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A PPP Model for China's Public Hospitals: An Empirical Study

Yao Zhidong

Doctor of Management

Supervisors:
PhD Nelson Antonio, Professor,
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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: 姚志东 Date: February 12, 2020

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作者申明

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Abstract

Medical resources are closely related to people's health and daily lives. At present, China's medical resources are confronted with seriously unbalanced distribution, which results in differences in healthcare services among regions, and is prone to causing the common phenomenon of "overcrowding of patients in large hospitals and lack of patients in small hospitals". Public hospitals are the main providers in China's medical service system, and play the main role in embodying public welfare, providing basic medical care, and resolving people's difficulty in seeking medical treatment. China's public hospitals are faced with difficulties and challenges, including insufficient government financial investment, rising medical expenses, as well as the overcrowding of patients in large hospitals and the lack of patients in small hospitals. These difficulties and challenges also reflect the context of China's medical reform. PPP refers to public-private partnerships in which the government and social capital (or social institutions) cooperate to build or operate public service facilities and provide public products or services. The practice of PPP has proved that this model is an effective way for China's medical reform.

Based on the difficulties and challenges faced by China's public hospitals and the application of PPP in the healthcare sector, the research purpose of this study is to explore the PPP model applicable to China's public hospitals. Literature suggests that strategic alliance theory, cooperative game theory, and stakeholder theory can affect the effectiveness of PPP projects. The present study adopts empirical research methods to answer the research questions raised herein through case study and analysis.

The research results indicate that PPP is an effective way to help public hospitals resolve their development difficulties, but not all models of PPP are applicable to China's public hospitals; the BOT (build-operate-transfer) model can help public hospitals raise the development funds, but it requires guarantee from institutions with certain strength; the "franchising" model is suitable for public hospitals in large cities; government cooperation willingness, coordination from public hospital management, hospital staff participation, investors' experience and management capabilities, and the contractual capacity of each cooperation party are the key factors for the success of PPP cooperation; there are huge business opportunities for the supply of mid-to-high-end medical services in China; there is also large room for investment in specialized hospitals, health tourism

services and integrated healthcare projects; social capital is more likely to identify investment and cooperation opportunities for public hospital projects in such administrative areas as districts (including counties), villages and townships, as well as streets and communities.

Keywords: Public-private partnerships (PPP); strategic alliance theory; cooperative game theory; stakeholder theory
JEL: D23; I18

Resumo

Os recursos médicos estão estreitamente relacionados com a saúde e a vida diária da população. Atualmente, os recursos médicos da China confrontam-se com uma distribuição severamente desequilibrada, o que causa diferenças nos serviços de saúde entre diferentes regiões e potencia o fenômeno comum de "superlotação de pacientes em grandes hospitais e falta de pacientes nos pequenos". Os hospitais públicos são os principais fornecedores do sistema de serviços médicos da China e desempenham o papel principal na incorporação do bem-estar público, na prestação de cuidados médicos básicos e na resolução das dificuldades das pessoas em procurar tratamento médico. Os hospitais públicos da China enfrentam dificuldades e desafios, incluindo insuficiente investimento financeiro governamental, aumento das despesas médicas, além da superlotação de pacientes em grandes hospitais e a falta de pacientes em pequenos hospitais. Essas dificuldades e desafios também refletem o contexto da reforma médica da China. PPP refere-se uma parcerias público-privadas na qual o governo e o capital social (ou instituições sociais) cooperam para construir ou operar instalações de serviço público e fornecer produtos ou serviços públicos. A prática da PPP tem demonstrado que esse modelo é uma maneira eficaz para a reforma médica da China.

Com base nas dificuldades e desafios enfrentados pelos hospitais públicos da China, assim como na aplicação de PPP no setor de saúde, o objetivo da pesquisa deste estudo é explorar o modelo de PPP aplicável aos hospitais públicos da China. A literatura sugere que a teoria da aliança estratégica, a teoria dos jogos cooperativos e a teoria das partes interessadas podem afetar a eficácia dos projetos de PPP. O presente estudo adota métodos de pesquisa empírica para responder as questões de pesquisa aqui levantadas por meio de estudo de casos.

Os resultados da pesquisa indicam que a PPP é uma maneira eficaz de ajudar os hospitais públicos a resolver suas dificuldades de desenvolvimento, mas nem todos os modelos de PPP são aplicáveis aos hospitais públicos da China; o modelo BOT (por suas siglas em inglês: construir, operar e transferir) pode ajudar os hospitais públicos a levantar os fundos necessários ao seu desenvolvimento, mas exige garantia das instituições; o modelo de "franquia" é adequado para hospitais públicos nas grandes cidades; vontade de cooperação do governo, coordenação da gerência do hospital público, participação da

equipe do hospital, experiência e capacidade de gestão dos investidores e, a capacidade contratual de cada parte da cooperação são os fatores-chave para o êxito da cooperação PPP; existem enormes oportunidades de negócios para o fornecimento de serviços médicos de médio a alto nível na China; há também um amplo espaço para investimentos em hospitais especializados, serviços de turismo de saúde e projetos integrados de assistência à saúde; é mais provável que o capital social identifique oportunidades de investimento e cooperação para projetos de hospitais públicos nessas áreas administrativas, como distritos (incluindo municípios), aldeias e cidades pequenas, além de ruas e comunidades.

Palavras-chave: Parcerias público-privadas (PPP); teoria da aliança estratégica; teoria dos jogos cooperativos; teoria das partes interessadas

JEL: D23; I18

摘　要

医疗资源与人们的日常健康生活息息相关。目前中国医疗资源出现分配严重不平衡情况，导致医疗卫生服务在地区之间产生差异，容易产生常见的“大医院人满为患，小医院门罗可雀”的现象。公立医院是中国医疗服务体系的主体，是体现公益性、解决基本医疗、缓解人民群众看病就医困难的主体。公立医院在政府财政投入不足、医疗费用又不断上涨的情况下，加上大医院患者人满为患而小医院却门罗可雀的现象，中国公立医院面临的困境与挑战，同时也从侧面反映了中国医疗改革面临的状况。PPP 模式（Public-Private Partnership）是指政府和社会资本（或社会机构）合作建设或运营公共服务设施，提供公共产品或服务的一种公私合作模式。PPP 模式的实践已证明了这种模式是我国医疗改革的一条有效途径。

基于中国公立医院面临的困境和挑战，PPP 模式在医疗卫生领域的应用实践，本研究的研究目的是探索适用于中国公立医院的 PPP 模式。文献资料显示战略联盟理论、合作博弈理论、利益相关者理论会影响政府与社会资本合作项目的效果。本研究是采用实证研究方法，通过案例的研究分析，对本研究提出的问题和假设进行回答和验证。

研究结果发现 PPP 模式是能够帮助公立医院解决发展困境的有效途径，但 PPP 模式里的所有种类不是都适用于中国公立医院；BOT（建设-运营-移交）模式可以帮助公立医院解决发展所需资金，但需要提供有一定实力的机构作担保；“特许经营许可”模式适合大城市的公立医院应用；政府合作意愿、公立医院管理层配合、医院职工参与度、资本方的从业经验和管理能力、合作各方的履约能力是 PPP 合作成功的关键因素；中高端医疗服务供给在中国境内存在巨大商业机会；专科医院和健康旅游服务以及医养项目也存在较大的投资空间；社会资本在区级（含县级）和乡镇及街道社区等行政区域较容易找到公立医院项目投资合作机会。

关键词：PPP 模式；战略联盟理论；合作博弈理论；利益相关者理论

JEL: D23; I18

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List of Abbreviations

BOO: Build-own-operate

BTO: Build-transfer-operate

BOOT: Build-own-operate-transfer

CSRS: Chinese Sleep Research Society

EPC: Engineering-Procurement-Construction

Foundation for National Institutes of Health: FNIH

International Monetary Fund: IMF

LIFT: Local Improvement Finance Trust

MDP: Mectizan Donation Program

Mectizan Donation Program: MDP

National Council for Public-Private Partnerships: NCPPP

National Health Commission: NHC

O&M: Operation and Management (Contracts)

OEM: Original equipment manufacturing

Organization for Economic Cooperation and Development: OECD

Partnership UK: PUK

People's Insurance Company of China: PICC

People' Republic of China: PRC

PFH: Partnership for Health

Private Finance Initiative: PFI

Private Financing Unit: PFU

Public-private integrated partnership: PPIP

ROT: Renovate-Operate-Transfer

Scientific Citation Index: SCI

Sun Yat-sen University: SYSU

TCM: Traditional Chinese Medicine

TOT: Transfer-Operate-Transfer

United Nations Economic Commission for Europe: UNECE

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Chapter 1: Introduction

1.1 Research background

1.1.1 Distribution of medical and health resources in China

Medical resources are closely related to people's daily health and lives. Medical resources are the collective name of various production factors that provide medical services, including personnel, medical expenses, medical institutions, hospital beds, medical facilities and equipment, knowledge, skills, and information. Hospitals control all the important medical resources, thereby bundling the four important medical resources, namely, hospitals, doctors, drugs and examinations, all of which are subject to the same ownership. The property right of public hospitals belongs to the government. Therefore, by directly controlling hospitals, government administrative departments indirectly control all important medical resources, thereby forming a network of administrative monopolization of medical resources and an intricate network of interests. Almost all problems in China's medical and health care sectors can be traced back to these two networks.

Since the founding of the People's Republic of China (PRC) in 1949, the development of China's medical and health system has gone through different stages, with different status of medical resources. As to the different development stages of China's medical service system, people have different views. We conclude that there are three stages, respectively represented by Chen (2012), Chen (2013), and Zhao (2016).

There is a view that the development of China's medical service system has roughly experienced two development stages (Chen, 2013): The first stage lasted from the founding of new China to the Reform and Opening-up (1949-1978). This stage was characterized by the emphasis on "medical services at the state expense" as it was the planned economy period, during which both urban residents and rural residents could get free medical services from their unit or collective; the second stage lasted from the Reform and Opening-up to the present. This stage was the market economy period, during which emphasis was laid on "self-pay medical services". Except for medical insurance

coverage and the partial expense borne by the state, units (enterprises) and collectives, the public obtain medical services mainly at their own expense.

The second view is held by Chen (2012), who believes that since the founding of PRC in 1949, China's medical and health system has mainly gone through the following three development stages:

The first stage lasted from 1949 to 1978. In this period, a basic medical and health system was preliminarily established in China, including a medical insurance system that was of low quality and public interest nature, a basic public health service system focusing on prevention, and a public health institution system managed by the planned means of the government. Under the planned economy system, the characteristics of China's medical and health system were low investment and high efficiency. However, development of medical and health care was rather backward. Because all hospitals were public hospitals, there was a lack of effective competition mechanism. Besides, such problems existed as the unbalanced distribution of medical resources in rural and urban areas, severe waste of resources, rapid increase of medical expenses, huge financial burdens, a low level of medical insurance, and lack of fairness.

The second stage lasted from 1978 to 2009, which was the exploration stage of the medical and health system after the Reform and Opening-up. In this stage, the government started to implement medical reform to change the medical system of the planned economy era. Fundraising by multiple parties and establishment of medical organizations through multiple channels were encouraged. Hospitals were allowed to provide for-profit supporting services, such as operations by designated doctors, special care, and special wards. However, driven by interests, such phenomena as over-prescription by doctors, arbitrary charges by hospitals, bribery between doctors and patients, and hospitals' charge of commissions from drug sellers also occurred. Besides, tense doctor-patient relations were also caused as a result. The public interest nature of medical services was under attack, accompanied by criticisms and questions from public opinions. The government finally determined that the purpose of the medical and health service reform was to maintain the public interest nature of public medical organizations, which shall continue to play the leading role, and properly regulate the pursuit of profits by private medical organizations.

The third stage covers the period from 2009 to the present, which was the exploration and innovation stage of the new round of medical and health system reform. Currently, a

basic medical and health system framework with Chinese characteristics has taken shape initially; basic medical insurance for all has been initially put in place; the basic state drug system has been established; basic public health service quality continues to improve; drug markup has been canceled and drug prices have been lowered significantly. The reform of public hospitals has been carried out on a broad scale. Appointment-based doctor consultations have been implemented and doctors are allowed to have a license to work in more than one hospital; many medical groups and medical consortiums have been formed; payment according to the disease category, hierarchical treatment, and premium care projects were advancing with greater momentum. On the whole, Chin's medical and health system and service quality have been continuously improving.

The above views respectively divide the development of China's medical and health system into two and three stages. Zhao (2016) argues that there are four main development stages, namely, the shortage period (1949-1978), the growth period (1978-1989), the adjustment period (1990-2009), and the new medical reform period (2009-present). The details of these periods are as follows:

(1) The shortage period (1949-1978)

After the founding of New China, the Chinese government implemented medical services at the state expense among residents in some cities. Basically, no medical expenses were required for medical treatment. Reimbursements were fully paid by government revenues. The main beneficiaries were government officials, civil servants, and employees of some state-owned enterprises. During the same period, "cooperative medical care" emerged as a new form of medical treatment for rural residents, providing treatments based on Chinese herbal medicine and acupuncture and with "barefoot doctors" providing medical services for rural residents. In this shortage period, the supply of medical resources was scarce. By 1978, most hospitals in China were on the verge of bankruptcy due to the deficits caused by low-efficient operations.

(2) The growth period (1978-1989)

In 1978, in order to improve the supply and quality of medical and health services and develop medical and health undertakings, the government policy allowed hospitals to retain part of their profits for their own development. This policy stimulated the overall supply of medical and health resources. Growth was indeed achieved, but negative effects were also produced, such as the waste of medical and health resources and over-treatment. Besides, it also triggered the rise in overall medical costs, which led to difficulties for free

medical services at the state expense in urban areas and cooperative medical care in rural areas. As a result, China initiated medical reform.

(3) The adjustment period (1990-2009)

In 1994, China implemented a new tax policy, accompanied with reduced investment in and reduced subsidies for hospitals by the government. During the adjustment period, over-prescription and over-treatment became more and more prevalent. Meanwhile, such problems as commercial bribes and rebates in drug sales gradually emerged. Complaints about the "difficulty and high cost of getting medical treatment" started to rise. To address these problems, the government issued as many as 17 administrative orders to lower drug prices.

(4) The new medical reform period (2009-present)

Several "historic" measures implemented during the new medical reform period include: the basic drug system, the pilot tasks of the medical reform, the establishment of a new medical insurance system, and the abolition of the system of free medical services at the state expense.

Although the above views differ on the development stages of China's medical and health system, the changes in the allocation of medical resources are closely related to the development of the medical and health system. The author has analyzed the current distribution of medical resources in China from the perspectives of the number of medical institutions, the number of beds, the number of people working in the healthcare sector and health costs.

According to the statistics released by the National Health Commission (NHC) in 2019, the number of medical and health institutions was as follows: In 2018, the total number of medical and health institutions nationwide reached 997,434, an increase of 10,785 over the previous year, of which 33,009 were hospitals, 943,639 primary medical and health institutions, and 18,034 specialized public health institutions, as shown in Table 1-1.

Table 1-1 The number of medical and health institutions and beds in China

Type of institution	Number of institutions		Number of beds	
	2017	2018	2017	2018
Total	986,649	997,434	7,940,252	8,404,088
Hospitals	31,056	33,009	6,120,484	6,519,749
Public hospitals	12,297	12,032	4,631,146	4,802,171
Private hospitals	18,759	20,977	1,489,338	1,717,578
Among hospitals: tertiary hospitals	2,340	2,548	2,359,911	2,567,138
Secondary hospitals	8,422	9,017	2,450,707	2,554,366
Primary hospitals	10,050	10,831	584,911	630,281
Community-level healthcare institutions	933,024	943,639	1,528,528	1,583,587
#Community health service centers (stations)	34,652	34,997	218,358	231,274
#Those run by the government	18,014	17,715	156,855	165,311
Township health centers	36,551	36,461	1,292,076	1,333,909
#Those run by the government	36,083	35,973	1,277,665	1,186,402
Village clinics	632,057	622,001	-	-
Clinics (medical rooms)	211,572	228,019	167	347
Specialized public health institutions	19,896	18,034	262,570	274,394
#Disease prevention and control centers	3,456	3,443	-	-
Specialized disease prevention and control institutions	1,200	1,161	40,833	40,845
Maternal and child health institutions	3,077	3,080	221,136	232,848
Health supervision institutions (centers)	2,992	2,949	-	-
Other institutions	2,673	2,752	28,670	26,358

Source: National Health Commission (NHC) of the People's Republic of China (2019)

The number of public hospitals was 12,297 in 2017 and 12,032 in 2018. Compared to 2017, the number of public hospitals reduced by 265, a decrease of 2.2%; the number of private hospitals was 18,759 in 2017 and 20,977 in 2018. Compared to 2017, the number of private hospitals in 2018 increased by 2,218, an increase of 11.8%. According to hospital classification: There were 2,548 tertiary hospitals (including 1,442 3A hospitals), 9,017 secondary hospitals, 10,831 primary hospitals, and 10,613 ungraded hospitals.

Among the community-level healthcare institutions, there were 34,997 community health service centers (stations), 36,461 township health centers, 228,019 clinics and medical rooms, and 62,2001 village clinics. The number of community-level healthcare institutions run by the government was 121,918. Among specialized public health institutions, there were 3,443 disease prevention and control centers, 1,161 specialized disease prevention and control institutions, 3,080 maternal and child health institutions, and 2,949 health supervision institutions. In terms of the number of beds, in 2018, there were 8.404 million beds in medical and health institutions nationwide. Specifically, 6.520 million were in hospitals (77.6%), and 1.584 million were in community-level healthcare institutions (18.8%). Among the hospitals, public hospital beds accounted for 73.7% and private hospital beds accounted for 26.3%.

The total number of people working in the healthcare sector is shown in Table 1-2. In 2018, the total number of people working in the healthcare sector nationwide reached 12.30 million. Specifically, 9.529 million were health technicians, 907,000 country doctors and health workers, 477,000 other technicians, 529,000 administrative workers, and 858,000 logistics workers. Among health technicians, there were 3.607 million (assistant) medical practitioners and 4.099 million registered nurses. The number of people working in the healthcare sector and the number of health technicians include the number of civil servants who have obtained the "health supervisor certificate".

The total health expenditure is shown in Table 1-3. In 2018, the total national health expenditure reached 5.79983 trillion yuan, an increase of 540 billion yuan over the 2017 expenditure of 5.25983 trillion yuan. Specifically: Government health expenditure was 1.639 trillion yuan (28.3%), social health expenditure 2.49447 billion yuan (43.0%), and out-of-pocket health expenditure 1.66629 billion yuan (28.7%). The per-capita health expenditure was 4,148.1 yuan, and the total health expenditure accounted for 6.4% of GDP.

Table 1-2 The number of people working in the healthcare sector in China

Indicator	2017	2018
Number of people working in the healthcare sector (thousand)	1,174.9	1,230.0
Health technicians	8,988	9,529
# (Assistant) medical practitioners	3,390	3,607
# Medical practitioners	2,829	3,010
Registered nurses	3,804	4,099
(Assistant) pharmacists	453	468
(Assistant) technicians	481	506
Country doctors and health workers	969	907
Other technicians	451	477
Administrative workers	509	529
Logistics workers	832	858
The number of (assistant) medical practitioners per one thousand people	24.4	25.9
The number of general practitioners per then thousand people	18.2	22.2
The number of registered nurses per one thousand people	27.4	29.4
The number of public health workers per ten thousand people	62.8	63.4

Source: National Health Commission of the People's Republic of China (2019)
Notes: The number of people working in the healthcare sector and the number of health technicians include the civil servants who have obtained the "health supervisor certificate".

Table 1-3 National health expenditure

Indicator	2017	2018
Total health expenditure (one billion yuan)	**5,259.83**	**5,799.83**
Government health expenditure	1,520.59	1.639.07
Social health expenditure	2,225.88	2,494.47
Out-of-pocket health expenditure	1,513.36	1,666.29
Composition of total health expenditure（%）	**100.0**	**100.0**
Government health expenditure	28.91	28.26
Social health expenditure	42.32	43.01
Out-of-pocket health expenditure	28.77	28.73
The proportion of total health expenditure to GDP (%)	**6.36**	**6.39**
Per-capita health expenditure (yuan)	**3,783.8**	**4,148.1**

Source: National Health Commission of the People's Republic of China (2019)

In addition to the above, hospitals differ in the distribution of medical resources due

to their different levels. Hospital qualification assessment is based on such indicators as functions, equipment and facilities, technical strength, and talents. Hospitals in China are divided into three levels, and each level is further divided into three classes: A, B, and C. The higher level a hospital is, the more resources it has and the more competitive advantages it owns. Tertiary hospitals are usually concentrated in provincial capitals and prefecture-level cities, secondary hospitals mostly in municipal districts and county-level areas, and primary hospitals mostly in streets and towns. There are also many "Class B tertiary hospitals", "Class A secondary hospitals" and "Class B secondary hospitals" in big cities. About 80% of hospitals are in cities; more than 80% of large hospitals are located in large cities. The general distribution of large hospitals is roughly the same as the trend of China's economic development: Hospitals in the eastern coastal areas develop faster in terms of size and other indicators (Zhao, 2011). On the whole, China's medical resources are distributed as follows: Eastern China is stronger than Western China, tier-1 cities stronger than tier-2 and tier-3 cities, rich areas stronger than backward areas, and public hospitals stronger than private hospitals.

This distribution of medical resources in China has led to regional differences in medical and health services, which is prone to causing the common phenomenon of "overcrowding of patients in large hospitals and lack of patients in small hospitals". Gu (2006) believes that the distribution of medical resources in China is severely uneven and the compensation packages in public and private medical institutions differ significantly. He argues that the establishment of private medical institutions should be encouraged, competition and the modern corporate governance system be introduced into the reform of public hospitals, and hospital administrative levels be eliminated.

1.1.2 Overview of public hospitals in China

Public hospitals refer to hospitals established by the government and included in the government budget. In other words, public hospitals are state-owned hospitals or hospitals run by the state. They can also be understood as medical institutions under the jurisdiction of the state, including governments at all levels, colleges and universities, the military, public institutions, or state-owned enterprises. Public hospitals are divided into three levels, the primary level being community hospitals, the secondary level county (district) hospitals, and the tertiary level municipal hospitals. According to statistics provided by China's NHC, there were 12,032 public hospitals in 2018. Public hospitals

are the main providers in China's medical service system, and play the main role in embodying public interest, providing basic medical care, and resolving people's difficulty in seeking medical treatment. Therefore, on March 14, 2012, the State Council printed and distributed the "Strategy and Implementation Plan of Deepening the Health Care Reform during the 'Twelfth Five-Year Plan' period", which explicitly put forward that public hospitals should continue to play a leading role in providing basic medical and health services to urban and rural residents, the purpose and duties of the government in establishing public hospitals further clarified, and the profit-seeking tendency of public hospitals reversed (www.gov.cn). Besides, public hospitals in China also undertake treatment in the event of a large public health crisis and emergency treatment of low-income people. Descriptions of their specific functions are shown in Figure 1-1 (Zhao, 2011).

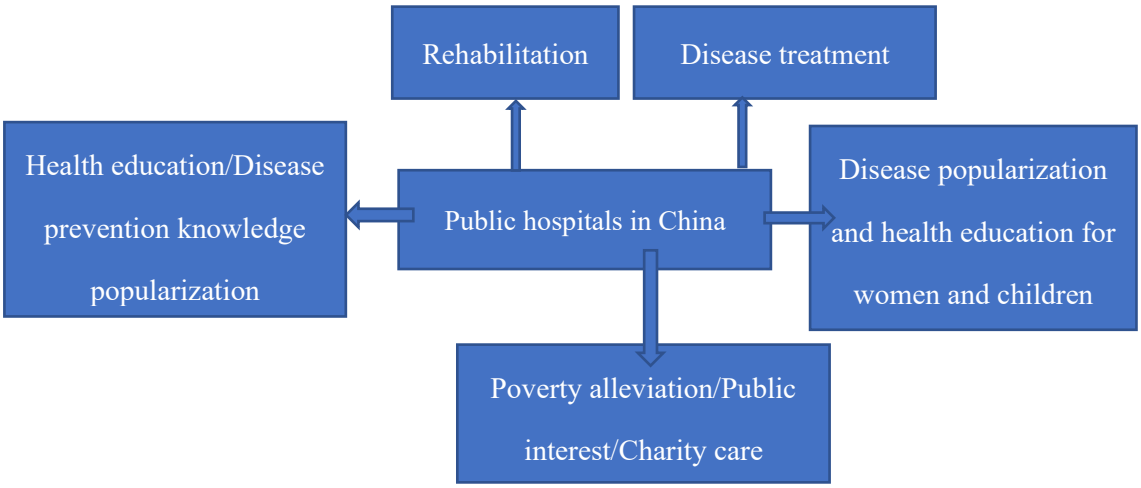

Figure 1-1 General functions undertaken by public hospitals in China

Source: Zhao (2011)

The medical and health system of China has undergone many rounds of reform with certain progress made since the reform and opening-up policy was adopted. However, as a principal part of China's medical system, public hospitals still face some difficulties and challenges. Zhao (2016) outlined nine types of challenges and problems facing public hospitals when discussing the reform of public hospitals in China:

(1) Public hospitals in China face a shortage of government investment or subsidies. Since public hospitals are owned by the government, they have always relied on government investment to keep them running. But public hospitals are subordinate to different upstream authorities, which means their sources of financial input and the

amount of funds obtained may vary. In addition, such funds are not likely to cover the total costs of running a public hospital (Zhao, 2011). Public hospitals at all levels receive inadequate government funding, accounting for about 10% or less of their operating costs. And hospitals have to be responsible for their own profits and losses, maintain daily operations, and face the pressure of survival. As a result, they must find ways to earn sufficient profits from daily medical services.

(2) In the context of insufficient government subsidies, public hospitals in China, which were supposed to be non-profit, have no choice but to operate on the model of for-profit hospitals and try to make a profit, giving rise to some "hidden rules" of revenue generation. This is one of the triggers for overtreatment, kickbacks and the intensified doctor-patient conflicts.

(3) Public hospitals in China face the predicament of irrational pricing of medical services. At present, the imperfect pricing mechanism of medical services has led to the irrationalities in the pricing system, which affects the income of hospitals and results in some inappropriate medical practices and an unreasonable income structure for medical staff.

(4) The human resource management system of China's public hospitals has fallen short of the needs of society and hospital development, and even the needs of medical reform. It is prominently reflected in administration rather than professionalism as well as the outdated salary system, which restricts the flow and development of medical workers.

(5) For a long time, reports and descriptions of the doctor-patient relationship have been almost always negative. And the lack of fair comments has been misleading. As a result, public opinions generally believe that the relationship between doctors and patients is not harmonious, which is another grim reality facing public hospitals in China.

(6) Due to flawed and incomplete policies for health care reform formulated by policy makers who are deficient in experience and ability, the government fails to provide strong and stable policies and legislative support for the reform of public hospitals, which will also lead to the lack of effectiveness of China's medical system reform.

(7) The ownership of public hospitals is separated from their daily operation and management, meaning the property right belongs to the government, while the responsibility for daily operation and management falls on hospital management. Important personnel appointments and major financial decisions of hospitals are vested

in government departments at all levels. There is no board of directors to monitor and take responsibility for the results of hospital operations. Consequently, no one is responsible for the development outcomes of hospitals. Wu (2017) conducted a comparative analysis of the accountability of different types of medical institutions in her research on the government investment in medical service PPP, as shown in Table 1-4.

Table 1-4 Comparison of key indicators of medical institutions with different business models

Model of institution	Degree of government control	Degree of marketization	Degree of realization of residual claim	Manager accountability	The degree to which social functions are guaranteed
Sole Proprietorship public Hospital	High	Low	Low	Low	High
Public hospital of social trusteeship	Medium	Medium	Low	Medium	Medium
Private beds rented in public hospitals	High	High	High	Medium	Medium
Public-Private partnerships Hospital	Low	High	High	High	Medium

Source: Wu (2017)

(8) The setup and operation mechanism of the internal and external management systems of public hospitals are not reasonable enough. As hospitals implement an administrative management system, their management staff have administrative ranks similar to those of civil servants. In addition, public hospitals are often subject to multiple leadership from such entities as local governments, affiliated universities, and health administration departments, resulting in wasted management resources and low efficiency.

(9) China's social security system is not perfect enough. As a result, the difficulties and challenges faced by China's public hospitals are not only in the development of medical technologies and clinical methods. They also play the role as a major "discharge" outlet of social contradictions and shoulder the heavy responsibilities that should have

been borne by social security programs. For example, it is difficult for poor people to get medical services, and hospitals have to bear the burden of overdue bills of some patients, as well as the wages and benefits of hospital retirees.

The difficulties and challenges facing China's public hospitals described above also reflect the context of China's medical reform. In a word, public hospitals suffer from insufficient government financial input and rising medical expenses, coupled with the overcrowding of patients in large hospitals and lack of patients in small hospitals. It is obvious that the pressure on public hospitals is considerable.

1.1.3 Application of PPP

PPP refers to public-private partnerships in which the government and social capital (or social institutions) cooperate to build or operate public service facilities and provide public products or services. The rights and responsibilities of the two parties are clarified through contracts, and the two parties form a partnership relationship (Liu, 2015). It is an institutional innovation for social capital to participate in the investment and operation of public infrastructure and public utility projects. The purpose of PPP is to establish a community relationship of "benefit sharing, risk sharing, and collaboration" between the government and social capital. The role is to transfer some government responsibilities to social capital in a specific way. This can not only reduce the government's financial burden and improve the efficiency of social welfare provision, but also reduce the investment risk of social capital and achieve a win-win situation (Feng et al., 2017).

In the early days, PPP was mainly applied for the construction of such projects as roads and lighthouses in Western countries. The government specially permitted private entities to engage in construction, management, and operation, and the government determined and exercised the property rights. In the 17th century, countries such as France and the U.K. applied PPP in such infrastructure areas as road transportation and urban water supply (Wu, 2017). The modern PPP originated in the U.K. in the 1980s. The original purpose was to meet financing needs. Projects involved public infrastructure construction and public services such as transportation and water supply. With the development of PPP, PPP projects have become more and more widely used in various fields, including roads, airports, communications, education, medical and health care, sewage treatment, and prisons. Exploration of the use of PPP by the British government in the construction and operation of public hospitals began in 1992. In 1997, the

Department of Health set up the Private Financing Unit (PFU) and launched the Private Finance Initiative (PFI), which proposed that construction of public hospitals be funded by the private sector, with property rights to hospital buildings owned by private investors within the concession period. Apart from investment into construction, private investors were also responsible for maintaining hospital buildings and providing logistics support during this period. Hospitals shall pay them an annual fee until the concession expired, when property rights ownership would be transferred to the hospitals. PPP is more and more widely used in the medical and health sectors in Western countries (Mao & Pan, 2012). This shows that PPP has played an effective role in promoting medical reform in western countries.

The development of PPP in China's infrastructure construction field is relatively mature, such as the construction and operation of power plants, stadiums and rail transit. In recent years, PPP has also been used in many cases in China's medical and health sectors, such as business outsourcing, franchising and privatization. At present, China's medical service PPP is in the start-up stage. On the one hand, there is no mature experience to draw upon; on the other hand, it lacks legal support (Chen, 2013). Although the application of PPP in China's medical and health sectors is at an exploratory stage, the practice of PPP has proven that this model is an effective way for China's medical reform.

1.2 Research questions

China started to implement the Reform and Opening-up policy in 1978, in which context breaking the former model of planned economy, launching economic reform and vigorously developing economy became the primary objectives. Although the reform of China's medical and health system has been developing continuously following the reform of the economic system, it has lagged behind the reform of the economic system. It has such problems as a relatively weak foundation, an incomplete operating mechanism, a slight shortage of health resources, a relatively backward infrastructure, and a lagging management system reform. The specific manifestations are as follows: The universal medical insurance system is still incomplete and poorly accessible; the distribution of medical insurance benefits is uneven; the coverage of vulnerable groups cannot be guaranteed; the hidden danger of "poverty caused by diseases" is widespread; Under the existing supplier payment system, the supply of medical services entails demand, causing

medical expenses to rise too fast and the drug market to be out of order; although the drug mark-up policy has been cancelled, the corresponding compensation mechanism has not been implemented; the public hospital reform faced many constraints and the reform failed to touch the core of the system. Specifically, such measures as delicacy management, medical service informatization, and conglomeration were only projects outside the institution. They can hardly fundamentally break through the development bottlenecks.

In the difficult environment of China's medical and health system reform, in addition to the nine types of challenges and issues discussed by Zhao (2016), China's public hospitals are currently facing the pressure of providing health and medical care for China's 1.4 billion people, medical problems caused by an aging population, and the ever-increasing medical and health costs. It is a very arduous task for public hospitals to undertake the health and medical care of 1.4 billion people. The aging of the population will increase the social burden, creating a prominent demand for medical care and life services and causing pressure to the building an old-age support system. China faces the severe challenge of an aging population. According to the United Nations forecast in July 2015, the proportion of the Chinese population aged 60 and above will increase from 15.2% in 2015 to 36.5% in 2050. From 2015 to 2050, the number of the elderly aged 60 and above in China will increase from 210 million to 490 million. *China Statistical Yearbook 2018* indicates that China's total population in 2017 was 1.39 billion, and the number of people aged 65 and above reached 158 million, accounting for 11% of the total population. According to the distribution of China's current population age structure, in the future, the proportion of the population over 65 will reach 35%. The rapid aging process will make China one of the countries with the biggest proportion of aging population. China's population is aging faster than usual. Developed countries reached higher living standards and economic levels when they entered an aging society. For example, Japan's per-capita GDP was 1,967 US dollars when it entered an aging society. When China's elderly population accounted for 6.96%, the national per-capita GDP was only 840 US dollars, which was only 16.25% of the world's per-capita GDP. In 2014, when the elderly population accounted for more than 10% of the total population, the per-capita GDP did not reach 3,000 US dollars. This shows that there is a huge gap between China's economic development and population structure, and the society is

exhibiting features of "getting old before getting rich" (Li, 2019). The acceleration of population aging will exert tremendous pressure on the socio-economic as well as medical and health systems. Yu (2013) believes that entering the aging society under poor economic conditions will cause the economy to bear a heavy burden of support. Bai (2016) studied the status quo of aging in China and South Korea and found that the labor supply and savings rate of an aging society will decline, economic growth slow down, government revenue decrease, and expenditure increase, thereby causing financial deficit.

In addition, rising medical and health costs are a direct pressure on public hospitals. Zhao (2011) points out that the vast majority of public hospitals' input and compensation from higher-level authorities are far from sufficient to maintain their daily operating costs, especially when their operating costs are increasing sharply nowadays. Hospitals around the world are under pressure from rapidly growing changes. The pressure can come from a changing population, changing forms of diseases, medical intervention opportunities brought about by new technologies and knowledge, and expectations of the public and politicians. The rapid increase in medical costs has become a worldwide problem (Anderson, 2005). Blumenthal (2001) pointed out that medical costs in most countries are rising faster than GDP. And there is no sign whatsoever that can curb this trend of rising medical costs (McKee & Healy, 2002). The results of Anderson et al. (2005) highlight that the main reasons resulting in the increasing costs of medical and health care include defensive medical measures, medical dispute litigation, stupid pricing, expensive new medical technologies, new spectrum of diseases, waste and inefficiency, profligacy of the medical services providers and aging. Therefore, studies indicate that the rising trend of medical and health care costs is a universal problem faced by countries across the globe (Zhao, 2016).

Therefore, it has become the objective of China's medical reform to explore ways to address the problems facing China's medical and health care.

Since the Reform and Opening-up in 1978, China has been promoting the medical system reform, adopting the principle of giving only policy support instead of money, increasing hospital autonomy, and improving hospital efficiency and effectiveness. The government is gradually shifting the burden of purchasing medical services to patients and employers. The government provided the funding for establishing public hospitals. Hospitals provided services to patients, and patients and employers paid medical expenses, thereby maintaining the normal operation of public hospitals and reducing the

financial pressure on government investment in hospitals. However, the practice of paying medical expenses by patients and employers is contradictory to the public interest nature of public hospitals. And the serious "difficulty and high cost of getting medical treatment" also occurred in China after many years of medical reform (Chen, 2013).

In order to resolve the difficulties and challenges facing China's public hospitals and address the series of social problems caused by the "difficulty and high cost of getting medical treatment", the government made various attempts. In 2002, the Central Government proposed changes in ownership of public hospitals and formulated corresponding policies. Public hospitals in many regions completed the change of ownership. Some public hospitals were transformed into joint-stock hospitals, with the employees, managers, investors, and governments holding different proportions of shares. Public hospitals in some regions were completely sold and turned into private hospitals. This wave of ownership change among public hospitals caused various problems, the most controversial of which being the loss of state-owned assets. Therefore, at the end of 2004, the Central Government suspended the shareholding reform among China's public hospitals (Zhao, 2011). On March 14, 2012, the State Council printed and distributed the "Strategy and Implementation Plan of Deepening the Health Care Reform during the 'Twelfth Five-Year Plan' Period". According to the document, measures would be taken to further encourage and promote social capital to establish hospitals, ease the access for social capital to establish hospitals, further improve the practicing environment, giving priority to supporting social capital to establish non-profit medical institutions, encouraging social capital to establish and develop medical institutions with a certain scale and characteristics, and developing large-scale and high-tech medical groups; public hospitals were positioned to continue providing basic medical and health services to urban and rural residents, so as to reverse their profit-seeking tendency. The number and distribution of public hospitals shall be reasonably determined (including those run by state-owned enterprises), and construction standards, scale, and equipment strictly controlled. Public hospitals were prohibited from borrowing money for construction. Medical treatment and drugs were to be separated, the drug markup policy gradually eliminated, and the compensation of public hospitals changed from the three channels of service charges, drug markup income and financial subsidies to two channels of service charges and financial subsidies. The charging standards for diagnosis and treatment, surgery, and nursing care were to be increased to reflect the reasonable cost of medical

services and the value of medical workers' professional services. Besides, charges for medical technology services should be included in the scope of medical insurance payments in accordance with regulations (Central Government website).

The government aims to not only maintain the public interest nature of public hospitals, but also introduce social capital in the provision of medical services to alleviate the insufficient medical supply and government financial pressure. Gillingham (2014) studied the financial investment policies in the field of medical services and concluded that government resources are limited. Specifically, when formulating policies, the government must consider the health goals and the financial reality. And how to allocate these limited resources and how much it costs to reach a specific goal are most important to policy makers. Practice has proved that PPP is conducive to helping China solve the dilemmas in its medical and health care reform. In October 2014, Chinese government required vigorous innovation in financing methods and active promotion of PPP, so as to enable social investment and government investment to be mutually complementary. Since then, PPP, which used to be a foreign concept, has frequently appeared in major media in China. Zhang and Li (2016) hold that the introduction of PPP is in keeping with the innovation requirements of China's new health system reform; It can comprehensively improve the construction level of the medical and health system from four aspects: medical and health security system, medical and health service system, medical and health resource supply system, and medical and health supervision system. But when introducing social capital into hospital reform, people must also consider relevant influencing factors. Zhu (2012) studied and analyzed the development and challenges of social capital in establishing medical institutions, elaborated on the internal and external environmental factors that social capital faces in medical treatment, and put forward the policy recommendations of social capital to establish hospitals from seven aspects, including values, legal system, market mechanism, and social action.

As to China's medical reform, since public hospitals are the main service providers of China's medical and health system, people often focus on the reform of public hospitals, and even blame public hospitals for the current tension between doctors and patients. In this regard, Zhao (2016) argues that regarding the solution to the "difficulty and high cost of getting medical treatment" as one of the main objectives of public hospital reform is a false proposition, because public hospitals themselves can neither determine nor affect the basic allocation of medical resources. Currently, China uses the highest quality and

most scarce medical resources to deal with a large number of common and frequently-occurring diseases. Senior experts do the work of community doctors. And medical resources allocation is extremely unreasonable. The overcrowding of patients in tertiary hospitals across the country can easily give people an illusion: Only by increasing the number of tertiary hospitals can the difficulty of getting medical treatment be resolved. In fact, this move is like adding fuel to a fire, which is counterproductive. Because the blind increase in the number of tertiary hospitals is bound to cause the "siphon phenomenon", where what will be "attracted away" include not only the backbone talents but also the patients at the community level, resulting in greater waste of medical resources. As a result, tertiary hospitals are getting stronger and stronger, whereas primary medical institutions end up shrinking. What is worse, the business of doctors as well as the devices and equipment in community-level hospitals may lay idle due to the lack of patients for a long time. Although the reform of public hospitals, especially the adoption of PPP, is one of the effective ways to help address the problems facing China's current medical reform, the above view also indicates that China's medical reform cannot be focused on only tertiary hospitals in public hospitals. Instead, attention should also be paid to reforms of primary medical institutions, such as community-level hospitals and other aspects in order to achieve comprehensiveness. In addition, by using the interpretations of the "frozen (glacial) river model" and the results of questionnaires and case studies in his research on the reform of public hospitals in China, combined with the "medical reform" theories and experience of other representative countries, Zhao (2011) arrived at relevant results, which further illustrate that: First, China's medical reform should be shifted away from the "one-size-fits-all" mentality; second, institutional evolution helps advance multiple goals; third, public institutions do not necessarily carry a strong "public interest nature"; and fourth, ownership diversification is a solution to increase supply and enable public hospitals to get rid of their predicaments.

In light of the medical and health predicaments China faces now and the application of PPP in the medical and health fields, the following questions are put forward:

(1) What means can effectively help public hospitals raise the funds needed for their development?

(2) Is PPP applicable to all public hospitals in China?

(3) Which PPP model is most suitable for China's public hospitals?

Based on the difficulties and challenges facing China's public hospitals, the

application of PPP in the medical and health sectors, and the questions of this study, the research purpose of this study is to explore a PPP model for China's public hospitals.

1.3 Research methods

According to the purpose of this study, to explore a PPP model for China's public hospitals, we reviewed such literature on China's medical reform as public hospital reform, PPP, strategic alliance theory, cooperative game theory and stakeholder theory to understand relevant research results and formulate research methods suitable for this study.

This study adopts empirical research methods, answers the research questions through case study and analyses.

1.4 Research significance

The following findings are the values of the present research:

(1) PPP is an effective way to help public hospitals solve development difficulties, but not all models of PPP are applicable to China's public hospitals;

(2) The BOT model can help public hospitals raise the funds needed for development, but it requires guarantee from institutions with a certain strength.

(3) The "franchising" model is suitable for public hospitals in large cities;

(4) The "mixed ownership" model is suitable for cooperation with district-level or county-level public hospitals. "Mixed ownership" is also applicable for social capital to cooperate with any public hospital with reasonable pricing for medical resources;

(5) The government's cooperation willingness, coordination from public hospital management, hospital staff participation, investors' experience and management capabilities, and the contractual capacity of each cooperation party are the key factors for the success of PPP cooperation

(6) There are huge business opportunities for the supply of mid-to-high-end medical services in China; there is also large room for investment in specialist hospitals, health tourism services and integrated healthcare projects; social capital is more likely to identify investment and cooperation opportunities for public hospital projects in districts, counties, villages and townships.

1.5 Thesis structure

This thesis consists of five chapters. Figure 1-2 shows the structure of this thesis: Chapter 1 analyzes the distribution of China's medical and health resources, the general situation of public hospitals and an overview of the application of PPP.

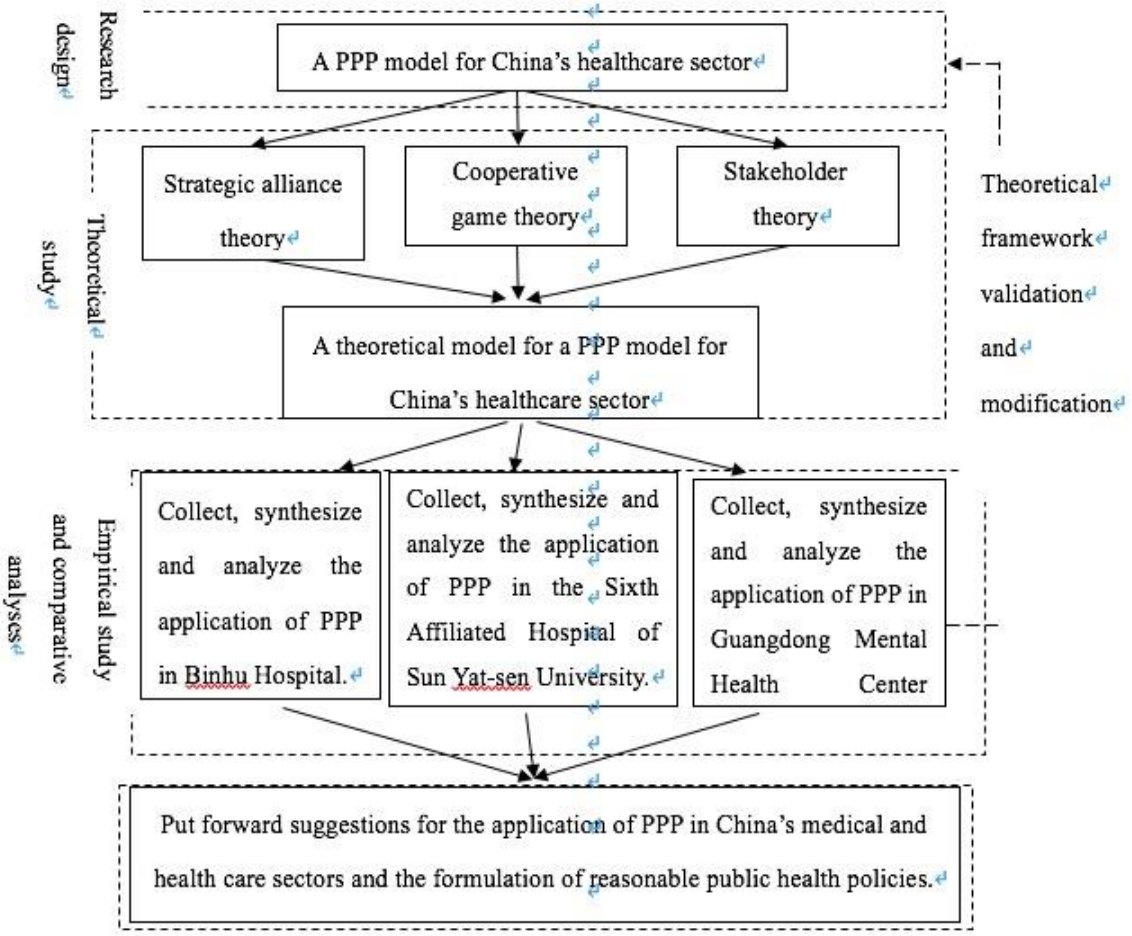

Figure 1-2 The structure of this thesis

Research questions and research methods are put forward. Chapter 2 provides a review of relevant theories, including strategic alliance theory, cooperative game theory and stakeholder theory; Chapter 3 introduces the research methods of this thesis, including case study method and interview method; Chapter 4 introduces the interview results and provides analyses of such cases as Binhu Hospital, The Sixth Affiliated Hospital of Sun Yat-sen University (SYSU), and Guangdong Mental Health Center Hospital (under preparation); Chapter 5 summarizes the research conclusions of this thesis, answers the research questions, puts forward the prospects of PPP application in China, lights upon the significance of formulating reasonable and public health policies,

points out the research implications and limitations, and gives suggestions for future research.

1.6 Chapter summary

This chapter analyzes the distribution of medical and health resources in China. The distribution of medical resources in China is affected by China's medical system. At present, the distribution of medical resources in China is uneven, resulting in differences in medical services among regions. The general situation of public hospitals in China is also introduced, and the difficulties and challenges facing public hospitals analyzed. At present, China's financial investment in the medical industry is still insufficient. The introduction of PPP in the field of medical services can make up for the government's relatively insufficient financial resources, help the government invest in building new or rebuilding existing public hospitals, effectively improve the medical service environment of hospitals in China, and meet the needs of the majority of patients. According to the application of PPP in medical and health sectors, the research questions, research methods and research significance of this study are put forward.

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Chapter 2: Literature Review

2.1 Overview of PPP

2.1.1 Definition of PPP

PPP refers to a public-private partnership in which the government and social capital cooperate to build or operate public service facilities. Based on the content of cooperation, some scholars and organizations offer different definitions of PPP from different angles. From the perspective of the cooperative results of "1+1>2", Liu (2015) defines PPP as a partnership relationship between the government and private organizations with each party's rights and responsibilities specified in a contract in order to provide certain public goods or services. Ultimately, the parties achieve better results than acting alone. Jia and Sun (2010) hold that the advantage of PPP is the sharing of various risks of the cooperation and financing by all parties involved in the cooperation with the provision of public goods or services as the goal. Savas (2002) argues that the scope of the private sector in PPP is relatively broad, so he believes that PPP refers to any arrangement in which the public and private sectors are jointly involved in the production and provision of goods and services, and even religious and non-profit organizations are involved in cooperation. In contrast to the interpretation of Savas, Bovaird's (2004) point of view is much simpler: any public service jointly provided by the public and non-public sectors can be called PPP.

Some organizations and countries have also provided their interpretations of PPP. The Organization for Economic Cooperation and Development (OECD) (2008) believes that PPP is a cooperation agreement between the government and the private sector aimed at coordinating the government's provision of public services and the pursuit of profits by the private sector. Its effect depends largely on the extent to which risk is transferred to the private sector. The European Commission (2003) defines PPP as a cooperative relationship between the public and private sectors with the purpose of providing public programs or services traditionally provided by the public sector. The National Council for Public-Private Partnerships (NCPPP) of the United States (2017) explains that PPP is a public product provision method between outsourcing and privatization and combines the

characteristics of both. It makes full use of private resources for design, construction, investment and operation and maintains public infrastructure while providing relevant services to meet public needs. The Infrastructure Australia (2008) defines PPP as a long-term cooperation agreement signed between the public sector and the private sector, with the private sector representing and supporting the government to provide infrastructure and related services. The private sector is usually responsible for infrastructure construction and maintenance in the whole lifecycle.

Both scholars and organizations have made different statements about PPP. But Jia and Sun (2009) found some common characteristics of PPP from these definitions: (1) Cooperation is a prerequisite. Therefore, each interpretation of the concept contains the keyword of cooperation; (2) The provision of public goods or services, including public facilities or services, is regarded as the goal of cooperation; (3) There is an emphasis on benefit sharing. In the process of cooperation, the two parties achieve win-win; (4) Risk sharing. Kang (2013) pointed out in his research on the application of PPP in China's medical and health sectors that PPP has the following three characteristics: First, PPP is a multi-subject supply model, which means multi-subject risk sharing and multi-subject mutual supervision and restraint; second, PPP reflects the government's shift in public management functions. In the context that the efficiency of public service supply is reduced, the supply level is limited, and social public welfare is affected, the role of government shifts from the original all-round provider of public services to the guide of service provision and the regulator of social order. Third, the inflow of social capital injects new vitality into the provision of public goods. Wu (2017) summarized the main characteristics of PPP in the modern sense: (1) The two parties of cooperation have an equal partnership. And their rights and responsibilities are provided in legal documents; (2) A risk-taking mechanism. Since the public and private parties have an equal cooperative relationship in PPP, the contract risks are shared by both parties. (3) Full lifecycle management. The contract period of PPP is generally 20-30 years. The public sector must continuously manage and monitor the whole contract period, from the preparation in the early stage to the contract completion so as to ensure that the objectives of the contract will be achieved.

The two subjects emphasized by PPP are respectively the government and the private sector. The public products or services involved fall into the social public domain, or in short, the products or services related to people's livelihood. However, due to different

national conditions, the definition of PPP differs between China and the West, as pointed out by Wu (2017). Wu (2017) pointed out that the definition of PPP differs between China and the West. The first P in China refers to the government, which means that PPP requires the government to play a role; the second P refers to private enterprises or private capital in foreign countries. In comparison, it is referred to as social capital in China, which includes both private capital and state-owned capital. It is the social capital of the non-governmental budget as opposed to the government budget. Besides, social capital also entails social responsibility because the field in which it participates is the public sphere of social influence.

2.1.2 Classification of PPP

Regarding the classification of PPP, Zhang (2016) believes that from the perspective of capital flow, there are two models of PPP: In the first PPP model, social funds flow to the government's public projects. It's a model of government strength combined with the resources of social organizations, where social capital is introduced into public services, and the capital, technologies, management and efficiency of social capital are utilized to improve the operating efficiency of public services. This is a typical PPP model used in most of the public hospital restructuring projects and the establishment of most mixed ownership hospitals. In the second model, the government funds flow to the society. By purchasing services, the government transfers public financial funds to social welfare organizations. A mutually complementary model characterized by the money of the government plus the efficiency of social organizations is thus formed, integrating the technical expertise of social organizations with the government's resource advantages.

There are many types of PPP, and they vary from country to country and from region to region. Chen (2013) made a summary: The United Nations Economic Commission for Europe (UNECE) divides PPP into two major categories. One is the institutionalization of all forms of cooperation between the public and private sectors; the other is various PPP contracts. International organizations such as International Monetary Fund (IMF), OECD, and World Bank also has different classifications of PPP. Classifications by different countries also differ. The U.K. divides PPP into such categories as asset sales, broader markets, share sales, partnership companies, PFI, joint ventures, and policy partners. The U.S. classifies PPP into twelve types, including build-own-operate (BOO), build-transfer-operate (BTO), and build-own-operate-transfer (BOOT). Canada divides

PPP into ten categories. Despite the different classifications listed above, the major types of PPP in the infrastructure sector are specifically classified by Guo (2010), as shown in Table 2-1.

Table 2-1 Major types of public-private partnerships in the infrastructure sector

Level-1 classification	Level-2 classification	Level-3 classification
Outsourcing	Modular outsourcing	Service outsourcing
		Management outsourcing
	Integral outsourcing	O&M: Operate and manage
		DBT: Design-Build-Transfer
		DBM: Design-Build-Maintain
		DBO: Design-Build-Operate
Franchising	TOT (Transfer-Operate-Transfer)	PUOT: Purchase-Update-Operate-Transfer
		LUOT: Lease-Update-Operate-Transfer
	BOT (Build-Operate-Transfer)	BLOT: Build-Lease-Operate-Transfer
		BOOT: Build-Own-Operate-Transfer
	Others	DBOT: Design-Build-Operate-Transfer
		DBFO: Design-Build-Finance-Operate
Privatization	Partial privatization	Equity transfer/Asset transfer
		Others
	Full privatization	PUO: Purchase-Update-Operate
		BOO: Build-Own-Operate

Source: Guo (2010)

2.1.3 Merits and demerits of PPP

Although PPP has been widely used in various regions and industries around the world and is becoming more and more mature, it still has its merits and demerits in practice. Savas (2002) believes that the main reasons for applying PPP in local infrastructure projects are the reduction of investment outlay, the lack of expertise, demand for the facilities, reduction of operating costs, a financing means and better services. Grimsey and Lewis (2008) argue that the main value of PPP in emerging markets lies in its ability to achieve social, commercial and environmental goals. Regarding the advantages of PPP in the medical and health sectors, Harding and Preker (2003) studied the economic principles of public and private parties in the medical service field and concluded from the perspectives of transaction costs and operating efficiency

that PPP can effectively overcome the limitations of both parties. The application of PPP in the construction of medical infrastructure can benefit the four parties, namely, government, hospitals, patients and the private sector (Guo, 2005): (1) The government benefits. PPP can make up for insufficient government financial investment, help the government build or rebuild a large number of hospitals in a short period of time, comprehensively improve the medical environment, and meet the needs of patients; It can also transfer the risk of government-funded projects, as the construction and maintenance of hospital facilities are borne by the private sector; (2) Hospitals benefit. Professional suppliers are responsible for the construction and transformation of hospitals and logistics chores, so that hospitals can focus on providing good medical services; introduction of the efficient management model and management culture of the private sector can help hospitals reduce costs and improve efficiency; (3) Patients benefit. The medical environment for patients can be greatly improved; (4) The private sector benefits. Long-term stable contracts can bring stable investment returns. It can thus be seen that the application of PPP in medical and health sectors can enable all-win among all parties. Zhou and Yan (2007) point out that the application of PPP in the reform of the health care system can produce the following effects: (1) The risk of government departments is partially or completely transferred to the private sector and thus generates performance, thereby improving the quality of public goods or services; (2) Purchasing costs will be significantly lower than traditional mechanisms, thus saving costs; (3) The government will reduce recent pressure on public utilities by adopting PPP. And the saved funds can be used for other public utilities to promote the comprehensive development of public utilities.

Although PPP boasts merits, it also has limitations. Li (2008) listed the hidden problems of PPP as follows: (1) The underlying dual agency problem may easily lead to serious conflicts of objectives; (2) The joint planning between the public and private sectors increases the risk for public interests; (3) There are conflicts in values and behavior patterns between the public and private sectors; (4) The public sector lacks adequate monitoring resources and capabilities; (5) There is increased regulation instead of decreased regulation; (6) It is unable to effectively increase the private sector's willingness or abilities to innovate; (7) It is difficult to carry out effective performance assessment; (8) It may have an impact on local systems.

2.1.4 Key factors affecting the success of PPP projects

Regarding the analysis of factors affecting the success of PPP projects, the UK Treasury has identified six key factors affecting the success of PFI, namely, risk transfer, long-term contracting, results-based project specifications, competition, performance evaluation, and private sector management skills (Chen, 2013). In addition to the above factors, Grimsey and Lewis (2008) have summarized the key factors for success as follows: (1) The government agencies must regard transactions as the purchases of services instead of the purchases of underlying assets; (2) Both parties agree that the transaction is a cooperative relationship rather than a sales contract, and they must share risks and responsibilities; (3) Both parties must be able to complete and perform the duties specified in the contract; (4) Interactions; (5) Preparations; (6) A deadline; (7) The contract must be flexible enough; (8) The risk allocation must be cost-effective, which guarantees that the risk is allocated to the party with the optimal management ability.

Zhang (2011) described the key success factors of PPP projects from four perspectives, namely, public governance, project management, public-private partnership and strategic alliance, as well as developing countries and countries in transition: A well-regulated PPP should have such characteristics as cooperation, trust, transparency, and fairness. The government should improve professional skills, enhance negotiation skills, correctly select partners, and strengthen supervision and management of PPP contracts. He also made a detailed analysis from the perspective of project management. See Table 2-2.

Table 2-2 Key success factors of PPP

Key success factors	Secondary factors
A favorable investment environment	A stable political system; a favorable economic system; an adequate local financial market; foreseeable exchange rate risks; a predictable and reasonable legal framework; government support; community understanding and support; projects that are in the public interest; predictable risk plans; projects that are suitable for privatization; sound economic situation.

Economic feasibility	Long-term need for project products; limited competition from other projects; attractive project profits to investors; long-term cash flows that are attractive to borrowers; long-term cooperation with suppliers required for long-term project operation
The availability of strong technical advantages and a reliable franchise consortium	The role of key corporate leaders; effective project organization structure; strong project team; good relations with relevant government departments; possession of partner skills; rich PPP project management experience; multi-sector participants; good technical solutions; innovative technical solutions; efficient technical solutions; low environmental impact; focus on public safety and health
A sound financing plan	Good financial analysis, investment, and payment plans; stable sources, settlements, and currencies; high equity / debt ratios; low financing costs; fixed and low financing rates; long-term debt financing with minimized risks; easy-to-handle interest rate and exchange rate risk fluctuations; appropriate fee levels and adjustment formulas
Appropriate allocation of risks through reliable contractual arrangements	Appropriate and reliable ways of risk taking; franchise contracts; stakeholder contracts; design and construction contracts; loan contracts; insurance contracts; supply contracts; operating contracts

Source: Zhang (2011)

2.1.5 Application of PPP in the medical industry

Regarding the application of PPP in western countries, in the early days, PPP consisted of monotonous models. Franchising was a widely used model. It was mainly used for the construction of such facilities as roads and lighthouses. The government specially permitted private entities to construct, manage, and operate, and the government determined and exercised the ownership. In the 17th century, countries such as France and the U.K. applied PPP in such infrastructure areas as road transportation and urban water supply (Wu, 2017). In the 1970s and 1980s, developed western countries such as the U.K. and the U.S. set off a wave of state-owned enterprise reforms and privatizations, and passed legislation to force local governments to transfer the provision of public services to private entities in the form of competitive bidding. Subsequently, many developing countries followed suit. During this period, PPP models included government sales,

contracting, and franchising. Most countries such as the U.K. and such Eastern European countries as the former Soviet Union adopted the model of government sales, whereas countries represented by the U.S. mainly adopted contract. The scope of cooperation also extended to the basic sectors of the national economy such as steel, post & telecommunications, and railways (Zhao & Wang, 2015). The modern PPP originated in the U.K. in the 1980s. The original purpose was to meet financing needs. Relevant projects involved the construction of public infrastructure and public services such as transportation and water supply. In 1989, the U.K. government lifted the original restrictions, and began to allow private capital to flow into the public sector. In 1992, it first proposed the PFI model; In 1997, it established a special agency to organize and coordinate the relevant matters of PPP projects; In 2000, an agency named "Partnership UK (PUK)" was established to lead PPP projects on behalf of the public sector. A series of mature PPP model management systems were gradually formed, and a complete mechanism for private capital to participate in the construction of public utilities was established. PPP projects were increasingly widely used in various fields, including roads, airports, communications, education, medical and health, sewage treatment, and prisons.

The application of PPP in public infrastructure construction and public services such as transportation and water supply in the early days provided practical experience and theoretical guidance for subsequent applications in the medical and health sectors. Feng et al. (2017) summarized the theoretical bases for the application of PPP in the medical industry:

(1) The theory of welfare pluralism

The theory of welfare pluralism advocates the diversification of welfare sources. It is believed that the coordination and provision of social welfare should be jointly provided and completed by the public sector, the private sector, non-profit organizations, and for-profit organizations to realize complementary advantages instead of just being confined to government departments. In light of the reality, only relying on the government to support public hospitals in the provision of medical services can no longer meet people's ever-growing needs for medical services. Therefore, welfare pluralism provides a theoretical basis for attaching importance to the role of the private sector apart from the government in providing health and other benefits, as well as encouraging and guiding the private sector to participate in the provision of medical services.

(2) Institutional change theory

With the constant changes of society, systems should also be updated accordingly to adapt to social changes. New systems gradually take place of old ones to realize institutional equilibrium. Thus, the government, public medical institutions, private sector and patients can share the benefits of the new systems. When the supply of medical resources is insufficient, the government should actively seek new solutions, encourage and guide social capital to invest in establishing medical institutions, and promote the coordinated provision of medical services by public medical institutions and social capital, so as to make up for the undersupply for medical services.

Such characteristics of medical services as heterogeneity, irreproducibility, and involvement in life safety determine that the PPP projects in the medical service industry are different from other projects. Wu (2017) summarized the specificities of PPP in the medical service industry as follows:

(1) The role of doctors. For medical services, doctors provide services, and the services provided by each doctor are professional and heterogeneous. Patients' choice of hospitals is often the choice of doctors. Medical institutions with high-quality medical staff can attract more patients, and even end up overcrowded, whereas hospitals lacking high-quality healthcare professionals may struggle to survive if they just rely on world-class facilities;

(2) The influence of medical insurance. Medical insurance settlement eligibility will also affect the level of hospital benefits, because patients covered by medical insurance will be more inclined to choose medical institutions that accept settlement by medical insurance;

(3) The existence of non-profit institutions. Due to the existence of non-profit institutions, the private sector of the medical service PPP cannot have the legitimate distribution right of the operating agency's profit. Therefore, people do not worry about the possibility of conflicts between the interests of medical institutions and patients.

Regarding the application of PPP in the medical and health sectors abroad, Mao and Pan (2012) described the application of PPP in the medical and health sectors in the U.K., the U.S., and Spain. Exploration of the use of PPP model by the British government in the construction and operation of public hospitals began in 1992. In 1997, the Department of Health of the U. K. set up PFU and launched PFI, which proposed that construction of public hospitals be funded by the private sector, with property rights to hospital buildings owned by private investors within the concession period. Apart from investment into

construction, private investors were also responsible for maintaining hospital buildings and providing logistics support during this period. Hospitals shall pay them an annual fee until the concession expired, when property rights ownership would be transferred to the hospitals. From this point (the initiation of PFI) on, PPP projects in hospitals entered the phase of implementation. Sixty-four public hospital projects, 70% of which comprised of new and renovated hospitals, had obtained national approval in the U.K. from 1997 to 2007. In 2000, the U.K. government launched another program, the LIFT (Local Improvement Finance Trust) program, designed to achieve modernization of primary health care and community health care by utilizing PPP. As shareholders, the local health and economic sector, PFH (Partnership for Health) and the private sector formed a LIFT LLC (limited liability company), whose assets were jointly owned by the public and private sectors. The LIFT LLC undertook construction, renovation, operation, maintenance and management and possesses ownership of the buildings of primary healthcare institutions. The private sector was allowed to render such services as property management, retail operations and create additional revenue for primary healthcare funds, without engaging in the core business, namely healthcare services. The buildings were leased to healthcare personnel including general practitioners, primary care workers, social workers at local governments, dentists, and pharmacists, and rent was collected. Currently in England, around half of the primary healthcare funds have adopted the LIFT program in updating medical facilities as well as building new modern GP clinics and medical centers. In the U.S., in 1987, the renowned pharmaceutical company Merck KGaA joined hands with the Rockefeller Foundation and WHO to initiate the MDP (Mectizan Donation Program), a program dedicated to curing river blindness prevalent in West Africa and the Caribbean by donating drugs to these regions. This was the first PPP program ever carried out in the U.S. healthcare sector. At that time, NCPPP placed particular emphasis on infrastructure construction, excluding PPP programs in the healthcare sector from its scope of work. In 1990, the Foundation for National Institutes of Health (FNIH) was founded, which provided a sound platform for lunching new PPP projects. To develop national health undertakings, multiple parties applied PPP in medical research and clinical practices, and introduced PPP in new drug development. A multitude of significant medical researches took off utilizing PPP. In PPP projects, the major responsibilities of the public sector lie in designing research plans and organizing sources of diseases, while the private sector offers proprietary drugs, medical devices, reagents and research funds at a low cost. In return, the private sector can have access to clinical

trials data for product updates, and enjoy positive effects of product promotion and public opinion. Apart from significantly expediting the translation of medical researches into clinical outcomes, this form of partnership had also given impetus to healthcare services delivered by the private sector. Spain adopted the Alzira model, which originates from the town of Alzira in Valencia. Under this model, the private sector takes responsibility for the construction of hospital buildings and the provision of medical care to the local residents. Meanwhile, the private sector is entitled to operation rights of hospital services within a certain timeframe, be them medical or non-medical services. In terms of medical services operation, the private sector can run one of the departments in a public hospital providing smaller diagnostic services, such as gastroscopy, or set up a small new private practice near the public hospital directly providing treatment services at prices slightly above government standards. Whatever form it may take, the operation should be up to par with the requirements of public hospitals. Medical treatment, for instance, should be performed according to standardized clinical procedures stipulated by public hospitals. The government grants financial aid based on the number of patients.

In the practices of PPP application, various countries have developed their own distinctive ways of application in light of their domestic situations. As is demonstrated in the healthcare reform in the U.K., its PPP focuses on infrastructure construction of healthcare institutions. The private sector gains return on investment mainly through collection of rental fees, management fees and auxiliary service fees. The core services of healthcare, however, remain in the hands of the public sector. The major achievement in the PPP model application in the U.S. lies in the research and development of new drugs, which has significantly pushed forward medical research and clinical application. The active engagement of social capital has brought tremendous benefits to the whole society. In the Australian case, the private consortium stays out of the core healthcare services. The private sector is strictly contained. In Spain, the role of social capital extends beyond infrastructure construction of healthcare institutions to directly provide healthcare services. According to research theories of the Global Health Group of the University of California, this type of PPP is collectively referred to as public-private integrated partnership (PPIP). According to the PPIP model, in order to guarantee better treatment for patients, it is far from enough for social capital to just offer funding and infrastructure construction. The accessibility of healthcare, the efficiency of healthcare delivery and the standards of operation and management are also in need of optimization

(Sekhri, Feachem, & Ni, 2011). Many existing projects do contribute to a better healthcare system, but in a fragmentary way and with sporadic effects, whereas the PPIP model can comprehensively raise the standards of healthcare services in healthcare institutions. However, it puts forward higher requirements in terms of coordination and compatibility between both parties of the cooperation. Studies suggest that the PPIP model will have significant influences on the income level of all aspects of the whole country. Therefore, countries all over the world still need to carry out more practices to develop a further understanding of the PPIP model.

2.1.6 Development of PPP in China's medical industry

2.1.6.1 The status quo of PPP in China's medical and health sectors

The development of PPP in China's infrastructure construction is relatively mature, such as the construction and operation of power plants, stadiums and rail transit. For example, the Bird's Nest of the 2008 Beijing Olympic Games is a PPP project. Currently, China's medical service PPP is in its start-up stage. On the one hand, there is no mature experience to draw upon; on the other hand, it lacks legal support. Despite so, in recent years, PPP has been applied in quite a few cases in China's medical and health fields, such as business outsourcing, franchising, and privatization. But the results of research on the reform of public medical institutions from a systematic PPP perspective are limited. Chen (2013) summarized the research in the field of medical and health services in China: (1) Introduction of PPP into hospital infrastructure construction: private financing, construction, leaseback of new public hospitals; sale of public hospitals (Zhu & Li, 2003; Guo, 2005; Chen et al., 2006; Du, 2007); (2) Hospital business outsourcing: Outsourcing of clinical support services, privately-run public hospitals (Wang, 2008); (3) Health care and medical research (Zhou et al., 2006; Zhang, Ju, & Meng, 2007; Yao & Peng, 2009); (4) Privatization of community health services; (5) Introduction of PPP in medical insurance sector; (6) PPP in foreign public health sector: the U.S. (Shi, 2009) and South Africa (Zhu et al., 2009).

One of the key factors determining whether PPP can be widely used in China's medical service field depends on the role that PPP can play in health care. Regarding the role of PPP in the transformation of government public management, Kang (2013) elaborated on the efficacy of two different organizations, the government and the private sector, in the process of cooperation. The government has strong administrative functions,

while the private sector has flexibility, adaptability and high professionalism. PPP can give full play to the advantages of different organizations, avoid risks, and maximize economic and social benefits. In the process of cooperation, the government plays a leading and regulating role, whereas the private sector plays the role of marketization. The two parties use PPP to enable public and private sharing of natural and capital resources, thereby improving the efficiency of human and information resources utilization, and ultimately achieving the purpose of maximizing the value of resource utilization. Feng et al. (2017) further described in detail the role that PPP can play in China's current medical and health sectors: (1) PPP can help alleviate the pressure on government financial investment in the medical and health sectors. In the case of economic slowdown, public hospitals cannot rely solely on government support. They must also find new ways to introduce social capital and help themselves develop through PPP to ensure the quality of medical service supply; (2) PPP can help make up for the current shortage of medical resources and improve the efficiency of medical resource allocation. In the case of uneven distribution of medical resources, large hospitals are overcrowded, whereas small hospitals have just a few patients, resulting in tension between doctors and patients. In order to change this situation, the cooperation between public hospitals and social capital through PPP is conducive to increasing the supply of medical services and improving the operating efficiency of hospitals.

China, with a population of 1.4 billion, has the world's largest medical service group. With the social development and the continuous improvement of people's living standards, people's awareness of health has been increasing, so have their requirements for medical services (Zhang, 2016). The situation China faces right now: On the one hand, the health needs have been increasing in an aging society; on the other hand, the government has limited financial resources and is also under the pressure to improve the quality of various public services. The slowing economic growth has caused the contradiction between increased demand and insufficient investment. Due to the pressure to raise funds and the limited capabilities, the government has no choice but to constantly look for new solutions.

Based on the role of PPP in medical and health care, the private sector is also more active in efficient investments and equipment upgrades, and is more in line with market rules in terms of talent employment, rewards and punishments. Therefore, the introduction of the market-oriented management mechanism of the private sector can help public hospitals make up for such government insufficiencies as low efficiency. As

national policy encourages the development of PPP, by December 31, 2016, China's Ministry of Finance had disclosed 492 medical and health PPP projects, covering the preparation stage, identification stage, and procurement stage. The project cooperation types included BOT, TOT and BOO (Wu, 2017).

2.1.6.2 Classification of PPP in China's medical and health sectors

PPP has different application classifications, and different industries have different application models; the same industry also uses different models for different PPP projects. Scholars have summarized in their own research the application of PPP in China's medical and health sectors.

Kang (2013) introduced the two models of PPP application in China's medical and health sectors:

(1) Mentougou Model

Mentougou Model is a demonstration model of public hospital reform. Beijing Mentougou District Hospital, as Beijing's first public hospital to introduce social capital, adopted the ROT model (Renovate-Operate Transfer) to incorporate public hospital reform into group operation. Social capital and the government form four breakthroughs at the restructuring level. First, a board of directors consisting of both the investors and the social forces has been set up; representative of the social capital side has assumed the position of hospital president, serving as the legal person of the hospital; and the administrative level of the president has been cancelled. Second, under the condition of retaining the original staffing of public hospitals, the administrative appointment and dismissal of senior management has been changed to an appointment system, and the control of total salary of staff has been removed to reshape the incentive mechanism. Third, a multi-supervision mechanism consisting of hospital self-regulation, industry supervision by the health bureau, and third-party supervision has been established. Fourth, in terms of doctor management, doctors are allowed to have a license to work in more than one hospital (Zhang, 2012).

(2) Zhanjiang model

Zhanjiang Model is an effective medical reform that highlighted the integration of medical insurance for both urban and rural residents. On January 1, 2009, Zhanjiang City started the integration of medical insurance for both urban and rural residents, creating a brand-new cooperation model in which social medical insurance and commercial

insurance complement each other. This model is known as the "Zhanjiang Model". The basic practices of the Zhanjiang Model cover the following four aspects: First, the government introduces Zhanjiang Central Branch of People's Insurance Company of China (hereinafter referred to as "PICC Health") as a professional insurer. PICC Health, by actively giving full play to its professional advantages in such aspects as product actuarial service, risk management and claims settlement, provides the government with a complete set of schemes for operating and managing medical insurance services. Second, in this model, government financial subsidies and contributions of the insured constitute medical insurance funds. The government withdraws part of the medical insurance funds to purchase large-amount medical aid from PICC Health, achieving a substantial increase in insured amount while maintaining the same standard of payment for residents participating in insurance and amplifying the insurance effects; Third, the operating mechanism of joint offices is adopted to establish an integrated reception service platform, payment settlement platform and policy consulting platform so as to provide one-stop services for the insured. Fourth, entrusted by the Social Security Department of Zhanjiang City, PICC Health also participates in the medical insurance service management process, sets up a professional team to be stationed in the hospital for follow-up supervision, inspects the medical treatment of the insured, and reviews medical archives to control unnecessary costs and set up a hospital medical service evaluation system (Du, 2011).

Zhang (2016) believes that the application of PPP in China's medical field is mainly reflected in the following models: PFI (Private-Finance-Initiative); ROT (Renovate-Operate-Transfer); EPC (Engineering-Procurement-Construction/Turnkey); O&M model (Operation and Management Contracts); shareholding reform. Zhang also compared the merits and demerits of these PPP models in the healthcare sector, as shown in Table 2-3.

Of the five PPP models listed below, only shareholding reform changes hospitals' ownership structure. The other four models do not change the original ownership attributes of public hospitals. They are only public-private partnerships on the basis of the management or operating mechanisms. In the shareholding system reform that changes the ownership structure of the hospital, the three restructurings of Guangzhou Baiyun Mountain Hospital have gone from a public hospital owned by a state-owned enterprise to a private hospital. Then the private hospital changed its shareholding structure once again. Most recently, it changed from a private hospital to a mixed ownership hospital

with shares controlled by a state-owned enterprise. So, it can be regarded as a typical case of this model.

Guangzhou Baiyun Mountain Hospital was established in 1982. It is located at Yunxiang Road in Tonghe, Guangzhou Avenue North Road, Guangzhou City, Guangdong Province, and sits at the southeast foot of the picturesque Baiyun Mountain Scenic Area.

Table 2-3 Comparisons of the merits and demerits between several PPP models in the healthcare sector

PPP model		Merits	Demerits
PFI	Private-Finance-Initiative	Revitalize social idle funds to serve the people. There is great flexibility in the ways of project management.	High expected return on capital
ROT	Renovate-Operate-Transfer	It solves the government's lack of funds to expand hospitals, while integrating the operation and management of the original facilities.	Operating risk and staff turnover risk
EPC	Engineering-Procurement-Construction/Turnkey	A better way for social funds that are good at construction projects to enter the medical market	Contradictions and conflicts are prone to being caused by unclearly defined interests between investors and operators.
O&M	Operation and Management Contracts	Governments or hospitals outsource services to professional companies, which handle professional matters.	Outsourcing is accompanied by a lack of the sense of ownership, making management difficult.
Shareholding reform		Ownership change makes financing more thorough and brings more development opportunities.	Institutional function positioning, staff turnover and operating risks brought by ownership change

Source: Zhang (2016)

Guangzhou Baiyun Mountain Hospital, formerly known as Guangzhou Baiyun Mountain Pharmaceutical General Factory Central Hospital, is the staff hospital of Guangzhou Baiyun Mountain Pharmaceutical General Factory. It has 136 beds and 175

employees. It was changed to a private hospital after the restructuring in 2003. It is a for-profit medical institution and its ownership is private. After the restructuring of the hospital, due to the poor diagnosis and treatment environment, outdated equipment, small scale of the hospital area, and relatively backward medical technologies, the hospital's operation was sluggish, and the annual turnover was only more than one million yuan, resulting in low salaries for staff and lack of commitment of backbone medical talents. The first restructuring failed to bring vitality to the hospital. Faced with this dilemma, the hospital actively looked for ways to change its state of depression. In 2006, Guangdong Civilization Investment Management Co., Ltd. and Songzheng Medical Investment Co., Ltd. bought shares of Baiyun Mountain Pharmaceutical General Factory Staff Hospital, which was later renamed as Guangzhou Baiyun Mountain Hospital. After more than ten years of development, the hospital has gradually developed into a primary general hospital with key specialties and sound comprehensive strength. In particular, it has formed key, characteristic and advantageous specialties in trauma, surgery, spine, joint, traditional Chinese medicine rehabilitation, gynecology, geriatrics, minimally invasive lithotripsy and other aspects. At present, Baiyun Mountain Hospital has development momentum, but the lack of development property and site has further restricted its development.

The state-owned enterprise Guangzhou Baiyun Mountain Pharmaceutical Group Co., Ltd. (hereafter referred to as Guangzhou Pharmaceutical Group) plans to invest five billion yuan to enter the medical and health sectors according to the company's development plan in the respective sectors. It will focus on the development of such industries as medical care, traditional Chinese medicine health preservation & health management, and modern old-age care through three major channels, namely, new construction, joint ventures and cooperation. Guangzhou Pharmaceutical Group ranked the first in the national pharmaceutical industry for six consecutive years, but it has no hospitals. Guangzhou Pharmaceutical Group had been preparing to invest or build its own hospital, with a large number of high-quality properties near Guangzhou Baiyun Mountain Hospital. Therefore, both Baiyun Mountain Hospital and Guangzhou Pharmaceutical Group had their own development needs and complementary advantages, so they carried out project cooperation.

In 2015, Baiyun Mountain Hospital underwent a third restructuring. Guangzhou Baiyun Mountain Medical and Health Industry Investment Co., Ltd., the wholly-owned

subsidiary of Guangzhou Baiyun Mountain Medical Group Co., Ltd., officially signed the "Guangzhou Baiyun Mountain Hospital Capital Increase Agreement" with the original shareholders of Guangzhou Baiyun Mountain Hospital. Capital was officially injected in March, 2016, and restructuring and shareholder reorganization were carried out. After the capital increase was completed, Baiyun Mountain Medical Company held 51% shares, Civilization Investment held 39.2% shares, and Songzheng Medical held 9.8% shares. Such medical facilities as a health check-up center, a special treatment center, and rehabilitation wards would be added in the newly established Guangzhou Baiyun Mountain Hospital to form an integrated traditional Chinese and Western medicine hospital based on traditional Chinese medicine according to the objective and vision of developing into a 3A general hospital. Baiyun Mountain Hospital is a state-owned holding unit and a member of Guangzhou Pharmaceutical Group. It is a designated medical institution for medical insurance, work injury, and medical services at state expense in Guangzhou. It is a hospital that accepts settlement of medical expenses for medical treatment incurred outside the municipal-level administrative area where the patient's medical insurance is registered, a hospital that accepts settlement of medical expenses for medical treatment incurred outside the provincial-level administrative area where the patient's medical insurance is registered, and a designated hospital by China Ping'an Insurance Company for direct online settlement through medical insurance. In 2016, it was named a Safety Hospital of Guangzhou Baiyun District, and it is the osteoporosis prevention base of Guangdong Medical Industry Association.

The project has been running for more than 3 years, and the number of beds has increased from 100 to 499. It has been upgraded from a primary hospital to a secondary general hospital. The economic indicators have also completed the valuation adjustment agreement, which has reached or even exceeded the expectations of both parties. The hospital's performance has been improving for three consecutive years, as shown in Table 2-4.

At present, the hospital has a beautiful environment, surrounded by green trees, fresh air and convenient transportation. It currently has three areas, consisting of the surgical building, rehabilitation building, internal medicine building and outpatient and emergency building, with a floor area of over 26,000 square meters, and nearly 500 open beds. There are over ten clinical departments such as internal medicine, surgery, traditional Chinese medicine, gynecology, traditional Chinese medicine rehabilitation,

otolaryngology, stomatology, dermatology, urology (andrology), cerebral palsy rehabilitation, hemodialysis, radiology (medical imaging), physical examination and laboratory medicine. There are outpatient and expert studios for each specialty, providing medical treatment services 24 hours. On the second floor of the Outpatient and Emergency Building, there is an area of more than 1,000 square meters dedicated to modern health management physical examinations with a full range of facilities and beautiful environment. It is equipped with Germany Siemens MRI MR, CT, DR, E8 four-dimensional color ultrasound and other first-class image inspection equipment. It has formed a secondary general hospital with such key specialties as rehabilitation, orthopedics, and urology (reproduction) with distinctive features and good comprehensive strength. At present, Guangzhou Baiyun Mountain Hospital has nearly 400 on-the-job employees, including 20 professionals and technicians with senior titles, nearly 100 professionals and technicians with intermediate titles, and more than 20 doctors with senior professional titles in third-level hospitals that work in more than one hospital. It has employed a group of experts with rich medical experience and excellent skilled from various places across the country, as well as a large number of young and middle-aged talents who have clinical experience, experienced orthopedics, and both Chinese and Western medicine skills, forming a team of talents with a relatively reasonable knowledge structure and age structure.

Table 2-4 The turnover, number of outpatient visits and number of hospitalizations of Guangzhou Baiyun Mountain Hospital

Year	Turnover	Outpatient income	Hospitalization income	Number of outpatient visits	Average daily number of outpatient visits	Number of hospitalizations
2016	64070537.1	30252732.47	33817804.66	193098	529	4517
2017	90184148.6	35055501.82	55128646.78	209323	573	6162
2018	104774404	26643203.58	78131199.96	110829	303	7226

After completing the third shareholding system reform, Baiyun Mountain Hospital has achieved greater development than the previous two system reforms. But there are still some problems in cooperation. In terms of corporate governance of the hospital, there

is still room for improvement in terms of the director's responsibility system under the leadership of the board of directors, talent introduction, and discipline construction. The following aspects need government policy support:

(1) Because the three-tier diagnosis and treatment is divided into tertiary hospitals, secondary hospitals, primary hospitals or community service centers. However, the medical insurance outpatient clinics in Guangzhou are only divided into two types, "big stations" and "small stations". Primary hospitals or community service centers, outpatient clinics, and community service stations are "smaller stations", which can reimburse 80% of the outpatient services. Secondary and tertiary hospitals are "big stations", which reimburse 45% without referral and 55% for referrals. Secondary hospitals cannot compete with tertiary hospitals, which has made the outpatient clinics of secondary hospitals become sandwich biscuits.

Guangzhou Baiyun Mountain Hospital's annual outpatient visits in 2016 were 193,098. After being upgraded to a secondary hospital in 2018, the annual outpatient visits were only 110,829. It can be seen from the above statistics that the hospital developed and the number of outpatients decreased. It is hoped that the designated hospitals that accept settlement of medical expenses for outpatient services in Guangzhou can also be divided into three types, large, medium, and small, and a hierarchical reimbursement ratio system be formed, which is more convenient for patients to seek medical treatment and is conducive to the healthy development of hospitals.

(2) Although the shares of Guangzhou Baiyun Mountain Hospital is held by a state-owned enterprise, it still belongs to a hospital established with social capital. It was registered as Guangzhou Baiyun Mountain Hospital Co., Ltd. The financial stamp on the invoices issued by the hospital is also Guangzhou Baiyun Mountain Hospital Co., Ltd. As a result, the patients' reimbursement will be hindered because the local reimbursement authority does not understand why a patient goes to a company to seek treatment. It is understandable that the hospital wants to be registered as a limited company, but the title of invoices issued by the hospital should be a hospital instead of a limited company.

The hospital's services are composed of core services and non-core services. Core services refer to services related to medical expertise, including surgery, chemotherapy, and nursing. Non-core services mainly include cleaning, meals, maintenance of facilities and equipment, security and other property management and logistics management. The choice of PPP by public hospitals is affected by such factors as the particularity of the

medical service field, the hospital's own resources and development status, competent government authorities, policies and regulations, and the cooperation goals of public-private partnerships. Therefore, whether it is appropriate for public hospitals to choose PPP will have a positive or negative effect on the cooperation results.

Based on the hospital's service characteristics, core services are highly specialized and related to the lives of patients. They should be implemented by public hospitals under government supervision and management. Since non-core services do not involve medical behavior, they can be outsourced and transferred to private sectors for operation and management, whereas the government and public hospitals are only responsible for guidance and supervision. In this way, the two sides of cooperation can benefit from each other and complement each other, which can not only reduce the economic burden of the government and hospitals but also promote public hospitals to invest more resources in medical services (Jia & Sun, 2010; Ma, 2014). With regard to this view, Feng et al. (2017) also believe that according to the actual situation of China's medical field, the PPP model suitable for public hospitals is limited outsourcing cooperation model, which requires private capital not to interfere with the core medical services of public hospitals but to gain rewards through non-core services.

Despite the multiple specific PPP application models, Chen (2013) concluded that two models are of great significance to the study of PPP for China's medical services: The first is the model in which public hospitals and enterprises cooperate to establish community hospitals; the second is the model in which public hospitals introduce social capital to participate in hospital restructuring. The former is the BOOT model, whereas the latter is similar to franchising and privatization.

2.1.6.3 The key success factors of PPP in China's medical and health sectors

The survival and development of any organization is affected by internal and external environmental factors. Public hospitals are also affected by the hospital's internal and external environment in terms of PPP model. Internal environmental factors include the hospital's resources, development needs, and attitudes of employees. External factors include such factors as the state of the political and economic environment, support from government authorities, laws and regulations, and the situation of partners, as well as the contents of contractual cooperation between the two parties. All these factors will affect the effectiveness of PPP project cooperation. For example, the restructuring of the First People's Hospital of Loudi City, Hunan Province, and the PPP Project of The Sixth

Affiliated Hospital of Sun Yat-sen University, Guangdong Province both failed to proceed due to the opposition of hospital staff, and ended in failure. Therefore, Chen (2013) summarized the key success factors affecting PPP in China's medical industry in his study of public-private partnerships in contemporary Chinese medical services, as shown in Table 2-5.

Table 2-5 Key success factors of China's medical service PPP

Primary factors	Secondary factors
Government and public sector factors	Stable government policies
	Relevant legal support
	A reasonable government incentive mechanism
	Strong government supervision
	Sound government coordination
Private sector factors	Support from hospital staff
	The strength of the hospital itself
	Enthusiasm for medical and health undertakings
	Rich experience and strong enforcement ability
	Adequate fund and sound operation
	Sustainable development ability
Environmental factors	A stable political environment
	A favorable economic environment
	Public understanding and support
Contract factors	Reasonable risk sharing
	Reasonable income distribution
	Clear division of responsibilities
	Contract flexibility
	Strong contract supervision

Source: Chen (2013)

2.1.6.4 Problems in the PPP in China's medical and health sectors

Although PPP has been applied in China's medical and health sectors, there still have been some problems so far. Feng et al. (2017) pointed out some of the problems in the current PPP in China's medical and health sectors.

As PPP has not been used in China for a long time, it lacks a complete legal system and regulatory mechanism. In particular, the legal regulations for PPP in the medical field are lacking, and there is a lack of relevant laws and regulations to supervise the joint provision of medical services through PPP between non-profit public hospitals and for-profit private companies (Zhang, 2016). And supervision should prevent illegal embezzlement of state-owned assets during the cooperation. The government has promulgated policy documents related to PPP projects that are not laws formulated by the highest legislature, so they have limited authority and influence. Besides, the process specifications, management system, information disclosure mechanism, responsibility division mechanisms needed for regulating the implementation of PPP projects are not perfect, and there is even absence.

(1) The contradiction between the public interest nature of public hospitals and the purist of interests of private capital

The nature and function of mixed-ownership hospitals are unclear between for profit and non-profit (Zhang, 2016). Public hospitals are non-profit institutions, and they embody public interest. They emphasize the protection of patients' rights and interests and the promotion of social benefits, whereas the purpose of social capital is to seek profits. China's medical and health policies have clearly stipulated that the government must not host for-profit medical institutions, and the main function of the government is to pursue public interests and meet public demand. Therefore, mixed ownership hospitals jointly established and operated by public hospitals and social capital should belong to for-profit hospitals, which runs counter to the non-profit nature of public hospitals.

(2) PPP is not attractive enough to social capital

The medical and health service sectors have such characteristics as strong professionalism, high risk, strict standards, and high industry entry standards. Besides, PPP projects are characterized by a low rate of return and a long return period. In addition, there is a lack of long-term and stable incentive mechanism in policies. And the imperfect regulatory system makes the private sector lack confidence in PPP. Therefore, PPP appears not attractive enough to social capital.

2.1.6.5 Policy measures to perfect PPP in the medical and health sectors

In order to ensure the effective realization of PPP and achieve the established goals of the original public-private cooperation, the government, as the leader of PPP, should

formulate appropriate PPP policies and measures according to the different development stages of the medical and health sectors, so as to ensure that PPP will play a supporting role in promoting the development of the medical and health sectors. Policy measures have a decisive impact on PPP projects. Binhu Hospital in Hefei City, Anhui Province, is a best demonstrative case for the failure of PPP project cooperation due to the lack of policy support in the early stage of its establishment. Policy measures also have different degrees of impact on the business model of different medical institutions. Wu (2013) summarized the different impacts of government policies on medical institutions of different business models in her study on government investment in medical service PPP. See Table 2-6.

Chen (2013), when evaluating the role of public-private cooperation in the supervision, evaluation and coordination mechanisms of medical services, points out that the incentive mechanism is a basic guarantee for successfully attracting social capital to participate in PPP projects and a key factor in whether PPP agreements can be reached, whereas the supervision mechanism, evaluation mechanism and coordination mechanism are the fundamental guarantees to achieve the contract objectives. According to the above descriptions, the impact of government policies and measures on PPP projects cannot be ignored. Therefore, this study summarizes the research results of relevant literature and puts forward suggestions for improving policies and measures for PPP in the medical and health sectors.

(1) Formulate special laws and regulations for PPP in the medical field

According to the particularity of the medical and health sectors at the national level and in terms of professional technologies, it is necessary for the government to specifically formulate laws and regulations on PPP applications in the medical and health sectors so as to actively play its due role. Liu (2015) believes that in order to facilitate supervision and management, the Central Government should issue special policy documents to clarify the areas, contents and modes of cooperation between public hospitals and social capital. When conditions are mature, the legislative process for the public-private partnerships of public hospitals can be initiated. The contents of laws and regulations should include clarifying the responsibilities of different parties, including the government, public hospital authorities, public hospitals, and social departments; formulating policies and measures for classified supervision of non-profit and for-profit mixed ownership hospitals; and clearly defining the means of return of social capital

participation in public-private partnership projects. The government functions as the leader, supervisor and coordinator for PPP in the medical and health sectors and undertakes important responsibilities. Therefore, Savas (2002) believes that the government must assume more responsibilities, strengthen the rules protecting collective welfare, ensure open competition, make full use of market forces, and reduce impractical control.

Table 2-6 A comparison of the policies of medical institutions with different business models

Business models of medical institutions	**Differentiated service policies**	**Pricing policies**	**Taxation policies**
Sole proprietorship public hospitals	Basic medical services; special care services take up no more than 10%.	Basic medical services are charged according to the pricing of the Medical Insurance Affairs Management Center; some pilot public hospitals implement a "medical service fee" system; special care services are subject to guided pricing by the regulatory authority.	Exemption of value-added tax (VAT) (the original business tax) and corporate income tax
Public hospital trusteeship	Basic medical services; special care services take up no more than 10%.	Basic medical services are priced according to national standards; special care services can be priced independently.	Medical institutions are exempt from business tax and corporate income tax. The hosting facilities need to pay corporate income tax.
Public hospital leasing	Basic medical services; special care services take up no more than 10%.	Basic medical services are charged according to the pricing of the Medical Insurance Affairs Management Center; special services are subject to guided pricing by the regulatory authority.	Private medical institutions are exempt from VAT (original business tax) and subject to corporate income tax.
Private-private partnership hospitals	No restrictions	All private hospitals (for profit and non-profit) can price medical services by themselves.	Non-profit hospitals are exempt from VAT (original business tax) and corporate income tax; for-profit hospitals are exempt from VAT (original business tax) and subject to corporate income tax.

Source: Wu (2017)

The contract is the concrete embodiment of PPP implementation. Therefore, in addition to the broad aspect of laws and regulations, the specific aspects also include

relevant provisions on contract. An effective contract can not only avoid many public liability disputes and reduce the uncertainty of the social environment, but also clarify the scope of responsibilities of various parties and avoid cross-functions (Kang, 2013). In order to facilitate the approval and supervision of government departments, Fang and Zhang (2015) believe that it is necessary to establish standardized project procedures and contract models, make arrangements for the adjustment mechanism of PPP projects, set up a public sector repurchase system for private inputs, and clarify the solutions to default. Other issues include contract confidentiality mechanism and assumption of public responsibilities (Graeme & Greve, 2007).

(2) Introduce special policies to encourage PPP to participate in rural development

China's rural areas are sparsely populated, and medical resources are worse than cities. At present, China's PPP is mainly used in urban infrastructure construction. Therefore, the government should increase policy guidance and support, formulate preferential policies, and encourage the active participation of social capital, so as to bridge the gap between urban and rural areas. Zhou (2014) conducted a research on carrying out PPP for basic public health services in rural areas and analyzed the difficulty to carry out PPP in rural areas through a survey of rural clinics. He found such major problems as improper incentives, misappropriation of funds, and low status of rural doctors. Therefore, he put forward such suggestions for carrying out PPP in public health services in rural areas as improving the incentive mechanism, training mechanism, communication mechanism, and supervision and evaluation mechanism. Kang (2013) believes that the Zhanjiang model has achieved preliminary results, alleviating the "difficulty and high cost of getting medical treatment" for rural residents. This is a successful PPP model for participation in rural development.

(3) Establish a risk management mechanism

PPP has a tendency seek profits in the market, which entails market mechanism risks. Therefore, it is necessary to take precautions beforehand. The PPP projects in the medical field have the characteristics of a long cooperation cycle, a large amount of funds involved in the project, and low return on investment. Therefore, the risk responsibility mechanism should be clearly defined. For example, social capital assumes risks in hospital construction, operation, and market changes, the government bears the risks caused by health laws and policy adjustments, and risks such as natural disasters and accidents should be shared by both parties. Besides, national, market, and project-level risks should

be divided to determine the corresponding risk takers. Finally, the return of the public and private parties should be determined based on the magnitude of the risks (Feng et al., 2017).

The establishment of an effective supervision mechanism by the government is the basic guarantee for achieving the purpose of PPP. Therefore, the establishment of a diversified monitoring mechanism for PPP requires more transparent and open institutional guarantees for the use of power and the flow of funds; it is necessary to establish a comprehensive performance evaluation system and an information disclosure system to encourage public participation in supervision and ensure fair and open competition (Kang, 2013). The government should establish a special evaluation mechanism to conduct a standardized evaluation of the participating public medical resources to prevent the occurrence of illegal acts of underestimating assets, which will lead to the loss of state-owned assets. Misconduct and illegal acts must be dealt with severely in accordance with law (Li et al., 2014).

Fang and Zhang (2015) believe that PPP projects in the medical industry involve multiple fields such as health care, finance, construction, and law. Therefore, the government needs to be equipped with corresponding professional and technical personnel. The supervision and management functions of PPP projects in the medical field must also be implemented by specific departments. This is the basic measure for effective supervision of PPP projects.

Only through the professionalization of laws and regulations, the professionalization of government management institutions, and the professionalization of government PPP project management personnel can the government implement effective supervision of PPP projects. Only in this way can the effective realization of the purpose of PPP be guaranteed.

2.2 Strategic alliance theory

2.2.1 Definition of strategic alliance

A strategic alliance is a long-term union and cooperation agreement in which two or more economic entities adopt any equity or non-equity form to share risks and benefits in order to achieve specific strategic goals (Gao & Xu, 2012). This kind of cooperation is an action taken by enterprises in order to survive or meet the needs of long-term

development. It has clear strategic intentions and goals, but the cooperative relationship itself is not necessarily long-term and stable. Dong, Jin, and Wang (2004) define strategic alliance as a relationship between two or more enterprises that adopt a voluntary and relatively long-lasting inter-enterprise cooperation out of a desire to achieve overall market goals and their own overall business objectives.

Chen (2002) believes that strategic alliance is a new form of enterprise organization under the cooperation and competition mechanism of enterprises, as well as a development trend of the form of enterprise organization in the 21st century. Because strategic alliance requires sharing of responsibilities, mutual coordination, and careful pursuit of various types of activities, they blur the boundaries of enterprises and enable each enterprise to take consistent or coordinated actions in order to achieve the common goals of the alliance. But it is clear that alliance partners maintain a cooperative and competitive relationship. Although the alliance partners cooperate in some fields, they still maintain the independence of operation and management in areas not covered by the agreement and the overall situation of enterprises' activities, and they may have a competitive relationship with one another (Gao & Xu, 2012).

Zhang (2008) pointed out that a strategic alliance is a long-term cooperation between superior enterprises fin order to achieve a certain strategic purpose. Therefore, a strategic alliance is strategic, equal, ambiguous, and flexible. Meng, Zhang, and Long (2004) describe the specific characteristics of a strategic alliance as follows:

(1) Blurring boundaries. Unlike traditional enterprises, a strategic alliance does not have clear hierarchies or boundaries; It is a situation where a cooperation relationship and a competition relationship coexist;

(2) Loose relationships. A strategic alliance is mainly contractual or linked, so the relationships between the parties to the cooperation are very loose, combining the characteristics of both a market mechanism and administrative management. The parties to the cooperation mainly solve various problems through negotiation;

(3) Flexibility. The process of forming a strategic alliance is also very simple and does not require significant additional investment. Moreover, the relationships between cooperators are very loose. Strategic alliance does not exist for a long time, and it is very convenient to dissolve; in other words, a strategic alliance can be dissolved quickly to adapt to the changing environment;

(4) Highly efficient actions. The parties to the cooperation add core resources to the alliance, and all aspects of the alliance are first-rate; under these conditions, the alliance can act efficiently and complete tasks that are difficult for some enterprises to complete.

A strategic alliance is related to the cooperation of all parties. Therefore, Chen (2002) believes that handling the issues of three aspects, namely, partner selection, management organization establishment, and cross-cultural management, is key to the success of a strategic alliance.

2.2.2 The role of strategic alliance

The power of enterprise alliance cooperation is always stronger than singles fighting alone. The purpose is to produce the effect of 1 + 1 > 2. Zhang (2008) believes that through strategic alliance, many benefits that cannot be achieved by a single enterprise can be achieved, such as enhanced competitiveness through complementary advantages, the ability to overcome trade barriers, effective technological innovation, and invisible enterprise expansion without producing "big enterprise ills". However, there are also many risks in forming a strategic alliance, such as technology leaks, affected control rights, and opportunistic behaviors of partners. Dong, Jin, and Wnag (2004) point out the five advantages of strategic alliance in the study of strategic trade policies and strategic alliances: (1) It is conducive to the transformation of government functions; (2) It can avoid the unreasonable flow of social resources; (3) It is applicable to a wide range of industries; (4) It is not easy to be retaliated by foreign governments; (5) It can help enhance enterprise competitiveness.

Meng, Zhang, and Long (2004) summarize the effects that a strategic alliance can have on all parties in the process of cooperation as follows:

(1) Enhance enterprise competitiveness.

Enterprises form a strategic alliance and expand their information network to the entire scope of the alliance. Relying on the cooperation with the enterprises within the alliance, each enterprise can transfer technologies to each other, speed up the research and development process, obtain the information and knowledge it lacks, and bring about the co-creation effect of different corporate cultures. A strategic alliance has a more active innovation mechanism and more economical innovation costs, and can also cater to the preferences and diversity of different countries, regions, social groups, and even individual consumers. It is conducive to developing new markets or entering new

industries. Therefore, it has stronger competitiveness.

(2) Share risks and costs while achieving economies of scale.

The research and development of new products and technologies require a large investment and is subject to high risks. Under such circumstances, it is natural for enterprises to shift from technological self-sufficiency to technological cooperation. Establishing strategic alliances and expanding the density and speed of information transmission can help avoid individual companies' blindness in research and development as well as repeated labor and resource waste in the whole society caused by isolated operations. Meanwhile, the globalization of markets and technologies has put forward the requirements for global production at a considerable scale and in multiple industries in order to achieve the largest economies of scale and scope. In this way, enterprises can gain advantages in global competition based on unit cost.

(3) Enter new markets with low costs.

Strategic alliance is an effective way to overcome barriers to entry of new markets at low cost.

(4) Challenge "big enterprise ills".

The economic nature of strategic alliance lies in the strategic innovation of the enterprises' own resource allocation mechanisms, which does not involve organization expansion. So, it can avoid the oversize and rigidity of enterprise organization, and allow the enterprises to maintain a flexible operating mechanism and keep pace with rapidly developing technologies and markets. Besides, a strategic alliance can also avoid the sanctions on oversized enterprises by anti-monopoly laws.

2.2.3 Classification and forms of strategic alliance

There are various types and organizational forms of strategic alliance. Enterprises that want to form alliances can choose the alliance form suitable for their development according to their strategic objectives and actual conditions (Zhang, 2008). Meng, Zhang, and Long (2004) categorize the types of strategic alliance from the perspectives of governance structure, value chain, and degree of formality of cooperation, as shown in Table 2-7.

Table 2-7 Types of strategic alliance

Research perspectives	Types of strategic alliances
Governance structure	Equity alliance (joint venture, mutual shareholding), contractual alliance (such links as production, research and development, and sales)
Value chain	Horizontal alliance, vertical alliance, hybrid alliance
Degree of formality of cooperation	Entity alliance, virtual alliance

Source: Meng, Zhang, and Long (2004)

Meng, Zhang, and Long (2004) also summarize the specific forms of strategic alliance: (1) Joint venture. Two or more enterprises jointly invest, undertake risks together, and share profits to form a joint venture; It is a form commonly adopted by developing countries, especially in Asia and Africa. The parties to the cooperation put their respective superior resources into the joint venture, so as to enable it to produce the results that a single company cannot. (2) Research & development agreement. For a new product or new technology, all parties to the cooperation identify a joint development agreement; pooling the advantages of all parties greatly increases the probability of success and speeds up the development progress; and sharing of development costs by all parties reduces the development costs and risks each party has to undertake. (3) Original equipment manufacturing (OEM). If one party has a well-known brand but insufficient production capacity, whereas the other party has surplus production capacity, then the latter can undertake OEM production for the former. In this way, the latter can make full use of its idle production capacity to obtain certain benefits, while the party that owns the brand can also reduce the risk of investment or merge & acquisition. (4) Franchising. A strategic alliance is formed by means of a franchise. One party has important intangible assets and can sign franchise agreements with other parties to allow them to use its own brand, patents or proprietary technologies to form a strategic alliance. The licensor can not only gain revenues, but also make use of scale advantages to strengthen its maintenance of intangible assets, whereas the licensee(s) can benefit from sales expansion and revenue generation. (5) Mutual shareholding. The parties to the cooperation hold a certain number of shares of each other in order to strengthen mutual relations; the relationships between the parties in this strategic alliance are relatively closer, and the personnel and assets of the two parties do not need be merged.

2.3 Cooperative game theory

2.3.1 Definition of cooperative game theory

Enterprises must compete in their business activities, but there is also cooperation. Nalebuff and Brandenburger (2013) believe that business activities are a special game, a non-zero-sum game that can achieve win-win. Cooperative game refers to the fact that two or more players form an alliance through arriving at enforceable agreements and the alliance plays games with other alliances or players as a whole to fight for increased interests for all parties of the game or at least one party of the game while not harming the interests of the other party, resulting in increased interests for the whole alliance. Cooperative game theory emphasizes teamwork and underscores efficiency, fairness and justice. The purpose of cooperative game is to realize increased overall interests for the alliance (Dong, Wang, & Guo, 2008).

Game theory is the study of decision-making when the behaviors of decision-making subjects interact directly, and the equilibrium of such decisions. Cooperative game adopts a cooperative approach, or a compromise. The reason why a compromise can enhance the interests of both parties and the society as a whole is that cooperative game can produce cooperative surplus. This surplus is produced from this relationship and way. The distribution of cooperative surplus among the players of the game depends on their strength comparison and skill application. Therefore, a compromise must go through bargaining among the parties to the game, who reach a consensus and cooperate. Here, distribution of the cooperative surplus is both the result of a compromise and the conditions for reaching a compromise (Branzei, 2011). Therefore, the existence of cooperative surplus, the establishment of mutual trust, and the availability of a reasonable distribution mechanism are the basic conditions for the existence of cooperative games. Besides, cooperative games involve the following elements (Zhang, 2004; Zhang, 2014): (1) players in the game; (2) all strategic actions or behaviors that each player can choose; (3) the order of the game (4) the gains to the players; (5) equilibrium.

Gao (2000) classifies games into four categories, as shown in Table 2-8.

Table 2-8 Classification of games and their equilibrium

Means of classification		Classification by the players' understanding of the overall game information	
		Games of complete information	Games of incomplete information
Classification by the order of decision	Static games	Static games of complete information; Nash equilibrium; Representative: Nash	Static games of incomplete information: Bayesian-Nash equilibrium; Representative: Harsanyi
	Dynamic games	Dynamic game of complete information; subgame perfect Nash equilibrium; representative: Selten	Dynamic games of incomplete information; perfect Bayesian equilibrium; representative figures: Selten, Kreps and Wilson, Furdenberg and Tirole
Classification by whether the two parties in the game have reached a binding contract			
Cooperative games		Non-cooperative games	

Source: Gao (2000)

As to the application of cooperative game theory in the medical and health sectors, Zhang (2016) believes that game theory research in the health field developed relatively late, relevant research literature is scarce, the research content is limited, and the research is not in-depth enough, mainly focusing on the field of health economy, such as medical cost control, medical insurance payment methods, and negotiation of different stakeholders in the medical service chain. There is no in-depth and specific research on the game of responsibilities and benefits in the integration process of medical and health capital and resources.

2.3.2 Co-opetition

There is a relationship of cooperation and competition in the process of cooperative games between enterprises, so co-opetition is an outstanding feature of cooperative game theory. Bengtsson and Slave (2004) believe that co-opetition is a business action that integrates competition and cooperation organically in the operation of an enterprise to achieve business goals. The essence of co-opetition is to realize the complementarity of elements of enterprise advantages and implement competition strategies to enhance the

strength of both parties, thereby promoting the establishment and consolidation of the market competitive position of enterprises. They believe that the competition and cooperation between cluster enterprises play an important role in promoting the innovation performance of enterprises, and atmosphere competition (such as degree of confrontation or friendliness) is an important driving force for innovation. Nalebuff and Brandenburger (2013) analyze the core content of co-opetition as follows:

(1) The logical thinking of co-opetition is: Map the value chain → Determine the co-operation relationship of all business game players → Implement PARTS strategy to change the game → Analyze and compare the results of various business games → Determine the co-opetition strategy → Expand business opportunities and achieve win-win;

(2) The strategic starting point based on co-opetition is to analyze the interactive relationships between the players in commercial games. The co-opetition theory proposes a new concept of player value chain and uses value chain to describe the interactive relationships of co-opetition between all players;

(3) The strategic goal based on co-opetition is to establish and maintain a dynamic co-opetition relationship with all players, and ultimately achieve win-win. The theory of co-opetition proposes a new concept of complementarity, and believes that in addition to competitors, suppliers, and customers, business game players also include complementors. It emphasizes the interdependence and mutually beneficial relationships between game players;

(4) The strategy formulation process based on co-opetition theory runs through the game theory. The strategy should be formulated "from the cognitive perspectives of other players", which overcomes the disadvantages of traditional strategies that are formulated only from the interests of the enterprise itself. Besides, through the analysis of the role of players, added value, rules, tactics, and scope on game behaviors and results, the appropriate strategy is selected to make the corporate strategy more interactive, realistic, and feasible. Game theory is a revolutionary strategic thinking combining the thinking of both cooperation and competition. The theoretical methods of game provide a new analysis tool for the study of strategic management of enterprises in the network competition environment.

(5) The strategy based on the theory of co-opetition is a kind of dynamic strategy focusing on the future. Co-opetition theory holds that business games are a kind of

repeated games, and the five elements that make up the games, PARTS, change over time, thereby changing the behaviors and outcome of each game. Therefore, corporate strategies are not always planned in advance, but dynamic strategies that are constantly adjusted and changed to adapt to changes in business games.

Co-opetition is the long-term development strategy of an enterprise. It proceeds from the long-term development perspective of the organization and integrates the enterprise's own resources and core competitiveness to innovate products, services, technologies, management and other aspects through cooperation and mutual learning between organizations, thereby enabling the enterprise to form lasting competitive advantages. Co-opetition is different from the traditional zero-sum game or negative-sum game. It aims at realizing the common interests of both parties in co-opetition. Besides, in order to establish a successful co-opetition relationship, it is necessary to rationally select partners as well as examine partners' resource advantages, potential of creating contributions, long-term strategies, corporate cultures and values, so as to effectively manage partners (Rackham, 1998).

2.3.3 Effects of co-opetition

The co-opetition of enterprises combines the advantages of several enterprises to jointly expand the market and participate in market competition, thereby enhancing the competitiveness of enterprises in the market. Therefore, Bleeke and Ernst (2000) believe that co-opetition will produce the following effects:

(1) Scale effect

Co-opetition enables enterprises to achieve economies of scale. First, the respective comparative advantages of individual companies are brought into greater play under the conditions of co-opetition, which reduces the unit cost of the enterprises. Second, cooperation increases specialization and the degree of division of labor, and optimizes the combination of cooperative partners' advantages in such links as parts production, finished product assembly, research and development, and marketing, thereby enlarging the scale effect; Third, through cooperation, enterprises formulate industry technical standards, form a format system, and enhance the externality of the network.

(2) Cost effect

Co-opetition reduces the external transaction costs and internal organization costs of an enterprise. Through relevant contracts, enterprises establish stable trading

relationships, which reduce the high transaction costs caused by market uncertainty and frequent transactions. Besides, the information exchange and cooperation between the cooperative enterprises alleviates the problem of incomplete information and reduces the information cost. Information sharing between cooperative enterprises also helps reduce internal management costs and increase organizational efficiency.

(3) Synergy effect

The same type of resources shows strong heterogeneity in different enterprises, which puts forward requirements for complementary integration of enterprise resources. Co-opetition expands the resource boundaries of an enterprise. Therefore, an enterprise can not only make full use of the heterogeneous resources of its partner, but also improve the utilization efficiency of its own resources. In addition, co-opetition saves enterprises' investment in resources, reduces their sunk cost, improves the flexibility of corporate strategies, and produces a 1 + 1> 2 synergy effect through the complementarity of the resources and capabilities of the two parties, thereby enhancing the overall competitiveness of enterprises.

(4) Innovation effect

Co-opetition enables enterprises to learn from each other at close distances, which is conducive to the spread, innovation and application of knowledge between cooperative enterprises. It also helps enterprises combine their capabilities with those of cooperative enterprises to create new capabilities. In addition, the overall information collection and communication cost of the cooperative organizations is low. So, they can pay more attention to the moves of industry competitors and trends of industrial development, track external technologies and management innovation, thereby providing new ideas and vitality for enterprises to greatly enhance their innovation capacity and ability to cope with the external environment.

2.3.4 Success factors of co-opetition

Co-opetition is a high-level competition. Co-opetition does not mean the elimination of competition. It only promotes new adjustments in the relationship between enterprises from pure confrontation to a certain degree of cooperation from the perspective of the development of the enterprise itself and the optimization of the allocation of social resources. As to the basic conditions for successful co-opetition, Rackham (1998) found after a large number of empirical studies that there are three indispensable factors that

facilitate the success of competition and cooperation, namely, contribution, intimacy and prospect.

(1) Contribution

Contribution refers to the ability to create specific and effective results after establishing a co-opetition relationship. In other words, the ability to increase the actual productivity and values. It is the most essential factor of the three factors and the reason for the existence of the successful co-opetition relationship. Contributions mainly come from the following three aspects. The first is to reduce repetitions and waste (Rackham, 1998); the second is to use each other's core competences and benefit from them; the third is to create new opportunities.

(2) Intimacy

A successful co-opetition relationship surpasses ordinary trading partners and has a certain degree of intimacy. This intimacy does not exist under the traditional transaction model. To establish such intimacy, enterprises must: First, trust each other. Mutual trust is the core of establishing co-opetition relationships; second, share information to promote the rapid flow of information and knowledge, and reduce the cost of information collection and transaction; Third, establish an effective cooperative team.

(3) Vision

Vision is a guiding system for enterprises establishing co-opetition relationships. It describes the goals that cooperative enterprises want to achieve and how to achieve them. It motivates the enthusiasm and creativity of employees and becomes a source of vitality for establishing co-opetition relationships. For the vision to function properly, the potential of partners must be assessed, partnerships developed, and a feasibility analysis conducted.

2.3.5 Limitations of cooperative game theory

The essence of cooperative game is the existence of an enforced contract in the alliance. In other words, the two parties of the cooperation have arrived at a specific cooperation agreement. However, in the process of agreement implementation, such factors as changes in external conditions or contract failure or force majeure cause the agreement to be partly enforceable and partly unenforceable; some players can reach a contract while other cannot; some execute the contract in accordance with the agreement

whereas others break the contract halfway. Therefore, there are default risks in the process of co-opetition. And once default happens, the whole cooperation project might collapse. The ultimate result is not only that enterprises part on bad terms, but they also need to undertake the economic losses and legal losses caused therefrom. Although introducing a third-party evaluation mechanism and establishing a default punishment mechanism are conducive to lowering default risks, the third-party evaluation mechanism is not applicable to every cooperation project. An example is the cooperation between states, where there is no third-party authority for rectification. Although there are such international organizations as the United Nations, these international organizations do not have absolute coercive force. Besides, cooperative games have a sequential progressive structure. The reflected realistic economic issues have incomplete information, rendering it impossible for cooperative games to provide a clear standard to analyze the solution to the competition in the real society (Dong, Jin, & Wang, 2004).

2.4 Stakeholder theory

2.4.1 The definition of stakeholder

The stakeholder theory was gradually developed in the 1960s in Western countries. In 1963, a research group from Stanford University first defined the term stakeholders as some groups without whose support the organization cannot survive. Since this period, multiple definitions have been developed, as shown in Table 2-9.

Based on relevant literature, we can roughly classify relevant definitions into three types: The first type of definition is the widest, according to which stakeholders refer to all the natural persons or social organizations that are influenced by company operations or that influence company operations. This definition specifies that stakeholders include not only the enterprise owners, shareholders, employees, customers and suppliers that have direct relationships with the enterprise, but also natural persons and social organizations that have indirect interest relationships with the enterprise, such as banks, media, government and competitors; the second type of definition is slightly narrower, according to which any natural persons or social groups that have direct relationships with the enterprise are stakeholders. This definition excludes the natural persons or social organizations that have other indirect interest relationships with the enterprise; the third type of definition is the narrowest, according to which stakeholders refer to the natural

persons or social groups that have invested in enterprise operation and whose interests are closely related to the enterprise interests.

Table 2-9 Definitions of stakeholder theory

Scholar	Definition of stakeholder theory
Freeman (2010)	Stakeholders are those groups without whose support the organization would cease to exist.
Ansoff (1965)	In order to formulate ideal enterprise goals, comprehensive and balanced consideration must be given to the conflicting claims between multiple stakeholders of the enterprise, which might include the management personnel, workers, shareholders, suppliers and customers.
Freeman (1984)	Any individual or group that the enterprise can influence through actions, decisions, policies, practices or objectives. Conversely, these individuals or groups can also influence the enterprise's actions, decisions, policies, practices or objectives.
Clarkson (1994)	Stakeholders refer to those who have invested some physical capital, human capital, financial capital or some valuable things in the enterprise and thus undertake certain forms of risks; in other words, they bear risks due to the enterprise's activities.
Blair (1995)	Stakeholders refer to all the people or groups who have contributed specific assets and are already in the venture capital state as a result.

We can divide stakeholders into direct stakeholders and indirect stakeholders. Direct stakeholders, as said by Blair, refer to the natural persons or legal persons who have invested in specific assets in the enterprise and these assets are in risk state in the enterprise. Without their participation, the enterprise cannot continue to exist as a business entity. These stakeholders can be shareholders, operators, staff, creditors, clients, and suppliers; indirect stakeholders refer to the interest subjects that do not have direct business relationships with the company, but objectively influence the company and are influenced by the company and the company must undertake certain social responsibilities. These stakeholders include such entities as communities, government, social groups, and news media. Therefore, stakeholders can be defined as the individuals

and groups that have made certain specific investments in an enterprise's production activities and undertake certain risks. Their activities can affect or change the enterprise's interests and objectives or are affected by the process of the enterprise's realization of its interests and objectives. This definition not only emphasizes the specificity of investment, but also includes the interactions between enterprises and stakeholders. Thus, it can be regarded as a comprehensive and representative one.

Regarding the theoretical schools of stakeholder theory, Li and Zheng (2012) classified the stakeholder theory into three major schools based on existing research: (1) normative stakeholder theory, which mainly provides a theoretical basis for the gains enterprises can obtain by fulfilling their social responsibilities (Ogden & Watson, 1999); (2) descriptive stakeholder theory, which analyzes the reasons why companies need to pay attention to stakeholders (Jones, 1991); (3) instrumental stakeholder theory, which focuses on discovering the actions that enterprises should take to safeguard the welfare of their stakeholders (Agle, Mitchell, & Sonnenfeld, 1999). It is not hard to see that the above three types of stakeholder theory all proceed from the enterprise itself and discuss the conscious behaviors and results of corporate social responsibilities.

Li and Wang (2004) reviewed relevant literature based on the research of different scholars on whom an enterprise's stakeholders are and why an enterprise should consider the interests of relevant stakeholders, and classified the studies on stakeholder into three stages based on different understandings and research focuses of the concept of stakeholder: (1) Affecting enterprise survival (1960s to 1980s). Stakeholders are a necessary condition for the survival of an enterprise, and it forms an interdependent relationship with the enterprise; (2) Implementing strategic management (1980s to 1990s). The role of stakeholders in corporate strategy analysis, planning, and implementation was emphasized; (3) Participating in ownership distribution (the mid-1980s to present). Stakeholders should participate in enterprise ownership distribution.

2.4.2 Classification of stakeholders

An enterprise's stakeholders include such parties as shareholders, employees, creditors, suppliers, dealers, consumers, competitors, local governments and social activity groups and media. As to the classification of stakeholders, currently, the internationally universal methods are multi-cone subdivision and Mitchell score-based approach.

2.4.2.1 Multi-cone subdivision

Jia and Chen (2002) point out that the survival and prosperity of an enterprise cannot be separated from the support of its stakeholders, but stakeholders can be subdivided from multiple perspectives. Different types of stakeholders have different degrees of influence on corporate management decisions and are influenced to different extents by enterprise activities. In the mid-1990s, many experts and scholars at home and abroad used the multi-cone subdivision method to classify stakeholders from different perspectives.

Freeman (1984) believes that stakeholders have different impacts on enterprises due to the different resources they have. He subdivides stakeholders from three aspects: (1) a group of people who hold company stocks, such as members of the board of directors and managers. They are called ownership stakeholders; (2) relevant groups who have economic interactions with the company, such as staff, creditors, internal service agencies, employees, consumers, suppliers, competitors, local communities, and management structure. They are called economically dependent stakeholders; (3) Stakeholders who have relationships with the enterprise's social interests, such as government agencies, the media, and special groups. They are called social stakeholders. According to whether relevant groups have a contractual relationship with an enterprise, Charkham (1992) divides stakeholders into two types: contractual stakeholders and public stakeholders. Based on whether relevant groups have sociality and whether their relationships with enterprises are directly built by real people, Wheeler (2002) comprehensively divides stakeholders into four types: First, main social stakeholders who have sociality and direct participation; second, secondary stakeholders, who form direct relationships with enterprises through social activities, such as government, social groups, and competitors; third, main non-social stakeholders, who have direct influences on enterprises but do not act on people, such as natural environment; fourth, secondary social stakeholders, who have no direct contact with enterprises and do not act on specific persons.

Regarding the definition of stakeholders in hospitals, Zhang (2016) classifies the stakeholders of public hospitals into internal stakeholders and external stakeholders. Internal stakeholders include hospital managers, medical staff and other personnel, whereas external stakeholders include investors, creditors, suppliers, patients, media, industry organizations, and competitors. But it is a pity that competent government authorities were not counted in. The present research has listed the stakeholders of public hospitals as shown in Figure 2-1.

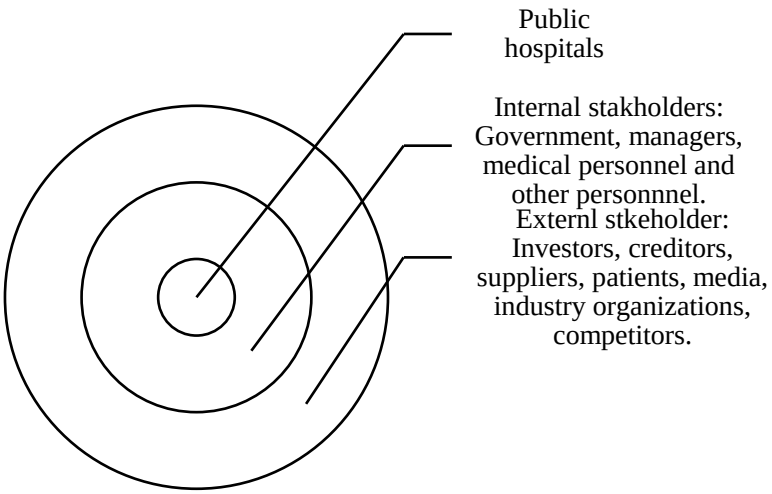

Figure 2-1 The stakeholders of public hospitals

2.4.2.2 Mitchell score-based approach

Mitchell score-based approach was put forward by Mitchell and Wood in 1997. It combines the definitions and classifications of stakeholders together. First, it holds that all the enterprise stakeholders must have at least one of the following three attributes: (1) Legitimacy, which refers to whether a certain group is endowed with legal and moral or specific claim for business; (2) Power, which refers to whether a certain group has the status, ability and respective means to influence enterprise decisions; (3) Urgency, which refers to whether the requirements of a certain group can immediately draw the attention of enterprise management. Mitchell believes that in order to become the stakeholder of an enterprise, at least one of the above attributes should be available depending on the specific situation of the enterprise. After evaluating the above three characteristics, the enterprise's stakeholders can be divided into three types according to the scores: (1) Identified stakeholders, which simultaneously have legitimacy, power and urgency. They are the objects enterprises primarily pay attention to and closely contact with, including shareholders, employees and customers. (2) Expected stakeholders, which have any two attributes out of the three. For example, those simultaneously having legitimacy and power include investors, employees and government departments; those simultaneously having legitimacy and urgency include media and social organizations; and those simultaneously having urgency and power without legitimacy include some political and religious extremists and radical socialists who tend to achieve their means through violent means. (3) potential stakeholders, who only possess one attribute out of the three.

Mitchell score-based approach can be used to judge and define the stakeholders of

an enterprise. It is relatively simple to operate and is a big step forward in stakeholder theory. Some scholars in China have also defined and divided stakeholders from other attributes. Wan (1998) and Li (2001) proceed from two aspects of cooperation and threat of stakeholders, and categorize stakeholders into supportive stakeholders, mixed stakeholders, unsupportive stakeholders, and marginal stakeholders. Chen (2003) classifies stakeholders into core stakeholders, dormant stakeholders and marginal stakeholders from the three aspects of stakeholders, namely, initiative, importance and urgency.

Mitchell's model of stakeholder classification is dynamic. In other words, any individual or group will change from one form to another after gaining or losing certain attributes. For example, some prospective stakeholders already have the legitimacy and power of an enterprise. If the changes in the political or economic environment make their requirements appear more urgent, they will be transformed into deterministic stakeholders. Therefore, Li and Wang (2004) believe that Mitchell score-based method is dynamic. After distinguishing between different types of stakeholders, the dynamic development is reflected in how stakeholders change their characteristics due to the gain or loss of certain attributes. This method provides a framework for stakeholder identification and characterization, greatly improves the operability of stakeholder theory, and promotes the application and development of stakeholder theory.

2.4.3 Limitations of stakeholder theory

Although the stakeholder theory helps people understand any stakeholders in the organization's external environment that are affected by organizational decisions and actions, and helps the organization consider how to balance the interests of all parties when formulating a strategy, the theory still has limitations in practice. Liu (2016) analyzed the relevant limitations of the stakeholder theory in the study of non-financial indicators based on stakeholder interest requirements and their implementation methods: (1) Impeded enterprise development. Traditional companies pursue profit maximization. But the emergence of stakeholder theory diverts companies' attention to operational goals. As a result, they have to focus some energy on undertaking social responsibilities and political responsibilities. Without dealing with the relationship between the two properly, enterprises will be prone to carrying moral baggage and even suffer moral abduction, which is not conducive to maximization of economic profits. (2) The scope of

stakeholders is too wide. So far, the demarcation of stakeholders has not been explicitly summarized. The studies carried out by domestic and international experts only stay at the levels of discussions and assumptions. Exploration of the theoretical system that measures the weight of stakeholders has not succeeded. (3) Lack of practical usage. In theory, the stakeholder theory has the conditions for feasibility. Many problems exist in the application of theories into practices: First, theories themselves are not mature enough; second, the scope of stakeholder is too wide. It is impossible to take actions on a one-to-one corresponding basis; third, in the process of applying theory into practice, there need to be people with relevant theoretical knowledge to provide guidance. Yet such talents are in short supply; fourth, the application of the stakeholder theory calls for the establishment of a complete participation system. Further exploration is needed as to how to complete the system.

2.5 Research questions and research model

2.5.1 Research questions

According to the current medical and health predicaments facing China and the application of PPP in the medical and health sectors, the following questions are raised:

(1) What means can effectively help public hospitals raise the funds needed for their development?

(2) Is PPP applicable to all public hospitals in China?

(3) Which PPP model is most suitable for application in China's public hospitals?

2.5.2 Research model

This study aims to explore a PPP model for China's public hospitals. Public hospitals and social capital cooperate on projects through PPP. By combining the influencing factors of strategic alliance theory, cooperative game theory, and stakeholder theory on the project effects, the research model of this study is designed. See Figure 2-2.

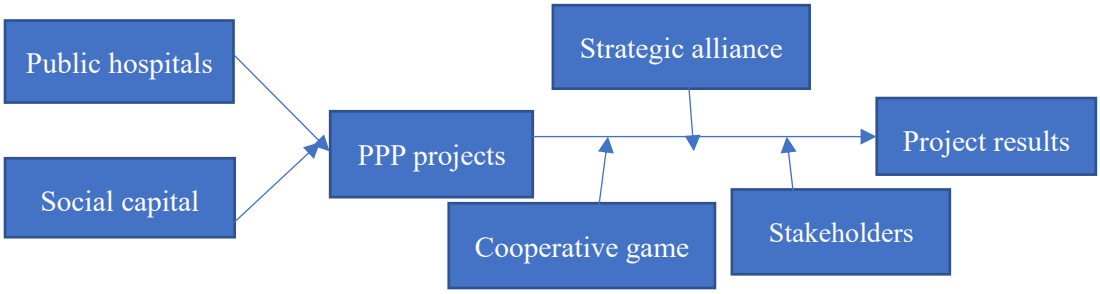

Figure 2-2 Research model

2.6 Chapter summary

PPP, which is increasingly applied in various industries, is an effective way of public-private partnerships. This chapter describes PPP, including its definitions and classifications, its merits and demerits, the key factors affecting the success of PPP projects, the application of PPP in the medical industry, and the development of PPP in China's medical industry. The three theories that influence the results of PPP projects, namely, strategic alliance theory, cooperative game theory, and stakeholder theory are elaborated on. Then, according to the current medical and health dilemmas facing China and the application of PPP in the medical and health sectors, three questions for this study are put forward and the research model designed.

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Chapter 3: Research Methods

3.1 Empirical research

3.1.1 Definition of empirical research

In research paradigms, appropriate research methods are adopted to carry out research work according to the research purpose and questions. The present research uses case study in empirical research as an investigation tool.

Empirical research refers to research in which researchers collect observational data in order to put forward or test theoretical hypotheses. The basic principles advocated by positivism are the objectivity and universality of scientific conclusions, emphasizing that knowledge must be based on the empirical facts of observations and experiments, general conclusions be revealed through the data of empirical observations and the means of experimental research, and these conclusions be provable under the same conditions. According to the above principles, empirical research is summarized as a research method to obtain the objective materials from a large number of observations, experiments and investigations of the research objects so as to summarize the essential attributes and development laws of things from individual to general. In the process of data collection and application, if the researcher directly applies relevant data and information in research without screening and processing, the empirical research will stay at a superficial level of observation, making it difficult to make more valuable analyses for reality (Leedy & Ormrod, 2015).

Empirical research methods consist of mathematical empirical research and case empirical research. Mathematical empirical research is a research method that uses mathematical and econometric tools to analyze and determine the interrelationships between relevant factors. This research method is suitable for studying complex issues and has relatively high requirements for data quality. Errors in data entry and operation can lead to erroneous analysis results. Case empirical research is a research method in which data and materials are collected systematically to conduct in-depth research and

analyses with a view to summarizing the intrinsic nature of things. Empirical research methods have the following characteristics (Zhu, 2016):

(1) The purpose is to understand objective facts and study the movement rules and intrinsic logic of phenomena;

(2) The conclusions drawn from the phenomena studied are objective and tested based on experience and facts.

3.1.2 Steps of empirical research

In order to ensure research effectiveness and efficiency, and according to the principles of empirical research methods, the following steps were followed during the empirical research (Guan, 2004):

(1) Determine the research objects, analyze their constituent factors, interrelationships, and influencing factors, and collect and classify relevant facts and data;

(2) Determine assumptions. In the process of research, the behaviors of the research objects are determined by their characteristics. It is obviously unrealistic and impossible to try to include all complex factors. Therefore, the conditions for a certain theory must be determined. It is certain that some of the assumptions are unrealistic, but scientific research cannot be carried out without assumptions. Using empirical research methods to study problems entails determining correct assumptions;

(3) Put forward theoretical hypotheses. A hypothesis is a temporary conclusion drawn from an objective study of phenomena, that is, an unproven conclusion. A hypothesis is an empirical generalization and summary of the phenomenon of the research object, but it cannot yet be said whether it can become a theory with universal significance;

(4) Verification. Hypotheses must be tested under different conditions and at different times, and facts should be used to test their correctness. The test involves applying hypotheses to predict the movements or development of a phenomenon.

3.2 Case study methods

3.2.1 Definition of case study

Feng (2010) believes that many scholars regard quantitative research and qualitative research as two basic research types. Qualitative research is a basic research paradigm in

the field of social sciences, and it is also one of the important steps and methods of scientific research. Qualitative research refers to gaining keen insights by identifying questions, understanding events and phenomena, analyzing human behaviors and opinions, and answering questions (Feng, 2009). If quantitative research addresses the "what" question, then qualitative research addresses the "why" question. Researchers use such methods as historical review, document analysis, interviews, observations, and participation experience to obtain data in natural situations, and use non-quantitative methods to analyze and obtain research conclusions. Qualitative research emphasizes such aspects as significance, experience (usually verbal descriptions), and descriptions (Denzin & Lincoln, 2007).

Qualitative research includes case study. Case study can provide researchers with a thorough and direct investigation and reflection of the research objects as much as possible, so that they can establish an in-depth and comprehensive understanding. Case study is suitable for answering such research questions as "how to change", "why did this happen", and "how is the result" when the boundary between a phenomenon and the actual environment is unclear and difficult to distinguish or when the researcher cannot design an accurate, direct, and systematically controlled variable (Feng & Dong, 2011). Case study can be further divided into single case study and multiple case study. The principle of case study is to oppose formalism, insist on seeking truth from facts, and discover facts. Finding evidence is put first, followed by drawing research results, rather than the practice of putting the cart before the horse in which ideas are formed first before evidence is found. Errors in research methods will inevitably lead to analysis errors, and ultimately render relevant research results and conclusions worthless, thereby failing to make real contributions to the development of social sciences.

In the early 20th Century, Harvard University introduced case study method into the realms of jurisprudence and medicine and achieved success. After that, case study method was popularized in various fields and its application was gradually expanded. The definition of case study method has been quite controversial in academia. Bromley (1986) believes that all case studies originate from the same obvious purpose: Eager to get close to or get an in-depth understanding of one or a certain "case" in their real world. Yin (1984) holds that case study is the empirical study where the current phenomena, such as "cases", are placed in scenarios of the real world, especially when there is no clear boundary between the phenomena and the social background. Stake (2000) argues that

case study is the process to understand the behaviors in specific situations or under specific conditions (single event). Based on a summary of the views of domestic and international scholars, the author holds that case study is a research method where detailed analyses of the scenario, process and principles of the occurrence of events are made with typical cases as the materials to explore and abstract general conclusions and particular issues reflected in the events, on which basis research conclusions are arrived at to inspire others' research or guide practices.

3.2.2 Characteristics of case study

While integrating the views of other scholars, Yu (2004) summarizes the common characteristics of case study as follows:

(1) Case study is an experiential study instead of a purely theoretical study. It mainly answers the questions of "why" and "how".

(2) The research objects of case study are the interrelations between various cases and evidences in the economic phenomena in the real society as differentiated from experimental study and investigation.

(3) Case study studies the research object as a whole instead of in parts. This determines that case study should be a system. Perhaps its various parts are not operating that well. Perhaps its purpose is non-theoretical. But it is after all a system. When using cases (single events or limited events) to arrive at inductive conclusions or predict the future, researchers must conduct an in-depth study of the inter-dependent relationships between various parts involved in this event and the ways of the occurrence of these relationships (Keeves, 1994). Only under the premise of ensuring the integrity of case study can the conclusions of case study have wider applicability.

(4) The research objects of case study are the interrelations between different variables in socio-economic phenomena. These variables are reflected by specific events that researchers cannot control.

3.2.3 Types of case study

According to the different research tasks, case study can be classified into five types, namely, exploratory case study, descriptive case study, illustrative case study, experimental case study and explanatory case study. See Table 3-1 (Hussey & Hussey, 1997).

Table 3-1 A comparisons of five case study types

	Exploratory	**Descriptive**	**Illustrative**	**Experimental**	**Explanatory**
Purposes	Lay a foundation for the formation of new theories.	Describe examples through story-telling or picture-drawing.	Elaborate on the new trends in the practical activities of enterprises or social organizations through theory-testing.	Test the implementation of new practices and new methods in enterprises or social organizations and review the returns.	Make judgement of specific cases.
Results Achievements	Tentative Generally further exploratory or conclusive research needs to be carried out.	Conclusive The results can be used as references for decision-making.	Conclusive The results can be used as references for decision-making.	Conclusive The results can be used as references for decision-making.	Conclusive The results can be used as references for decision-making.

Source: Hussey and Hussey (1997)

Based on the difference in the number of applied cases in actual study, case study can also be divided into single case study and multiple cases study.

3.2.4 Limitations of case study

Although case study can provide researchers with real-life examples and systematic views, they also have the following limitations (Yin, 1984):

(1) Case study tends to last a long time, cover a wide range of survey data, and consume a lot of time and efforts.

(2) Case study involves the summary and conclusion of a large number of cases, yet the summary is not statistical but analytical. This tends to cause the summary to be unable to reflect all the data contained in various investigation results. As a result, it tends to be casual and subjective, lowering the validity of case study.

(3) Case study depends heavily on the reasonable choice of cases, the authenticity,

integrity and systematic arrangement of materials, as well as the correlation of research questions to materials. Problems in any of these links is prone to resulting in lowered validity or even lack of validity of the case study.

3.2.5 Design of case study

The design of case study mainly consists of the following few steps. See Figure 3-1:

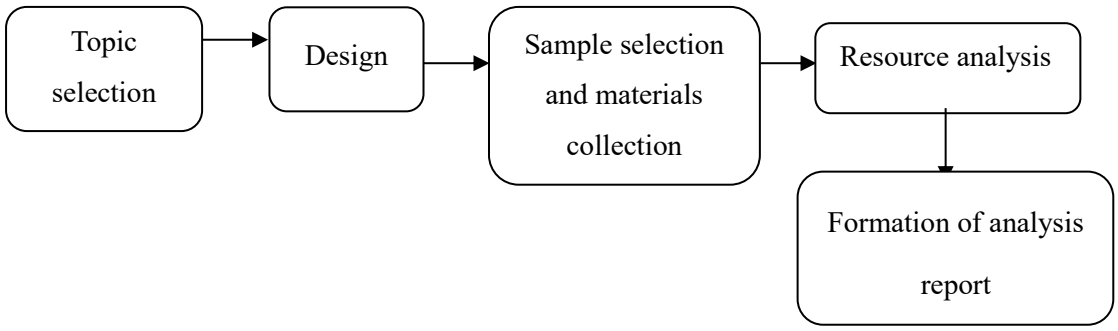

Figure 3-1 The design process of case study

In this process, it is necessary to reasonably choose research objects to ensure that the research objects are representative. It is necessary to reasonably and comprehensively select research materials to ensure the systematic arrangement, authenticity and relevance of the chosen materials. Thorough design and research plans should be formulated to regulate the research behaviors of researchers and establish a case database so as to ensure the validity and fidelity of the research results.

3.2.6 Relevance of case study to the present study

In November 2015, the National Health and Family Planning Commission, the Ministry of Civil Affairs and other departments jointly issued the "Guiding Opinions on Advancing the Combining of Medical and Health Services and Elderly Care Services", in which it was explicitly put forward that efforts should be made to "explore the investment and financing model characterized by the cooperation between government and social capital (PPP)". But seen from the current situation, most of the cases of China's PPP model application are in infrastructure construction area, covering expressways, bridges, sports venues, urban public transport, and even development zone construction. The scope of its applicability is narrow in the healthcare sector, only in a few hospitals. Compared to the infrastructure sector with increasingly fierce competition, medical and educational projects can provide high investment returns. Thus, they are more attractive

to private capital and have extremely huge room for development. China's healthcare enterprises are expected to benefit from the popularization of PPP. In order to find a healthcare PPP model suitable for China's national conditions, the researchers are required to choose suitable research methods and case study is undoubtedly one of the most important methods for the following two reasons: First, PPP appeared late in China. In particular, its scope of applicability in the healthcare sector is narrow. As a result, there is no fixed, existing or authoritative literature for reference. However, the use of PPP in the healthcare sector abroad has grown mature. Drawing on its advanced experiences and mature operating models, combined with China's reality and the characteristics of hospitals in China is undoubtedly conducive to the development of PPP in China. Meanwhile, bringism and copisim should be prevented. Second, we are in an era that calls for the establishment of theories. The existing theoretical systems in the West cannot be directly copied and used in China's situation. Besides, there is still a large gap that needs to be filled in the theory establishment based on the research in China (Ye, 2006). Third, the objects of case study tend to be some social phenomena or social situations, where problems are identified as well as explained, elucidated and verified with scientific management theories. In the current academic research, scholars are more prone to using quantitative empirical study methods, which is in fact the use of statistical analysis method in natural science to demonstrate the problems existing in social sciences (Feng & Dong, 2011). However, management research is a very complicated, multi-dimensional and inter-related field. More often than not, using empirical study method to arrive at an excellent model can only focus on two to three of its dimensions. Therefore, it is very difficult to master the context of the whole event and the nature of management practices by just relying on the vested model and literature (Porter, 2006). In comparison, case study method, with its own characteristics and advantages, at least has important implications on management theory research in the following three aspects: Motivation, inspiration and illustration (Siggelkow, 2007). Therefore, case study method is used to analyze the practices of PPP application in the above three hospitals to summarize general conclusions.

With Binhu Hospital (Hefei No. 1 People's Hospital), the Sixth Affiliated Hospital of Sun Yat-sen University, and Guangdong Mental Health Center Hospital (under preparation) as cases, this study conducts in-depth interviews with participants of each hospital (including the managers of each party and the project leaders), carries out in-

depth observations of the hospital operation model, and provides a comprehensive collection of relevant data in the hospital archives (including all openly published documents, such as news reports, annual reports, financial statements, PPP cooperation documents signed with the government, the summaries, reports and memorandums hospitals handed in to the government), and distributes survey questionnaires to all cooperation parities and local residents. Then the data relevant to this study are extracted for integration and analysis before general conclusions are abstracted and arrived at. At last, the conclusions are used to expound and prove the rationality and feasibility of introducing PPP into China's public hospitals.

3.3 Interview method

3.3.1 Definition of interview method

In the scope of case study, interview is the basic method of investigation. Interview method refers to the basic research method in which interviewers communicate with interviewees face to face to understand them or events. As to what interview method is, Dong (2004) points out in his book entitled *Psychological and Educational Research Methods* that interview method is a research method where researchers collect the data about relevant psychological characteristics and behaviors of the research objects through oral conversations. Chen (2000) believes in the book entitled *Qualitative Research Methods and Social Studies Research* that interview is a research-based conversation and a research method where researchers collect (or "construct") first-hand materials from interviewees through oral conversations. Pei (1995) holds in her book entitled *An Introduction to Educational Research Methods* that an interview is a research-based conversation and a way to accurately describe the whole that samples are representing based on the objective and non-biased factual materials according to the replies of the inquired. Zhou, Yao, and Jiang (2013) conclude in their article entitled "Literature Review on Interview Method in Qualitative Study" that interview method is a research method where the interviewers obtain first-hand materials with a view to establishing language-based activities with the interviewees. The definitions of interview method by the above few views are to some extent representative. Although there are differences in the expressions of these views, they have clarified that interview is in oral form, the purpose of the interview is to collect objective and authentic first-hand materials, and interview is

a common research method.

The interview method has a wide range of applications. It can collect many aspects of job analysis data in a simple and narrative manner, and it is mostly used for personalized or individualized research.

3.3.2 Classification of interview method

The forms of interview method differ as the nature, purposes, or objects of research questions change. According to the degree of standardization of the interview process, interviews are further classified into structured interviews, unstructured interviews and semi-structured interviews. Structured interviews are conducted in accordance with established standard procedures, usually in the form of questionnaires or schedule of survey; unstructured interviews are conducted in the way of free conversations without standardized procedures; semi-structured interviews are between the previous two types of interviews (Feng, 2009). Based on previous literature, the interviews are summarized and classified, as shown in Table 3-2.

The forms of interviews are various, so the choice of interview form needs to differ according to the research questions, purpose, objects, scenarios and stages. Besides, different forms can be combined when necessary (Zhang, 2013).

According to the purpose of this study, the structured interview method is adopted to investigate the background of the hospitals (see Appendix A for the questionnaire). And five interview questions are designed (see Appendix B):

(1) What was the purpose for you to cooperate on this project?

(2) Were there any conflicts during the cooperation of this project? If so, in what ways?

(3) After the project was launched, has it achieved your expected results?

(4) Do you think there is still room for improvement in the cooperation of this project?

(5) What other government policy support do you think is needed for this project?

Table 3-2 A comparison of three interview methods

	Structured interview	**Non-structured interview**	**Semi-structure interview**
Characteristics	Exercise strict control of the interview process and proceed according to the directed standard procedures.	Exercise no or slight control of the interview process. There is no free conversation following directed standard procedures.	Control the whole framework of the interview. But the content form of the interview is not controlled.
Degree of control	Strong	Weak	Medium
Scope of applicability	The interview results are easy for statistical analysis. Normally it is applicable for quantitative analysis.	It is difficult to quantify the interview results. Normally qualitative analysis is applicable.	The degree of control over the interview results is not strong. Normally it is applicable for qualitative research.
Main forms	Questionnaire or schedule of survey	Individual interview	Individual interview, interview with the main insiders, group interview and focus group interview.

3.3.3 Merits and limitations of interview method

Information collection of the interview method, which is realized through direct face-to-face conversations between the researcher and the respondents, is characterized by good flexibility and adaptability (Zhang, 2013). However, the interview method also has limitations (Zhou, Yao, & Jiang, 2013): (1) The cost is high. Compared with questionnaires, interviews take more time, manpower and material resources. Because interviews are expensive and time-consuming, they are difficult to conduct on a large scale. As a result, the sample size of interviews is generally small; (2) Lack of secrecy. Since the two parties communicate with each other face-to-face, the interviewee might be unwilling to tell the truth of some secret issues due to the lack of secrecy. (3) Difficulty

of recording. Interview investigation refers to the language communication between the two parties of the interview. If the interviewees do not agree with on-site recording, the requirement on the note-taking speed of the interviewer is very high. However, interviewers that have not received special stenography training tend to be unable to record the full conversation completely. Much information tends to be missing through retrospective and supplementary recording. (4) Difficulty of processing the results. For the same question, different interviewees may give different answers. This results in the difficulty to process and analyze the interview results. It is only possible to arrive at the percentage based on the number of times of the appearance of the same answer. It is difficult to make quantitative analysis, leading to deviations in the results.

3.4 Respondents and data collection & analysis

In this study, three cases are used as the research objects, respectively, Binhu Hospital in Hefei City, Anhui Province, the Sixth Affiliated Hospital of SYSU, and Guangdong Mental Health Center Hospital. All these three hospitals have participated in PPP to different degrees, so they have research value. In terms of data collection, interview method is used for Binhu Hospital in Hefei City, Anhui Province and the Sixth Affiliated Hospital of SYSU to provide relevant information through interviews and consultations. The author, as an investor of the cooperation project of Guangdong Mental Health Center Hospital, has first-hand materials. The collected data were then analyzed.

3.5 Chapter summary

This study adopts case study method in empirical research as an investigation tool. Case study can provide researchers with a thorough and direct investigation and reflection of the research objects as much as possible, so that they can develop an in-depth and comprehensive understanding. In case study, interview method is the basic survey method. It is adopted to understand the respondents and events through face-to-face conversations between the interviewer and the interviewee(s). But the interview method also has limitations. In this study, three cases are used as the research objects, respectively Binhu Hospital in Hefei City, Anhui Province, the Sixth Affiliated Hospital of SYSU, and Guangdong Mental Health Center Hospital.

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Chapter 4: Interview Results

4.1 Background and results of interviewees

The method of case analysis is adopted in this study, where three cases, specifically Binhu Hospital in Hefei, Anhui, the Sixth Affiliated Hospital of SYSU and Guangdong Mental Health Center Hospital, were taken as the research objects. See Table 4-1 for the schedule of survey of the hospital backgrounds. These three hospitals are of great research value as they have all participated in PPP projects to varying degrees.

Table 4-1 Schedule of survey of hospital backgrounds

Hospital name	**Binhu Hospital of Hefei City**	**The Sixth Affiliated Hospital of Sun Yat-sen University**	**Guangdong Mental Health Center**
Hospital address	Binhu New District of Hefei City, Anhui Province	Tianhe District, Guangzhou City, Guangdong Province	Yuexiu District, Guangzhou City, Guangdong Province
Hospital ownership	Government	College	Government
Institutional type	General hospital	General hospital	General hospital
Hospital level	3A	3A	3A

4.2 Interview information collection

We collected the information on the development and PPP project engagement of Binhu Hospital in Hefei, Anhui, the Sixth Affiliated Hospital of SYSU and Guangdong Mental Health Center Hospital through interviews, talked to the associated people based on five pre-designed interview questions, and sorted out and summarized their answers.

4.3 Results of interview questions

The answers to the five questions in the interview are organized and categorized as follows:

(1) What was the purpose for you to cooperate on this project?

Binhu Hospital in Hefei, Anhui: Funds were needed to build new hospital buildings.

Guangdong Mental Health Center Hospital: Our goals were to bring in funds, erect new hospital buildings, introduce advanced technologies and management philosophies, and improve and expand medical services.

The Sixth Affiliated Hospital of SYSU: We needed to raise 900 million yuan to create new hospital facilities and procure medical equipment.

(2) Were there any conflicts during the cooperation of this project? If so, in what ways?

Binhu Hospital in Hefei, Anhui: The two sides showed evident willingness to cooperate, but there was no clear guidance from government policy at that time.

Guangdong Mental Health Center Hospital: The two sides are engaged in friendly communication and exchanges, and there have been no differences or conflicts so far.

The Sixth Affiliated Hospital of SYSU: There was resistance from some hospital employees, who were concerned about letting social capital control the hospital.

(3) After the project was launched, has it achieved your expected results?

Binhu Hospital in Hefei, Anhui: The two sides did not initiate cooperation.

Guangdong Mental Health Center Hospital: The project was never launched.

The Sixth Affiliated Hospital of SYSU: Yes. We were able to raise funds for hospital construction in a timely manner.

(4) Do you think there is still room for improvement in the cooperation of this project?

Binhu Hospital in Hefei, Anhui: The two sides did not initiate cooperation.

Guangdong Mental Health Center Hospital: No.

The Sixth Affiliated Hospital of SYSU: We failed to consult hospital staff prior to the project; Nor did we explain the situation and reassure them once the project was up and running.

(5) What other government policy support do you think is needed for this project?

Binhu Hospital in Hefei, Anhui: Relevant government departments should introduce detailed laws and regulations on PPP cooperation.

Guangdong Mental Health Center Hospital: We advise that relevant government

departments completely relax the control on social capital participation in the restructuring of public hospitals.

The Sixth Affiliated Hospital of SYSU: Relevant policies on employee stock ownership plans of hospitals should be introduced as soon as possible.

4.4 The case of Binhu Hospital

4.4.1 An introduction to the case of Binhu Hospital

Binhu Hospital

Binhu Hospital, located in Binhu New District, Hefei, Anhui Province, was built and went into operation in 2010. It is a modern non-profit general hospital with the scale of a tertiary institution integrating medical treatment, medical education, scientific research, preventive care, health care and rehabilitation services.

The hospital covers an area of 133,000 square meters, with a planned total floor area of 360,000 square meters and a bed capacity of 3,000. It has built and put into use 230,000 square meters, fitted with 2,200 beds, of which 1,127 are utilized. The annual number of outpatient and emergency visits is about 300,000, while 32,000 patients are hospitalized, and 10,000 surgeries performed each year.

Binhu Hospital is scientifically designed and fully functional with a pleasant environment and reasonable treatment process. It is designed as an individual building with a holistic layout and clear signs that allow for convenient visits. A large electronic display, mounted on the wall in the spacious and well-lit outpatient hall, releases information in a timely manner. The hospital is fully equipped with supporting facilities such as cafeterias, supermarkets, banks, and large underground and ground-level parking lots for 3,500 cars. As much as 60% of its total area is covered by landscapes.

The hospital has brought in a series of sophisticated world-class medical facilities and equipment: Anhui's first Siemens Dual Source CT Scanner, the only clinical lab automation system made by Beckman Coulter currently available in the province, and the latest Siemens 3T MRI Scanner, to name a few. It is also outfitted with a large number of advanced devices, including Siemens' digital angiography system, digital X-ray machine, digital mammography system, digital gastrointestinal diagnosis machine, digital and mobile X-ray machine, linear accelerator, the automated microbial susceptibility

identification and blood culture system created by BioMerieux, the high-end color Doppler ultrasound machines IU22 and IE33 made by Philips, SYSMEX blood coagulation detection system from Japan, the 5-part differential hematology analyzer developed by Beckman Coulter, Olympus gastroscopes GIF-H260 and GIF-Q260J, and Olympus colonoscopes CF-H260AI and PCF-Q260J. Moreover, the hospital boasts state-of-the-art pharmacy intravenous admixture services with by far the largest single-floor area completed all at once in the province.

Binhu Hospital adheres to the strategy of invigorating the hospital with talents, combining the attraction of talents with their training and employment. It has formed a reasonably-structured and highly-organized team of medical, teaching, scientific research and management personnel. Among its 1,536 employees, 512 are medical professionals and 853 are nurses. There are 41 professors, 47 associate professors, one doctoral supervisor and 31 master supervisors; sixty-one have a senior professional title and 178 are in possession of a secondary senior professional title; thirty-nine graduated with a doctor's degree and 415 hold a master's degree. Ninety-six experts serve as members of standing committee or above in provincial societies (or their local chapters), and 29 experts hold the position of deputy chairman or above in municipal societies (or their local chapters), which enhances the influence of the hospital in the industry.

The hospital has a full range of disciplines with a strong technical force, setting up 42 clinical departments and 17 departments of medical technology. There are 20 key disciplines, of which nursing is a national key clinical specialty; respiratory medicine, medical imaging, pharmacy and clinical laboratory are key disciplines of clinical medicine incubated by the province during the "Twelfth Five-Year" period; anorectal is a provincial key specialty of traditional Chinese medicine (TCM) during the "Twelfth Five-Year" period; orthopedics, general surgery, critical care medicine, nursing, medical imaging, pharmacy and clinical laboratory are key disciplines of clinical medicine in Hefei; pediatrics, neurology and cardiovascular medicine are key disciplines of clinical medicine supported by Hefei; oral and maxillofacial surgery is a specialty of clinical medicine in Hefei; pharmacology, clinical imaging and nuclear medicine are key disciplines of Anhui Medical University; and general surgery is a key discipline of clinical medicine supported by Anhui Medical University.

Binhu Hospital also prides itself in being the training base for clinical pharmacists and the "Ten-thousand People" training project approved by the Ministry of Health. It

also serves as a standardized training base for resident doctors in Anhui Province, a training base for general practitioners in Anhui and an international school for enterostomal therapists. There are eight provincial clinical teaching bases for nurse specialists, one provincial training base for nursing management cadre, and an on-the-job training base for technical personnel of blood transfusion in the hospital.

Revitalizing its development through science and education has consistently been an important strategy for the hospital. Since 2009, 107 scientific research projects of various types and levels have been approved and funded. Among them, seven projects are backed by the National Natural Science Foundation of China and one has received funding from the Provincial Natural Science Fund; Five projects are affiliated to the provincial science and technology program, 11 are medical research projects supported by the Provincial Department of Health, while 16 are funded by the Provincial Department of Education; Finally, there are 40 city-level projects and 27 projects at the university level. Since 2009, 16 scientific and technological achievements have been made by the hospital, which was awarded one third prize for progress in science and technology in Anhui Province once, four second prizes for Progress in Science and Technology in Hefei and eight third prizes for Progress in Science and Technology in Hefei. The total amount of funding reached more than 3.5 million yuan, and 30 papers were included in the Scientific Citation Index (SCI).

Binhu Hospital holds more than ten classes of state-level continuing education each year and strengthens foreign cooperation and exchanges by sending multiple delegations to the U. K., Germany, the U. S. and other countries for academic exchanges and medical investigations.

Many influential surgeries have been performed in the hospital, including intraocular lens replacement, minimally invasive endoscopic surgeries, cardiovascular and cerebrovascular interventional surgeries, holmium laser lithotripsy, thoracoscopic surgeries, orthognathic surgeries to correct maxillofacial skeletal deformities, total tongue reconstruction, scoliosis correction, spinal tumor resection, coronary artery bypass grafting on the beating heart, aortic arch replacement, complex congenital heart disease surgeries, and endovascular treatment.

Binhu Hospital upholds a "patient-centered" service philosophy, and strives to build a brand of special medical services aimed at satisfying patients and providing high-quality services. An e-hospital has taken initial shape, with an electronic queuing and calling

system and electronic prescription system coming into use. The hospital has devoted major efforts to a wide range of services for the convenience of patients, such as all-year-round outpatient service, accompanied visits for hospitalized patients throughout their medical examination and round-the-clock use of CT scanners, MRI scanners and other large medical equipment. Strong support has been given to the socialization of logistic service so as to improve its management efficiency and service level.

It's a public hospital run with public interest in mind, fostering a culture of health communication and taking the initiative to undertake mandatory governmental tasks, handle public emergencies, and guide medical work at the community level.

Through the continuous efforts of the whole staff, Binhu Hospital has been honored as one of the "Hospitals of Hefei Selected by China Charity Federation", "Top 100 Model Hospitals Trusted by the People", and "Cooperative Hospitals of Shanghai Municipal Health System". Other honorary titles include "Hefei Organization with a Garden-like Environment" and "'Excellent Practice for the Convenience of the People' in an Effort to Build a Model Industry in Hefei" in 2010, "Anhui Academician Workstation" awarded by Anhui Provincial Government in 2011, and one of the "12th Annual Model Units of Hefei" in 2012. Moreover, it was certified as an "Excellent Nursing Hospital in the Assessment of Quality Nursing Service" in 2010, and received the "Hospital Innovation Award" from the Ministry of Health in 2011. Finally, the hospital was dubbed "National Model Unit for TCM work in General Hospitals" by the Ministry of Health and the State Administration of Traditional Chinese Medicine at the end of 2012, and "Most Caring Unit" by Hefei Charity Association in 2013.

4.4.2 Analyses of the case of Binhu Hospital

In 2003, Hefei First People's Hospital needed to build a new medical service base in Binhu New District due to its own limited development conditions. However, the hospital itself lacked the funds to build a new hospital area, and the government's financial subsidies were insufficient. In this context, the introduction of social capital into the hospital to participate in the construction of Binhu New District Hospital was an effective way to resolve the shortage of funds. Therefore, the hospital planned to use PPP to participate in the investment and operation of the project. In the choice of social sectors, it planned to introduce Taiwanese companies to participate in the mixed ownership reform cooperation. However, as PPP was not a common means adopted by public

hospitals back then, there were significant resistances from all parties, which compelled the Taiwanese companies to quit cooperation halfway.

In this case, Binhu Hospital failed to cooperate with Taiwanese companies in its endeavor to use PPP. Based on the theoretical analyses in the literature review of this study, Hefei First People's Hospital planned to build Binhu Hospital, but it lacked funds and hoped to introduce social capital, while Taiwanese companies had funds and hoped to realize its investment purpose of sharing risks and profits by utilizing the hospital's platform resources in a joint effort to build Binhu Hospital. This situation is in line with the principles of PPP. Therefore, the purpose of the cooperation between Binhu Hospital and Taiwanese companies is also in line with the goals of strategic alliance theory to complement each other's advantages and realize the goal of benefit sharing. Meanwhile, the cooperation between the two parties was also in line with cooperative game theory where the interests of both parties in the game would increase, or at least the interests of one party would increase, while the interests of the other party would not been harmed, leading to the interests of the entire alliance. However, since the application of PPP in the reform of public hospitals then was not widespread, the guidance of relevant government policies on the application of PPP in medical reform had not been perfected. In the case of unclear policies, according to the stakeholder theory, relevant stakeholders such as the government, competent authorities at all levels, hospital management, employees, and suppliers raised their objections for their own interests. Due to policy constraints, the government's concept of PPP cooperation with hospitals at that time was unclear and thus rejected. In the end, this cooperation ended with the exit of Taiwanese companies halfway due to the resistance of all parties. In this research model, the three factors, namely, strategic alliance theory, cooperative game theory, and stakeholder theory all influenced the effects of the cooperation project between the public hospital and social capital. Specifically, the stakeholder factor exerted the strongest influence in this case.

Although Binhu Hospital failed to introduce social capital, it did not prevent Hefei First People's Hospital from looking for other ways to develop Binhu Hospital. It was one of the major livelihood projects in Hefei in recent years. In 2006, the leadership of Hefei Municipal Health Bureau and the director of Hefei First People's Hospital confirmed again after study that Binhu District City Investment Company, an enterprise run by Binhu District Government, would serve as the guarantee for Hefei First People's Hospital to apply for a loan of 800 million yuan from commercial banks. The construction

commencement date was November 15, 2006, with Beijing No. 3 Construction Engineering Co., Ltd. and Zhejiang Dongyang Construction Company as the construction units. In February 2009, the hospital construction was fully completed. It was officially put into use in 2010. So far, the hospital has been in sound operation, and it has obtained stable medical income and good social benefits every year. The successful establishment of Binhu Hospital in the end is mainly attributable to the following three reasons: (1) The hospital leadership always adhered to the firm belief of developing a modern large-scale hospital in Hefei; after many years of efforts and repeated requests, it finally won the strong support of the main leaders of Binhu District in 2006, who agreed to let the state-owned district enterprise provide key financing guarantee for the construction unit Hefei First People's Hospital, which enabled the construction and successful completion of Binhu Hospital; (2) The leadership of Binhu Hospital made correct guidelines and arrangements for the preparation, function positioning, department setting, personnel organization, salary system and planning development of the new hospital. (3) The construction unit Hefei First People's Hospital invested in strong manpower and material resources, management experience, and brand resources into Binhu Hospital.

As to the questions raised in this study (1) What means can effectively help public hospitals raise the funding needed for development? In addition to PPP financing, the case of Binhu Hospital provides successful experience and effective financing paths for public hospitals at all levels to establish and operate new hospitals with their own resources and capabilities. (2) Is PPP applicable to all public hospitals in China? Binhu Hospital failed to cooperate with Taiwanese companies by adopting PPP, which proved that PPP is not applicable to all public hospitals in China, at least not in a period with no clear policies.

4.5 The case of establishing Guangdong Mental Health Center Hospital

4.5.1 An introduction to the case of establishing Guangdong Mental Health Center Hospital

4.5.1.1 An introduction to Guangdong Mental Health Center

Guangdong Mental Health Center is developed on the basis of Guangdong Mental Health Research Institute. The institute, which was founded in 1959, is the only provincial-level specialized mental health institution in Guangdong Province. It

undertakes mental illness prevention and control, clinical treatment, scientific research, teaching and training, health education, international communication and cooperation, and relevant information work. It also undertakes psychological crisis intervention in public emergencies, develops the key disciplines of Guangdong Province, and functions as the clinical diagnosis and treatment quality control center of mental diseases of Guangdong Province; It is the training base of SYSU, Southern Medical University, and Shantou University Medical College for graduate students in mental health; one of the first batch of specialist physician training bases / resident doctor training bases designated by the Ministry of Health, a national clinical pharmacology base; the technical guidance center of drug addiction treatment in Guangdong Province; and the only review unit for forensic appraisal of mental illnesses by Guangdong Provincial Government.

1. Human resources of the Center

The Center currently has 71 professionals, including 30 physicians (including 2 psychotherapists), 39 nurses, and two technicians. Among the team of doctors, ten are doctors, nine are masters, and the proportion of graduates is 63%. There are seven chief physicians and professors, and 13 deputy chief physicians. As to the nursing team, 64.86% are nurses under 30 years old, three are deputy chief nurses, and 15 have a bachelor's degree, accounting for 40.54%.

2. Status of the Center's major academic groups

The Center is the chairman or vice chairman unit of many academic organizations. Its main positions in academic organizations are as follows: member of the Standing Committee of the Psychiatrist Branch of Chinese Medical Doctor Association, chairman unit of the Sleep Medicine Specialized Committee; chairman unit of the Sleep and Mental Health Specialized Committee of China Sleep Research Society (CSRS); vice chairman unit of the Psychological Rehabilitation Specialized Committee of China Disabled Persons' Rehabilitation Association; chairman unit of Mental Health Association of Guangdong Province; president unit of the Psychiatric Branch of Guangdong Medical Association; chairman unit of the Psychiatrist Branch of Guangdong Medical Association; vice president unit of Guangdong Preventive Medicine Association; chairman unit of the Mental Health Specialized Committee of Guangdong Preventive Medicine Association; member of Guangdong Medical Association and vice chairman unit of its Psychiatry Branch; vice chairman unit of the Behavior and Psychosomatic Medicine Branch of Guangdong Medical Association; chairman unit of the Forensic Psychiatry Specialized

Committee of Guangdong Forensic Medical Association; Chairman unit of the Mental Disability Rehabilitation Specialized Committee of Guangdong Association of Rehabilitation for Disabled; chairman unit of the Forensic Psychiatric Specialized Committee of Guangdong Provincial Forensic Appraisal Association; vice president unit of Guangdong Association of Rehabilitation for Disabled; chairman unit of the Neurology and Psychopharmacology Expert Committee of Guangdong Pharmaceutical Association; vice chairman unit of Guangdong Family Doctor Association; vice chairman of the Psychological Evaluation Specialized Committee of Mental Health Association of Guangdong Province; and vice chairman unit of Psychiatric Hospital Branch of Guangdong Province Hospital Association.

3. Scientific research:

The Center has undertaken and participated in more than 50 scientific research projects such as those of National Natural Science Fund, National Programs for Science and Technology Development, Guangdong Provincial Natural Science Fund, Guangdong Provincial Programs for Science and Technology Development, and Guangdong Provincial Medical Science and Technology Research Fund. It has also chiefly edited and co-edited more than 20 books and published nearly 200 academic papers.

Since 2010, the Center has received 19 provincial and ministerial level projects, 16 departmental and bureau level projects; won one provincial scientific and technological achievement award; published 86 academic papers, of which 68 were Chinese journal papers, 18 were included in SCI indexed journals, and 16 were edited and co-edited by it.

4. Discipline advantages

(1) Diagnosis and treatment of difficult and serious mental illnesses

Guangdong Mental Health Center has established the most complete full-course clinical service system for mental disorders and mental health with the widest coverage, and the system is in line with the development trend of international mental health services. Thus, it can undertake all-round quality control of psychiatric clinical diagnosis and treatment of such organizations as specialized psychiatric hospitals, general hospitals, and primary medical and health institutions. The technical team of the Psychiatric Department boasts strong overall strength, a high technical level, and strong capacity for sustainable development. It is the training base for the Provincial Mental Health Center, one of the first batch of specialist physician training bases / resident doctor training bases designated by the Ministry of Health, and a national clinical pharmacology base; The

diagnosis and treatment of mental disorders in this department is at the advanced level in China, having strong academic impacts at home and abroad. It is underpinned by reasonable division of labor, equipped with strong medical technologies. Every week, senior experts make the rounds of the wards and chair discussions on difficult cases. Doctors at all levels have a profound medical theoretical foundation. They have accumulated rich clinical experience, enjoy advanced technologies, and boast sophisticated operational skills.

(2) Research and training on rehabilitation technologies for mental illnesses

At present, the domestic mental disorder rehabilitation system and technology is far behind that of foreign countries, and most provinces are in lack of such a system. The mental disorder rehabilitation system and technological development of Guangdong Province led by Guangdong Mental Health Center has taken shape, and it is a domestic leader in the field of community rehabilitation of mental disorders. Guangdong Mental Health Center has established a collection of in-hospital rehabilitation and community rehabilitation. It integrates a series of rehabilitation aspects covering functional assessment, life skills, interpersonal communication, and vocational skills, and introduces the most advanced mental disorder rehabilitation concepts and technologies in the world as well as the seamless rehabilitation system for the disabled. Therefore, it has become a domestic demonstration center and training center, making outstanding contributions to the training of mental disorders rehabilitation personnel both inside and outside the province and the overall improvement of the level of rehabilitation of mental disorders in our province. As a result, the overall rehabilitation of mental disorders in Guangdong Province has reached an advanced level internationally and the leading level domestically.

(3) Sleep disorder diagnosis and training

Sleep medicine is one of the important professional directions of the Center, which is the vice chairman unit of CSRS and the chairman of the Sleep and Mental Health Specialized Committee of China Sleep Research Society. The Center has a sleep laboratory that complies with international standards, is equipped with advanced polysomnography, has established the South China Sleep Medicine Training Center of CSRS, and has compiled *China Sleep Health Guide* commissioned by CSRS. It has been holding trainings on sleep monitoring technologies for a long time, and its qualifications are authenticated by American Sleep Association. As a leader in China, it has been continuously developing new sleep monitoring technologies. For example, in the course

of anti-depressant treatment, effective monitoring methods for the side effects of patients' night drugs are still lacking, which severely affects patients' treatment compliance and long-term treatment effects; the polysomnography technology of the night-time side effects of anti-depressant drugs can effectively monitor the night-time side effects of patients receiving anti-depressant drug treatment. The application effect in our Center is good and this technology is suitable for all patients treated with antidepressants, thus deserving to be widely applied in psychiatry. The night-time side effects of drugs may also appear in the course of other psychoactive drug treatments. Our Center is actively exploring the application of this technology in the field of night-time side effects of other psychoactive drugs. Our Center is the earliest in China to use this technology as a routine monitoring project for patients under SSRIs treatment. Patients receive polysomnography after taking anti-depressant drugs. This technology guides clinical diagnosis and treatment, and timely identifies the night-time side effects of SSRIs, thereby improving the diagnosis rate and treatment effects, reducing drug side effects, and improving treatment compliance.

(4) Clinical psychological assessment and psychological intervention

On the basis of outpatient services of general psychiatric care, there are outpatient services of such specialties as children and adolescent psychology, anxiety and depression, psychological counseling, and psychological treatment. It has open and people-oriented psychiatric wards, equipped with international advanced biofeedback therapy equipment, transcranial magnetic stimulation therapy instrument, music therapy instrument, non-convulsive electric shock therapy instrument and other equipment. There are full-time psychotherapists, and world-renowned large-scale intelligence, personality, neuropsychological tests and other psychological diagnostic tools.

The main research directions of clinical psychology include the research and development of psychological assessment tools, the introduction and revision of international standardized psychological assessment tools, the research and development of commonly used assessment scales for psychiatry, and the development of short scales, mainly the development of mental health scales and the research and development of Hamilton Depression Rating Scale-6 (HAMD-6). It actively explores the methods of psychotherapy and develops psychotherapies with the characteristics of the Institute according to the current theories of psychotherapy and in light of China's cultural background and characteristics, including psychotherapies for individuals, families and

groups. The Clinical Psychology Department receives patients from inside and outside the province and surrounding countries, deals with referrals, treatment and guidance of difficult and serious cases from various hospitals in the province. Its diagnosis and treatment of psychological disorders are at the leading levels in China, and it also leads the same specialty in China in terms of social benefits and economic benefits. It has established a clinical psychotherapist training base with California School of Professional Psychology, Union Institute and University. It has also established a new model of fully open psychiatric wards in a large general hospital in China, providing a model for general hospitals to develop mental health services.

Guangdong Mental Health Center is an affiliated unit of the Psychological Rescue Team of Guangdong Branch Red Cross Society of China. It has long been engaged in psychological crisis interventions inside and outside the province, such as the Sichuan earthquake and the Foxconn suicides. The psychological crisis intervention model is constantly being innovated and is at the domestic leading level.

(5) General hospital liaison consultation medicine (psychosomatic medicine)

Relying on the resources of Guangdong Provincial People's Hospital, the Center conducts screening, evaluation and intervention of physical and mental problems and disorders associated with physical diseases in various clinical departments. At present, the "cardiovascular and mental diseases" and "psycho-oncology" screening and intervention treatment models have been established with the cardiovascular and oncology departments, providing diagnosis and treatment for patients with acute and severe comorbidity of mental and physical disorders. It has been exploring effective diagnostic models and looking for safe and effective treatment drugs and methods; It also provides palliative care for patients with physical diseases. Palliative care has received more and more attention from society. With the development of the society, people are living longer lives and aging has become a key issue of social concern. The palliative care and physical illnesses of elderly patients have become a topic of widespread concern in society. Psychological interventions to reduce the psychological pain of dying patients are particularly important. The Center has preliminarily established the model and methods of palliative care; Risk identification, monitoring, and intervention of mental disorders and physical diseases, as well as the risks of physical diseases caused by mental disorders, such as metabolic syndrome, obesity, diabetes, and heart disease, have become important factors affecting the quality of life and clinical outcomes of patients with

mental disorders. The psychological, behavioral, and biological markers of the associated physical disease risks are particularly important, and the Center has also conducted preliminary explorations.

Guangdong Forensic Center for Mental Illnesses. Forensic psychiatry is one of the important specialties of Guangdong Mental Health Center, which is a provincial-level psychiatric forensic appraisal unit designated by Guangdong Provincial People's Government (Yuefuban [1998] No. 9), the affiliated unit of the technical appraisal team of the Forensic Appraisal Committee for Mental Illnesses of Guangdong Province (Guangdong Provincial Higher People's Court, Guangdong Provincial Procuratorate, Public Security Department of Guangdong Province, Guangdong Department of Justice, and Health Commission of Guangdong Province), the affiliated unit of Guangdong Forensic Association and the Forensic Psychiatric Specialized Committee of Guangdong Provincial Forensic Appraisal Association, and the annual training organizer of judicial experts of forensic psychiatry in Guangdong Province appointed by Guangdong Provincial Department of Justice. It is the only external professional judicial institution of forensic psychiatry entrusted by Guangdong Provincial Higher People's Court. Since the development of forensic appraisal of mental illnesses in China, the Center has been responsible for the appraisal of mental illnesses in and outside Guangdong Province. It is mainly responsible for the initial forensic appraisal, re-appraisal, review appraisal, and appraisal of difficult and major cases. Its business radiates many provinces and cities in China, such as Hainan, Guangxi, Jiangxi, Hunan and Guizhou.

4.5.1.2 Status quo of psychiatric diseases in Guangdong

In recent years, homicides, troubles and accidents caused by patients with severe mental disorders have occasionally occurred in China, especially in Guangdong Province. In 2015, the proportion of homicides accounted for up to one-fourth of the national total, causing extremely serious harm to society. Mr. Meng Jianzhu, former secretary of Central Political and Legal Affairs Commission underscored this issue twice at the National Politics and Law Conference, which has aroused great attention from Guangdong Provincial Committee of Politics and Law. After taking certain measures, the high incidence of accidents caused by patients with mental illnesses in 2016 had been curbed to some extent. However, due to the inadequate mental health institutions in Guangdong Province, the mental illness prevention and control system and service network are far behind most of the provinces in the central and eastern parts of China. The long-term

mechanism for preventing patients with mental illnesses from causing troubles and accidents in the province has not yet been established, and relevant vicious incidents still pose huge risks.

There are 1.5 million patients with severe mental disorders in Guangdong Province, of which only 500,000 have been registered (of which the standard treatment rate is only 29%), and the conditions of two thirds of the patients are unknown. Since the promulgation and implementation of the Mental Health Law of PRC, the development of mental health institutions at the provincial and municipal levels has been accelerated and strengthened throughout the country. However, the number of full-time employees of Guangdong Mental Health Center is only 40. The scale is too small and there is no independent office space. As a result, Guangdong Mental Health Center falls further behind other provinces on the basis of the original backwardness, which has affected such functions as professional training and technical guidance in the province, and it is far from meeting the basic national requirements for the development of mental health centers in various provinces.

4.5.1.3 The cooperation intention put forward by Guangzhou Super Best Group on March 18, 2015

1. Project cooperation proposals

(1) The cooperation partners are: Guangdong Provincial People's Hospital, Guangzhou Super Best Group, Healthscope Group (Australia) and the University of Melbourne (UOM). A Sino-foreign joint venture and its business supervision agency (such as: Company Board of Directors) shall be established.

(2) Design and build a new mental health institution with 1,000 beds in Luogang District, Guangzhou. Super Best Group shall provide financial investment.

(3) Guangdong Provincial People's Hospital (Guangdong Mental Health Center) shall provide brand and staff and apply for operating qualifications.

(4) Healthscope Group (Australia) shall assist in the design and development of the facility. Once in operation, Healthscope Group (Australia) shall coordinate and manage according to the daily operation management agreement.

(5) In accordance with the consultation and training agreements, UOM shall provide technical expertise and highly specialized nursing training services, including mutually recognized education and training modules. Besides, UOM is willing to support the

establishment of a research center to study and implement the best model of integrated Chinese and Western practices.

(6) The cooperation parties shall exchange the information and plans of other domestic and foreign enterprises involved in the establishment of this medical institution. These enterprises include those involved in the operations, recruitment, training, and maintenance of a high-quality medical team of this medical institution.

(7) In the process of acquiring this project, the partners must use and protect the brands and intellectual property rights of other partners with respect and responsibility.

(8) This cooperation must ensure that all parties receive a fair and reasonable return with raged to the funds, services and product support they each provides.

Construction of the Eastern City Hospital of Guangdong Provincial People's Hospital (Guangdong Mental Health Center) project covers six departments, namely, Outpatient Department (Psychological Counseling Center), Inpatient Department, Rehabilitation Department, Mental Health Research Institute, Forensic Appraisal Center of Mental Illnesses, and Public Health Affairs Department.

Outpatient Department

Outpatient services of the Psychiatric Department: Ten psychiatric consulting rooms, two child psychiatric consulting rooms, two geriatric psychiatric consulting rooms, two sleep consulting rooms, two depression consulting rooms, and two anxiety consulting rooms.

Psychological counselling (Psychological Counseling Center)

Objective: To build a psychological counseling center that provides clinical treatment, teaching, and research services covering such areas as psychological counseling for children, the elderly, women, and adolescents as well as the diagnosis and treatment of sleep disorders and neurological diseases. The overall strength shall reach the domestic leading level.

Inpatient Department

There should be 1,000 beds. Wards: Eight adult psychiatric wards, one geriatric psychiatric ward, and one child and adolescent psychiatric ward.

Rehabilitation Department

Occupational Therapy Department: Provide trainings on life skills, interpersonal

skills, recreation and leisure, and work skills.

Physiotherapy Department: Provide correction of nutritional and metabolic diseases as well as somatic diseases caused by antipsychotics.

The base of Guangdong Mental Health Center Hospital

Objective: With the aim of developing to the advanced level at home and abroad, the Hospital shall make efforts to obtain provincial and national natural science foundation projects, gain scientific and technological achievements above the provincial level, publish SCI papers, establish a provincial and national key laboratory, develop into an international cooperative research center, and serv as a training base for graduate and doctoral students. It shall develop into a provincial leader in three years and a national leader in ten years.

Forensic Appraisal Center of Mental Illnesses (Luogang): Undertake the forensic appraisal and re-appraisal of difficult cases of mental disorders in the province and play the role of the technical guidance team for forensic appraisal of mental illnesses.

Public Health Affairs Department

The internal functional bodies shall be set up according to the current structure of Guangdong Mental Health Center. They shall undertake such tasks as the organization, implementation, guidance, quality control, training (including publicity), and information management of mental health work issued by the National Health Planning Commission, Health Commission of Guangdong Province, and the Project Office of National Mental Health Center.

2. Site location

The project is planned to be built on the parcel next to Taikang Life Insurance Nursing Home Project in Changlingju, Luogang District, Guangzhou. It is planned that "invitation for bids, auction, and listing" will be used to purchase 250 *mu* (around 166,667 square meters) land for the public health project.

3. Scale of construction

See Table 4-2 for planning standards. In accordance with relevant provisions of the "Establishment and Development Planning of Mental Health Prevention System" (Fa Gai Shehui [2010] No. 2267) formulated by the National Development and Reform Commission, the Ministry of Health, and the Ministry of Civil Affairs, the floor area of the hospital will be 140,000 square meters (The floor area of each bed is 70 square meters),

rehabilitation area 50,000 square meters, and the logistics and research department 10,000 square meters. The total floor area of Guangdong Mental Health Center Hospital project will be 200,000 square meters.

Table 4-2 The floor area ratio of each area in the medical health center

No.	Project name	Proportion	Floor area (m^2)	Total area of used land (*mu*)
1	Diagnosis and Treatment Area	70%	140000	175
2	Rehabilitation Area	25%	50000	62.5
3	Medical Research	0.1%	2000	2.5
4	Logistics Supporting Area	0.4%	8000	10

The planned area of used land for this project is 166,665 square meters, with a total floor area of about 180,000 square meters, of which the area above ground is 150,000 square meters, the underground area is about 30,000 square meters, and the building density is 30%. The floor area ratio is 1.2 based on the land available for construction, and the green area ratio is about 45%. The number of beds planned is 2,000. No other vehicles will be parked on the ground except ambulances so as to separate the pedestrian system from vehicle system. The main technical indicators of this project are shown in Table 4-3.

Table 4-3 Main technical indicators of the project

No.	Project name	Planning indicators	Notes
1	Total area of used land	166,600 square meters	（250 mu）
2	Area of the land available for construction	116,6oo square meters	（175 mu）
3	Total floor area	180,000 square meters	
3.1	The floor area above ground	150,000 square meters	
3.2	The underground floor area	30,000 square meters	
4	Building density	30%	
5	Floor area ratio	1.2	
6	Green area ratio	45%	
7	Total number of parking spaces	610	
7.1	The number of parking spaces above ground	10	Only ambulances are allowed to park here.
7.2	The number of underground parking spaces	610	

4. Specific proposals for the project

(1) Tentative name of the hospital: "Guangdong Mental Health Center Hospital";

(2) Total project investment: RMB 800 million;

(3) Hospital address: Changdun Health Industrial Park, Caipin Road, Guangzhou Science City, Huangpu District, Guangzhou

(4) Hospital nature: Joint-stock non-profit hospital

(5) Length of cooperation: 20 years (tentative);

(6) Project completion target: To complete a specialized mental health medical institution with domestic leading and international advanced levels, integrating "clinical treatment, teaching and training, scientific research, and forensic appraisal" within five years. The first phase consists of 300 beds and the second phase over 700 beds. See Figure 4-1.

Figure 4-1 Aerial view of the completed buildings

5. Cooperation model

Guangdong Mental Health Center Hospital will be co-established by Guangdong Mental Health Center and Guangzhou Jinluo Health Industry Co., Ltd. (a subsidiary of Guangzhou Super Best Group). Guangzhou Jinluo Health Industry Co., Ltd. provides the project site and required funds, holding 80% of the shares of "Guangdong Mental Health Central Hospital"; Guangdong Mental Health Center provides relevant medical resources (including but limited to: brand, medical management technologies, and business), accounting for 20% of the shares of the "Guangdong Mental Health Center Hospital" (based on the appraisal report of Guangdong Allied Appraisal Yangcheng Assets Evaluation Co., Ltd.) .

6. Project construction schedule

Start preparation and recruitment in March 2016;

Complete the various approval procedures and start construction in June 2016;

Initiate staff training in September 2016;

Start installation of electromechanical equipment and medical equipment in November 2016;

Complete and operate the project on a trial basis in January 2017;

The hospital will be official open in March 2017.

7. Project operation and management

In the hospital preparation stage, the two sides shall send staff to set up a "project preparation office", and all preparation work of the hospital shall be uniformly handled by the preparation office. After the hospital is officially open, major matters and development decisions shall be decided by the hospital's board of directors, and daily affairs managed by the president and vice president employed by the board of directors. The financial audit of the hospital shall be independently done by a third-party accounting firm, and the audit report shall be recognized by all parties.

8. Functions of Guangdong Mental Health Center

The original staffing and administrative functions of Guangdong Mental Health Center shall remain unchanged. All original business and social functions such as forensic appraisal, teaching, and scientific research shall continue to be retained, and funding increased to an appropriate extent (extracted from the development fund for the establishment of the hospital). After the new hospital is completed, Huifu Branch and Guangdong Mental Health Center will be relocated to the new hospital (including the outpatient department, inpatient department, and scientific research and administrative department), and the outpatient service on Dongchuan Road retained.

4.5.2 Analyses of the case of establishing Guangdong Mental Health Center Hospital

In the case of setting up Guangdong Mental Health Center Hospital, the project investment budget was 800 million yuan. Guangdong Mental Health Center was responsible for providing medical resources such as brand, medical management technologies and team, and medical service business (about 70 million yuan revenue in the previous year) would take up 20% shares of the project, whereas the social sector was

responsible for project construction, medical equipment, equipment funds and working capital and would account for 80% of the shares of the cooperative project. From the perspective of the funds and ratio of shares required for the cooperation project, the social sector was responsible for providing most of the funds for the cooperation project. This PPP model is the "government strength (brand) + social organization's money (technology)" model where social capital is introduced into public services and leveraged to revitalize the operating efficiency of public services. Most public hospitals in China adopt this typical PPP model (Zhang, 2016) for their restructuring. This model is also in line with the viewpoint of cooperative game theory, where the two parties rely on each other's core capabilities to benefit from them and create new opportunities (Rackham, 1998); and cooperative competition strategies are identified to expand business opportunities so as to ultimately achieve win-win cooperation purposes (Nalebuff & Brandenburger, 2013). But unfortunately, the project did not succeed in the end.

The reasons for the failure of the case of establishing Guangdong Mental Health Center Hospital: (1) Guangzhou Super Best Group is not a state-owned enterprise. Hence, it was not recognized by the government departments; (2) There was a worry to be denounced as transferring interests during decision making by relevant government authorities; (3) Guangzhou City of Guangdong Province is a prosperous region, which is not receptive to the establishment of hospitals by social capital.

The theory of strategic alliance indicates that both partners must have clear strategic intentions and willingness. In this case, the government, which was the owner of the property right of Guangdong Mental Health Centre Hospital, did not have a clear strategic intention for the cooperation, nor did it have a strong willingness, which would affect the cooperation of the project. In addition, the support from stakeholders affects the survival of the organization. Among the hospital's stakeholders, the property owner of the hospital and the relevant government authorities in charge of the hospital played a decisive role in determining the destiny of the hospital. The main reason for the unsuccessful cooperation of this case was that the cooperation project did not receive government support. In this research model, three factors, namely, strategic alliance theory, cooperative game theory, and stakeholder theory, influence the effects of the cooperation project between public hospitals and social capital. Among them, the stakeholder factor has the strongest influence in this case, followed by the strategic alliance theory factor.

This case illustrates the situation during the application of PPP in China's medical

and health sectors: (1) The model of establishing medical institutions by social capital is not suitable for all parts of the country; (2) Government departments have not yet established a mechanism for reviewing and approving public hospital PPP projects, and there are no fair, just and operable evaluation standards; (3) Even though Guangdong is a big province with a developed economy and a large population, its degree of openness to, and favorable policies for, the establishment of medical institutions by social capital are not advanced.

This case is beneficial to the present study in the following aspects: (1) The case is real and has distinctive characteristics; (2) The case bears practical research significance to the exploration of public hospitals' transfer of franchising rights to social capital; (3) In developed and prosperous areas, the franchising model is more difficult to implement fee pricing compared with the mixed-ownership model, and it is more difficult to obtain financing to facilitate rapid project development.

The theory of strategic alliance shows that both partners must have clear strategic intentions and willingness. Judging from this case, the government, which is the owner Guangdong Mental Health Center Hospital, did not have clear strategic intention. Coupled with other reasons, the cooperation was finally unsuccessful.

As to the second research question raised in this study: Is PPP applicable to all public hospitals in China? The unsuccessful cooperation in this case proves that not PPP is not applicable to all public hospitals in China.

4.6 The case of The Sixth Affiliated Hospital of Sun Yat-sen University

4.6.1 An introduction to the case of The Sixth Affiliated Hospital, Sun Yat-sen University

I. Hospital background

The Sixth Affiliated Hospital of SYSU (Guangdong Gastrointestinal Hospital) (abbreviated as Sun Yat-sen Sixth Hospital) is located in the heartland Guangzhou's Central Business District, adjacent to Zhujiang New Town, and close to Metro Line 5, which guarantees convenient transportation. Its predecessor was Guangzhou Sixth People's Hospital. In 2007, Guangzhou Sixth People's Hospital was collectively transferred to SYSU and re-named "The Sixth Affiliated Hospital of Sun Yat-sen

University". In 2009, the alternative name "Guangdong Gastrointestinal Hospital" was added. In 2016, Sun Yat-sen Sixth Hospital passed the evaluation of 3A hospitals. It has now developed into a first-class and domestically well-known "3A" general hospital with distinctive specialties. Its disciplines such as gastroenterology and reproductive medicine have achieved nationwide influence, becoming a characteristic medical card of Guangdong Province.

At present, Sun Yat-sen Sixth Hospital is a 3A general hospital that integrates medical treatment, teaching, scientific research, preventive care, and rehabilitation care. As one of the ten directly affiliated hospitals of SYSU, it has two hospital locations (headquarter in Yuancun and north branch in Shougouling), two community health service centers (or stations, namely, Huaying Community and Yuancun Street. It is designed with 1,202 beds and 1,323 beds are utilized in reality. The hospital is one of the "AAA-level hospitals", the highest level of hierarchical management of designated medical institutions providing services to the insured of the Social Medical Insurance System in Guangzhou. It is a hospital that accepts settlement of medical expenses for medical treatment incurred outside the municipal-level administrative area where the patient's medical insurance is registered, a hospital that accepts settlement of medical expenses for medical treatment incurred outside the provincial-level administrative area where the patient's medical insurance is registered, a designated hospital with medical services at the state expense (Guangdong Province, Guangzhou City, and each district of Guangzhou City), and one of the top five medical institutions in Guangdong Province in terms of the number of inpatients of residents from other provinces. By December 2018, there were 2,121 on-the-job employees and 1,808 health professionals and technicians in Sun Yat-sen Sixth Hospital. The hospital boasts a large number of professionals and technicians in such fields as clinical treatment, scientific research, and teaching, including 173 employees with a senior title, 41 doctoral supervisors, and 138 master supervisors, including the "One Hundred Leading Talents Plan" of SYSU, State Council special allowance experts, young and middle-aged experts with outstanding contributions selected by the Ministry of Health, and "100 Outstanding Talents of Southern Guangdong" out of Guangdong Special Support Plan. The Sun Yat-sen Sixth Hospital is a clinical teaching base for training high-level medical talents. It undertakes the teaching tasks of undergraduates, students of eight-year schooling, masters and doctoral students. Professor Wang Jianping, the first president and honorary president, once served as the

leader of the Colorectal and Anus Surgery team of the Surgery Branch of Chinese Medical Association. The current president Professor Wen Weiping, is currently Vice Chairman of the Specialized Committee of Otolaryngology, Head and Neck Surgery of Chinese Medical Association, Vice President of the Otorhinolaryngology Branch of Chinese Medical Doctor Association, Chairman of the Specialized Committee of Otolaryngology, Head and Neck Surgery of Guangdong Medical Association, Vice Chairman of the Specialized Committee of Head and Neck Oncology of Guangdong Provincial Anticancer Association, and a leading medical talent in Guangdong Province.

The Department of Gastroenterology (gastrointestinal and anal surgery, gastroenterology, oncology and Institute of Gastroenterology) of Sun Yat-sen Sixth Hospital consists of 25 doctoral supervisors, 46 master supervisors and over 50 professionals with a senior title. It has 800 specialized beds and one of the highest levels of colorectal and gastric cancer consultation and treatment centers in China. It opened the first colorectal tumor MDT outpatient clinic, inflammatory bowel disease MDT outpatient clinic, gastric tumor MDT outpatient clinic, and constipation outpatient clinic in South China. According to the characteristics of diseases, the gastrointestinal and anal discipline group is further divided into ten sub-specialties, including colorectal cancer, inflammatory bowel diseases, hernia, radiation enteritis, chronic constipation, and benign perianal diseases. The subdivision is the most in-depth, providing professional diagnosis and treatment, professional nursing, and professional services. The technical team can solve major, complex and difficult cases in the surgical fields of esophagus, stomach, small intestine, colorectal and anus. Rectal cancer anus-preserving surgery and protective functions rank at the national leading level. Remarkable results have been achieved in the comprehensive treatment of difficult and complicated malignant tumors in such organs as esophagus, stomach, small intestine, and colon. Benign anal diseases and pelvic floor functional diseases are treated first-class with a combination of Chinese and Western medicine.

Sun Yat-sen Sixth Hospital has complete disciplines and powerful strength. There are 49 specialized departments in the hospital, 30 administrative departments, ten teaching institutions, and four scientific research institutions. The hospital has a complete set of clinical departments, including general surgery, which is a national key discipline and a key clinical specialty by the Ministry of Health, as well as key clinical specialties of Guangdong Province such as colorectal anus surgery, nephrology, anesthesia, and

medical imaging. In 2017, seven specialties of the hospital, namely General Surgery, Gastrointestinal Surgery, Anorectal Surgery, Reproductive Medicine, Gastroenterology, Neonatology, and Rehabilitation Medicine were included in the first "List of the Best Hospital Specialties" of Guangdong Province. Since the establishment of the hospital, more than 40 academic leaders in various disciplines have been introduced from home and abroad. And 25 clinical first-level specialties and 52 clinical second-level specialties have been established, including preventive health care, internal medicine, surgery, obstetrics and gynecology, pediatrics, ophthalmology, otolaryngology, stomatology, dermatology, oncology, emergency medicine, rehabilitation medicine, anesthesiology, intensive medicine, pathology, medical imaging, and Chinese medicine. The hospital has a community health service center in Yuancun Street, Tianhe District, which is committed to providing convenient, high-quality, affordable, and continuous community health services integrating prevention, medical treatment, health care, rehabilitation, health education, and family planning guidance for 5,000 local residents and a floating population of more than 40,000 in Yuancun Street.

The Institute of Gastroenterology of SYSU / Guangdong Institute of Gastroenterology (Class-I public institution of public welfare) is based on The Sixth Affiliated Hospital of SYSU and is also a "Key Laboratory of Colorectal and Pelvic Floor Diseases in Guangdong Province". It has a central laboratory, a molecular diagnostic laboratory, a database, a tissue bank, a biotherapy center, and an experimental animal center. It covers a total area of about 5,520 m^2. The Institute implements the principal investigator (PI) system. Currently it has 45 researchers, including 14 professors and 16 associate professors. Its annual research funding is more than 20 million yuan. Centering on the national policies and guidelines for the prevention and treatment of major diseases, combined with the actual needs of Guangdong Province, it carries out innovative research on colorectal and pelvic floor diseases, and has produced a number of high-level scientific research results published in such internationally renowned journals as *Cancer Cell*, *Gastroenterology*, and *Gut*, providing theoretical bases and an experimental platform for formulating China's diagnosis and treatment guidelines in the field of intestinal diseases. Sun Yat-sen Sixth Hospital has achieved outstanding research results in recent years. The team led by Professor Wang Jianping spent nearly 20 years doing research, and his research result entitled "Key Technology Innovation and Promotion of Rectal Cancer Treatment Based on Anal Function and Sexual Function Protection" was awarded

National Second Prize for Progress in Science and Technology in 2016. The application of the project result will benefit hundreds of thousands of patients. Three studies, namely, "Research on Functional Cancer-Resistant Surgery to Improve the Quality of Life of Patients", "Basic and Clinical Research on Colorectal Inflammation and Tumors", and "Innovation and Promotion of Key Technologies for Colorectal Cancer Prevention" won Guangdong Provincial First Prize for Progress in Science and Technology in 2007, 2011 and 2018 respectively. It is the clinical teaching base for SYSU to train high-level medical talents, one of the first group of standardized training bases for general surgeons in China, undertakes the teaching tasks of undergraduates, students of eight-year schooling, doctoral and master students, and resident doctors, and has won awards in the clinical skills competitions in Guangdong Province, Guangzhou Cit. colleges and universities many times. Besides, the hospital actively carries out multi-channel exchanges and cooperation between China and other countries, has established long-term friendly bilateral exchanges and cooperation relationships with many well-known foreign gastrointestinal disease centers, and invites well-known experts at home and abroad to come to the hospital to give lectures on a regular basis, ensuring its diagnosis technologies, scientific research and academic activities to keep pace with international advanced levels.

II. Hospital restructuring process

If the restructuring of Sun Yat-sen Sixth Hospital were successful, it would have become a typical example of innovation in the mixed ownership reform of public hospitals in China. Yet it ended in failure. In early 2014, the restructuring plan of Sun Yat-sen Sixth Hospital was approved by the provincial government. Sun Yat-sen Sixth Hospital and GL Capital Group planned to jointly hold the shares according to a ratio of 3: 2 and jointly build a new gastroenterological and anal hospital affiliated to SYSU. The new hospital and Sun Yat-sen Sixth Hospital would share the original premises and adopt the management method of "two institutions under one leadership". It is learned that the main motivation for the restructuring of Sun Yat-sen Sixth Hospital was the lack of money for its development. It was planned that the new hospital would need an investment of about one billion yuan to build "Guangzhou's largest single medical building", yet the government could only contribute about 100 million yuan. The funding gap was huge, so social capital was introduced to hold shares to raise the needed funds. In fact, this was not the first time Sun Yat-sen Sixth Hospital took use of social capital to facilitate its development. Back a few years ago, Sun Yat-sen Sixth Hospital had already introduced

social capital and successively established the Imaging Inspection Center, Reproductive Medicine Center, and Yahe Special Diagnosis Center. Back then, in order to reduce the resistance to the restructuring, the hospital leadership worked hard on the restructuring plan. After the restructuring, although some doctors of the Sun Yat-sen Sixth Hospital practiced in the new Gastroenterology and Anus Hospital Affiliated to SYSU, their public institution employer remained unchanged. In addition, new recruits could also work in Sun Yat-sen Sixth Hospital first before being sent to work in the joint-stock hospital. These measures helped attract talents to the hospital and ensured its stable business development.

Sun Yat-sen Sixth Hospital is a 3A general hospital integrating such services as medical treatment, teaching, scientific research, preventive care and rehabilitation. However, it can be seen from another brand of the hospital, "Guangdong Gastroenterology & Anus Hospital" that the specialty of Gastroenterology and Anus is the core specialty of the hospital. It is reported that the reason why Sun Yat-sen Sixth Hospital suddenly rose was its strategy to develop strong specialties and comprehensive services. The gastroenterology and anus specialty were determined as the underlying discipline of the hospital. Therefore, unlike the previous introductions of social capital, this restructuring touched the core of Sun Yat-sen Sixth Hospital. The importance and scope of benefits of the restructuring were different from previous cooperation. Once the restructuring was successful, Sun Yat-sen Sixth Hospital would have actually become a joint-stock hospital with the characteristics of a public hospital.

4.6.2 Analyses of the case of The Sixth Affiliated Hospital of Sun Yat-sen University

It can be known from the descriptions of the restructuring of The Sixth Affiliated Hospital of SYSU that the main motivation for The Sixth Affiliated Hospital of SYSU to carry out restructuring was the lack of money for its development. It was planned that around one billion yuan would be invested to build a new hospital that would become "Guangzhou's largest single medical building". However, the government could only contribute about 100 million yuan. In other words, the hospital needed to raise 900 million yuan, which was a huge funding gap for itself. Therefore, the hospital wished to introduce social capital to solve the funding problem. And Sun Yat-sen Sixth Hospital had successful experiences in this regard before. It had, by introducing social capital, successively established the Imaging Inspection Center, Reproductive Medicine Center,

and Yahe Special Diagnosis Center. This shows that PPP can effectively help public hospitals raise the funds needed for development. Therefore, the successful experience of this case in introducing social capital before answers the first research question of this study, "What means can effectively help public hospitals raise the funds needed for their development?" As to the second research question "Is PPP applicable to all public hospitals in China?", the failure of the restructuring of Sun Yat-sen Sixth Hospital proves that PPP is not applicable to all public hospitals in China.

The main reason for the failure of the restructuring of Sun Yat-sen Sixth Hospital in the later stage was from the inside, not the change of mind of the social capital side, nor the obstruction from government departments. This case illustrates the following points: 1. The social capital, the hospital authority, and the hospital management did not fully consider the employees' participation in the mixed ownership restructuring beforehand, and ignored the risks caused by the employees' objections during the mixed ownership reform; 2. After the launch of the mixed ownership reform, the hospital leadership did not report to the higher authority in time the plan to approve shareholdings by hospital management and individual employee to stabilize the hospital staff; 3. The resignation of the hospital president during the restructuring caused significant uncertainty for the hospital to continue the mixed ownership reform.

In this research model, the three factors, namely, strategic alliance theory, cooperative game theory, and stakeholder theory, influence the effects of the cooperation project between public hospitals and social capital. As to the influence of strategic alliance theory and cooperative game theory factors on the cooperative project, Sun Yat-sen Sixth Hospital and GL Capital Group jointly held shares to jointly build the new gastroenterological and anal hospital affiliated to SYSU, which was in line with the strategic goals of both parties and consistent with the realization of win-win and non-zero-sum game in the cooperative game theory. However, because it is difficult to balance the interests of employees, which were also stakeholders, hospital employees showed resistance in answering the second interview question "Were there any conflicts during the cooperation of this project? If so, in what ways?" as they were concerned about shareholding by social capital. Therefore, the restructuring was met with opposition from employees and ended up in failure. It happens that there is a similar case. The case of the failure of Sun Yat-sen Sixth Hospital's restructuring bears some similarities with the failure of The First People's Hospital of Loudi City, Hunan Province. In 2016, according

to The Health Industry Development Plan of Loudi City, the local government decided to introduce social capital, implement cooperation according to the mixed ownership system, and build The First People's Hospital of Loudi City into a 3A hospital. However, the results of the survey on whether the hospital staff support the introduction of social capital showed that more than 96% of the hospital staff were against it. The reason why the staff objected is that there was no reason to give the hospital to a private owner when it is well developed and had no debt. This result eventually led to the failure of its restructuring. It can be seen that among the three factors that affect the effects of cooperation projects between public hospitals and social capital, the stakeholder factor has the strongest influence in this case.

4.7 Chapter summary

This chapter summarizes the interview results and analyzes the cases. Three cases were used as research objects, namely, Binhu Hospital in Hefei, Anhui, the Sixth Affiliated Hospital of SYSU and Guangdong Mental Health Center; Information was collected on the development and PPP project cooperation of these three cases; Relevant people were asked the same five questions and their answers combined and summarized. Each of these three cases has their own characteristics, but they share common features: They are all 3A hospitals and all in provincial capitals with a large population and a large medical service gap. These cases illustrate the investment preferences of social capital when they choose to invest in 3A hospitals in large cities. They believe that such investment returns can be better expected. From another perspective, government management departments in provincial capitals are extremely strict and cautious in choosing social capital cooperation for 3A hospitals. In other words, government management departments have more financing channels and are unwilling to contribute and share state-owned medical resources. However, although none of the above cases has become a typical case of successful PPP cooperation, they did not pose any fear to local government management departments. On the contrary, they form a stark contrast to the situation where some county and district government management departments have repeatedly lowered cooperation requirements in order to attract social capital to invest in their local public hospitals.

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Chapter 5: Conclusions

5.1 Structural brief of the present research

The structure of this study, which consists of five chapters, was designed based on its research purpose: To explore the PPP model applicable to China's public hospitals. The first chapter is an introduction to the research background, research questions, research methods, research significance and thesis structure; The second chapter is literature review, which provides an overview of PPP, explains strategic alliance theory, cooperative game theory and stakeholder theory, and puts forward the research questions and model; Chapter Three discusses research methods, including empirical research, case study methods and interview method, respondents as well as data collection and analysis; The fourth chapter is the case analyses, covering the backgrounds and results of interviewees, interview information collection and results of interview questions of the three cases, namely, Binhu Hospital, The Sixth Affiliated Hospital of SYSU and Guangdong Mental Health Centre Hospital; Chapter Five studies three cases, specifically Binhu Hospital in Hefei, Anhui, Guangdong Mental Health Center Hospital and The Sixth Affiliated Hospital of SYSU; The final chapter concludes the thesis with a structural brief of the present research, comprehensive analyses of the case results, answers to the research questions, research findings, research limitations and suggestions for future research.

5.2 Comprehensive analyses of the case results

In this study, Binhu Hospital in Hefei, Anhui, Guangdong Mental Health Center Hospital and The Sixth Affiliated Hospital of SYSU were selected as the research objects. These three hospitals have had unsuccessful experiences with PPP projects for different reasons. Their answers to the interview questions are analyzed and summarized as follows:

(1) What was the purpose for you to cooperate on this project?

Binhu Hospital in Hefei, Anhui: Funds were needed to build new hospital buildings.

Guangdong Mental Health Center Hospital: Our goals were to bring in funds, erect

new hospital buildings, introduce advanced technologies and management philosophies, and improve and expand medical services.

The Sixth Affiliated Hospital of SYSU: We needed to raise 900 million yuan to create new hospital facilities and procure medical equipment.

According to the answers provided by the three hospitals, all of them needed funds for development, and it is a feasible way to obtain funds through PPP projects. This conforms to the intention of strategic alliance of both sides and the interest demand in cooperative game theory.

(2) Were there any conflicts during the cooperation of this project? If so, in what ways?

Binhu Hospital in Hefei, Anhui: The two sides showed evident willingness to cooperate, but there was no clear guidance from government policy at that time.

Guangdong Mental Health Center Hospital: The two sides are engaged in friendly communication and exchanges, and there have been no differences or conflicts so far.

The Sixth Affiliated Hospital of SYSU: There was resistance from some hospital employees, who were concerned about letting social capital control the hospital.

The answers reflect a lack of explicit government policy support for Binhu Hospital, and that the restructuring of The Sixth Affiliated Hospital of SYSU was opposed by some of its employees, which comes down to the balance of interests of the staff among stakeholders.

(3) After the project was launched, has it achieved your expected results?

Binhu Hospital in Hefei, Anhui: The two sides did not initiate cooperation.

Guangdong Mental Health Center Hospital: The project was never launched.

The Sixth Affiliated Hospital of SYSU: Yes. We were able to raise funds for hospital construction in a timely manner.

It was difficult to achieve their expected results, since all three hospitals have failed in their respective project.

(4) Do you think there is still room for improvement in the cooperation of this project?

Binhu Hospital in Hefei, Anhui: The two sides did not initiate cooperation.

Guangdong Mental Health Center Hospital: No.

The Sixth Affiliated Hospital of SYSU: We failed to consult hospital staff prior to

the project; Nor did we explain the situation and reassure them once the project was up and running.

The projects of Binhu Hospital and Guangdong Mental Health Center Hospital were still in the exploratory stage, which makes it difficult to pinpoint any room for improvement in terms of cooperation, while the Sixth Affiliated Hospital of SYSU has made more progress so that deficiencies can be easily identified.

(5) What other government policy support do you think is needed for this project?

Binhu Hospital in Hefei, Anhui: Relevant government departments should introduce detailed laws and regulations on PPP cooperation.

Guangdong Mental Health Center Hospital: We advise that relevant government departments completely relax the control on social capital participation in the restructuring of public hospitals.

The Sixth Affiliated Hospital of SYSU: Relevant policies on employee stock ownership plans of hospitals should be introduced as soon as possible.

Responses from the three hospitals all suggest that the government should provide clear guidance and support for PPP projects in formulating relevant laws and regulations. It is also a reflection of some obstacles faced by the application of PPP in the medical and health sectors, which is well summed up by Feng et al. (2017): (1) There is a lack of relevant laws and regulations and an unsound coordination mechanism; (2) The relationship between public welfare and productivity is questionable. Once a PPP model is introduced into public hospitals, the transfer of equity may lead to the conflict between the public welfare of public hospitals and the profit-seeking nature of social capital; (3) There is a risk of loss of state-owned assets; (4) Due to the high risk and low investment return, social capital has little incentive to enter into such cooperation. Therefore, Wu (2017) believes that the government should take a long-term point of view and consider the policy of social capital involvement in public hospitals from the aspects of efficiency, effect, relevance, influence and sustainability, and promote the appropriate reforms accordingly.

As is suggested by the research model of this study in 2.5.2 in the literature review of Chapter 2, strategic alliance theory, cooperative game theory, and stakeholder theory can all impact the effectiveness of PPP cooperative projects where public hospitals work with social capital. This is fully illustrated by the three cases used in this study, though

the extent of their influence varies from one case to another. See Table 5-1.

Table 5-1 Case study results

Name of hospital	Binhu Hospital, Hefei	The Sixth Affiliated Hospital of SYSU	Guangdong Mental Health Center Hospital
Hospital ownership	Government	College	Government
PPP model	Introduction of social capital by the hospital	Introduction of social capital by the hospital	Introduction of social capital by the hospital
Cooperation result	Unsuccessful	Unsuccessful	Unsuccessful
The biggest impact factor	Stakeholders	Stakeholders	Stakeholders

5.3 Answers to the research questions

The questions raised herein will be answered based on the research results:

(1) What means can effectively help public hospitals raise the funds needed for their development?

Literature suggests that PPP has been widely used in various industries with growing sophistication. Its application in the medical and health sectors can not only help hospitals access the funds needed for development, but also relieve the financial pressure on the government to invest in medical and health care. Based on the role of PPP, in 2014, the National Development and Reform Commission published the "Guiding Opinions on Carrying out Public-Private-Partnership", explicitly encouraging the application of PPP in medical care, health care for the elderly and other public service projects (Feng et al., 2017). It was because of their financing needs that Binhu Hospital in Hefei, Anhui and The Sixth Affiliated Hospital of SYSU, which are analyzed in this study, decided to pursue PPP in the first place. Therefore, PPP can effectively help public hospitals address their capital needs in the process of development.

Among all PPP models, the BOT financing model is the most effective way to help public hospitals raise their development funds. Since there are no property rights or ownership involved in this model, once a cooperation agreement is reached between the construction company and the project owner, funds can be invested into the construction

of the hospital. When the project is completed and delivered to the hospital for management, the hospital will repay the capital with interest annually in five to eight years as agreed by both parties. In this way, the financing party can make profits from both the construction and installation costs, and interest on financial investments. The hospital, on the other hand, does not need to transfer brand property rights or hospital equity, and there is no need for its staff to worry about being marginalized by the transformation of such public hospital into a private joint-stock one.

(2) Is PPP applicable to all public hospitals in China?

PPP is not applicable to all public hospitals in China. China's public hospitals are highly diverse and complex as they are located in different regions and subordinate to different superior departments. As a result, it is difficult for PPP to closely match each public hospital. The failure of the three cases in this study is a perfect example.

(3) Which PPP model is most suitable for China's public hospitals?

Of all the PPP models, the franchising model is most suitable for public hospitals in China. In the franchising model, a public hospital licenses its brand or the right to charge fees to accredited social capital for paid use. Among other responsibilities, social capital should bear the investment risks, oversee operation and management, and faithfully fulfill the social welfare obligations assigned by the government. This model is relatively easy to implement and less risky for government policy makers. Beijing Anzhen-Orient Hospital, for example, is a PPP project jointly built by China Orient Asset Management Co., Ltd. and Beijing Anzhen Hospital of Capital Medical University in the form of "franchising". It is the first "franchised" non-government-run hospital in China. The hospital, located in Dongba, Chaoyang District, Beijing, has invested 3 billion yuan and is expected to open in 2023, providing medical services for 400,000 people in Dongba. The construction and operation of the hospital will be in the charge of a team of medical experts sent by Beijing Anzhen Hospital. Once completed, it will become a non-profit general hospital integrating medical treatment, medical education, scientific research and international exchanges, focusing on the treatment of cardiovascular diseases.

5.4 Research findings

(1) PPP is an effective way to help public hospitals resolve their development difficulties, but not all models of PPP are applicable to China's public hospitals;

(2) The BOT model can help public hospitals raise the development funds, but it requires guarantee from institutions with certain strength;

(3) The "franchising" model is suitable for public hospitals in large cities;

(4) The "mixed ownership" model is suitable for district or county-level public hospitals as well as social capital participation in the cooperative projects of any public hospitals with reasonable pricing of medical resources.

(5) Government cooperation willingness, coordination from public hospital management, hospital staff participation, investors' experience and management capabilities, and the contractual capacity of each cooperation party are the key factors for the success of PPP cooperation;

(6) There are huge business opportunities for the supply of mid-to-high-end medical services in China; there is also large room for investment in specialist hospitals, health tourism services and integrated healthcare projects; social capital is more likely to identify investment and cooperation opportunities for public hospital projects in districts, counties, villages and townships.

5.5 Research limitations

(1) Binhu Hospital and The Sixth Affiliated Hospital of SYSU are both large-scale Grade-A tertiary general hospitals, while Guangdong Mental Health Center Hospital is the only professional mental health institution at the provincial level in Guangdong Province; All three hospitals are located in Guangzhou, the provincial capital of Guangdong;

(2) The three cases selected in this study have all failed, meaning no successful cases were adopted for analysis.

5.6 Suggestions for future research

(1) In future research, secondary and primary hospitals, community hospitals, general hospitals outside of the provincial capital and other medical institutions can be taken as research objects to study the significance of PPP;

(2) Charging standards in the franchising model can be studied;

(3) We can explore the most suitable model of PPP for cooperative projects with social capital investment;

(4) Successful cases or a combination of successful and failed cases can be used for analysis;

(5) We can also investigate how local governments implement the PPP policies enacted by the central government.

5.7 Chapter summary

This chapter concludes the thesis by introducing its structure, which consists of five chapters, comprehensively analyzing the results of the three cases, pointing out the reasons for the unsuccessful cooperation and the problems, and answering the three research questions raised: The research findings and limitations are summarized here, and suggestions for future research made.

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Appendix A: Hospital Background Survey

1. Hospital name:_____
2. Hospital address:_____
3. Hospital ownership: ☐Government ☐ State-owned enterprise
   ☐ College or university ☐ Military ☐ Others
4. Institutional type: ☐General hospital ☐ Specialized hospital
5. Hospital level: ☐Tertiary ☐Secondary ☐ Primary ☐ Others

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Appendix B: Interview Questions

1. What was the purpose for you to cooperate on this project?
2. Were there any conflicts during the cooperation of this project? If so, in what ways?
3. After the project was launched, has it achieved your expected results?
4. Do you think there is still room for improvement in the cooperation of this project?
5. What other government policy support do you think is needed for this project?