a technical level. These measures were conducive to short-term performance, but the slow transition from external research networks to independent R&D resulted in insufficient long-term development. Therefore, the combination of external social capital and exploratory learning shows less evident driving effects on the company in terms of either mergers and acquisitions performance or the level of R&D platforms.

6.2.2.2 Obvious synergy effects of corporate universities - Top-down exploitative learning

In the four stages of its development, the integration of internal capital and the institutionalization of organizational learning are the main reasons for the rapid development of ZGJK Group in its early stage. With changes in the market and the business strategies, especially the replacement of leaders, a series of evolution have taken place in its internal social capital structure. In addition, each change in its internal social capital structure has triggered a corresponding change in its networks, relationships and cognition of the internal social capital. Eventually, the internal capital structure of ZGJK Group has stabilized, and the leadership decided to build the company into a learning organization. All the internal social capital also had to change around this decision, enabling the organization to implement the top-down exploitative learning.

In a word, ZGJK Group's exploitative organizational learning based on the internal social capital is mostly derived from its exploratory organizational learning based on the external social capital, and enjoys investment preferences for proportional human and capital resources given its corporate strategy.

6.2.2.2.1 Internal training network

When internal training network in ZGJK Group is flourishing, the whole pharmaceutical industry is basically at this stage. After introducing the concepts of internal trainer and training camp, ZGJK Group hopes to create a learning atmosphere that “every minute is devoted to learning and knowledge rotates among learners”. Therefore, the internal social capital with learning organization at its core is committed to break down the barriers between departments. Since the goal is clear--training is to promote learning, and learning is to improve training, all departments are unified in thought, step up the pace of learning and accelerate the pace of training. In this process, the thought and behavior of the management are unified, which has given a good demonstration and played a leading role, and also has fully reflected the very high

recognition of the firm-internal social capital.

In the process of research, we find by observation method that: the leaders of the company who act as both leaders and teachers day and night have to deal with different kinds of affairs of the company every day and they often have to work overtime to study, go to the classroom to discuss with the employees, answer the doubts of the employees and teach them the fresh knowledge. Sometimes they are too busy to eat and they even have no time to go home. The workers all said that the leaders' hearts were all put into the company. The leaders of the technical department who study assiduously on professional technology take the factory as their home, work hard in the laboratory, often sleep in the research center, and work nearly 16 hours every day. They put their hearts and souls into every task and where there is a technical problem, they will write it down, lead the team to analysis it carefully and then find the solution in academic research. Once the problem is solved, the leaders will share their experiences at the next internal training in the technology department until every employee knows about them. "Leaders teach us how to solve technical problems step by step, and when we can't understand they will teach us over and over again. We ask the leaders to rest, they just said, 'Don't worry about us. We need to ensure that no one be left behind'." It can be seen that the leaders' emphasis on production is reflected incisively and vividly in the words of the ZGJK people.

6.2.2.2 Internal trainer network

The concept of internal trainer, as an important part of organizational exploitation learning, can create an atmosphere of "learning for all" for the organization, so that the concept of exploitation learning will remain in the thinking ideas of every employee in every department and a good institutional and ideological foundation will be laid for building a learning organization. Internal trainers refer to those excellent employees who are selected as lecturers. They will train some staff belonging to a module or all the staff according to different topics. The selection of internal trainers is open to all departments. The human resources department needs to establish rules and regulations as well as manage these internal trainers. The teaching time will be arranged by ZGJK Group, but the course content and teaching style need to be determined by the internal trainers themselves.

Internal trainer belongs to the part-time job which focuses more on ability than staff's levels. The selection and training mechanism of internal trainers are very strict as the total time of training is as long as one year, and the selection is once a year. Firstly, it has a written test and an interview, which mainly examine whether the internal trainer's thoughts are in line with the Group and whether the internal trainer has a good understanding of the work of the Group.

Only those who pass the two tests can enter the next section. Then comes the trial lecture part, which is inspected by the leaders of the human resources department. The employee needs to select a topic and to design a course for teaching within the given scope, and the leaders of the human resources department will select the best according to their performance. Those who have passed the tests will receive the internal trainer training for half a year, and those who finish the training will face the final test -- subject competition. The declared subject is limited to the company, which is required to propose questions, explain the reasons and solutions as well as hold a roadshow. Employees who fail to hand in the subject as scheduled will be directly eliminated, and all the subjects will be ranked through the selection of leaders. Finally, the internal trainers of this period will be selected based on their previous performance.

The primary problem of internal trainers is whether they can teach staff well. Internal trainers who improve employees' performance by giving lectures can get points in exchange for promotion or bonus. The ZGJK Group makes internal trainers work hard spontaneously through a series of incentive systems. There is a certain subsidy for giving lectures. However, the motivation of internal trainers is not material-oriented, and it focuses more on promotion points. For example, to become a middle-level cadre, internal trainers can continuously improve their points through teaching, and then they may be promoted to the ideal position, that is, the points of internal trainers can affect their administrative level. Some internal trainers are good at professional courses, while others are good at general education courses. These courses can convey the Group's policies, procedures and working methods to employees at different levels and can help other trainees to get promoted.

ZGJK Group regards internal trainers as the mechanism of staff promotion, which can prompt employees to mature as soon as possible. The Group implements a training map: employees are divided into five levels, and employees at different levels are assigned to different sections for training. Only those who master knowledge of all the sections can get the ticket for promotion and becoming an internal trainer. In order to build a more complete internal training network, the evaluation and points of internal trainers will also become the stepping stone for their future promotion, because they have made outstanding contributions to the organization's exploitive learning. In terms of internal trainers, ZGJK Group does not advocate nepotism. It hopes that internal trainers can consciously adjust their own teaching methods and content, so that each internal trainer has a unique magic weapon and the content taught by each internal trainer is integrated with their own characteristics. This is undoubtedly a very high requirement for internal trainers. Therefore, the internal trainers of the Group must constantly find their own problems, learn to serve for exploitative learning.

6.2.2.3 Corporate university network

6.2.2.3.1 Strategic orientation

Zhang Shanyong, editor-in-chief of *Modern Enterprise Education Corporate University*, believes that “it is the business of entrepreneurs to build corporate universities, not the business of training managers, and it is almost impossible for training managers to build corporate universities successfully.” Since the establishment of ZGJK University, the leaders of the Group have always attached great importance to it. “ZGJK University will cultivate and transport talents for the main business of ZGJK Group, which is characterized by the combination of training and practice in order to win the competition ultimately. This goal may seem shortsighted, but it is urgently needed for the current transformation management of ZGJK Group. We will talk about what happens in 5-10 years at that time.” In his view, the Corporate University is both a “vocational school” and a “Party school”. The clue of “Party school” can be seen in ZGJK University since leaders of ZGJK Group set Chinese People's Anti-Japanese Military and Political College founded by the Communist Party as a benchmark when building ZGJK University. Chinese People's Anti-Japanese Military and Political College has cultivated tens of thousands of core leading cadres of the Communist Party of China, which can be regarded as the most successful Party school in history. Its educational policy is that a firm and correct political orientation, an industrious and simple style of work, and flexible strategy and tactics. Political orientation comes first, style second, and tactics last. Chinese People's Anti-Japanese Military and Political College is not only to train generals with excellent military capabilities, but also to train political commissars with excellent values, and then these core leading cadres are entrusted with important tasks to influence and lead the people and the revolutionary army. In terms of ability cultivation, ZGJK University is a teaching delivery platform, focusing on enabling and organizing high-quality delivery for the purpose of education, in combination with the “customer demand” of various departments. “Full-time teachers who are demand-centered but not supply-oriented need to adjust the changes in demand. Teaching platform needs to be able to keep up with demands, and teachers can do a variety of professional teaching organization work on the delivery platform.” On the other hand, the ability cultivation of ZGJK University needs to support the corporate culture, management platform and critical business capabilities of ZGJK Group, especially its construction of strategic reserve teams. “Culturally and ideologically, we need to establish a unified management platform. Culture is the base, and the fertile soil which is above culture is the management platform. And business is the energy grown up on this land. The cultural

foundation platform is the seminars on cadre management; Management platform is the existing management, including the current system reform, project management support, and the management platforms of each system. Business are like the mountain peaks that keep coming out, which can stand on their own.” To sum up, ZGJK University needs to help enterprises to export two things: (1) people who are more in line with the company spirit, values and abilities; (2) better summarized and refined knowledge as well as experience. Therefore, the main work of ZGJK University focuses on three things: cultural inheritance; ability promotion and acquisition of knowledge assets. In addition, ZGJK University concentrates on internal training and does not involve in external training business. As a group leader said, “I pay more attention to our internal training. I care about the progress of our staff and when the staff make progress. We have the possibility to achieve greater success. The solution to the problem of our client is that if he asks, I will offer high-priced training. Our teachers are all invited, and there is nothing cheap.”

6.2.2.3.2 Organizational operation

In order to ensure the strategic direction of ZGJK University, the leaders of ZGJK Group set up a steering committee. The leaders of ZGJK Group act as the instructors and the three rotating CEOs are members of the committee, in which the meeting is held every six months. As for the organizational management of ZGJK University, leaders of the Group believe that “ZGJK University, as a light-weight subsidiary, needs to simplify its management and conduct independent accounting, so as to gradually experiment with de-matrix management. First of all, it needs to ensure rapid decision-making.” The key points of its organizational operation are as follows:

(1) Sole responsibility for its profits and losses

Paid service of ZGJK University is different from that of training departments of many enterprises. ZGJK University is not a cost center, but a Service Biz Group (SBG). It balances its accounts with the business department and is responsible for its own profits and losses, balance of payments and paid services. “My policy with ZGJK University is that you spend the money and cultivate the capacity in return. I'm not going to give money to you, because it's going to run out. You can make money from the people who are benefited from you and then put it into the service for those people. ZGJK University just sticks to the charge model, which is to make money internally, not externally.”

The executive president of ZGJK University shared the story of ZGJK Group leaders and ZGJK University at the Learning, Technology and Talent Development Conference hosted by

China Telecom University in 2014. The leaders of ZGJK Group only cared about two things about ZGJK University: First, how much was the revenue? Second, how much was the profit? When its president Chen Haiyan reported the profit figure, the Group leaders responded immediately: “who let you keep the profit? Spend it all. All profits need to be returned to our employees: “what you provide is paid service, and you need to make ends meet, so as to get rid of the ‘fetters’.” The paid service ensures that the business department will not abuse the learning resources for free, and employees will study hard. ZGJK Group leaders clearly points out the role of paid training in ZGJK University: “if ZGJK University does not receive money, it will be the disaster of ZGJK University. And you will also get infinite calls until you burn out. The representative of each representative office will call, ‘we have a problem here, and we would like to invite trainers in ZGJK University for training.’ And when he have finished the phone call he just leaves the matter as it was. On the other hand, the self-sustaining economic model also ensures a high degree of consistency between ZGJK University and the company's business, which promotes the improvement of the endogenous ability of ZGJK University, and makes its organizational operation more independent. “The method to assess the effectiveness and value of the training is very simple,” said a learning project manager at ZGJK University, “that is, whether the business revenue will grow next year and whether the business department is willing to give money to send people here for training.” The Group leaders also mentions, “if the training service of ZGJK University is valuable, every department is willing to pay for your service. After making more money, we can also increase resources and improve teaching ability to make ZGJK University more popular. ZGJK University does not have to ask for instructions on everything. The training also has no need to be approved as long as you have talked to the training unit. The platform has to pay ZGJK University for consultation, which will be cheaper than the consultation fees of IBM and outside consulting companies.”

(2) Project-type operation

ZGJK University which responds quickly to demands does not pursue complete systematism and systematization. Instead, it is dedicated to responding to business demands. The core business of ZGJK University focuses on cultural inheritance, management capacity, professional capacity and project management capacity, among which cultural inheritance is the most core part. “if a well-designed shared platform is established between your current lower-level organization and the four core competence departments (management capacity department, professional capacity department, project management department and new employee training department), these departments will promote the empowerment education.”

On this basis, ZGJK University adjusted its organizational structure at the end of 2014. In

terms of business, it formulated a relatively flexible organization form of “project group”, which relied on a unified delivery management platform, and taken learning projects as the core. Projects followed business demands. And once new business demands arose, ZGJK University would set up a project group to ensure a flexible response to “customers”. The president Chen Haiyan mentioned that in the continuous communication with the company's business department, the project team of ZGJK University gradually grew from ADDIE who only knew training and learning to a team who were now able to talk with the company's market department, R&D department and other business departments. “The fundamental reason is that the business management of ZGJK University refers to the real business management processes and scenarios, which not only need to contact with the business demands, set up projects and audit projects, but also need to consider how to do pricing, how to quote, how to define service commitment and how to confirm the acceptance of customers... Paid service and the self-sustaining economic model are the roots that make ZGJK University think and act like a business unit.” As the Group leaders said, “ultimately, ZGJK University will rely on the right mechanism to become a necessary organization for the company, and it will move forward in a rolling cycle, and finally reach the top!”

(3) Learning system

The learning system is the core system of the ZGJK University, and the main work is undertaken by the School of Continuing Education of ZGJK University. In this regard, the group leaders have explicitly requested: "ZGJK University is different from those formal normal universities which aim to cultivate college trainees, masters or PhDs, because we and our trainees have accepted basic training. The essence of ZGJK University is to provide those who have graduated from universities with re-education related to function rather than basic knowledge. We need you to undertake this job, so we empower you, but not in an all-round way. “ZGJK University must not be run in the same way as common universities considering the formal education our trainees have accepted. ZGJK is featured by the combination of training and actual combat, which will endow our trainees with professional operational capability.” “Combing training with actual combat means that these two things are the same to our trainees. All of the tables we use in the training are exactly the same as what we use in reality, so as the codes and tags. So, what we are doing now is to simplify the process of empowerment, which means we are teaching you how to combat instead of the theories.”

Therefore, adhering to the teaching philosophy of combing training and actual combat for years, ZGJK University has gradually developed a learning system suitable for its company's own needs.

a. Learning of project delivery system

At present, as the main undertaker of company-level learning projects, ZGJK University does not cover the training related to professional and technical training of detailed departments, but covers the training related to management, project management, and corporate culture in specific as follows: a) learning projects with the improvement of management ability and leadership of administrative staff at its core, including senior management seminar for cadres, global training for first-line managers project (FLMP), HRBP empowerment project, and national supply chain supervisor training and combating program, etc. b) learning projects with the improvement of project management capacity of project members at its core, including resource pool training project for sales managers (the “general pool”— one part of the three strategic reserve forces), the C8 resource pool training for project management (the coordinated delivery of sub-departments — another of the three strategic reserve forces), short-term project management training project for reserve cadres (the Youth Training Course), etc. c) learning projects with the improvement of professional skills in customer interface, namely the resource pool training project for solutions (the brigade combat team of the three strategic reserve forces). d) cultural training projects with values at its core, including orientation training projects for new employees and cross-cultural management learning projects for expatriates, etc. e) other training, such as projects for examination consultation and certification, and pre-employment training for expatriates, etc.

b. Instructional design and curriculum development

It is acknowledged that many training courses lack efficiency. One condition may be that some lecturers, although as battle-hardened veterans themselves, are not good at summing up experiences or teaching trainees with orienting skills, so that the content of the lesson cannot be expressed efficiently. Just as the dumplings trapped in the teapot, trainees are confused after the training. This condition often occurs in the classes of part-time lectures within the company. Another condition may be that some lecturers, not experiencing first-line battles, simply take theories in textbooks as the Golden Rule, which may lose contact with reality and secede the trainees from effective practice. Condition like this often happens in the classes of lectures from other business schools or consulting companies. In order to solve this problem effectively, ZGJK University decided to shift its priority from looking for excellent lecturers to the design and development of its curriculum. Considering the diverse background of different project members, ZGJK University made full use of their complementary advantages to cooperatively develop its courses. In the research and development group, most of the education professionals were from normal colleges and universities, with professional backgrounds in pedagogy,

educational psychology, adult learning, etc., and were responsible for providing teaching methodologies. While for those who were good at cognitive design and teaching experience are appointed to design the training of delivery activities. Meanwhile, the R&D team kept recruiting experienced professionals to join the team, jointly develop teaching content, communicate with operation departments, and collect theoretical and practical cases.

The learning programs offered by ZGJK University are trainee-oriented and emphasize self-study and self-management. Take the C8 resource pool training for project management as an example, the instructor guidance only accounts for 20% of the whole class hours, while class discussion and simulation exercises and evening class for case studies account for 50% and 20% respectively. By following the rules of adult learning, the teaching and discussion of trainees emphasizes that the trainees should summarize their past experience through independent research and group discussion, and reapply the new knowledge into practical work. The teaching concept of “flipped classroom” is adopted in orientation training projects for new employees, in which each learning task follows the three steps of “input-discussion-output” after trainees’ group learning. The course development team designed the teaching process and simulated exercises in various forms, including LEGO games, role-playing, and sand table simulations, so that the lecturers could let trainees enjoy their classes through lively activities. For trainees and teams with excellent performance in the classroom, each project has its unique reward mechanism to provide instant incentives to ensure the enthusiasm of the trainees. Besides, standardized trainee textbooks, lecturer textbooks and class sponsor manuals are prepared with detailed introduction to course contents, teaching process and skills, in order to provide sufficient reference materials for those busy internal part-time lecturers so as to reduce their pressure for preparing lessons.

c. Comprehensive learning solution

The consulting program at ZGJK University has already surpassed the scope of traditional training. Each learning project can be taken as a management consulting project, not just a course. ZGJK University regards all departments of the company as “customers”, while the seniors of ZGJK University serve as learning consultants who provide comprehensive and systematic learning solutions according to customer needs in the process of communicating with their customers. By doing this, ability of personnel at key positions can be improved while business be boosted. The manager of a learning consulting project is responsible for the management and operational delivery of the project. The primary part of the project is to learn requirement analysis. Previously, ZGJK University has organized a group of experts to study and refine the methodology of learning needs analysis, and then formed an analytical

framework of thoughts of “business needs, performance needs, learning needs and learner needs”, which could conduct comprehensive analysis from perspectives including company strategy, business performance, employee ability, and learning approaches.

d. Case method teaching

ZGJK University is one of corporate universities that has applied case method teaching to corporate training practice earlier in China. The application of this teaching method is the embodiment of the teaching concept of “combing training and actual combat” of the group leaders. The group leaders once pointed out that “At the present stage, ZGJK University with the development of the organization as its focus, should tailor the teaching content according to the practical business demand of its trainees. While case method teaching should be adhered to serve the production of the first-line.” To this end, ZGJK University set up a case center, responsible for case development and writing, empowerment of case teaching methodology, and guidance to trainee cases. In 2014, experts from ZGJK University Project Management and Case Study Program, after referring to the case system of Harvard Business School and Richard Ivey School of Business in Canada, compiled a trilogy methodology for ZGJK's own teaching case development and writing, case studies and case teaching. At the same time, ZGJK University launched the project named as three strategic reserve forces and developed more than 680 hours of courses. Those courses were not piled-up theories, but a composition of real cases jointly collected and edited by each side of the project team and business departments. So all of the courses were practical combat-oriented, instead of chasing the so-called high-end courses. Many courses require students to pre-write their own cases, bring them to the class, and discuss with their classmates. Besides, there are experts who will empower the students in the methodology of case writing. At present, case method teaching has run through all the learning projects of ZGJK University, and become the main part of curriculum development and training delivery.

e. Quality of faculty

Since its establishment, ZGJK University has always pursued the philosophy of “the best people to cultivate better people”. Because of the application of internal lecturer system, among the 170 employees of ZGJK University, few of them are full-time teachers, and the external lecturers are just auxiliaries. The teachers are excellent managers and technical experts from the front line of the company, forming a faculty team of nearly 1,000 people. For example, in the university's empowerment project for basic managers, those who teach the classes are regional department managers and supervisors, rather than full-time teachers. Group leaders stressed “the need to build up the ranks of part-time lecturer, is significant in ZGJK, especially

in the application of combination of training and actual combat mode. It's essential to find someone who knows how to operate the aircraft carrier to teach the novice, otherwise it may hit the rocks. So it is for us to train our trainees.” Li Jie, a member of TMT, also mentioned that “our model is beyond the scope of outside teaching institutions, because their lecturers only teach theories without actual operation, so we can only teach trainees by ourselves.” For instructor motivation, ZGJK University adopts a combination of material and spiritual incentives. According to the latest regulations, the maximum salary of a lecturer is 8,000 yuan per day. Meanwhile, ZGJK University has a lecturer evaluation system, in which excellent lecturers will be publicly praised throughout the company. As for the development of lecturers, ZGJK University adopts the round robin rather than the lifelong system. For lecturers lacking practical experience, the group leaders asked them to go deep into the front line for exercises. “Many of our lecturers don't know the actual situation, therefore the contract formula they teach is unrealistic. You cannot imagine the difficulty of installing the base station in the Himalayas if you've never been there. With sufficient funds, trainees of ZGJK University are allowed to be project managers with experienced teachers like me to be your assistants. I will bring my own ration and meal tickets without increasing your cost. After listening to the real condition told by the trainees, the teacher may have a better understanding of their needs, while his teaching will soon be improved. As a result, what he teaches would also be better in line with trainees' practice.”

(4) Learning technology

Advocating the concept of “technology change learning”, ZGJK University, different from many companies, rarely purchases standardized learning technology or system from outside. As a high-tech company, ZGJK has its own technology research and development foundation. It sets up a project team to develop learning technology, which provides personalized solutions for each study project, and to actively change the learning mode into case-centered, so that the practical learning suitable for actual combat can happen whenever and wherever trainees want to. The group leaders expect the establishment of a strong online teaching platform. “The future e-learning platform can imitate the experience center of the exhibition hall. We can monitor the click rate of the learning content in this area at a specific time to decide what content to be pushed to the front-end server, so that our staff can learn by themselves when they are free at night.” ZGJK has a demand for E-Learning due to its large organizational size. In many overseas regions, such as Afghanistan, one new employee is recruited every year, so it is costly to send them together to ZGJK University Shenzhen Headquarter for training. However, with E-learning, ZGJK University can simultaneously train new employees in more than 40

countries. As an improvement of E-learning, the ZGJK University learning technology team has realized mobile learning. In the context of the internet moving from “desktop to pocket”, ZGJK University, by combining with mobile internet technology, has developed an APP named Huawei ilearning, which enables trainees to learn anytime and anywhere through Pad and medical mobile terminals, making ZGJK “the university at the fingertips of its employees”. The group leader mentioned, “In the future, even project contracts would be mobile and connected, let alone teaching.” Now, Huawei ilearning has become a unified internal learning platform where its employees can conveniently access through computers or mobile terminals to study no matter whenever and wherever they want.

(5) Knowledge management

Instead of setting a special knowledge management department, ZGJK University internalizes knowledge management into each learning project, and implements management according to characteristics and needs of different projects. Besides, ZGJK University conducts personalized knowledge development, sharing and application through its unified knowledge management platform. ZGJK University uses cloud server technology to build a cloud information database for information storage about each learning project. In order to protect the information security of the company, the cloud server administrator will set the viewing permission for each project. When a new member comes, the cloud server administrator will open the corresponding viewing permission for him to facilitate his/her independent learning. Except for the general knowledge management of technology, case study has also become one of the core competencies of ZGJK University. ZGJK University makes special summaries of some company-level cases. For example, in order to develop a large-scale case of the Telekom Malaysia project, ZGJK University has set up a case project team, and jointly worked with the regional business team to systematically sort out and summarize that case for more than a year. The project team not only made a detailed record of all the “critical moments” in the case, but also restored the real situation at that time and reflected on its experience and lessons. In addition, ZGJK also attaches great importance to the individual case summary of employees. Through the platform that ZGJK University established with learning technology, everyone can post and share cases on it. Employees provide cases and content first, then the experts and public can make comments, thus achieving social interactions. Case platform managers design various incentives to facilitate more staff to write and post cases. In terms of corporate knowledge precipitation, ZGJK University has not only established a static knowledge management platform, but also formed a case-centered circulatory system containing case development, sharing, analysis, summary, learning and re-application through the dynamic

circulation of enterprise knowledge during the process of teaching and training. The group leaders also instructed the university to “recycle these cases.” The individual and company cases in the platform have been further processed into the intellectual assets of ZGJK University, used by the various project groups as teaching cases for curriculum development. In almost all study projects, trainees are required to bring their own case studies for class discussion, then optimize their case studies after class, and upload them to the learning section or case platform, while the excellent ones will be selected into the teaching case library for follow-up training. For example, most cases applied in senior management seminar for cadres comes from previous trainees. Our learning projects, relying on the learning delivery platform of ZGJK University, has formed an “automated” learning system for knowledge development, sharing and application with trainees as core creators.

(6) Human resource development

ZGJK University works closely with the talent management section affiliated with human resources department to jointly undertake the task of talent development. Among them, ZGJK University is responsible for the training and learning empowerment, while the talent management department and the company's business departments responsible for talent inventory, selection and rank, and promotion. The leaders of the group firmly believe that “the generals steel themselves from the battlefield”, therefore the cultivation of ZGJK’s talent adheres to the selection system. Training projects of ZGJK are not the welfare for all employees, because the university-level educational resources are only available to excellent and potential talents, and the empowerment of these people will indeed boost the growth of the company. After passing the training and assessment of ZGJK University, the trainees return to various departments for practice and training. A trainee’s personal career growth path will be based on both the policies of the talent management section and the specific system design of the business departments. As a result, training empowerment of the university, career development of employees, and organizational development of the company have formed a unity with common goals that works together.

6.2.3 Case summary

On the whole, ZGJK Group’s internal social capital is featured by both exploitative and exploratory learning. After acquiring Guangxi Wuzhou Pharmaceutical (Group) Co., Ltd. (hereinafter referred to as Wuzhou Pharmaceutical), in particular, ZGJK conducts researches by learning from its competitors’ finished products, which is a typical process of combining the two leaning models. In fact, the exploitative and exploratory learning cannot be completely

isolated by internal and external networks as they are mutually complementary and interlaced. In addition, for ZGJK, the leading role of external social capital's exploratory learning in market innovation is not obvious yet while the synergistically leading role of internal social capitals' exploitative learning in technological innovation is highlighted. Many demands come from the external part of the market but they are met through the organization's internal independent research and development (R&D). Therefore, these two learning models affect the enterprise performance from different perspectives. Relatively speaking, ZGJK's utilization of external social capital and application of exploratory learning, whether in the initial stage when it went public with the manufacturing industry as its major operation or later when it was re-structured by acquiring Wuzhou Pharmaceutical, have fully demonstrated its desire for innovation and growth. Controlled by state-owned enterprises, however, ZGJK pursues stable and long-term development. The innovation-driven market forces of management staff's property rights and employees' stock ownership need to be improved. Additionally, ZGJK's organizational learning, which is constructed through internal and external social capital, is formed based on the complete trust and cognition of ZGJK and social capital. And such trust and cognition are developed through high-intensive and high-quality interaction, which is a progressive process that requires a stable financial environment. Consequently, the path of risk preference, external social capital and exploratory learning is not obvious while the path of internal social capital and exploitative learning that focus on overall financial performance is very evident. Thus the enterprise performance and stock price encounter little fluctuation and insufficient progress has been made in mergers and acquisitions (M&A) and the growth momentum needs to be improved. On this basis, ZGJK University emerges as the times require. Based on ZGJK University, the two learning models are flexibly applied and the internal and external social capital is integrated. But generally, the enterprise university more reflects the top-down relationship, which works as a carrier that combines the internal social capital with exploitative learning and shows that the relatively sound overall financial performance safeguards the enterprise margin.

Due to insufficient external social capital especially market external capital, the exploitative learning is relatively weak. Everyone should be duty-bound for insufficient progress; the management is surplus while the innovation is not sufficient. The incomplete integration of external social capital with exploratory learning, which is reflected as low performance of M&A as well as weak market-oriented R&D capability, severely restricts the enterprise's future development momentum and space. In order to achieve ZGJK's healthy and sustainable development, it is not enough to attach excessive importance on the synergistic

effect of internal social capital and exploitative learning. Instead, efforts have to be made to construct a growth model that balances the two kinds of social capital and organizational learning models, and particularly, to enhance the growth mechanism for integrating external social capital with exploratory learning. Besides maintaining the coordinating function of the enterprise university's training, the urgency and importance of the leading strategic position of M&A as well as R&D should also be highlighted.

6.3 Summary

For enterprises, internal social capital includes the close and continuous cooperation among their departments while the external social capital is more reflected as managerial staff's external resources. The acquisition and assimilation of knowledge are embodied as the combination of the enterprise's external social capital with exploratory learning while the transfer and application of knowledge are reflected as the matching of the enterprise's internal social capital and exploitative learning. It is an eternal topic regarding enterprise development to realize knowledge sharing among departments, promote knowledge's flow and value increase within the enterprises, and innovate performance to drive the overall financial performance.

Featured by its attention to the construction of external social capital, ZGJK has received the supports from governments, scientific research institutions, financial banks and other agencies. The most prominent progress ZGJK has made is its growth from the learning of introducing high technologies and talents, including R&D and production. The exploratory learning begins to play an intermediary role in the path of "external social capital—exploratory learning—new product development performance". This lays a solid foundation for the enterprise's sustainable development. During its development process, ZGJK Group Wuzhou Pharmaceutical has made great efforts to implement the strategy of "independent innovation and technology-based powerful enterprise", managing to establish autonomous region-level technological R&D center, Guangxi Pharmaceutical Industrial Engineering Academy, Guangxi Medicine Purification Engineering Technological Research Center, Guangxi R&D Center with a value of 100 billion RMB, academician workstation, ZGJK Health Industry Research Institute and other leading technological platforms. It has been equipped with high-grade precise and advanced test equipment and a skilled, high-efficient, professional scientific and innovative team, with leading independent innovative levels. Thanks to its cutting-edge technologies and new techniques in traditional Chinese medicine (TCM), ZGJK Wuzhou Pharmaceutical is able to develop various new medicines and new products and re-develop old products, which makes

it successfully develop Zhusheyong, Xueshuatong, Zhonghua Dieda Wan, Fuyanjing Jiaonang and other high-tech products. In recent years, ZGJK Wuzhou Pharmaceutical has successively undertaken the development and production of several national major new medicines, formulation of quality standards for TCM and other national scientific research projects, and has delivered brilliant results: the project of “Establishment and Application of the International TCM Quality Standard System” was awarded the second prize of National S&T Progress Awards; Zhusheyong Xueshuatong (freeze-drying) powder injection, Zhonghua Dieda Wan, Fuyanjing Jiaonang and other products were granted with China Excellent Patent Awards and Gold Award for Guangxi Invention and Creation Achievement. In the later period of 2007, its sales volume and profit rate increased rapidly.

Theoretically, these achievements are made because of the intermediary function of exploratory learning and the augmented effect of the path of “external social capital—exploratory learning—new product development performance”. Practically, the competition in the pharmaceutical industry is becoming increasingly fierce; the market has higher requirements for pharmaceutical innovation; ZGJK Wuzhou Pharmaceutical’s organizational learning model of matching external social capital with exploratory learning meets the requirement for constant innovation in this industry. On the one hand, the new product development performance drives the rise of overall enterprise performance and injects continuous impetus. On the other hand, the exploratory learning intensifies the effect of the exploitative learning and promotes the exploitative learning. Additionally, the innovation of internal knowledge accelerates the transfer and assimilation of knowledge within the enterprise, injects ceaseless impetus into the organizational exploitative learning, raises the overall organizational learning capability and improves the overall enterprise performance.

But such cooperation is not profound and continuous enough, involving few researches on the industrial fundamentality and creativity. During the talent exchange and training together with external social capital, no specific training goal or effect evaluation standard has been stipulated. The joint scientific R&D and joint construction of laboratory do not deliver desirable results, always failing to achieve breakthrough innovation based on the existing products. With the rapid growth of sales and profit rate, ZGJK Wuzhou Pharmaceutical does not take advantage of the opportunity to increase long-term investment in basic R&D, nor did it change from gradual R&D to breakthrough research and development in a timely manner. Instead, it pays more attention to the follow-up and assimilation of international new technologies and puts more emphasis on the extermalization of tacit knowledge, but its technological progress mainly rests on the improvement of technical process. These measures are beneficial to improving its

medium and short-term performance but it is slow in the effort and investment in transferring external scientific research network into independent R&D. The governmental external social capital's leading role in the early stage, due to its inherent risk avoidance preference, has developed into the conventional thinking in the industry. The insufficient market-based R&D and investment, excessive reliance on the synergistic effect of internal social capital and exploitative learning as well as the neglect of innovation-driven effect of external social capital and exploratory learning will inevitably lead to insufficient momentum for ZGJK's long-term development, which is reflected as the excessive sensibility of management risks, lack of cognition of market effect and risk combination as well as severe restriction on growth.

ZGJK's strategic goals in the next several years are clear, which include, centering on inheritance and innovation in the field of pharmaceutical and medical health, improving human life quality experience, focusing on the TCM industrial chain, extending to the consumer health, taking characteristic pharmaceutical chemicals as supplements, regarding researches, marketing and capital operation as focal points, seizing national and local policies as well as industrial opportunities, devoting itself to cultivating a core value concept of "quality, innovation, inclusiveness, excellence", and creating a global service provider in the pharmaceutical health value chain. By these measures, ZGJK will become a comprehensive enterprise group in the pharmaceutical health industry. Later, ZGJK introduces such concepts as internal trainers and training camps and invests a lot of money to establish ZGJK University that provides ZGJK with qualified talents who accord with ZGJK's spirit and value concept. ZGJK University can also offer the summarized and refined knowledge and experience. In terms of teaching design and curriculum development, more attention is paid to whether it can support the practical operation of the business. Experienced business members is also introduced to participate in the design and development so as to form a thinking analysis framework of "business demands, performance demands, learning demands and learner demands" for learning project design. Regarding teaching, a case center is established to offer practical case-based learning methods. Among the faculties, over 170 members are ZGJK's employees, with few external lecturers hired.

ZGJK's current sound development demonstrates that the exploitative and exploratory learning cannot be completely isolated by internal and external networks as they are mutually complementary and interlaced. In addition, for ZGJK, external social capital's exploratory learning played a leading role in the market innovation in its early stage in this industry, which motivated and drove the applied leading role of internal social capital's exploitative learning in technological innovation. Many demands come from the external part of the market but they

are satisfied by internal independent R&D. ZGJK has always attached importance to the operation of external social capital and contributes great efforts to the fundamental and forward-looking R&D as well as intensifies and advances the development of the R&D center. It matches the organizational dominant learning method with exploratory learning. The powerful organizational culture and internal training system guarantee the effectiveness of exploitative learning, which results in ZGJK's constant improvement of performance and sustainable development.

With the intensified market competition and the increasing innovation-driven efforts and R&D investment, ZGJK has to mobilize the external resources, especially investing more in industrial M&A and professional R&D of exploratory learning, so as to inject continuous power into enterprise development and enhance innovation-based performance and development potential. Otherwise, as the pharmaceutical industry becomes more structured, ZGJK will fail to make fresh progress by following the old routines. If ZGJK becomes contented with present situation and presents insufficient innovation-based performance, it will face the severe strategic risks of falling behind and being cleared by the industry.

Based on the analysis of above two cases, it is found that, on the one hand, attention should be paid to the exploratory learning and the network construction of external social capital. On the other hand, the exploitative learning should not be neglected and importance should be attached to the accumulation of internal capital. The influence on the organization includes: the innovation-based performance of enterprise's new product development drives the improvement of its overall financial performance, which further provides more financial supports for the R&D of new products and new technologies as well as for the new product development performance. This forms a virtuous circle, promoting each other and realizing the enterprise's sustainable development.

Similarly, it is also found that an organization's establishment and maintenance of internal and external social capital vary along with the changes in the organizational strategies and market environment; different strategic orientations and market strategic focus will lead to different combinations of organizational learning models. As the industrial environment changes and the industrial competition intensifies, the requirements for the utilization of various social resources and organizational learning capability become more specific. To re-integrate various social resources and organizational learning capability, the attention cannot only be paid to the "surface" of social resources and organizational learning. Instead, in-depth exploration has to be conducted on the internal functional mechanism of the matching of various social resources and organizational learning models, and the issue of enterprise strategic positioning

has to be re-examined. ZGJK's strategic goals are clear, which include, centering on inheritance and innovation in the pharmaceutical and medical health, improving human life quality experience, focusing on the TCM industrial chain, extending to consumer health, taking characteristic pharmaceutical chemicals as supplements and becoming a comprehensive enterprise group in the pharmaceutical industry.

ZGJK mobilizes external social capital to establish a market-oriented and original application-based research institute that adopts the exploratory learning to give play to the leading role of innovation. And it makes full use of internal social capital to construct the enterprise university, amplify the synergistic or growth effect, create synergistic and innovative models, and realize its healthy and sustainable development. On the basis of enhancing its core capability, Holley Group emphasizes diversified development models and acquires and assimilates cross-industry external social capital by M&A and creating maker space. By combining external social capital and exploratory learning, it creates innovative and synergistic models and improves the new product performance to drive the stable growth of the overall financial performance.

In 2019, the world economy is facing more uncertainties. Learning determines growth. This is true to both individuals and enterprises. Learning has never been abstract and organizational learning needs to be achieved with certain carriers. Virtually, the exploratory learning is the link of enterprises with external brains while the exploitative learning focuses more on the connection of internal brains. Both the path of "external social capital—exploratory learning—new product development performance" and the path of "internal social capital—exploitative learning—overall enterprise performance" are changeable. Different industrial competition patterns, different corporate life cycles and different strategic positioning lead to different focal points and different functions of the paths. What's more, different path choices result in different carriers of learning methods. The path choice of "external social capital—exploratory learning—new product development performance" stresses the acquisition and assimilation of knowledge as well as innovation of original knowledge and technology. And it requires matching with the construction of R&D centers that is dominated by prospective and fundamental technological innovation. Nevertheless, the path choice of "internal social capital—exploitative learning—overall enterprise performance" focuses more on the technological application that is based on knowledge transfer and assimilation as well as the construction of the training system (enterprise university) with market-based innovation at its core.

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Chapter 7: Research Summary and Prospect

Traditional studies have mainly focused on social capital in a general sense, without introducing the concept of corporate boundaries to distinguish different types of social capital. The social capital of enterprises can reduce transaction costs but the utilization of social capital itself also incurs in transaction costs. Therefore, pharmaceutical enterprises should acquire internal and external social capital from within and from the outside of the enterprise in a balanced way. Social capital is divided into external social capital and internal social capital. Then, in view of the internal and external sources of social capital, how should pharmaceutical enterprises absorb, integrate and apply knowledge in the organizational learning process? Based on this, this study has divided organizational learning into exploratory learning and exploitative learning, and explored the impact mechanism of the two organizational learning modes in the application of different social capital, in order to understand the growth mechanism of Chinese pharmaceutical enterprises under the concept of social networks.

For pharmaceutical enterprises, internal social capital refers to close and continuous cooperation among different departments within the organization. External social capital mostly refers to the external connections of the organization. In order to effectively acquire, absorb, convert and apply knowledge, external social capital should be combined with exploratory learning, and internal social capital should be combined with exploitative learning. How to achieve knowledge sharing among departments, promote the flow of knowledge within enterprises, and promote the comprehensive performance by improving new product performance has become an eternal topic for survival and development of enterprise.

This study has tested the theoretical hypotheses through a questionnaire survey and quantitative analysis. Questionnaire survey was used to measure social capital, organizational learning and business performance of pharmaceutical enterprises, in order to obtain first-hand research data for analysis. The measurement scales were designed and their reliability and validity tested and then a structural equation model was constructed. Taking pharmaceutical enterprises as the research objects, we have conducted a questionnaire survey on the special industry and tested the relationship between variables through formal questionnaire survey and a variety of data analysis methods. In addition, the theoretical hypothesis is further tested by qualitative analysis. The research conclusions and significance of this study are described as follows.

7.1 Research conclusions

7.1.1 Research conclusion 1

Through structural equation model and case analysis, the conclusions of this study show that external social capital is beneficial to exploratory learning of pharmaceutical enterprises ($\beta = 1.35$, $t = 12.54$), while internal social capital is conducive to exploitative learning ($\beta = 0.64$, $t = 9.98$). Thus, hypothesis H1 is supported, that social capital influences organizational exploratory learning in pharmaceutical enterprises. ZGJK Group has established technology and development edges through its early relationship networks, and at the same time held on to and gradually strengthened its research networks, pushing its organizational learning to new heights.

External social capital serves the basis for pharmaceutical enterprises to establish external connections and acquire network resources, including cooperation network and information sharing network among pharmaceutical enterprises. The exploratory learning of pharmaceutical enterprises is the process of knowledge creation and the prerequisite for developing new technologies and products, but it carries certain risks. The relationship network formed by the vertical links of pharmaceutical enterprises in the industrial chain and horizontal links between pharmaceutical enterprises and other enterprises in the industry (e.g., strategic alliances, cooperative research centers, and industrial clusters of pharmaceutical enterprises), governments and universities does have knowledge spillover effects. It is also an important prerequisite for pharmaceutical enterprises to absorb knowledge, obtain new products and market information and create an environment for exploratory learning. Therefore, external social capital can help pharmaceutical enterprises share and reduce the risk of exploratory learning process and encourage them to invest in R&D and innovation research in new knowledge, new technology and new products.

Exploitative learning of pharmaceutical enterprises is mainly aimed at the development of existing organizational innovation, which is a process of knowledge conversion within the organization. The internal social capital of pharmaceutical enterprises provides a platform for knowledge sharing, team and organizational learning, which is conducive to the integration and utilization of enterprise knowledge. Internal social capital takes the form of information sharing networks among various departments and employees in a pharmaceutical enterprise, which provides conditions for knowledge sharing within it. The process of exploitative learning

enables the existing knowledge of pharmaceutical enterprises to be standardized and better applied to the existing products and services in pharmaceutical enterprises. According to the resource-based theory, the external social capital and internal social capital have different impact on different learning modes of pharmaceutical enterprises, which shows the resources endowment of pharmaceutical enterprises determines the effect of exploitative learning, while the acquisition and absorption of external resources, i.e., external social capital, is of decisive significance for the improvement of innovation ability of pharmaceutical enterprises.

7.1.2 Research conclusion 2

Exploratory learning in pharmaceutical enterprises is conducive to promoting and enhancing the ability of exploitative learning in pharmaceutical enterprises, but exploratory learning and exploitative learning have entirely different effects on the different aspects of business performance of different pharmaceutical enterprises. Exploratory learning is conducive to improving the new product performance in pharmaceutical enterprises, while exploitative learning is beneficial to improving the comprehensive performance. Featured by its attention to the construction of external social capital, ZGJK, the case reported in this study, has received the support from governments, scientific research institutions, financial banks and other agencies. The most prominent progress ZGJK has made is its growth from the learning of introducing high technologies and talents, including R&D and production. The exploratory learning begins to play an intermediary role in the path of “external social capital—exploratory learning—new product development performance”.

The new knowledge, new information and new technologies acquired from exploratory learning are the important sources of knowledge accumulation and form the knowledge base of pharmaceutical enterprises. The market and product innovation of pharmaceutical enterprises is benefited from the knowledge conversion in the process of the exploratory learning and exploitative learning, so exploratory learning provides the basis for exploitative learning to utilize knowledge. Through exploratory learning, exploitative learning standardizes knowledge, optimizes process and formulates strategic decisions at a relatively low level.

Exploratory learning mainly focuses on unplanned activities such as exploring cutting-edge technology and developing new products and markets, while exploitative learning aims at the improvement of existing products and services. Therefore, the exploratory learning has contributed mostly to the success of new products and services. Exploitative learning, by contrast, mainly helps maintain the existing market share of enterprises and ensures sales returns, so it has played a significant positive role in financial performance (profits and sales

revenue) and non-financial performance (employee, customer satisfaction and social image).

Exploratory learning can improve the innovation ability of pharmaceutical enterprises, which can be reflected in the innovation performance of pharmaceutical enterprises (e.g. new product performance) ($\beta = 1.32, t = 31.92$). Thus, hypothesis H2-3 is supported, that organizational exploratory learning influences the innovation performance of pharmaceutical enterprises. This is because exploratory learning can improve the effects of exploratory learning, which means that the basic innovative results produced by exploratory learning are the foundation the foundation on which exploratory learning can improve products and services. Further, the exploratory learning has positive effect on the comprehensive performance of pharmaceutical enterprises. It can be seen that exploratory learning plays an intermediary role between exploratory learning and the comprehensive performance of pharmaceutical enterprises. Therefore, the conclusions of this study expand the existing theoretical framework of organizational learning.

7.1.3 Research conclusion 3

Organizational learning plays an intermediary role between social capital and performance of pharmaceutical enterprises.

Through the path analysis of structural equation model, we can see that external social capital is conducive to exploratory learning, and exploratory learning is conducive to improving the new product performance of pharmaceutical enterprises ($\beta = 1.78, t = 28.88$). Thus, hypothesis H3-2 is supported, that exploratory learning plays an intermediary role in the relationship between external social capital and new product performance in pharmaceutical enterprises. Therefore, exploratory learning plays a mediating role between external social capital and new product performance. External social capital has a positive impact on new product performance by improving exploratory learning ability. Similarly, internal social capital has a positive impact on exploitative learning, while exploitative learning is conducive to improving the comprehensive performance of pharmaceutical enterprises ($\beta = 0.45, t = 16.67$). Thus, hypothesis H3-1 is supported. The exploitative learning plays an intermediary role in the relationship between internal social capital and comprehensive performance in pharmaceutical enterprises. As in the medium and late stage, ZGJK Group gradually shifted its reliance on the cooperation with business networks and began to pay attention to the use of competition and cooperation relationship with its rivals and partners, and at the same time tried to achieve further improvement and development of organizational learning through the cooperation with relationship networks and research networks. In this stage, in addition to strengthening

exploitative learning that it has long valued, and internalizing knowledge and capabilities such as technologies and management to improve corporate performance.

Therefore, exploitative learning plays an intermediary role between internal social capital and comprehensive performance, and internal social capital has a positive impact on comprehensive performance by improving exploitative learning ability.

Because exploratory learning is conducive to the improvement of exploitative learning ability, exploitative learning plays an intermediary role between exploratory learning and the comprehensive performance of pharmaceutical enterprises. It also means that pharmaceutical enterprises should not only use exploratory learning to develop new technologies and create new knowledge, but also attach importance to the role of exploitative learning in industrialization of innovative achievements such as new knowledge, application innovation of new technologies and market innovation.

7.2 Theoretical contributions and practical significance

7.2.1 Theoretical contributions

The theory of organizational learning has been heavily studied, but there are few studies on the relationship between social capital, organizational learning and corporate performance of pharmaceutical enterprises. The pharmaceutical industry is a special industry, not only because of its unique products, but also because it is an industry that needs long-term knowledge accumulation and continuous learning.

In today's increasingly fierce competition among enterprises, matching different kinds of social capital with appropriate organizational learning modes is crucial for the development of enterprises, as well as for enterprises in the pharmaceutical industry. Foreign pharmaceutical titans have flooded into the Chinese market, many of which enjoy hundreds of years of history capable of producing thousands of different drugs, while China is still at a stage of manufacturing generic drugs and has scarcely gained a foothold in the field of innovative drugs, which has piled enormous pressure on Chinese pharmaceutical enterprises. However, China is a big drug consumer and Chinese population is rapidly aging. Based on these grim facts, what innovative initiatives should Chinese pharmaceutical enterprises take? What kinds of social capital should be mobilized? What types of organizational learning modes should be adopted? What is the impact mechanism and growth mechanism? What is the key path of innovation and growth for Chinese pharmaceutical enterprises? All these are important and urgent strategic

issues before us. Therefore, it is of great significance for pharmaceutical enterprises to analyze the impact of social capital and organizational learning on enterprise development and explore the relationship between social capital, organizational learning and enterprise performance. Therefore, through the theoretical analysis of social capital and organizational learning, combined with a series of empirical research and analysis methods, this study further clarifies the relationship between social capital, organizational learning and corporate performance.

The innovation process of pharmaceutical enterprises is also a process of knowledge creation and innovation, and organizational learning plays an important role in the process. However, social capital provides favorable conditions for enterprises' knowledge creation and innovation activities (Zhou and Chen, 2004). How pharmaceutical enterprises should integrate internal knowledge capital and social capital to obtain sustained competitive advantage in competition is what the theoretical framework of this study is constructed for. Through large sample surveys, structural equation model tests and case study analysis the conclusions of this thesis have some innovations, with a view to providing useful reference for subsequent theoretical research and practice:

First, the existing research mainly focused on the relationship between social capital and the performance or sustainable advantage of pharmaceutical enterprises, and meanwhile the attention has been paid lavishly to external social capital. Therefore, this study broadens the research scope of social capital and places equal emphasis on internal social capital and external social capital, which provides the foundation for construction of social resources and analysis of impact mechanism of social capital.

Secondly, this study finds that external social capital mainly affects the innovation performance of pharmaceutical enterprises by improving their exploratory learning ability ($\beta = 1.78$, $t = 28.88$). Thus, hypothesis H3-2 is supported, that exploratory learning plays an intermediary role in the relationship between external social capital and new product performance in pharmaceutical enterprises. While the internal social capital plays a positive role on business performance through exploitative learning. This internal social capital of pharmaceutical enterprises has become the resource base for pharmaceutical enterprises to develop existing innovative technologies.

Thirdly, this study also analyzes and discovers the coordinating role of exploratory learning and exploitative learning in different types of performance in pharmaceutical enterprises ($\beta = 1.32$, $t = 31.92$, for exploratory learning on new product performance, $\beta=0.70$, $t=14.25$, for exploitative learning on comprehensive performance). The balanced use of exploratory and exploitative learning and their impact on the performance of pharmaceutical

enterprises have attracted more and more attention from scholars. The study explores the relationship between different types of performance and the organizational learning modes and reveals their complex relationship (see table 5-4); meanwhile how different type of social capital should be matched with different kinds of organizational learning modes and the corresponding measurement methods are also discussed.

7.2.2 Recommendations for the industry

From the practical perspective, the pharmaceutical industry is not only a special industry crucially important to national health and social stability, but also a technology and knowledge intensive industry. With the social progress and the continuous improvement of people's living standards, especially the aging society is approaching, and the social demand for pharmaceutical products continues to be soaring, the pharmaceutical industry has become a well-known "sunrise industry". The design and improvement of national innovation system directly affects the performance of pharmaceutical enterprises. China is a big drug producer, but there is still a long way to go before it becomes a powerful pharmaceutical manufacturing country. The most important thing is to establish the system in favor of pharmaceutical innovation. Currently, Chinese pharmaceutical enterprises are only capable of producing generic drugs. Therefore, how Chinese pharmaceutical enterprises should shift their roles from emulators to innovators or even leaders has become a pressing problem that not only concerns the survival and development of Chinese pharmaceutical enterprises in the global competition, but also affects their strategic positions in the national industrial structure and whether they can play a dominant role in field of international innovative drugs in the future.

Considering the results of this research the following are some steps that should be taken:

(1) Pharmaceutical enterprises should pay equal attention to the role of exploratory learning and exploitative learning. There are generally two sources of knowledge creation and innovation in pharmaceutical enterprises: one is from internal independent R&D knowledge, the other is from external sources. In order to convert the two kinds of innovative knowledge into the core competence of pharmaceutical enterprises, it is necessary to go through the process of exploratory learning and exploitative learning. However innovative activity carries risks. Especially in the pharmaceutical industry, there is a huge investment in R&D of innovative drugs. But if pharmaceutical companies invest too much in the outside-in and bottom-up exploratory learning, it is easy to fall into a failure Trap because of R&D for the sake of R&D. The main reason is that the pharmaceutical companies have no enough resources to absorb, convert and apply the knowledge acquired by exploratory learning. Take Nokia for example, it

has more patents than Apple, but it still ended up being kicked out of the competition in smart phone market, which teaches us a hard lesson. The top-down exploitative learning mode focuses on transfer existing successful experiences and knowledge from organizational level to individual level, but the disadvantage of the learning approach is that it reduces the access to new knowledge and technologies in the pharmaceutical industry, thus missing the good opportunities. Therefore, the strong capability and advantages in a specific field instead becomes the barriers to innovation, or known as “competency trap”, a concept developed by Levinthal and March (2010). General Electric (GE), has the best corporate university, but recently it was excluded from the Dow Jones Index in New York. Chinese pharmaceutical enterprises, especially high-tech pharmaceutical enterprises, should focus on the combination of exploratory and exploitative learning (Leonard-Barton, 1995).

(2) Exploratory learning is conducive to enhancing the technological innovation and independent R&D capabilities of pharmaceutical enterprises ($\beta = 1.32, t = 31.92$) (H2-3), while exploitative learning is beneficial to the absorption, assimilation and integration of knowledge and technologies of pharmaceutical enterprises ($\beta = 0.70, t = 14.25$) (H2-2). Based on the impact path of external social capital-> exploratory learning-> new product performance, pharmaceutical enterprises should strengthen the construction of innovative R&D platform; similarly, on basis of the impact path of internal social capital ->exploitative learning-> comprehensive performance, pharmaceutical enterprises should focus on the construction of collaborative training system. The theoretical study of the two paths has laid a solid theoretical foundation for pharmaceutical enterprises to effectively utilize social capital, promote organizational learning, and better guide pharmaceutical enterprises to build learning-oriented organizations, thus enhancing the operating performance of pharmaceutical enterprises. For example, the development of new drugs and new indications should be based on the knowledge of diseases and antibodies. Due to the highly professional knowledge structure of pharmaceutical enterprises, the internal knowledge is mostly created on the basis of existing knowledge. Although the external knowledge has impact on the existing knowledge system, it helps the pharmaceutical enterprises avoid stepping into the "familiarity trap" and improves the ability to produce new ideas and solutions (Geng, Liu, & Yang, 2012). Thus, the innovation of pharmaceutical enterprises should not be confined to the existing knowledge system, which provides innovative ideas for new drug research and development, and more paths for innovation.

7.3 Practical significance

According to a report released on February 5, 2019 by China's National Medical Security Bureau, as of February 31, 2018, China's medical institutions and drug stores have purchased 17 anti-cancer drugs under the coverage of medical insurance at negotiated prices, which has reduced medical costs by more than 75%. In the face of global economic uncertainties in 2019, learning determines growth, both for individuals and enterprises. Learning is never an abstract process, and therefore organizational learning needs to be carried out on a concrete basis. Figuratively speaking, exploratory learning is essentially to connect an enterprise with the external brain, while exploitative learning aims to build networks and connections inside the internal brain of the enterprise. The impact path of social capital->exploratory learning->new product performance, or internal social capital->exploitative learning->enterprise comprehensive performance functions differently depending on industry competition pattern, enterprise's life cycle, strategic positioning and the focus of path selection.

Firstly, pharmaceutical enterprises should develop and utilize the internal and external social capital according to their own actual situation. For pharmaceutical enterprises with high innovation ability, due to their high exploratory learning ability, they should pay attention to the accumulation of external social capital ($\beta = 1.78, t = 28.88$) (H3-2). Meanwhile, they should also make efforts to improve the ability of exploitative learning in order to transform the innovative results and knowledge derived from exploratory learning into the financial performance and provide financial support for further exploratory learning.

Secondly, for pharmaceutical enterprises lacking the innovation ability, they should focus on the accumulation of internal social capital, improving the existing product technology through exploitative learning, constantly promoting product quality and competitiveness, and quickly transforming internal resources into financial performance, so that the enterprises can maintain stable growth, obtain specific external social capital through mergers and acquisitions, and prepare for transformation and upgrading. But the competitive advantage of this kind of pharmaceutical enterprises is not necessarily sustainable ($\beta = 0.45, t = 16.67$) (H3-1).

In addition, the innovative pharmaceutical enterprises should place equal emphasis on external and internal social capital and allocate them in a balanced way. The complementary role of exploratory learning and exploitative learning makes it possible for pharmaceutical enterprises not only to gain "first mover advantage" in the new product market, but also achieve stable financial performance as the support for innovation investment. The organizational learning activities of pharmaceutical enterprises are not performed in a closed environment.

The pharmaceutical enterprises should use external and internal social capital in combination with exploratory and exploitative learning to enhance the innovative ability of organizations.

Finally, in terms of strategy formulation and improvement of organizational learning ability, the pharmaceutical enterprises should combine external social capital with exploratory learning and strengthen the construction of innovative platform, such as R&D centers, fundamental and forward-looking R&D investment, and introduction and cultivation of talents, in order to promote innovation performance, especially the new product performance ($\beta = 1.78$, $t = 28.88$) (H3-2). Meanwhile, internal social capital should be used in combination with exploitative learning to strengthen the construction of learning platform aimed at improving organizational collaborative ability, such as training system and enterprise universities. Therefore, the growth of pharmaceutical enterprises should depend on neither the "excessively innovative" independent R&D nor "once and for all" wholesale introduction. The proper thing to do is to lay stress on the balanced allocation of external and internal social capital and the complementary role of exploratory and exploitative learning under the guidance of the concept of collaborative innovation, in a bid to make full use of external and internal resources, gain international competitiveness, move up to the global high-end pharmaceutical industry value chain with edge-cutting products and services and finally achieve healthy and sustainable development of enterprises. China's remarkable achievements owe largely to the policy of reform and opening-up. Reform is the product of internal social capital and exploitative learning while opening-up is the crystallization of external social capital and exploratory learning. And the same is true for enterprises.

7.4 Research limitations and future research direction

Although through quantitative and case analysis, the theoretical hypotheses of this study have been supported and useful conclusions have been drawn, there are still research limitations.

Firstly, due to geographical constraints, the questionnaire survey is mostly conducted among pharmaceutical enterprises in the eastern region with similar institutional environment. On this basis, future research should expand the scope of samples and study the differences of pharmaceutical enterprises in different industrial areas or institutional environment.

Secondly, exploratory learning and exploitative learning are complementary concepts in the field of organizational learning and innovation research. This study does not design the measurement scale for comprehensive innovation performance and explore the impact mechanism of the two learning modes on innovation performance. The complementary role of

exploratory learning and exploitative learning in innovation performance of pharmaceutical enterprises is also a research field that is worth deeply researching.

Thirdly, to what degree does the stable or dramatically changing business environment affect the exploratory and exploitative learning? What impact will it have on the performance of pharmaceutical enterprises? Understanding these problems is helpful to establish the mechanism for organizational learning in various kinds of pharmaceutical enterprises in China at the stage of economic transformation.

Fourthly, if exploratory learning and exploitative learning are applied to pharmaceutical industry (e.g. pharmaceutical enterprise for innovative drugs) to examine the impact of organizational learning on its economic and social benefits, such as patient concentration, resource concentration and business efficiency, the research results will shed light on the medical reform.

Fifthly, for pharmaceutical enterprises with different nature of ownership, such as state-owned enterprises and private enterprises, what is the impact of the ownership nature on acquisition of external and internal social capital, selection of organizational learning modes, and innovative performance and mechanism?

Finally, one of the research innovations in this study is to divide the social capital of pharmaceutical enterprises into external social capital and internal social capital, organizational learning into exploratory learning and exploitative learning, discover the intermediary variable between social capital and enterprise performance, and explore the innovative path. But whether there are interactive effects between two kinds of social capital and the organizational learning? In the process of knowledge exploration and development, whether pharmaceutical enterprises have adopted different learning methods on the basis of different internal and external social capital? All these problems need to be further studied in the future.

Chinese pharmaceutical enterprises will gradually shift their role from emulators of international pharmaceutical giants, to strong contenders and finally to the industry trailblazers. In the process of industrial transformation and upgrading, Chinese pharmaceutical enterprises are faced with tremendous industrial strategic challenges as well as risks and opportunities arising from global structured development. As the results of this thesis suggest, on the one hand, they should combine internal social capital with exploitative learning to carry out top-down system reform; on the other hand, they should use external social capital in combination with exploratory learning to exploit market and make innovations through a bottom-up approach. Therefore, it is important for Chinese pharmaceutical enterprises to strike the balance between the two combined approaches in order to establish the innovation growth mechanism and determine their development path.

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Appendix 1: Questionnaire

Notes: The following items are about the current situation of your company's business contacts with partners (including customers, suppliers, competitors, governments, financial institutions, industry associations, universities and consulting companies). Please score the statements using the scale of 1 to 7 to express your approval degree, with "1" representing "totally disagree" and "7" representing "totally agree".

Totally disagree	Disagree	Partially disagree	Neither agree or disagree	Partially agree	Agree	Totally agree
1	2	3	4	5	6	7

1. External social capital

Specify your approval degree	Totally disagree		<=-----=>		Totally agree		
A1. We hold regular meetings with our partners to discuss the business conditions.	1	2	3	4	5	6	7
A2 We often send staff to partners to understand the situation.							
A3 There are many forms of informal exchanges between us and our partners.							
A4 We often work with partners to solve product/service problems.							
A5 We have frequent contacts with employees at different levels in our partners.							
B1 The exchange of information between us and our partners is very timely.							

B2 The information

exchanged between us and
our partners is very
important.

B3 We and our partners

often work together in
product/service development

B4 We and our partners

often mutually share
customer resources.

B5 We and our partners

value the ideas exchanges in
order to reach consensus.

C1 In the long-term

cooperation, the both sides
know each other's weak
points but will not take
advantage of the other's
weakness.

C2 Our business dealings is

established on an equal
footing.

C3 Our business dealings

will not damage each other's
interests

C4 When faced with

difficulties, we and our
partners always help each
other.

C5 We and our partners

never conceal information
about products, technologies
or services.

C6 The information we exchange with our partners is very reliable

D1 We feel very happy in the process of cooperation with our partners.

D2 We are satisfied with the results achieved through cooperation

D3 We and our partners have maintained a stable relationship.

D4 There are few conflicts between us and our partners in the process of cooperation.

D5 We are satisfied with the efforts made by our partners in the process of cooperation.

D6 Our partnership is as good as anticipated.

E1 We are committed to maintaining long-term relationships with our partners.

E2 We and our partners remain true to each other's cooperative relationship.

E3 We and our partners have an emotional attachment to our cooperative relationship.

E4 We will do what we can for each other.

E5 Both of us are willing to make extra efforts to help each other achieve their goals.

E6 It is worth the ongoing effort at maintaining our partnership.

F1 The corporate culture of partners is very different from that of our company.

F2 The internal management mode of partners is very different from that of our company.

F3 The strategic orientation of our partners is very different from that of our company.

F4 The business practices of our partners are very different from ours.

G1 In the course of cooperation, conflicts never occur between the two sides because of different opinions.

G2 In the process of cooperation, the two sides never conflict because of uneven distribution of interests.

G3 There is no conflict between us and our partners in business exchange.

G4 When there are disagreements between the two sides, they often seek solutions to the problems together.

G5 Both sides have been working hard to take measures to prevent possible conflicts.

H1 We share common goals with our partners.

H2 We share business values with our partners

H3 We agree with our partners on each other's business philosophy.

H4 We agree with our partners on social responsibility

H5 We share the same view with our partners about the way of pursuit of interests

H6 We agree with our partners on the development direction of product or service.

2. Internal social capital (Specify your approval degree based on the internal interactions between R&D, sales, production, procurement, human resources management and other departments of your company)

Specify your approval degree Totally disagree <=-----=> Totally agree

	1	2	3	4	5	6	7
I1 Different departments often hold regular meetings to discuss the company's operating conditions.							
I2 Departments often send staff to other departments to understand situation.							
I3 There are various forms of frequent informal exchanges between departments.							
I4 Different departments often work together to solve product/service problems.							
I5 Interaction between employees at different levels in different departments is very frequent.							
J1 The exchange of information among departments is very timely.							
J2 The information exchanged between departments is very important.							
J3 Different departments often work together in product/service development							
J4 Different departments often share their customer resources.							
J5 Different departments value the ideas exchanges in order to reach consensus.							

K1 Oral commitment and written instructions are equally effective in department interactions.

K2 In the long-term cooperation, different departments know each other's weak points but will not take advantage of the other's weakness.

K3 Different departments will not damage each other's interests.

K4 When facing difficulties, departments can help each other.

K5 Different departments never conceal the information about the customers, products or services.

K6 The information exchanged between departments is very reliable.

L1 Departments feel very happy in the process of cooperation.

L2 All departments have achieved satisfactory results in cooperation.

L3 There are few conflicts in the process of cooperation among departments.

L4 All departments are satisfied with the joint efforts in the process of cooperation

L5 The relationships among departments fit in with expectations.

M1 All departments are committed to maintaining long-term relationships.

M2 All departments stay true to the partnership.

M3 Departments have emotional attachment to their daily cooperative relationships.

M4 All departments will do whatever they can do for each other.

M5 All departments are willing to make extra efforts to help each other achieve their goals.

N1 The internal culture of different departments is very different.

N2 The internal management modes of different departments are quite different.

N3 The behavioral norms of different departments are quite different.

O1 Different departments never conflict because of different opinions in the process of cooperation.

O2 In the process of cooperation, departments never conflict because of uneven distribution of interests.

O3 Conflicts never occur between departments

O4 When conflicts arise among departments, they often seek solutions to problems together.

O5 All departments have been working hard to take measures to prevent possible conflicts.

P1 All departments have common goals and pursuits.

P2 All departments share the same value orientation.

P3 Different departments identify with each other's behavioral norms.

P4 All departments share the same views on social responsibility

3. Exploratory learning (steer away from the existing knowledge of the organization toward creating new knowledge) and exploitative learning (dig deeper into the existing knowledge of the organization in order to make full use of the existing knowledge)

Specify your approval degree Totally disagree <=-----=> Totally agree

Exploratory learning: your company's strategies for new markets and products.

Q1 Constant search for high- 1 2 3 4 5 6 7
 risk and potential market or

product information

Q2 Keep collecting

information that help the

enterprise enter new markets

and technology field.

Q3 Continuous search for

information that will divert

the enterprise from the

current market or products.

Q4 Constant search for

information about new

market and product

technology information

Q5 Pay attention to

retrieving uncommon and

unrecognizable market

demand information and

problem solutions.

Exploitative learning: your company's strategies for existing markets and products.

R1 Focus on searching for

information about the current

market/product of the

enterprise

R2 Focus on searching for

existing market and product

information that will enable

enterprises to achieve better

performance

R3 Focus on finding

common and proven

solutions and methods.

R4 Emphasize on utilizing
knowledge related to
existing products and market

R5 Focus on accumulating
effective solutions to current
market/product problems

Exploratory learning: your company's strategies for new markets and products.

S1 We attach great
importance to the study of
new product or service
models.

S2 We carry out R&D
programs in many different
areas.

S3 We often try to research
and develop patented and
unique products

S4 We have a wide range of
products and services

S5 We often launch new
products or services.

S6 We often experiment with
new products and services in
potential markets.

Exploitative learning: your company's strategies for existing markets and products.

T1 We have invested a lot of
resources in a few areas of
technology.

T2. We often collect
information about product
preferences of existing
customers.

T3. We frequently make
minor improvements to and
adaptations of the existing
products.

T4 We often experiment with
our products and services in
our existing market

Exploratory Learning: your company's strategies for knowledge of new technology.

U1 Search, identify and track
knowledge in new
technologies/services field.

U2 Create or acquire
knowledge of new
technologies/services

U3 Disseminate and share
created or acquired
knowledge in new
technology/service areas in
your company

U4 Apply the knowledge
created or acquired in new
technology/service areas to
different scenarios

Exploitative Learning: your company's strategies for knowledge in existing technology field.

V1 Search, identify and track
knowledge in existing
technology/service fields

V2 Create/acquire the
required knowledge in
existing technology/service
areas

V3 Disseminate and share
the created/acquired
knowledge in existing
technology/service areas in
your company

V4 Apply knowledge
created/acquired from
existing technology areas to
different scenarios

Exploratory learning environment

W1 The ordinary staff and managers of our enterprise will all contribute to the development strategy of the enterprise.

W2 Our employees are often involved in collective decision-making.

W3 Individual opinions of employees will be taken into account when making decisions in our company.

W4 Working proposals offered by different departments are often adopted in planning

Exploitative learning environment

X1 Our company pays attention to conveying company policies to every employee.

X2 Our company pays attention to publicizing the established strategy to its employees in various forms.

X3 Our company pays attention to giving a clear direction of job tasks and objectives.

X4 Our company often provides training for its employees in enterprise concepts and regulations.

4. Business performance

The business performance of Very poor <=-----=> Broadly flat <=-----=> Very good

your company in recent three
years

Financial performance

1 The company's profit margin compared with competitors

2 The growth rate of the company's sales compared with its competitors

3 Return on investment (ROI) of your company compared with its competitors

4 The company's market share compared with competitors, the company's market share

5 The company's cash flow compared with competitors

New product performance

6 The success rate of new services/products of the company compared with competitors,

7 The profit growth rate of the company's new products compared with competitors

8 The growth rate of the company's new product market share compared with its competitors

9 The company's new product sales growth rate compared with competitors

Non-financial performance

10 Compared with

competitors, the company's
achievements in market
expansion

11 Compared with
competitors, the company's
customer satisfaction

12 Compared with
competitors, the company's
employee satisfaction

13 Compared with
competitors, the company's
social image

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Appendix 2: Interview Outline

Dear leaders:

We are currently undertaking a research topic on corporate social network, organizational learning and corporate performance. In order to have a deeper understanding of the company's practice, we intend to conduct research on your company. The relevant information obtained in this research is purely for academic research. The purpose of this survey is not for any commercial use. The following are related to this survey:

1. Date and time of investigation
 - (1) Date of investigation: March 5th and March 9th, 2018
 - (2) Time: 10: 00-17: 30
2. Interviewees
 - (1) Number of people: 3-4
 - (2) Requirements: A good understanding of your company's development in recent years, especially for your company and external stakeholders (including your company's customers, suppliers, government departments, banks, industry associations, universities, consulting companies and research agencies) Colleagues who have a better understanding of the relationship between institutions.
 - (3) Position: founder, senior leader and head of corporate university
3. Interview outline
 - (1) Introduction to the development of your company in recent years
 - (2) What are the main social network relationships in your company? What role do they play in the development of your company?
 - (3) How do you learn about each other's technology, management, and market knowledge in your company's interaction with external social networks?
 - (4) What is the current status of daily contact between your company's departments? (including atmosphere, time of interaction, frequency, daily conflicts, common goals, values, mutual trust)
 - (5) How does your company develop internal products, how to use existing markets, products, and technologies to develop products and services?
 - (6) How does your company innovate products and services in addition to existing markets, products, and technologies?

- (7) How does your company conduct management innovation and service innovation?
4. Please provide the following information to us.
- (1) your company introduction (including development history, business scope, performance in the past five years);
 - (2) Company organization chart
 - (3) Information on major events in the development of the company and external business networks (customers, suppliers and competitors and other companies)
 - (4) Information on major events in the development of the company's external relationship network (government, banking and other financial institutions and industry associations)
 - (5) Information related to major events in the development process of your company and external research networks (colleges, consulting companies, etc., accounting firms and other intermediary research institutions)
 - (6) Relevant documents (policy regulations and incentive systems) for your company's expatriate learning and internal learning (training) system.
 - (7) Relevant institutional documents (policy regulations and incentive systems) for your company's technological innovation and management innovation.
 - (8) Your company's corporate document manual.
 - (9) Your company's nearly 3-5 years of internal publications (if any)
5. Attachment (questionnaire)

Part two: basic information about your company

1. The ownership nature of your company

- State-owned enterprises (including state-holding)
- Private enterprises (including private holding)
- Joint ventures
- Wholly foreign-owned
- Others

2. Which industry category does your company come from?

- Manufacture of chemical pharmaceutical raw materials
- Manufacture of chemical preparations
- Manufacture of Chinese herbal medicine
- Manufacture of finished traditional Chinese herbal medicine
- Biopharmaceutical manufacturing
- Manufacture of health materials and medical supplies
- Manufacture of pharmaceutical equipment
- Medical instruments and equipment manufacturing
- Pharmaceutical industry
- Others (Please specify_____)

3. The total assets of your company

- Less than 5 million yuan
- 5-10 million yuan
- 10 to 50 million yuan
- 50-100 million yuan
- 100-1000million yuan
- More than 1000 million yuan

4. The number of employees in your company: _____.

5. Location of your company_____ Founded in _____.

How many years have you worked in this company? _____.

6. Your position:

- Senior manager
- Middle-level manager
- Basic level manager
- Ordinary staff

7. Compared with 2017, the business performance of your company in 2018

- saw a substantial increase in profits
- saw a small increase in profits
- was roughly flat
- suffered small loss
- suffered huge loss

Please return the completed questionnaire back to the questionnaire distributors and thank for your participation and cooperation!