

**How to Choose the Agent Construction Mode in Chinese
Government Investment Projects?**

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Thesis submitted as partial requirement for the conferral of

Doctor of Management

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Abstract

The complexity of managing government investment projects arrives, among others, from the fact it involves many stakeholders. Managerial problems in government investment projects resulting in inefficiencies, waste of resources, and delays often appear in China. Government departments used to control all the aspects of a project, including construction, investment, management, and use which result in waste and rent-seeking behaviors. On July 25, 2004, the state council published the document "Decision on Investment System Reform" which clearly put forward the requirements of using construction agents in non-profit government investment projects. Methods of selecting and managing construction agents are different in different regions in China.

We adopted qualitative research methods. First, we analyzed the principal-agent relationships and the information asymmetry in construction agent models, and discussed the theory methods to abate information asymmetry and decrease the moral hazard problem. Then we investigated five construction agent modes in five regions of China, and analyzed the project process and management methods. We found that these modes could be split into two types of construction agent models: "market competitive agent" construction model and "administrative agent" construction model. Finally, we analyzed CIXI city's construction agent model in non-profit government investment project, and found that CIXI also used an "administrative agent" construction model. Therefore, we thought that although market competitive construction agent model is better than administrative construction agent model in theory, the latter might be a contingent way to adapt to the environment in the transition economy period that China is living.

Keywords: Governance; Construction agent mode; Non-profit projects;

JEL: L74; L9

Resumo

A complexidade da gestão de projetos de investimento dos governos é inegável mormente tendo em conta os incontáveis “stakeholders” envolvidos. Na China sempre existiram problemas de gestão nos projetos de investimento do governo que motivaram ineficiências, desperdícios de recursos e demoras na concretização desses projectos. Dado que os departamentos do governo controlavam todos os aspectos relativos aos projetos, incluindo construção, investimento, agenciamento e gestão, o resultado consubstanciou-se em elevados desperdícios e na geração de comportamentos oportunistas. Em 25 de julho de 2004, o Conselho do Estado da China publicou um documento acerca da gestão de investimentos governamentais - “Decisão sobre a reforma do sistema de gestão de investimentos”. Sob este novo sistema, claramente, o governo apresentou os requisitos de utilização de agentes de construção nos projectos sem fins lucrativos de investimento do governo. Contudo os métodos de seleção e gestão dos referidos agentes são diferentes nas várias regiões da China.

Neste trabalho foi utilizado o método qualitativo de pesquisa. Primeiro, analisou-se as relações principal-agente e a assimetria de informação nos modelos de agência em construção civil. Além disso, discutiram-se os métodos teóricos para diminuir a assimetria de informação e o problema de risco moral. Segundo, investigou-se os cinco modos de agente na construção em cinco regiões da China, e analisou-se o processo de projeto e os métodos de gestão, tendo-se descoberto que estas formas podem ser divididas em dois tipos de modelos de agente na construção: o modelo de construção “market competitive agent” e o modelo de construção “administrative agent”, conforme mencionado anteriormente. Finalmente, analisou-se o modelo de agente de construção da cidade de CIXI em projectos sem fins lucrativos de investimento do governo. Ficou evidenciado que o modelo de construção “administrative agent” também foi utilizado nesta cidade. Por isso, conclui-se que, embora em teoria o modelo de construção “market competitive agent” seja melhor do que o de construção “administrative agent”, o último pode ser uma solução contingente e intermédia que se adapta ao período da economia em transição da China.

Palavra-chave: Governação; modos de agente de construção; projectos sem fins lucrativos

JEL: L74; L9

摘要

中国从 2004 年开始在非经营性政府投资领域推广和实行代建制。不同地方在实际使用过程中形成了不同的代建制模式。在使用的过程中，也出现了一系列的问题。例如，代建单位的权利和责任不相符，代建单位的法律地位并没有得以真正的明确。所以，在我国，代建制在非经营性政府投资领域并没有产生预期的效果。笔者在文章中对各地代建制模式的差异进行研究，提出了减少信息不对称的对策和措施。最终，笔者选取慈溪市代建制模式进行案例研究，进而为我国非经营性政府投资领域代建制的推广和使用提供相应的参考。

研究发现：(1)不同地方模式的区别主要体现在三个方面，一是委托人的不同；二是代建人的组织形式不同；三是代建合同的不同。(2)各具地方特色的代建模式可以划分为“市场竞争型”和“行政管理型”两种一般性代建模式。两者的本质区别主要在于代建单位的选择方式和组织形式有所不同。北京、上海和浙江就属于“市场竞争型”代建模式。”深圳、广东则是“行政管理型”代建模式的代表。两种代建模式在代建单位的经营目标、委托关系和风险承担方面都有显著的区别。(3)浙江慈溪市于 2005 年成立慈溪市公共项目建筑中心(局)，实行“行政管理型”代建模式。现如今，我国全面实行竞争型代建模式的时机还不成熟。所以，根据目前的经济社会发展形势，行政型集中代建模式实际上是一种符合中国国情的过度模式。随着市场经济体制的不断完善和发展，实行竞争型代建模式的条件不断成熟，中国的代建模式最终会过渡到竞争型企业代建模式。

本文的主要内容主要包括以下几个方面：在第一章中，笔者对文章研究的背景和意义进行介绍，指出了本文的创新之处；在第二章中对国内外相关的理论研究进行介绍；在第三章中，以委托代理理论为基础，对代建制的基本模型进行了详细的分析。第四章说明案例研究的方法和；第五章介绍五个案例地区的代建制实践情况，总结地区代建模式的特征；第六章是案例分析，对五个地区的代建制模式进行分析，总结出了两种主要的典型模型，一是“行政型管理模式”，二是“市场竞争型模式”，对这两种模式进行了详细的比较分析；第七章基于第六章的分析结论对慈溪市案例进行剖析，分析其特点和优缺点，并提出未来的发展建议。第八章是结论。

关键词：治理；代建模式；非营利性项目

JEL 分类： L74; L9

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Chapter 1: Introduction

1.1 Research background

Investment has become one of the most important driving forces for China's economic growth since the implementation of reform and opening-up policy. In China, the total investment of the society comprises two parts: government investment and non-government investment. Government investment means that the government uses financial funds to invest in public goods in order to meet the social public needs and achieve economic and social development strategy. The government investment projects refer to the fixed assets projects that the government invests with financial funds, the bonds, foreign government grants, or national financial guarantee. From Figure 1-1, the investment in government investment projects (mainly infrastructure and public facilities that need a huge amount of funds) witnessed an annual increase, arriving at 25,000 million in 2014, nearly 5% of China's total social fixed assets investment.

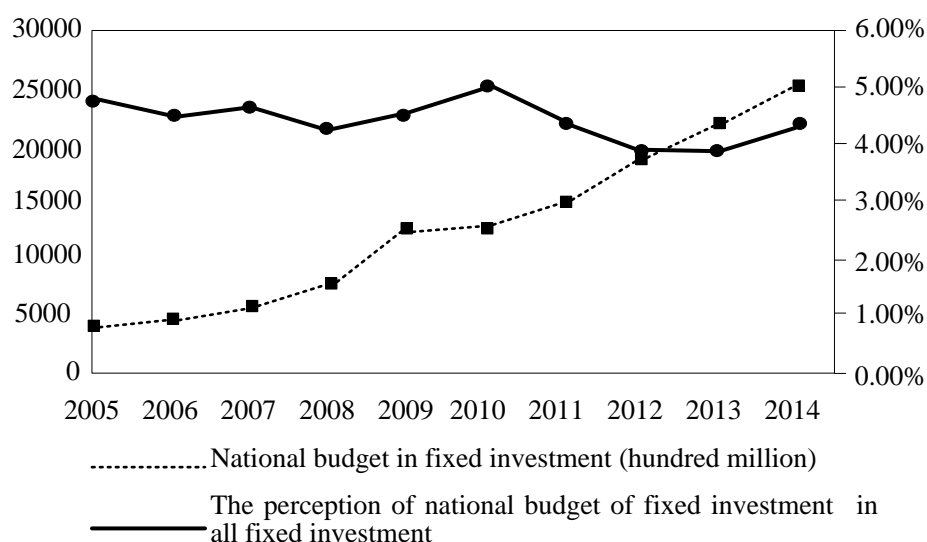


Figure 1-1 National budget investments in fixed investments and the its perception in fixed investments

In China, the problem of government and business functions being mixed together has

existed for a long time. Before the 1980s, government investment projects were mainly managed by government departments. In 1988, the Ministry of Construction of China implemented a project supervision mechanism, with a bidding mechanism planned to be implemented by the Ministry of Water resources in 1990. From 1992 to 1996, the State Planning Commission proposed the institutions of owner responsibility and a project legal person. In 2003, the Ministry of Construction started to carry out EPC (Engineering, Procurement and Construction) general contract project and project management regulations. In 2004, the Ministry of Construction introduced 'the trial management regulation of construction project'. While reforming the management system of government investment project, the main body of project management changed through construction departments of users, engineering headquarters, and the project legal person to project agents and government procurement units.

Table 1-1 below illustrates the main documents that the Chinese government issued from 1993 to 2004 that relate to investment system reforms. These reforms orientate the direction of investor diversification, methods diversification, diversification of funding sources, and construction management marketization. The 'Decision on problems about establishing the socialist market economic system' (issued in 1993) proposed that investment projects should fall into three classifications: projects for public welfare, for infrastructure and for profit. This classification separated government projects and private projects, which laid a foundation for reforming the management of government investment project. Eight steps for the reform was put forward by the 'State Council decision on the reform of investment system' (issued in 2004), namely defining the scope of government investment, improving the decision-making mechanism of the government investment projects, standardizing the management of government investment funds, separating the powers of check and approval, and simplifying the check and approval procedure of government investment projects, strengthening the management of government investment projects and improving the methods of construction implementation, using market mechanisms to get more benefit from government investment, establishing and improving the supervision system of government investment which include an accountability system, a check and audit mechanism and a social supervision mechanism and

perfecting the laws and regulations so as to manage the projects according to law.

Table 1-1 The main documents on investment institution changes in China from 1993 to 2004

Year	Documents
1993	One decision in the Third Plenary Session of the 11th CPC Central Committee, "The decision of several issues on the establishment of the socialist market economic system".
1994	"Interim Measures for the Administration of Engineering Consulting Industry" issued by the State Planning Commission.
1996	The State Council issued the "The Trial Capital Fund System for Fixed Assets Investment Projects".
1997	The State Planning Commission issued "The Interim Regulation on the Implementation of the Legal Person Responsibility System for Construction Projects".
1997	The State Planning Commission issued "The Provisions on the Operation Conditions of Large and Medium-sized Infrastructure Projects", and "The Interim Provisions on Large and Medium-sized Projects Implementing Bidding and Tender".
1997	The State Planning Commission and the Construction Bank and other four major banks jointly issued "The Provisions on the Improvement and Standardization of Commercial Bank Loans to Basic Construction".
1999	The Ministry of Finance issued "The notice on Strengthening the Management and Supervision of Funds for Infrastructure Construction".
2000	The State Planning Commission issued "The Construction Project Bidding Scope and Scale Standards" and "The National Major Project Audit Approach".
2001	The State Planning Commission issued "A Number of Opinions on Promoting and Guiding Private Investment".
2001	The National Audit Office issued "The National Construction Project Audit Standards".
2003	The Third Plenary Session of the 16th CPC Central Committee issued "The Decision of the Central Committee of the Communist Party of China on Some Issues Concerning the Improvement of the Socialist Market Economic System".
2004	The State Council issued "The Decision of the State Council on Reform of the Investment System".

After a series of reforms, the incentive mechanisms of projects for profit are becoming more effective. However, there still exist many problems in the management of non-profit

government investment projects. There are two basic objectives for the non-profit government investment projects. The first one is efficiency, that is, to promote the effective allocation of social resources and the growth of a country or a region's economy. The second one is fairness, that is, to promote the fair distribution of social welfare, and generally improve people's welfare level. Therefore, the performance of non-profit government investment projects is associated with social and public benefits. If the project management cannot achieve the desired objectives or fails in the process, it will harm the social and public benefits. As regards the traditional management model of non-profit government investment project, accountable owners of investment, construction, management and usage were integrated. The old project management style of non-profit government investment project is comparatively ineffective in many regards. First, the project owners are lacking in professional construction management experience. Second, there are no complete restraint mechanisms to restrict owners' behavior in the integration management model. Third, the government investment projects are often encountered with various problems, such as excess costs, scale and standard, construction period delay, low quality, waste of resources and corruption.

In order to address the defects in traditional project management, and achieve the goals of investment project, enhance the quality and efficiency of time spent on a project, with efficient use of government funds, the State Council issued the "Decision on the Investment System Reform" in 2004, which clearly stipulated that non-profit government investment projects should implement a 'construction agent system'. In the project agent system, the government should select the project agents, which are project management companies with required qualifications, by way of bidding. The agent is accountable for the organization and management of construction projects, while exercising strict control over the investment, quality and time of the whole project. The project agent transfers the buildings to users after they are completely constructed. The project agent system splits the traditional integration model and helps solve existing problems in non-profit government investment projects.

1.2 Research question

The project agent system derives from a United States system called the Construction Manager system (CM) (Dong & Zhong, 2006) under which the owner's commission construction managers are accountable for the management of the entire project, including feasibility studies, design, procurement, construction, test running, except for the engineering costs. At present, the project agent system is very popular around the globe, and the main business of large engineering companies in the United States, Canada and other countries that provide construction service for governments.

The city of Xiamen began to implement a project agent system in 1993 with a government investment program. From then on, other provinces and cities in China also actively implemented the project agent system. Through 20-year development, the project agent system has experienced three stages: the pilot stage of exploration in China (before July 2004), rapid promotion stage (July 2004 - December 2006), and the perfecting stage (since 2007). By the end of 2011, 45 big cities and regions in China have carried out the project agent system in government investment projects, taking up 95.7% of all the regions in China, in which there are 29 regions that introduced normative documents of the project agent system, accounting for 61.7% (Cao, 2014) regions of China. Some secondary cities also carried out project agent work, such as the Zhejiang CIXI, and the cities of Guizhou, Anshun, and Yunnan Yuxi, which have formed some local project agent models. However, there are still varied problems for the project agent models, for instance, the unclear legal status of project agent, the imperfect regulatory mechanism, unreasonable agency fees. And the responsibilities and power of the government and construction unit do not match. As a result, there is no clearly effective and satisfactory project agent system.

Project agent models of non-profit government investment projects are faced with principal-agent problems. There are two levels of principal-agent relationships in the models. The first relationship is between the people and government. The people commissioned the power of project investment to the government. The main problem here is restriction to the government's power. The second relationship is between the government department and

construction companies. Government department commissioned construction authority to professional project company (the project agent). So, it need to simultaneously and effectively incentivize and constraint the project agent. In the construct agent models, the government departments and project agents may all have a moral hazard, which would damage the benefit of government investment projects (including economic and social benefits). Therefore, it is the key reason for protecting the government investment project in order to reduce information asymmetry, incentivize and constraint agents' self-interested behavior to avoid moral hazard.

The objective of this research is to analyze and study the advantages of the current management of non-profit government investment projects in Beijing, Zhejiang, Shanghai, Guangdong, and Shenzhen, and then analyze and discuss the issues of current CIXI's construction agent system and finally provide effective suggestions combining with the study of five regions' construction agent modes.

The research questions are as follows:

What are the differences among the different project agent models? Which kind of construction agent model is better?

How to choose a suitable construction agent model for a non-profit government investment projects?

What's the development trend of construction agent model?

These questions will be answered based on principal-agent theory and the case study of the construction models in five regions and the city of CIXI.

1.3 Research significance

The project agent system, a new tool for managing government investment construction projects, is adopted in China. The Chinese government wants to improve the management level of government investment projects, and change the government's function in those projects. It is paramount to research principal-agent relationships in some typical project agent models and explore the most efficient model in a special context. On the one hand, this research helps clarify

the power and responsibilities regarding relationships between the government and other related parties, and promotes project management development. On other hand, this study also contributes to the theory of project agent. In the past, project agent system studies have mainly concentrated on mechanism designing and practical experience summary. The existing theories and literature are not sufficient to meet the need of rapidly changed practices. There are still many problems regarding the process of project management which require systematic and careful study.

1.4 Contribution

This research work has two contributions, the one is theoretical and the other is managerial: (1) The author compared the differences between principal-agent relationships in various project agent models, which is the theoretical basis of proposing measures to improve the models' effectiveness. (2) The author analyzed the case of the project agent model in the city of CIXI based on the principal-agent theory, which provided an empirical reference of perfecting the project agent system to China.

1.4.1 Theoretical contribution

The theoretical part is the theory research, which the author summarized the main project agent models in China, and then analyzed the differences between principal-agent relationships in the various different models. It finally put forward corresponding improvement measures for government investment projects in China.

1.4.2 Managerial contribution

The managerial part includes the case study, which the author analyzed the project management case in the city of CIXI in the Zhejiang Province, based on theories of project agent and principal-agent. The author summarized the successful experiences as well as existing problems, and made suggestions of how to improve the Chinese government's management efficiency of project agents'.

1.5 Content

Chapter One illustrates the research background, significance, scope and objectives as well as research question and contribution. Chapter Two provides a literature review with an overview of various theories. Chapter Three presents the theory analysis of construction agent model in non-profit government investment projects. Chapter four introduces the research method and data collection method applied in this dissertation. Chapter five describes the construction agent systems in such five regions as Zhejiang Province, Beijing, Shanghai, Guangdong Province, and Shenzhen, and then make a brief summary. Chapter six discusses and compares the project agent models that the author narrowed down to two modes: the administrative management mode and the market competition mode. Chapter Seven analyses the construction model in CIXI including the government investment project, the bottleneck development, the development strategy and the development prospects. Finally, Chapter Eight concludes the whole dissertation and make a statement of the contribution as well as elaborate the limitation.

Chapter 2: Literature Review

A government investment project is a concept full of Chinese characteristics. China's Ministry of Finance put forward the term of government investment projects in 2000 defining it as follows: a construction project with the government as the main investment entity, public goods as the investment target, and public social product with the goal of meeting the public demands of the society as the goal, and achieving the maximization of social benefits. Prior to that, government investment projects were called "fiscal basic construction fund investment projects" or "projects funded by the central government and local government" without a formal definition (Cao et al., 2014). Similar projects are called public projects or public-sector projects in the United States, Britain, Hong Kong, and other developed countries. Such projects fall under the umbrella of government procurement.

2.1 Project management in other countries

In the study of engineering project management, foreign literatures mainly focused on the following: (1) the origin and development trend of project management; (2) systematize project agent in its mechanism and characteristics; (3) two specific project agent models useful; (4) evaluation of project agent management; (5) illustrations of the success reasons of project agent management.

Mark and Victor (1998) compared three main types of project management models in the United States. These are the CM model (construction management at risk), the DB model (design-build) and the DBB model (design-bid-build), in terms of cost, time and quality of results. In the DB model, the owner signs a main contract including design and construction with an independent entity (that is a company), and this company will subcontract some parts of the business. In the DBB model, the project requires advanced processing in order to design, bid and build. The owner signs a professional services contract with a design company, and then commits the construction task to a qualified head contractor whose price and qualifications

can meet the owner's requirement by way of competitive bidding under a design company's assistance. The design company serves as the supervisor at the construction stage, which is an important communication bridge between the owner and the contractor. The CM model entails construction risk management. Here the owner signs separate agreements with the design company and the general contractor who plays the role of CM and is involved in the project at the beginning of design. In order to make the construction plan, subcontracting business bidding and project design successfully, the general contractor needs to participate in project cost estimates, drawing up a project construction plan, organizing the competitive bidding of subcontractors and putting forward reasonable suggestions to the designers. A CM general contractor, different from the general construction contractor, is also different from a project's head contractor. In comparison with the other two models, the CM model, which makes a connection between the design and construction in project management, is a fast track construction management method. It consists of design, bidding and construction, hence it is conducive to shortening the construction period. Dennis (1998) proposed the trend of project development characterized by being increasingly complex and precise, requiring a tighter time period, attaching greater importance to quality and pursuing higher value, increasing the emphasis on team cooperation, and avoiding disputes as much as possible. People begin to consider more about the implementation of project agent and start to systematize it.

Christopher (1994) proposed that we should consider the characteristics of the project, the market conditions, the owners, law, risk management, and incentive schemes, to determine the project management model and pricing. David (2001) designed the process of the partnering project, which includes clearing responsibilities of the main parties, along with the determination of project objectives and selection of designers and contractors. This process is helpful to promote cooperation and avoid conflict between different parties in a project. Adekunle (2001) compared four project management models, containing the proxy CM model, the risk CM model, the British CM model, and the management-contracting model. Adekunle (2001) looked at these models in terms of operating mechanism, contractual relationship, the allocation of responsibilities, and risk allocation. His work helped the author build the framework of this dissertation and get the general concept of the project management such as

the factors the author should consider when studying the CIXI city's construction agent model. Kerzner (2017) researches that with the growth of complex projects, stakeholder involvement, and advancements in visual-based technology, metrics and KPIs (key performance indicators) are key factors in evaluating project performance. Dashboard reporting systems provide accessible project performance data, and it is a key communication responsibility for all project managers to share this vital data in a concise and consistent manner. His work helps functional managers gain a thorough grasp of what metrics and KPIs are and how to use them. Plus, this edition includes new sections on processing dashboard information, portfolio management PMO and metrics, and BI tool flexibility. What's more, it also enhances my awareness of what good metrics management really entails today, which calls for extensive knowledge to measure performance in a more effective manner.

Different models of Project Management appeared after years of developments and frequently implementations to meet diverse requirements. Among them, the author paid more attention to DB (Design-Build) and BOT (Build-Operate-Transfer) models. Anthony and Keith (1996) studied the reason why an owner chooses the DB model. Through surveying 290 government and private owners, Anthony and Keith (1996) summarized the criteria's to why owners choose the DB schema. Under the criteria, the construction costs and schedule need to be controlled, with the total costs, the project's total time claims and the project size or its complexity reduced, as well as the innovation in design and construction promoted. Keith and Anthony (1998) proposed five most important indicators in evaluating the effect of DB project implementation based on 122 cases study. These are cost deviation, time deviation, and satisfaction to meet the expectation, owners' management burden, and users' satisfaction. The main criteria for selecting the DB model include characteristics of the project and owners, market conditions and the relationship among the parties. Alhazmi and McCaffer (2000) constructed a selecting model of project procurement mode, and calculated different procurement models based on the score of 30 public sector experts. The result showed that DB had the highest score, which means that the DB mode is most welcomed by the public sectors. Rande (2016) seeks to establish the industry practices that are most effective in design administration for mitigating the risk of cost and time growth due to scope creep during the

design process in commercial design-build projects. The research maps an extensive content analysis of relevant literature against an industry survey and structured interviews with construction professional to determine the best practices of design administration in design-build projects. This study integrates the research conclusions into a framework that can be referenced by CIXI city's agent model to ensure effective management of the design process. Jane and Young (2017) tackles the three questions related to fundamental decisions in the procurement process: 1) For which project owners are likely to employ one delivery method or the other? 2) To which contractor owners tend to award Design-Build projects? And 3) How different are the consequences of the decisions between the two methods in terms of cost and schedule? They also find that Design-Build seems advantageous to schedule control, while cost advantages of one method over the other are still inconclusive. Wang and Tiong (2000) analyzed the functions of government in a BOT (Build-Operate-Transfer) project in order to reduce investor risk. Wang (2000) investigated the organizations, which participated in BOT projects in developing countries and China, and analyzed and ranked the key political risk factors in developing countries. Zhang and Mohan (2001) summarized the experience of five great projects with BOT models in Hong Kong, with the introduction of all the management process such as feasibility study, bidding, financing, compensation for land acquisition, design and construction, operation and maintenance, and transfer and operation management. Serdar and Syuhaida (2017) use Turkmenistan City, which is in the process of privatizing the state-owned enterprises that help to provide infrastructure for economic development, to show that Build-operate-transfer (BOT) has become a popular mechanism in developing countries for infrastructural privatization. They use the Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis to provide whilst the factors for successful BOT implementation are discussed, evaluate BOT application in Turkmenistan through a descriptive survey of stakeholders is conducted and the results are used to identify and rank the most significant factors affecting BOT implementation and address recommendations future challenges faced by both the private and public sectors are provided. All these can be referenced in China's agent model design process. The most welcome DB model has outstanding performance due to its specific characteristics while the BOT model has a considerable implementation potential in China market, from which the author can really absorb in researching CIXI city's agent model.

Evaluation is also an important part researchers can extract new ideas from the accomplished project and assessment process. John (2000) proposed the principle of engineering project management, including maximizing the impact of initial investment on the project effect, valuing the whole life cycle, being transparent, being competitive, clearing the project scope, allocating reasonable risk, and ensuring revenue. Cheung (2001) designed an evaluating model for the engineering project management mode with the Analytic Hierarchy Process method. The model has eight indicators, such as speed, cost control, reliability, flexibility, the level of quality, complexity, risk prevention capacity, price competition, and the clarity of responsibility. Cheung (2001) calculated the weights of every indicator through expert scoring, and calculated the scores of many project management models such as DBB (Design-Bid-Build), DB (Design-Build), PMC (Project Management Contract) and CM (Construction Management), and selected the project management model according to its ranking. Florence (2004) constructed an evaluation model for project implementation with the multiple linear regression method. The evaluation indicators include average cost, construction time, project implementation time, construction quality, and the quality of the system. He also conducted an empirical analysis based on a questionnaire survey of 87 DBB projects and DB projects in 11 regions. Pierre and Carole (2018) considered two perspectives on project performance in project management research including project efficiency (delivering efficient outputs) and project success (delivering beneficial outcomes). The first perspective is embedded in a deterministic paradigm of project management, while the second appears more naturally connected to the emerging non-deterministic paradigm. Complexity and uncertainty are key constructs frequently associated with the non-deterministic paradigm. This conceptual study suggests that these two concepts could very well explain and define particularities of both paradigms, and seeks to articulate both perspectives in a contingent model. Appropriate estimation method would be applied in CIXI city's project management.

In the estimation process, after determining the assessment method and the indicate factors, the standard can be set to judge the success of the Project Management. Victor (1992) summed up four key factors in the project implementation after a survey of 16 projects. These are good organization, systemic contract, project management experience and timely and effective

communication between the parties in the stage of planning and design. David (1999) discussed the concept and connotation of project success. With the Logical Framework Method (LFM), the success of a project is divided into two parts, namely product success and project management success. Chua (1999) analyzed the factors that determined the project schedule, quality and cost control effects and the overall effect. He gave the ranking of each factor through 20 experts' scoring. Feniosky and Tadatsugu (2001) analyzed the principle of conflicts between different parties in different project management models, and expounded upon how to clear every party's responsibilities, rights and obligations, and conflict-avoiding methods. They noted that we should use cooperation and negotiation to resolve the conflicts. James (1996) proposed a method to measure the communication in a project, and tested the relationship between project communication and project effect with the data of 25 public projects. Cheng (2003) built an analysis model for quantifying communication barriers in a project management organization. Turner and Simister (2001) studied how to choose the type of contract in infrastructure projects according to the contract theory. The conclusion is that the type of contract is related to the project's uncertainty and its process. When a project's uncertainty and its process are small, one should use a single price contract. A fixed price contract should be adopted when the uncertainty of a project is small and the uncertainty of implementation is large. When project uncertainties and its implementation are large, one should use cost plus contracts. Martin (1994) proposed that the project management and consulting company would maintain its sustainable competitiveness only when they had good strategic planning, along with the ability to reasonably broaden their consulting business scope. Brower (2002) studied the incentive contractor. The incentive contract will help the parties change the traditional adversarial relationship to a partnership. The incentive measures should be based on the owner's objectives and experience as well as characteristics of the project, which serve as the basis to divide incentives based on cost, technique, schedule, and completion. Researchers studying public project management model seem to pay more attention to the DB model. The research mainly includes the development trends, the implementation effect and process, the selection criteria, the success factors, and the DB model's purchase methods. Bill and Jeffrey (2002) introduced and analyzed the third-party contract model, used by the United States National Aeronautics and Space Administration. The third-party contractor takes charge of design,

construction, operation, and maintenance of the whole process, whose fundamental purpose is to coordinate design, operation, and maintenance systemically and reduce the life cycle cost, which exactly conform to the requirements of CIXI city's current situation, as directly observed by the author. Francis and Patrick (1996) found that in the project the attitude of the parties to risk allocation is not the same, which may give rise to disputes in the project implementation. The third-party model will help reduce disputes and the losses caused by disputes by implementing a project design that effectively accounts for risk allocation and accountability. The Construction Management Risk System (CMRS) for Korean Construction Management (CM) Firms was carried out by Kyungmo, Sanghyo to minimize the losses in construction management (CM) firms. The research results revealed that risks were not managed systematically due to the absence of risk management systems and the development of a construction risk management system (CRMS) for systematic risk management. For this purpose, the field operation managers of CM firms were interviewed and surveyed in order to define risk factors. Upon this, a risk assessment priority analysis was performed. Finally, a risk management system, composed of seven modules and 20 sub-modules and capable of responding systematically to risks, was proposed. Furthermore, the effectiveness of this system was verified through on-site inspection. This system allows early response to risks, accountability verification and immediate response to legal disputes with clients by managing risk records. As social consciousness and personal welfare demands increase, social conflicts among external stakeholders, such as local residents, local and central governments, and NGOs, have become more critical factors in enhancing project viability. Chang (2017) aims to propose a conflict management framework based on twenty-two representative public construction projects. Their study identifies and frames the various causes, impacts, and resolutions of conflicts through the case history of project viability. Through these findings, five types of conflict scenarios were derived: project termination, early mitigation, late mitigation, project enforcement, and late occurrence. Furthermore, they suggest root causes, pathway of conflict propagation, and characteristics of each conflict scenario, which will assist project stakeholders in developing sustainable management for conflict solutions in line with each project's unique situation. The success of Project Agent Management is not determined by one factor, it's an integrated result including the interior incentive and exterior cooperation.

In summary, foreign researchers who study project management models approach the subject in a more in-depth manner than Chinese studies. Most of the literature uses the empirical analysis method to study the projects' specific issues. Researchers tackle the concept and mechanism of different models, but also discuss many deeper project management problems. These studies have important implications for the study of the project agent system in China.

2.2 The development of project agent in China

In accordance with the "Decision on the Reform of the Investment System", issued by the State Council of China in 2004, project agent means that the government selects a qualified project management company as a project agent by way of bidding for government invested non-profit projects. The project management company will take responsibility for the project's construction, strictly control the project investment, ensure quality and timeliness, with the completed building transferred to users after completing the project. Implementing the project agent system in China has caused wide concern for both practitioners and academics. This chapter will review the relevant literature that discusses the implementation effect, the principal-agent relationship, and the project agent model.

Principal-agent relationship defined by Jensen and Meckling (1976) is a contract that is either explicit or implicit, under which one or more agents designate the hiring of other actors to serve them and pay the appropriate remuneration based on the quantity and quality they provide. Their work integrates elements from the theory of agency, property rights and finance to develop a theory of the ownership structure of the firm. By defining the concept of agency costs, they show its relationship to the 'separation and control' issue, investigate the nature of the agency costs generated by the existence of debt and outside equity, demonstrate who bears the costs and why, and investigate the Pareto optimality of their existence. Besides, a new definition of the firm is also provided, while showing how the analysis of the factors influencing the creation and issuance of debt and equity claims is a special case of the supply side of the completeness of markets problem. This study reminds the author how relevant would be to consider the principal-agent issue in studying CIXI city's Project Management. This dilemma

exists in circumstances where agents are motivated to act in their own best interests, which are contrary to those of their principals, and is an example of moral hazard.

At present, China is devoting itself to the great and arduous project of transforming the state-owned enterprises into modern enterprise systems. By studying the model of the principal-agent relationship, Lu (1995) researches the obstacles (agent problem) and the solution (effective constraint-incentive mechanism). These points can be enlightened for the Chinese government's agent system:

(1) The essence of the modern enterprise system in modern market economy (its operating mechanism) is a principal-agent system.

1) The efficiency and business performance of business organizations lies in the choice of managers.

2) The function of resource allocation in a market economy is oriented by the organization of an enterprise, or more precisely, by a manager.

3) The viability of the business depends on the ability of the incentive constraint to reach the minimum deviation (proxy cost) of the owner (principal) from the manager (agent) target. Operating other people's assets, "the key to the efficiency of the principal-agent system is commissioned by agents to implement incentives, penalties and strict supervision system.

(2) Through the empirical investigation of the state-owned enterprises in our country, we find that the operating mechanism can be expressed as a double-agent system. The first level is the principal-agent relationship between all the nationals (clients) who are the ultimate owners of the enterprise assets and the governments (agents) at all levels in the country. The second level is the relationship between the government (principal) at all levels and the leaders of state-owned enterprises Agent) between the principal-agent relationship.

He and Hu (2002) go beyond the classical perspective into the enterprise and explore the characteristics of the incentive contract between the principal and the agent in the enterprise under the condition of information asymmetry. Economists through this framework a good analysis of the impact of information asymmetry on the allocation of resources between

principal and agent, which is the problem, cannot be answered in the past theory. Of course, the "first-order" processing technique of the analytical method is still flawed, and the method is too critically criticized.

Chen and Wang (2004) find that Government regulation contract is actually a multi-agency contract, the multiplicity of performance in two aspects. From the vertical perspective, there exist multiple chains of agency between the public, the parliament, the regulatory agencies and the regulated enterprises. From a horizontal perspective, there are two or more regulatory agencies sharing the regulatory rights of a certain enterprise or industry. In either case, there is an ethical risk to the agent due to the asymmetric information that must be taken into account when formulating a regulatory policy. In terms of designing China's regulatory system, what must be fully considered is that the core of establishing an effective principal-agent relationship is to establish an incentive and restraint mechanism to reduce the moral hazard in each of the principal-agent relationships.

With further growth of the market economy, China has encountered more problems concerning principal-agent. The relationship includes the relationship between the state and the enterprise, the relationship between the enterprise and the enterprise, and the relationship between the enterprise and the individual. By analyzing the principal-agent theory through theoretical analysis, Ren and Li (2007) propose to use the partial transfer of property rights and the agent's incentive to solve the agent problem according to the different utility requirements of agents.

With continuous promotion of new urbanization, the government functions of economically developed towns will expand. Public service supply will face the problem of how to assume "unlimited responsibility" with "limited resources." Based on the case of public service supply in three economically developed towns in Shunde District of Foshan City, Ye and Shang (2017) analyzes the current situation of the public service supply through its public expenditure, and considers that the content of agency needs to be rationalized, both the supply capacity and supply structure need to be further improved. The study found that the trust between Shunde District Government and the town-level government as agent does not have the same interests and information asymmetry. The deviation of the role of agent and the

existence of moral hazard will stimulate the behavior preference of selective execution. Finally, Affect the effective supply of public services, which can be a good practical example for CIXI city's Project Management.

As an important part of modern enterprise contract theory, the principal-agent theory is an objective summary of the separation of classical capitalist enterprises from the modern joint-stock enterprises and the accompanying separation of ownership and management. At the same time, this classic theory has greatly promoted the economic development and the transformation of the enterprise management system over the years. The impact on our country is self-evident. However, completely copying principal-agent theory in practice cannot solve all the problems, despite other defects in principal-agent theory, such as inconsistent national conditions of China, which is unsuitable for its economic environment. However, the principal-agent theory is used to solve all kinds of problems because the principal-agent relationship is ubiquitous in society. The mechanism of incentive and restriction in the principal-agent theory also applies to the construction of non-profit projects in CIXI city. In practice, the application of principal-agent theory should also pay attention to the peculiar problems caused by the system and structure of the government under the socialist system in China. Hierarchy of responsibilities among different levels of government under the bureau-level system enables the district government to dispatch a lot of power to the township government Affairs, but the corresponding management authority and property rights are not matched in place, the town government out of their own interests for the maintenance of selective implementation of superior tasks. The relationship between the financial power and the power of the government, the clear division of responsibilities should arouse the attention of governments at all levels, the role of public service supply, the effective supply of public services and other issues still need to be further explored.

Wang and Zhou (2012) divided the development course project agent in China into four stages. First there was the pilot stage (before July 2004). Xiamen Fujian first used a project agent in China, and then, Qingdao, Anhui Province, Chongqing, Shanghai, Ningbo, Beijing, the Guizhou province, and other places began to implement the project agent system. Different local project management models resulted. Local governments gradually introduced their

regulations on project management. Second was the rapid promotion stage (July 2004 to December 2006). The State Council of China issued the ‘Decision on the Reform of the Investment System’ in July 2004, and then the entire nation began using the project agent system. Third was the slow development stage (January 2007 to December 2008). New projects slowed down during this stage, so this impacted the further development of project agent systems. Fourth is the gradually complete stage (2009 to present). Some provinces and cities began to widely use project agent system in project management.

Zhou (2012) analyzed the running status of the project agent model in government investment projects in 13 Chinese cities through interviews and questionnaires. She found a mediocre effect of the project agent system in these cities. Although some effects such as investment control, construction scale and content control, quality and safety control are significant, there are still some existing problems in the implementation process, such as lack of legal regulation, unclear project funds management, and imperfect agent incentives and constraint mechanisms. As the issues mentioned in her study, the project agent management applied in Chinese market is imperfect and still has an enormous progressive prospect.

2.3 Project agent modes

Xu (2004) proposed three project agents for government investment projects in China based on the experience of developed countries and regions. These are the professional government construction company model, the professional management institution model, and the competitive project management company model. In the professional government construction company model, some state-owned construction companies, investment companies or project management companies that are established or designated by the government to possess strong economic and technological strength and have strong economic and technical strength, would manage the project. In the professional management institution model, the project would be managed by the agency management agencies with strong economic and technological strength that is set up by government and managed by the institutions. In the model of competitive project management company, the government shall

establish the conditions for access and approve certain project-based management companies with strong economic and technical strength and good investment performance in the management of project-based construction in accordance with the principle of market competition. Finally, government would choose the company with better conditions to undertake the task of construction agency. Han and Jin (2009) divided government investment project agents into two typical models, the administrative and the market model. They compared the advantages and disadvantages of these models from the perspective of implementing the project agent system effectively. They concluded that the administrative project agent model had some advantages in an organization's objectives, legal status, applicable station, applicable scope, applicable stage, moral hazard and scale effect, while the project agent market model has some advantages regarding incentives and restraint mechanisms.

Song and Fu (2010) summarized three kinds of project agent models of government investment projects: the government centralized agent, the market agent, and the intermediate model. There are many advantages of the centralized model. First of all, the construct agent can charge the government investment projects intensively and professionally, and effectively solve the problems of 'one-time owners' in government investment projects. Second, as the project agent is an administrative unit, which has a close relationship with the government, it can coordinate many problems during the project and help the government control and supervise the project's process. Third, the project agent is a project management professional who has advantages in professional talents, technology, and experience, so he or she can help the government improve its management level. There are two kinds of centralized agents: one is an administrative organization constructed by the government, such as the Shenzhen City Construction and Public Works Department; the other one is the management center or office that belongs to the Investment Department or Construction Department in a government, such as the Public Project Construction Management Center of the Anhui Province, the Integrated Construction Management Office of the Shaanxi Province, and the Government Investment Construction Project Management Center of the Zhuhai municipality. In comparison with the centralized project agent model, there are obvious advantages for the market project agent system. First, it is helpful to introduce a competition mechanism in management, to control

project investment, and to improve the project quality and professional management level. Second, it is helpful to improve the project agent's development. Third, the model does not need to add a new government department, thus avoiding the overlap of functions and institutions, which can decrease corruption due to transparency properties of the competition mechanism. Beijing, Ningxia and Guangxi all used the project agent market model. The intermediate model is such that the government has an investment company or a city construction company that represents the government and plays the role of owner, who manages the project through a "project agent contract". The intermediate model decreases some defects in the centralized agent model and market agent model. Not only does it solve the problem of 'role confusion' of government in the centralized model, it also brings about competition between project management companies. Under this model, the government will also be able to better pursue its objectives through the project agent. Currently, Chongqing and Shanghai are using this model.

Wang (2013) divided the project agent models of government investment projects into two types, namely the enterprise agent model and the government agent model. Compared to the enterprise agent model, the government agent model helps save management and supervision costs, establishes strict and effective accountable mechanisms, forms an effective supervision mechanism from government departments, and thus, through streamlining, it reduces government coordination costs. Wang also thought that the government agent model should be advanced as follows: strengthen the supervisory and regulatory system, increase transparency, clarify the administrative principal-agent relationship in the allocation of rights and responsibilities, and divide the power of decision-making, control, and supervision.

Song (2013) analyzed the management model of non-profit government investment projects in Tianjin. It was found that there are some problems, such as functional disorder, poor supervision and poor cost control. As a result, Song designed a project agent management system, in which the government assign a non-profit unit to supervise agent and sign a 'three parties' contract' with project agent and users. This unit serves the function of supplying service and supervision, and supervises the agent during the whole process. Thus, by separating investment, construction, and management functions, project management will improve.

Zhang (2008) noted three types of project agent models: agent designated by investor, a professional management unit set up by the government, and a market competitive agent. Zhang summarized the reform practice of the project agent system in Huaian and Jiangsu, and found that the government established an office of project agency. The government of Huaian set up two units for managing projects: a project investment evaluation committee and a project agency office. The former focuses on the problems at stake and the overall investment amount. The latter focuses on how to separate the following elements: investment, construction, and use. The Project Agency Office (PAO) is involved with the projects from the beginning. It checks the budget, and will reduce it if it is not realistic. The PAO relays this information to the government and makes recommendations to keep the budget in check.

Using a difference lens, Liang and Liu (2008) analyzed the project agent management style of a government investment project in Beijing. They summarized five existing management problems: 1) the government documents that regulate the project agent are not complete; 2) the supervision of government to the project is not effective; 3) the responsibilities division between the project agent and user are not clear; 4) the 'third parties' model and project agent contract is not in accordance with the laws such that the 'general principles of the civil law' and 'contract law', and the project agent's management fee is low. They also suggest some measures to improve the project agent system in Beijing, such as improving laws and regulations, government and social supervision system, evaluating indexes that help in the project agent selection process, and implementing a performance evaluation system for the project agent.

The relationship among the government investment department, the entrusting entity and the project agent in government investment projects of Beijing was analyzed by Guo (2012). She also summarized the problems in the 'three party' project agency system and recommended the ways to improve this system, for example, completing laws and regulations, clarifying responsibilities of the project agent and users, using new types of 'three party' project agent contracts, regulating the standard of project agent fees, and improving the project agent's performance evaluation.

Wang (2014) analyzed the management problems in the Jiading New Town project. First, there is no specialized unit to manage the project agent's qualification, and the project agent's

market access conditions are not standardized. Second, the responsibilities of each party are not clear, and the project agency fee is unreasonable. Third, the project agent's incentive and constraint mechanism are not adequate. Fourth, the quality of people in the construction units and the project agent is not high, which negatively affected the project management, resulting in such problems as repetitive work, having to frequently update the design, and erratic bidding and purchasing.

Because China has not been using the project agent system very long, there is no in-depth research regarding the project agent system in China. Most of the studies are still in the conceptual analysis stage with basic model comparisons. There are a few scholars trying to explore the contractual relationship, price method, enterprise strategy and legal problems in the project agent system, but most of them lack empirical research support.

2.4 The mechanism of the project agent system

Zhang and Wang (2005) believed that the management of project agent in China is similar to the contract management of 'construction and engineering service outsourcing' in the United States. They analyzed two cases regarding establishing and developing 'architectural and engineering services outsourcing' in the United States, and the methods that California used in implementing 'architectural and engineering services procurement', and made suggestions to develop and improve the 'project agent system' in China. Liu and Shi (2006) argued that owners can effectively establish supervision and an incentive mechanism for a project management company in the market project agent model, by mastering sufficient and necessary information, and arranging a rational structure of property rights. Miu (2008) believed that the project agent system could realize the social and professional management of the government investment projects, which is beneficial to improve the level of project management, but there still exists the risk of rent seeking. Rent-seeking behavior often appeared in the stages of selecting the right agent, budget preparation and approval, the construction process, and acceptance. Based on economic analysis of project management benefit and cost, Miu proposed measures of preventing rent-seeking risk in a project agent system of a government investment project from

formal and informal institutions, that is, enhancing the construction market access standard, trading fairly, establishing experienced files, adhering strictly to the contract, and establishing the correct value of honor and disgrace.

Chen and Liu (2007) proposed that two forces coexist in the development of the project agent system, that is, the normative force and the anomic force are in conflict for protecting different benefits. Based on a game model of power, they analyzed existing problems in the project agent system, and suggested that the government should give a legal identity to the project agent system in the form of legislation and related policies. They continue to state that some conservatives in the government should be encouraged to select a project agent system, build an orderly competitive environment, and boost healthy development of the construction industry. Zhao, Yan, and Zhou (2009) analyzed the relationship between project success, project governance, project management, and project performance improvement in the framework of project governance. He constructed an analysis framework of optimizing the institution of the project agent system based on project governance. In accordance with the current model of enterprise agent, he analyzed and proposed key governance factors regarding project agent system reform, and concluded that project governance structure and governance mechanism are keys to reform the project agent system. He also suggested reforming the project agent system of the government investment system. Xu (2011) considered that credit was very important in the construction market. In his game model, he considered the cost of information research, supervision and communication, and analyzed necessary conditions for the project agent to promote a win-win situation, and implement ways to control credit losses in the construction market.

Yan and Zhao (2009) thought that the research on the agent's incentive mechanism is crucial to reform and to implement the project agent system in the enterprise agent model. Based on the theory of project management, they put forward the overall theoretical framework of the agent's incentive mechanism, including the internal and the external incentive mechanism. Internal incentive mechanisms include risk sharing and reward mechanisms based on risk sharing. External incentive mechanisms comprise the agent project management performance evaluation and reputation mechanism. Zhang and Zhou (2009) considered the

precondition that the project agent system takes into effect is that the principal and agent divide their responsibilities well, which does not always take place in practice. The authors analyzed the case of the project agent system in the projects of post disaster reconstruction in Sichuan implemented by Hunan province. They established an economic model dividing the responsibilities of different parties. The results showed that the agent's management capacity and the government's supervision capacity require improvement to make the project agent system more effective. The agent market should be fostered fully to make the agents compete in the market, ensure the market is under effective supervision, prevent adverse selection and moral hazard, avoid agents' rent-seeking which results in low efficiency and high cost and risk. The government should use market rather than administrative appointments to select project agents openly, fairly, and justly. The agent should be entrusted and empowered fully and reap reasonable rewards, so as to burden their responsibility actively and promote their management capacity continuously.

Bai (2009) thought that the project agent system developed slowly because project agent fees were low. He constructed an agent fee model based on the principal-agent relationship. He found that an agent's compensation portfolio in a project agent system is a combination of fixed payment and variable payment and is associated with the agent's effort. If the fee model is linear, the agent's expectation is stable and he or she will take a coherent effective action. If the model is nonlinear, we should pay more attention to the role of the performance appraisal system in determining an agent's compensation.

Zhang and Chen (2010) summarized the calculation of an agent fee with four methods: (1) fixed rate budget construction costs, no commission; (2) fixed rate construction budget costs, no commission, but rewards and punishment based upon performance; (3) agent fees determined by a construction unit's management fee, with fixed rate commission according to cost savings; and (4) project agent fees according to the contract terms with no commission, but other rewards and punishment based upon performance. Based on the analysis of the four agent fee calculation methods and the practice of non-profit government investment projects in China, Zhang and Chen suggest a new method to calculate the agent fee: a fixed rate based upon the construction project's total budget, plus commission according with savings, and penalties if

there are breaches in the contract or if the agent goes over budget.

Chen (2013), who studied project contracts of the three parties, found that the government and the user are all principals (named two principal), thus forming two principal-agent relationships. In instances where the government and user are not professional in their project management, there can be asymmetry between the principal and the agent, and the agent could have noteworthy information advantages over the government and user. Their game model analysis showed that the double principal could establish a project management office to supervise the project agent's work behavior, so as to reduce information asymmetry. Meanwhile, in order to make the agent put more effort in work, the principals should give the agent incentive compensation and adjust the incentive and punishment terms according to the project agent's level of risk aversion. Cao (2014) constructed a project agent system incentive and supervision model based on a hypothesis of complete rationality and fairness preference and a principal-agent theory framework. He found that the incentive and supervision mechanism are important in affecting the project agent's behavior. The project agent will claim higher fees when government supervision is stricter. Not only will the government save on supervision costs, but it also can increase the expected return if it considers the agent's fairness preference. Guo and Yao (2014) analyzed the principal-agent relationship in a project agent system according to the principal-agent theory. They found that the principal and agent all have moral hazard, that is, their decision may benefit themselves but no other parties. Guo and Yao established a game model between principal and agent, and analyzed the methods to avoid moral hazards, such as extrinsic incentive mechanism and intrinsic incentive mechanism.

Qian and Huang (2014) studied the relationships between audit supervision, governance and performance of project agent system in government investment projects with data from 143 questionnaires in China's Yangtze River Delta region. They found that project governance had an immediate effect on the relationship between the tracking audit and project performance, and played a partial intermediary role in the relationship between the performance audit and project performance. This meant that the tracking audit and performance audit are effective ways to improve the performance of the government investment projects. Tracking and performance audit can play roles of supervision, evaluation and verification in the process of

government investment projects, which will ensure the authenticity, legitimacy, and effectiveness of the whole process, and the economy, efficiency, and effectiveness of the government investment project results.

Based on analyzing the Construction agent System of government investment projects, Hu (2016) found out some problems in the application of the Construction agent System in the construction agent of government investment projects in our country, including the chaos of market management, the imperfect related supporting system and less competitiveness of the construction agency. And a series of measures were put forward to solve these problems, such as optimizing the management mechanism of agent building, setting up a scientific and effective incentive and restraint mechanism, integrating the agent building agencies, and constricting the conspiracy in the agency management.

Wei (2017) analyzed current problems in implementing agency construction system in government investment projects, including the imperfection of current admittance and supervision system, the chaos of construction market, the contradictions between construction agency and intermediary like supervision units and inappropriateness of agency fees and the system of rewards and punishments. He also put forward some measures according to these problems such as improving the supporting regulations and systems, standardizing the market access conditions, credit guarantee and risk control mechanisms, improving the overall quality of project management companies and improving the process of monitoring and performance evaluation system.

Cha (2016) analyzes the traditional management mode of government investment projects, combining with the implementation situation of investment projects in Tongxiang City, Zhejiang Province, and points out the problems of immature market and difficult to promote and implement. Some solutions are puts forward such as optimizing the mode of construction agency system due to promotion the project management mode based on agency system, improving the generation of the relevant laws and regulations, accelerating the transformation of government functions as well as promoting service outsourcing, cultivating the system of agent competition in the market, and establishing a scientific evaluation system.

Focusing on the internal construction agent system of the non-profit government investment projects in Chongqing City, Song (2016) comprehensively explored the management function of internal agent system, the distribution of rights and liabilities, the procedures of organization and implementation, the appropriation management and supervision of funds. Taking Jialingjiang magnetic well section of flood protection and bank protection comprehensive renovation project in Shapingba District of Chongqing City as a case, Song demonstrated the details in this project including the implementation process of organization, fund raising, payment and management, audit and monitor, and risk control, to show the superiority of construction agent system.

2.5 Chapter summary

Based on the current research on the government investment project management at home and abroad, this chapter combined with the background, current situation and the main theoretical foundation of China's government investment project agent system management, discusses the status quo of China's generation agency system. By analyzing the pros and cons of each generation system and the concrete analysis and research of the application examples of the generation system as well as combining with the current economic situation in China, it is more appropriate to choose suitable construction mode for the current stage of development of CIXI City. This chapter reviewed the literature on project management method, and the definition, development and operation mechanism of project construction agent system. This review will provide a solid theory basis for later chapters' study.

Chapter 3: Theory Analysis of Construction Agent Model in Non-Profit Government Investment Project

3.1 Basic model of project agency system

There are many stakeholders in the project agent system, including government departments (including the investment department, supervision department, project using units), project agent, design units, contractors, supervision units, and suppliers. The principal, project agent, and user are the most important three parties. In the basic model, the using units (user) generally are government departments or their subsidiary bodies, which submit the project application and will accept, use, and manage the project after it is completed. The user will finally have the property rights of the project. There are the main responsibilities of users: (1) submit the project proposal and feasibility study report in accordance with their real demands and government development planning, which should be checked and approved by the government investment department; (2) introduce the use conditions of the project and its function requirements in the project design stage; (3) assist the project agent to handle procedures related to the projects, including all kinds of checking procedures from the government departments of investment, finance, environmental protection, planning, construction, land and housing, fire, municipal, landscape and greening; (4) assist the project agent to coordinate the relationships between project agent and government departments and organs; (5) supervise the project agent together with other government departments; (6) cooperate with other government departments to check and evaluate the report of feasibility studies, scheme design, preliminary design, and construction drawing design; (7) supervise the demolition process and resettlement, field exploration, design, construction, supervision, procurement and bidding, and submit opinions and suggestions in the construction process; and (8) participate in the project acceptance work, and handle the projects receiving procedures.

Principals generally refer to the government department in charge of investment, that is, the DRC or its authorizing unit. The principal's main duties are regulated as follows: (1) check

and approve the project proposal, feasibility study report, scheme design, engineering budget and start planning; (2) determine the project agent through open tender; (3) arrange an annual investment plan and coordinate the financial sector to disburse construction funds according to the project schedule; (4) supervise the project agent to complete the contract; and (5) organize the project acceptance and hand over.

Project agents are legal persons or organizations with construction management experience and professional qualifications in project consulting, engineering supervision, construction, and real estate development, such as a project management company and an engineering consulting company. The main duties of a project agent are engineering construction management and consultation. A project agent is often an enterprise that has competitive advantages in project management. It makes its money from agency and consultation fees and commission on construction saving.

The project agent is legally in charge of the government commissioned project and is the project construction manager in the project construction phase. It takes total charge of the construction according to the responsibilities the government entrusted to it, and is accountable to the government. The project agent has professional and technical qualifications and management experience, which will help it control and manage the investment, quality, and time well in project planning, design, preparation, project budget, bidding of construction unit selection, and equipment and materials procurement. It will help ensure that the construction project is completed successfully. The project agent is responsible for managing the construction funds that need to be used in accordance to how the government departments planned and approved. The project agent has legal power and bears the legal and economic responsibility for the project.

3.2 The process of construction agent system

As for the type of project, a project agent system can be categorized into two types: whole process agency and construction stage agency. The whole process agency means that the department in charge of investment selects the project agent after the project is approved, and

the agent is responsible for project preparatory work (including preparing the project feasibility study report, selecting design units, preliminary design organizational work), and project construction. Construction stage agency means that the agent is only responsible for construction management work in the construction stage, including the organization of preliminary design, construction drawing design, selection of construction and supervision units, supervision and management of the construction work, and the project acceptance and handover after project completion.

According to the “Decision on the Reform of the Investment System” issued by the State Council of China in 2004, the project agent system means a project management system with non-profit government investment projects, in which the government chooses a professional project management organization by way of tender, and this professional project management organization is responsible to construct and implement the project. The organization must manage the project’s investment, and ensure that the project is carried out in a quality fashion and adheres to the timetable. Upon completion and approval, it must then hand over the project to the user. The project agent system includes the following steps:

(1) Propose the project. The user proposes the project’s specific functional requirements, professional and technical requirements, construction content and standard and initial investment estimation. The user prepares the project proposal and applies to the government-planning department.

(2) Project approval. The government investment department (generally the DRC) approves the project proposal, and note in the approval whether to use project agent system, as well as the type of project agent.

(3) Determine the project agent. The government should determine the project agent after approving the proposal if the agent is a whole process agent. If the government uses different agents throughout the process, after approval, the government will select the first agent for the preparatory work, and then determine the second agent to take the construction lead after approving the initial design and budget. The government selects the project agents through a bidding system in accordance with national and local policies and rules.

(4) Sign a project agency contract. After the government determines the project agent, a commission unit and the user sign the project agency contract with project agents according with the policies and rules, and define the rights and obligations of various parties.

(5) Carry out preliminary work. The project agent puts together the project feasibility study report, preliminary design, and budget according to the approved project proposal and bidding documents. The agent then submits these reports to the government department in charge of investment. The departments entrust social intermediary institutions with corresponding qualifications to assess these reports, and examine and approve the preliminary design and budget according to the assessment.

(6) The user determines the amount of investment in accordance with the approved budget, and uses this as a basis to control investment and assess the agents.

(7) The project agent determines who will work on project design, construction, supervision, consulting and tender through a bidding process according to corresponding policies and the project agent contract.

(8) Planning approval and construction implementation. The project agent begins the project planning, handles procedures to start construction, and organizes the building in accordance with the basic construction procedures.

(9) Complete the files. The project agent collects, sorts, and files the documents in project stages according to corresponding regulations on the project file. When the project agent transfers the project plans to the user and government, the engineering records, financial records, and other project documents should be transferred at the same time.

(10) Completion, acceptance, and handover. After the construction project is completed, it finally should be accepted according to corresponding regulations and contract. Only a qualified and approved project can transfer to the user.

(11) Government audit departments check and supervise the whole process with the project agent in accordance with its duties.

3.3 Principal agent relationship in construction agent system

The essence of project agency lies in that the project owner entrusts the project agency to offer professional engineering management services in order to achieve the investment, quality, duration, and other construction investment objectives. In accordance with the draft of “Reform Plan for Investment System”, drafted by the National DRC and approved by the State Council, it points out that the relationship between project owner and the project agency is a typical principle-agent relationship, that is, the project owner is the principal with the project agency as the agent.

3.4 Problem of asymmetric information

Zhang (2001) defined the asymmetric information that some participants have the information but other participants do not have. According to dimensions of time, asymmetric information can be categorized into two types: 1) the problem of asymmetric information in advance (ex ante), namely the information asymmetry occurring before the principal-agent contract, which could cause "adverse selection", namely the principal rejects the outstanding agent and selects the unqualified agent instead; and 2) The ex post asymmetric information, that is, asymmetric information occurs after signing between the principal and the agent, which is likely to induce "moral hazard". This means the principal cannot understand the agent's actions, thus causing agents to select actions in their own interests and not in the client's. According to content asymmetry, information can be divided into “action asymmetry” and "knowledge asymmetry", which are known as “hidden action” and “hidden information” respectively. The former corresponds to ex post moral risk while the latter corresponds to ex ante adverse selection.

The adverse selection problem stems from ex ante asymmetric information. Here, the agent is unqualified to provide certain quality products or services, but in order to obtain the contract he deceptively commits to the client to deliver. It is difficult for clients to know whether they are working with a qualified agent or being deceived. In the "adverse selection" problem,

the principal's main focus is to obtain the agent's private information via the rational design of contracts, in order to reduce the degree of asymmetric information, thereby avoiding passive behavior in the contract performance. The main way to solve the adverse selection is to design the mechanism of "signal" and "screening". Zhang (2001) defined the signaling and screening as follows, the signaling is that the principal does not know the type of agent but the agent knows it. In order to make principal units know it, the agents can transmit some information in some form. The screening is that the principal provides several contract options for the agent and the agent chooses the most suitable one according to its information and acts following the contract. Information screening achieves the purpose of identifying different types of agents via separate equilibrium. In the screening mechanism, the player without private information takes action first, but in the signaling mechanism, the player with private information takes action first. Bid work is the most common signaling mechanism in engineering, and the screening mechanism is seldom used in engineering construction.

Moral hazard means that agents take advantage of information asymmetry and reduce their loyalty to clients, possibly engaging in opportunistic behavior to maximize their own benefits. This is detrimental to the clients. In order to mitigate moral hazard problems, the clients can take the corresponding measures:

(1) Design an incentive contract to induce agents to select the action most advantageous to the client from their own interests, mobilizing their (1) enthusiasm and causing an increase in their efforts.

(2) Build an effective supervision mechanism, enabling agents to pay the price for the moral hazard behavior.

(3) Construct competitive agent markets binding them through market mechanisms and reputation.

3.5 Participation party and information asymmetry in the construction agent system

The parties concerned with the project agency contracts on the non-profit government investment projects generally include three main parties: (1) the project entrusted organization, (2) the project agency unit, and (3) the using unit. The relationship among them is: through bidding and other models, the project entrusted organization selects a professional project management unit (that is, the project agency unit), which is in charge of construction and implementation. A professional contractor is chosen by the project agency unit and handed over to the client upon completion, according to the construction contract, with the project investment, quality and time limit for a project strictly controlled in the construction process.

(1) The project entrusted organization

The project entrusted organization refers to the unit, which passes the non-operating investment project to the professional project management unit responsible for constructing and implementing it by commissioning. In other words, the project entrusted organization is the principal of the project agency project.

At present, implementing the pilot practice, the project entrusted organization varies depending on place. Some provisions are commissioned by government departments or departments authorized by the government (such as the Beijing MDRC), and some are delegated by the using unit (such as Chongqing and Ningbo), and some are commissioned by the lawfully established project entity (such as Shanghai rules "The project agency system is to sign an authorized management contract between a lawfully established project entity and a project management company").

In the project agency system, different principal subjects lead to different patterns of the project agency system and form various styles and management styles. Apparently, the role of the principal in the project agency is so critical that a specific pattern cannot be applied to all cases and should be determined under different backgrounds in various ways in order to achieve the client's best interests.

(2) The using unit

In the project agency system, the using unit refers to the party, which puts forward the use function, assists the project agency to complete the project's construction work and actually receives, uses, and manages the project upon completion,

(3) The agent-construction enterprise

The agent-construction enterprise implements the entire process or phased management functions of the government investment project in place of the government owners. However, from the practice of all around pilot points, the project agency's establishment and operation mechanisms are different. They can be divided into three types: 1) government-agency, 2) event-unit, and 3) enterprising type. The government-agency type has government authorities in direct charge of the project construction management. For example, examining the "Unified Project Construction Management Office of Shanxi Province": the office is responsible for the unified construction and management of government investment projects in the province, carrying out the uniform construction and management for construction projects originally belonging to all bureaus (except for water, transportation, and other industries) and withdrawing the infrastructure departments in the above bureaus. Shenzhen Municipal Public Works Bureau and the Public Project Construction Center of CIXI in Zhejiang province behave similarly to that in Shanxi Province. In the event-unit type, the government sets up a special event unit to manage construction projects. For instance, a special project construction management company has been established by the Construction Bureau of Shanghai Pudong New Area. The company is a non-profit organization dedicated to implementing and managing government invested partial municipal infrastructure projects. The enterprising type is usually utilized after the project plan is defined. The relevant government departments commission an enterprise to act as the owners. An example is the Chongqing Urban Construction Development Co., Ltd. This is similar to foreign project management companies. The company takes responsibility for the project construction commissioned by the government, namely the government hosts the government investment project to the company, which is tasked with implementing the entire construction process.

However, in the economic utility maximization and the behavior of opportunism hypothesis, the agency problem emerges due to the agent's inconsistent objective function and the principal and the existence of information asymmetry in the principal-agent relationship, namely the adverse selection problem and the moral hazard problem. Table 3-1 shows the information asymmetry of agent-construction body of the government investment projects.

Table 3-1 The information asymmetry of the agent-construction body of the government investment projects

Project agency stakeholders	Information advantages	Information disadvantages
The government principal	Finance paying capacity ; project planning intentions; construction standards and regulations	The intention of the using unit to change the plan; actual conditions of the project construction ; management level and integrity of the project agency company, supervision company, contractor and other related parties
The using unit	Project planning intentions; management intentions ; needs of project using	Lacking in specialized management institutions and professional technical personnel; Insufficient mastery of the existing laws and regulations; The intention of the government commission to change the plan;
The project agency company	Familiar with design and construction technical specifications; professional management experience in engineering construction; capacity to control the contract	Management level and integrity of the project agency company, supervision company, contractor and other related parties Construction regulations and standards ; finance paying capacity of the government principal; Intentions of the using unit to change the plan and management; Intentions of the government principal to change the plan

3.6 The principal-agent relationship in the traditional project management model

Generally speaking, the traditional management model of government investment projects adopts the project management model built by project users, which means project users directly control government-invested projects by establishing organizations like project legal persons, project command departments or infrastructure departments. To begin, the first level of the principal-agent chain is the relationship between the government investment department and the project unit, where the former is the principal and the latter is the agent. Then, the project unit directly sign business contracts with professional institutions like planning and design units, construction contractors and supervision units, thus establishing a couple of the second parallel layers of principal-agent relationships. The project user is the principal, and organizations like planning and design units that serve as agents, and financial and audit departments have the function of supervision. There are many drawbacks in the chain in these double principal-agent chains with project units serving as the coupling point, no matter whether they are an agent, or a principal. The reasons are as follows. First, due to the imperfect investment system in China and insufficient supervision from the relevant government departments, there exists the moral hazard problem that project users construct more than they have reported. Second, adverse selection problems arise when the project user select construction contractors and other institutions because they lack professional knowledge and project management expertise.

3.7 The principal agent relationship in the construction agent system

After implementing the project agency system in the non-operating government investment projects, the project units are no longer directly involved in project, construction, and management after addressing building function needs and requirements. Their main functions are to supervise the project agency's construction activities together with the government authorities. Since the project users are the most direct stakeholders, they have enough motivation to supervise the project and improve its efficiency. At the same time, it also

avoids the moral hazard and adverse selection risk produced by the project units as an agent. Under the project agency system, the related interest parties of the government investment projects have formed a principal agent chain, which takes the professional project agency company as a link. In this principal agent relationship, the government investment departments are clients of the investment project, and the project units have now the role of supervision, and the professional project agency companies become agents, responsible for the project's investment management and construction implementation activities. In the relationship between the principal and agent, the project agency unit, as an agent, plays a crucial role in the project. The construction agency unit has its unique advantages. They are rich professional knowledge and experience in project management, and the agency units are familiar with the investment rules and infrastructure program, and they are able to take charge in the entire construction procedure. On the other hand, it will take more time and money if the government investment departments and/or project users do it by themselves comparing with agents'. Thus, with some extent, the agent system is an effective and efficiency system that can improve the government's investment benefits and management level.

3.8 Chapter summary

This chapter analyzed the basic model of project construction agent system and its principal-agent relationship in theory. Drawing upon principal-agent theory, the information asymmetry and the agent problems (adverse choice and moral hazard) were analyzed in project construction agent system. We also compared the traditional project management system with the project construction agent system on the principal-agent relationships.

Chapter 4: Research Methods and Data Collection

This chapter introduces the research methods that the author applied in this thesis, as well as the data collection and analysis methods. The author implemented a case study strategy in which he collected first-hand data through interviews. The author also collects secondary data mainly from related governmental documents and announcements.

4.1 Research Method: Case Study

4.1.1 Research Philosophy

Researchers must understand the philosophy research before actually studying the research problem. This understanding helps a researcher select the appropriate research methods and data collection procedures. The philosophy of research includes some important assumptions, which support the research strategy and methods when investigating problems. Furthermore, research philosophy connects the developments of knowledge and the nature of that knowledge. (Saunders, Lewis, & Thornhill, 2009) In short, philosophy help the researcher select appropriate research methods and strategy, and provide a context for him or her to evaluate the research process. Moreover, it can inspire research in terms of the method and design of the research. (Easterby, 1997)

Additionally, there are two typical perspectives to think about when examining research philosophy. One is the ontology, and the other is the epistemology. The former is concerned with nature of reality, which focuses more on objective and subjective aspects. The latter focuses on what constitutes acceptable knowledge in a specific field. In short, ontology is a kind of logical like “what is it” while epistemology questions “how do we know it” (Saunders et al, 2009).

There are four aspects of philosophy, positivism, realism, interpretivism, and pragmatism respectively. Each has its own characteristics and properties.

Positivism embraces the empirical method and makes use of quantitative analysis. In other

words, it states that knowledge is based on natural phenomena and their properties and relations. There is considerable mathematical computation involved in positivism because this type of research requires verified data (positive facts) that are empirical evidence. As a result, positivism is based on empiricism.

Realism about a given objective is the view that this object exists in reality independently of one's conceptual scheme. In philosophical terms, these objects are ontologically independent of one's conceptual scheme, perceptions, linguistic practices and beliefs. The opposite of realism is idealism. Idealism asserts that reality, as we know it is essentially mental, mentally constructed, or otherwise immaterial. From an epistemological perspective, idealism manifests as skepticism about the possibility of knowing any mind-independent thing.

With respect to interpretivism, it involves interpreting elements of study, thus it integrates human interest into the research. Interpretive researchers believe that access to reality is through social constructs such as language, consciousness, shared meanings and instruments. The interpretivist approach crucial for the research to appreciate differences in people. When using an interpretivist approach, the research usually focuses on meaning and may employ many methods in order to reflect different aspects of the issue.

As for pragmatism, this approach focuses on a practical applied research method through quantitative analysis or qualitative analysis (Saunders et al, 2009). Note that quantitative analysis focuses on numerical data while qualitative analysis concentrates on descriptive data. Pragmatism includes those who claim that an ideology or proposition is true if it works satisfactorily, that the meaning of a proposition is found in the practical consequences of accepting it, and that one should then reject unpractical ideas.

Based on this study's research questions of what are the differences of various project agent models and what is their main information asymmetry, the author chose to utilize qualitative analysis. Additionally, and based on the information gathered the aim of this study is also to improve the current construction agent system of CIXI city through studying other regions' construction agent systems. Having said that the current research study is ultimately concerned with the practical application of its results therefore from an epistemological

perspective it can be inserted in pragmatism approach. In terms of the methods and following the choices made researcher usually employ participant observation, in-depth interviews, and focus groups while using this approach.

4.1.2 Case Study

There are seven strategies in social science research, namely Experiment, Survey, Case study, Action research, Grounded theory, Ethnography, and Archival Research (Saunders et al, 2009). In light of the type of study, various strategies can be utilized by researchers. Based on the purpose of study, the author chooses the case study method.

Robson (2002) proposed that ‘case study is a type of strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiples sources of evidence’. In short, case study approach summarizes practice phenomenon through empirical analysis.

The case study method can answer the question “why?” but also the “what?” and “how?”. As we can see, the case study is flexible enough so that it can be both used in exploratory and explanatory studies (Saunders et al, 2009).

In terms of the data collection in the case study strategy, researchers can utilize the following method: Interviews; Observation; Documentary analysis; and Questionnaires (Saunders et al, 2009).

Normally, case strategy data collection depends on the case information. Moreover, researchers can use more than one data collection method in order to obtain accurate information about the case in analysis.

Furthermore, Yin (2003) recognized four case study categories based on two dimensions:

Single case v. multiple cases

Holistic case v. embedded case.

The first dimension is based on the number of cases the researcher applies in the study. The second dimension is the unit of analysis, which means the researcher analyzes the whole

organization in general or one or several sub-groups or departments of the organization. (Yin, 2003)

In this research, the author primarily studies how to choose the appropriate management agent model in the government invested nonprofit projects. Taking into account that involving third-parties in nonprofit projects in which the Chinese government invests is a relatively new area, the case study approach is the best research strategy to implement in order to obtain as much information as possible. In this study, the author studied and summarized the management agent models from five different areas: Peking, Guangdong, Zhejiang, Shenzhen, and Shanghai respectively.

The author then looked at the general situation regarding the construction agent management model in CIXI City. This served as the prototype for the rest of the study and give context to the research questions at hand. The author then implemented case selection in order to compare and contrast the situations in the five regions.

Case selection:

The researcher selected project management experiences in non-profit government investment projects in five regions: Peking, Guangdong, Zhejiang, Shenzhen, and Shanghai. The construction agency models of non-profit government investment projects in these five regions are typical and representative for China. These models have been in place for more than ten years so there is a pattern and track record to be followed. While similarities exist between the construction agency models in these five areas, there are distinct regional characteristics.

Shanghai was one of the first places in China to implement the construction agency model at the end of 2001. The construction committee of Shanghai approved 13 companies as the first batch of construction agents. Some representative projects using construction agents included Shanghai Municipal Party school project, Xinmin Line Engineering, Gonghuoxinlu Elevated Engineering, the Pearl Line projects, the Dalian Road Tunnel, the North Central Expressway, the Shanghai Viaduct Project (phase two), the Shanghai Green Ping Highway Project (West), the Hulu Expressway, and the Jia Jin Expressway.

Peking started implementing the construction agency method in government investment

projects in 2002. This method involved separating investment, construction, management and use and utilizing a professional management company to oversee all aspects of the project. Beijing Hui Long Guan Hospital was the first project to use a construction agent in its ward-building project in May 2002. The DRC of Peking issued 'Measures of Beijing Municipality on Administration of Construction agent System for Government Investment Construction Projects (Trial Implementation)' and 'Commissioned Construction Contract of Beijing Municipal Government Investment Projects (model text)' in 2004. The latter provides an example contract for construction agent companies. Thereafter, construction agent system came to be used by non-profit government investment projects in many areas (including education, health, culture, sports, public security department, party, trade, and environmental protection).

The Developing and Reform Commission of Zhejiang Province issued 'Interim provisions of the Zhejiang Provincial Government Invested Project on the Implementation of Construction agent System in February 2005 and implemented it in March 2005. After that the government issued 'Interim Measures of Qualification Assessment to Zhejiang Province Construction Agent Units' and 'Construction Project Contract Model Text'. The first project using construction agent system is the construction project of "one school and two chambers", which actually include three units: Zhejiang provincial Party school, provincial administrative college, provincial socialism institute new campus. Until 2008, there have been 25 projects using construction agency system, and the projects cover areas, such as schools, hospitals, public security, fire protection, civil affairs, labor, and culture.

Guangdong Province issued and implemented 'Guangdong Province, the Provincial Government Investment Projects Construction Management Measures (Trial)' in February 2006. It claimed that all the non-profit government investment projects should use the construction agent system.

The construction agent system of Shenzhen city includes two kinds of organization models: a bidding selection construction agent unit and a special agent organization. The Shenzhen municipal government founded a construction works bureau that is subordinate to the principal construction bureau, and is responsible for managing of city government investment projects except for water and transportation projects. The first project that used the construction agent

model was the Nanping Expressway Project in October 2003. The agent was Shenzhen Expressway Company Limited. The Shenzhen city government issued ‘Administration Measures of Construction agent System on Shenzhen Municipality Investment Highway Construction Projects (Trial Implementation)’, and proclaimed that companies must participate in a bidding process to become the government’s construction agent. The agent period begins from design conception and ends at the final acceptance.

4.2 Data Collection

As stated earlier, there are numerous methods for collecting data when implementing the case study strategy. The thesis analyzed first-hand data, but also utilized secondary data. In terms of collecting first-hand data, the research relied on interviews. The author drew his secondary data from analyzing documents.

4.2.1 First-hand data: Interview

In order to match the research problem of how to choose an appropriate agent model for the government investment nonprofit project, primary data was collected by the author through personal interviews with project managers and staffs.

Undoubtedly, interviews are one of most popular and effective ways to collect information in the case study strategy. Additionally, there are different interview categories. One common typology is based on the interviews level of formality and structure. These include structured interviews, semi-structured interviews, unstructured or in-depth interviews (Saunders et al, 2009).

In this thesis, the author used semi-structured interviews and unstructured interviews (in-depth interview). Semi-structured and unstructured (in-depth) are more flexible compared to structured interviews. Therefore, in semi-structured interviews, the interviewer can change the order of questions list and remove some questions in a specific interview although despite a comprehensive list of questions. Furthermore, in the unstructured interview, the interviewees have fewer restrictions from questions, thus they can talk more freely about the event and

projects related to the topic area by combining this information with the interviewee's experience and thoughts. (Saunders et al, 2009)

The author first used semi-structured interviews in this research, chiefly when interviewing those involved with the CIXI city government investment nonprofit project. Then, the author used the unstructured interview to study the CIXI city government's management model for investment projects after understanding the general management model of CIXI city government's investment projects.

The following Table 4-1 lists the semi-structured interview questions:

Table 4-1 Interview questions in the CIXI city case

no	Interview Questions
1	How does a construction agent find the project?
2	How does the government choose the agent model for the project construction?
3	What are the bidding processes and requirements?
4	How does the government finally decide the construction agent company?
5	What is the type of contract? (contract signatories, contract content)
6	How do the government departments and building users evaluate the construction agent?
7	What does the construction agent think of the principle-agent relationship?
8	What management model does the construction agent chooses to manage the project? What are the difficulties in the management?
9	What kind of management model does the construction agent adopts for the project? What are the difficulties?
10	How is the project performing?

4.2.2 Secondary data

Secondary data differs from the primary data because it is based on others' research, but it provides a context for the original research and helps guide the researchers as he or she tries to glean new information that will contribute to the scholarly body of knowledge. Since secondary data is easy to obtain and has already been validated by scholars, researchers have widely applied such information to management studies. To a certain degree, secondary data have large

enough sample sizes and sufficient information that can add value to studies.

In this thesis, the author collected secondary data from government documents related to the construction agent. The following Table 4-2 lists related documents and materials from five regions that were relevant to this study.

Table 4-2 Relevant regulations in five regions

	Issued	Regulations
Beijing	2004.03.01	Measures for the Administration of Construction agent System of Beijing Municipal Government Investment Projects
	2004.12.07	Measures for the Implementation of the Construction agent System of Highway Projects in Beijing (Trial Implementation)
Shanghai	2001.10.01	Regulations on Shanghai Municipal Engineering Implementation Construction agent System (Trial Provisions)
	2001	Interim Provisions of Shanghai Municipality on the Administration of Qualification for Project Management Company
Zhejiang	2004.02.21	Interim Provisions of the Zhejiang Provincial Government Invested Project on the Implementation of Construction agent System
	2005.05.16	Interim Measures of Zhejiang Province on construction agent units Qualification Assessment
Guangdong	2012.6.29	Guangdong Province: The Provincial Government Investment Projects Construction Agent Unit Tendering and Bidding Management Approach
	2006.4.7	Guangdong Province: The Provincial Government Investment Projects Construction Agent Management Measures (Trial)
Shenzhen	2005.6.13	Measures for the Administration of Construction agent System of Guangzhou Municipal Government Invested Construction Projects
	2000.7.1	Regulations of the Shenzhen Municipality on the Administration of Investment Projects
	2014.8.28	Regulations of the Shenzhen Municipality on the Administration of Government Investment Projects
	2005.8.1	Interim Measures of Shenzhen Municipality on the Administration of the Construction Agent of the Futian District Government Invested Construction Projects

After collecting the data, the author collated and analyzed it. In this process, he filtered, code, classified and processed the data. Chapter 5 will provide this detailed analysis process.

4.3 Chapter Summary

This chapter introduced different philosophical approaches to research and research method to frame the choices made by the author. The author discussed how he selected the case study approach and then outlined case selection and case survey methods. The following chapter will provide an in-depth analysis and finding of this research.

Chapter 5: Construction Agent System in Five Regions

The “Decision on the Reform of the Investment System’ issued by the State Council of China in 2004 did not define which government department can act as a principal and did not define who can be the agent. It regulated that the agents should be selected by open bidding, but not limited to bidding. As a result, there are many tricks in the agent selection, which resulted in various kinds of project agent models in different regions of China.

5.1 Five construction agent systems

5.1.1 Project agent system in ZheJiang province

The DRC of Zhejiang Province issued the “Interim Provision on the Implementation of the Project Agent System in the Government Investment Project of ZheJiang Province” in 2005, based on the central government’s “Decision on the Investment System Reform” and the Zhejiang provincial government’s “Management Regulations on the Government Investment Project”. The provisions regulated that the non-profit government investment project that is invested by the provincial government and the total investment of which is more than 500 million Yuan should use the project agent system. There are two kinds of project agent models to select: whole process agent and stages agents.

The Department of Investment Management of Zhejiang Province (namely the DRC of Zhejiang Province) is responsible for guiding, coordinating, and supervising the implementation of the project agent system, including checking and approving the project agent’s qualifications, determining the project agents by way of bidding, auditing, and supervising the projects according to laws, and investigating and punishing illegal behaviors. Departments of finance and audit manage and supervise the financial activities of government investment projects. Other departments in the provincial government also have responsibilities to manage and supervise these projects.

The use unit is a project legal person and is responsible for preparing project proposals,

coping with the approval and planning procedures, proposing the construction standards and function demands. Moreover, it participates in the project activities, agent selection and project tendering and bidding, and construction supervision.

The project agent takes charge of the construction. It will play the role of the project legal person in the project's construction phase. Its responsibilities are writing the feasibility study report, customizing and reporting for approval on the preliminary design, organizing the bidding for the engineering survey, design, supervision, construction, materials and equipment procurement, contract negotiations, signing and fulfilling the contract. It manages the entire construction process, and should submit the annual investment plan to government departments according to the project schedule requirements, and should report the project's progress and the use of the funds on a monthly basis to the use units and government departments.

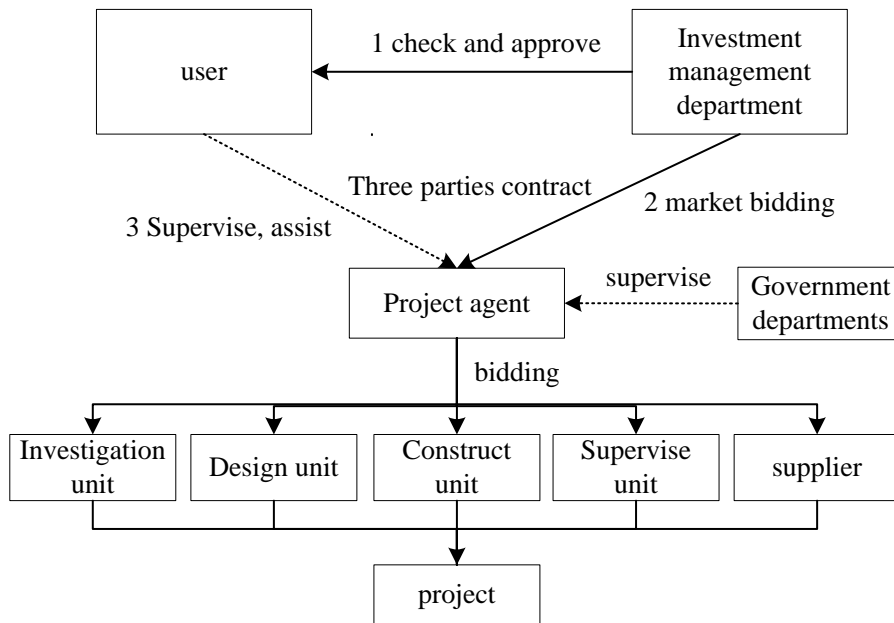


Figure 5-1 Project agency mode in Zhejiang

Figure 5-1 shows the project agent model system in Zhejiang Province. The investment management department of the Zhejiang provincial government first approved the project application of project user, then selected the project agent by way of market bidding. The project agent is legally independent and has corresponding qualifications and similar engineering construction management experience, corresponding construction management

capabilities and financial strength. The project agent system uses contract management, which the government department of investment management approves. The project agency contract will define the project requirements on investment, quality and time, on the basis of meeting the project's functional requirements.

The DRC of Hangzhou City, Zhejiang Province issued "The Interim Regulations for the Management of the Project Agent System of Government Investment Projects" in 2009, which regulated that the projects that are invested by city government and the total investment amount of which is more than 500 million Yuan should use the project agent system. The city's DRC is responsible for comprehensive management of the project agent system. It organizes a joint meeting composed of construction, transportation, water conservancy, finance, audit, supervision, and other government departments, which are responsible for checking the project agent's qualifications. The difference between the project agent system in Hangzhou city and that in Zhejiang Province is that the DRC does not sign the project agency contract. It is signed only by the project agent and user after determining the agent.

In 2001, the government of Ningbo Zhejiang decreed that if a project's total investment is over 200 million Yuan and its financial investment is more than 200 million Yuan, and the construction units have no capability to manage the projects, these projects should use the project agent system. The project agent qualification review committee of government investment projects is responsible for certifying a project agent's qualification. The review committee is composed of delegates from the city's planning commission, supervision bureau, finance bureau, construction committee, and other departments. The project agent is recommended by the departments in charge of the enterprise or industry associations and obtains its qualification for government investment after approval by the review committee. The user should sign the project agency contract after determining the agent to establish the scope and form of the project, the rights and obligations of both sides, and incentives and punishment. The investment management department does not participate in signing the project agency contract, which is the same to that of Hangzhou city.

5.1.2 Project agent system in Beijing

The project agent system began in Beijing in 2002. The DRC of the Beijing Municipality tried the project agent system in some projects, such as Huilongguan Hospital, the Beijing Disabled Vocational Training and Sports Training Center, and the Beijing Disease Prevention Control Center (Liang & Liu, 2008). The Beijing government issued the “Approach (Trial) of Project Agent Management in the Beijing Government Investment Project” in 2004, which documented that non-profit government investment projects accounted for more than 60% of the total investment, therefore, they must implement the project agent system. The DRC of Beijing takes the lead in organizing and implementing the project agent system. The Finance Bureau of Beijing takes charge of finance management and supervision with project agent projects. There are also management responsibilities of other administrative departments of Beijing for the project in accordance with their respective functions and duties. Project agent is determined by tender and bidding which is charged by the DRC of Beijing. Other departments participate in or cooperate with the tendering according to their responsibilities. Project agency approved by the government should organize bids to procure construction prospecting, design, construction, supervision, main equipment and materials openly, in accordance with the relevant provisions of the law on tendering and bidding, “Beijing bidding regulations” and the “Approach (Trial) of Project Agent Management in the Beijing Government Investment Project”.

Figure 5-2 above shows the Beijing model of the project agent system. The principal is the DRC of Beijing, which awards the project to the agent by way of market bidding. The project agent is an enterprise or an intermediary organization with independent economic ability and technical strength. When the agent is determined, the DRC, the user, and agent will sign a principal-agent contract of three parties. This is the same model that Zhejiang province uses.

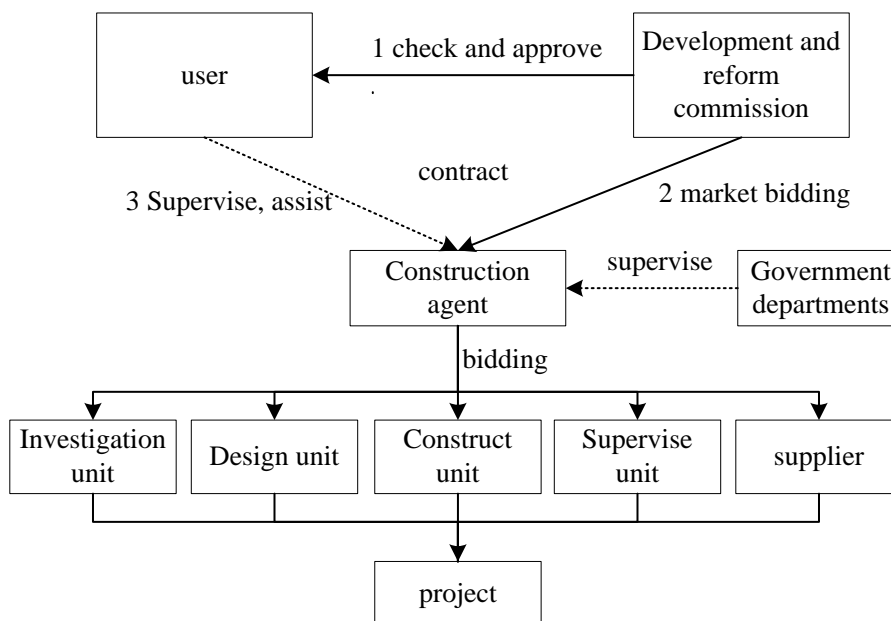


Figure 5-2 Project agency system in Beijing

5.1.3 Project agent system in Shanghai

The management model of the government investment project in Shanghai is a three-level management model, that is, (1) the government; (2) legal person of projects (investment company) and (3) the project management company, which separates the functions of government investment, investment management, and project management. The legal person of project includes that entity that is invested fully or controlled by the government, the main investment body authorized by the government, or companies which obtain project management rights by bidding, and bear functions of the project investment, construction, and operation. The legal person of project is a representative of the government whose main task is to manage the project's entire process, including investment, loan repayment, and facilities operations. The project management companies refer to the construction management companies, which have a management qualification certificate, issued by the Construction and Management Committee of Shanghai or that is listed as pilot companies to implement project agency.

According to the “Trial Provisions on the Project Agent System of Shanghai Public Engineering Management” released in 2001, the legal person of project should select the project management company through the market competition model in the project's preparation phase,

and the number of project management companies participating in the selection shall not be less than three. It can select a project management company by other ways if the project is small and its technical difficulty is low, but the municipal engineering authority should approve them. The project management company that the project legal person selects should be under the supervision of the administrative departments. After the project proposal is approved, the project legal person shall sign a principal-agent contract with a project management company. The project management company will oversee all management for the project from the initial preparation to completion. The Shanghai model is a whole process agent system, and the contract is signed between the project legal person and the project management company, while the government investment department does not sign the contract.

In the process of building, the project management company mainly provides technical advisory services to the project legal person, and participates in contract negotiations between the project legal person and subcontractors that include design, construction, and material supply units. The project management company does not dominate the contract signing. The contracts are signed by the project legal person and the subcontractors in design, construction, and material supply. The contracts should define the power and responsibilities of the project management company. The project management company also needs to sign its name on the contract as the implementer of the project contract. The project management company will implement the contract and related decisions of the project legal person seriously to meet the requirements of the project legal person. The project management company is responsible for contract management. It will manage the project's schedule, quality, safety, and civilized construction in accordance with the contract signed by the project legal person and subcontractors in design, construction, and materials supply. It will also supervise the quality of the entire construction process.

Figure 5-3 shows the project agent model of Shanghai. Differing from the Beijing model, the administrative department in charge of the project agent system in Shanghai is not the NDRC, but an engineering management bureau that the government specifically establishes. The bureau takes charge of approving projects, market regulation, supervision, and management. It is not responsible for selecting project agent and contract signing. The project

agent (a project management company) is selected by the project legal person in accordance with corresponding rules and laws. The project legal person signs a project management contract with the project agent. In the construction process, the project legal person will pay a construction management fee (including project management fees, a project bidding agency fee and project supervision fees) to the project agent according to the principal contract and time on the basis of the provisions of the central government and Shanghai government. The project company (project agent) shall implement the contract based on national laws, regulations, and the relevant technical standards of engineering construction, in order to protect the legitimate rights and interests of the project legal person and other related parties. The project management company cannot engage in the design, construction, and material supply of the project it manages.

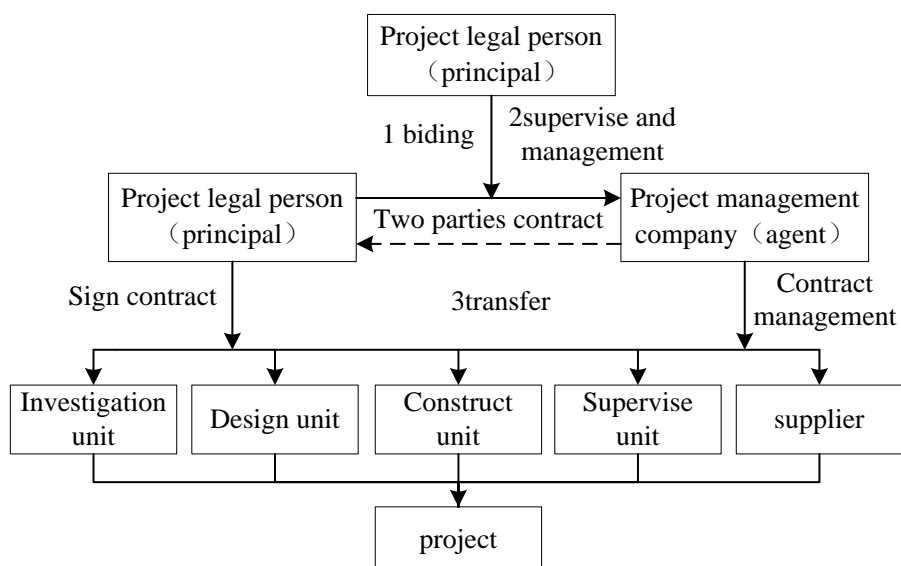


Figure 5-3 Project agency mode in Shanghai

5.1.4 Project agent mode in Guangdong province

Guangdong Province issued “The Management Approach (Trial) on Project Agent of Non-operating Projects Invested by the Guangdong Provincial Government” in 2006, which regulated that all the non-profit projects invested by the provincial government should use the project agent system. With a total investment of over 30 million Yuan, an open bidding should be used by the project to determine the project agent. Projects with total investment less than 30 million Yuan should be bind with other projects and implement open bidding to determine

the project agent. The Guangdong province government founded the Provincial Construction Project Management Bureau (CPMB) in 2007, which is in charge of the centralized management of projects using project agents. The CPMB undertakes projects from the DRC freely. However, the CPMB is not a subsidiary of the National Development and Reform Commission (NDRC) that is charged with project approval, and it does not belong to the construction department that supervises the construction market, and is not connected to the financial department in charge of paying out funds. It is a unit attached directly to provincial government, and funded by the provincial government. It is not a government department, and has no administrative power.

Project agency should be used by the operation process of a construction project as follows. First of all, the CPMB selects the project management company (project agent) using market-oriented bidding. After the project agent is confirmed, the CPMB will sign a project agency contract with a project management company. Second, the design, construction, and supervision units through open bidding are selected by the project management company. Third, the project investment, quality, and time are audited. Finally, the project is accepted and transferred to users. The project management company can manage all the project processes, which include project feasibility study, surveying, design, construction, and final acceptance. It can manage part of the project process, which includes the preliminary work or construction work.

The Provincial DRC, jointly with other relevant departments, formulates the project agent system's policies, and is responsible for coordinating and investing in government non-profit projects. It checks the project proposal and reports its recommendations to the provincial government, which will finally audit the proposal. It also checks and approves the project feasibility study report and the preliminary design budget, audits and issues the project's annual investment plan. The provincial supervision department is involved in promoting the implementation of the project agent system, which is responsible for inspecting that the supervision and management department perform their duties and responsibilities, which include investigating and handling any lawless and violent discipline activities. The provincial finance department manages and supervises the financial activities in agency projects, which

takes responsibility for arranging the project’s annual budget, paying according to the progress of construction, tracking and evaluating funds using performance, and auditing the project final account. The provincial administrative department of construction monitors the behaviors of investigation, design, construction, and supervision during project, and monitors the project’s quality and safety. It also checks the preliminary design of some large and medium-sized construction projects. The provincial audit department supervises the construction project’s entire process with auditing measures in place.

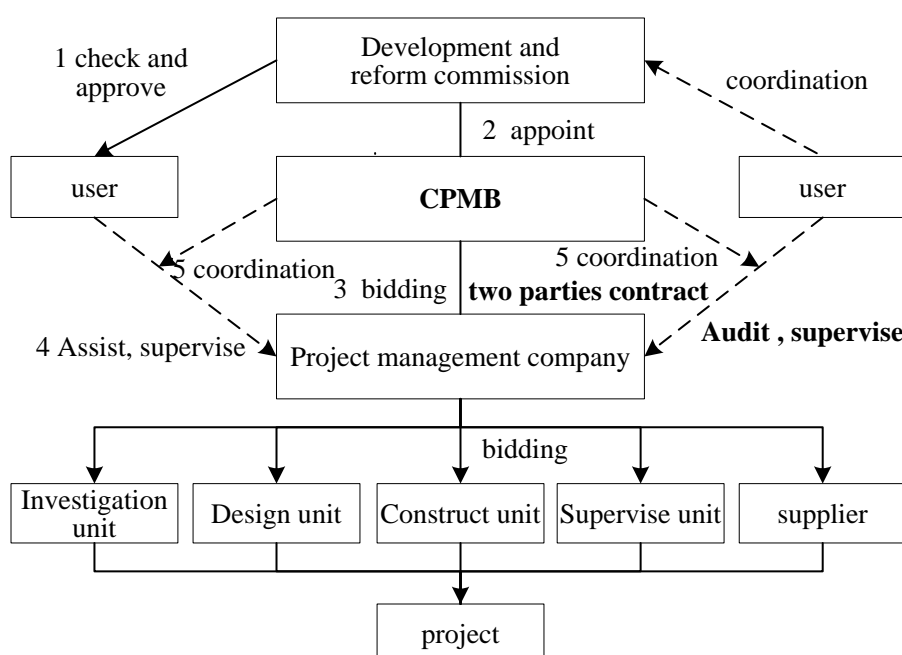


Figure 5-4 Project agency system in Guangdong

Figure 5-4 above shows the project agent model of Guangdong. The CPMB is responsible for managing the non-profit projects invested by the Guangdong province government. In implementing the project, it will choose a specific project management company by open bidding and sign a project agency contract with the project management company.

In this model, the CPMB serves as a connecting link, which coordinates the relationships between the project management company and the user, and the relationships between the project management company and the government, so as to ensure that the project’s quality, time, and cost meet the user’s requirements. We can summarize the Guangdong model’s

characteristics as follows: 1) The project agent is chosen by market-oriented open bidding; 2) Professional management is utilized to control problems of wasting and delay; 3) Define the rights and responsibilities of the project agent with contracts.

5.1.5 Project agent model in Shenzhen

The Shenzhen government established the Bureau of Construction Works in 2002, and upgraded it as a department directly attached to the Shenzhen government in May 2004, named Shenzhen City Construction Works Department, which delegate the government to exercise owners' rights and is responsible for managing government investment projects. The main functions of this department include: 1) manage all the projects that are invested by city government except water and transportation projects (water and transport projects are managed by enterprises which are selected by open bidding); 2) manage the housing construction projects that are invested by government; and 3) implement a project agent system in some public projects. The government established this project agent model as a public institution to manage government investment projects solely as an administrative agent. The administrative agent solved the problems that existed under the situation of "one-time owner", and centralized the management of government investment projects, enhanced the professional level of management and realized economies of scale. Figure 5-5 shows this model.

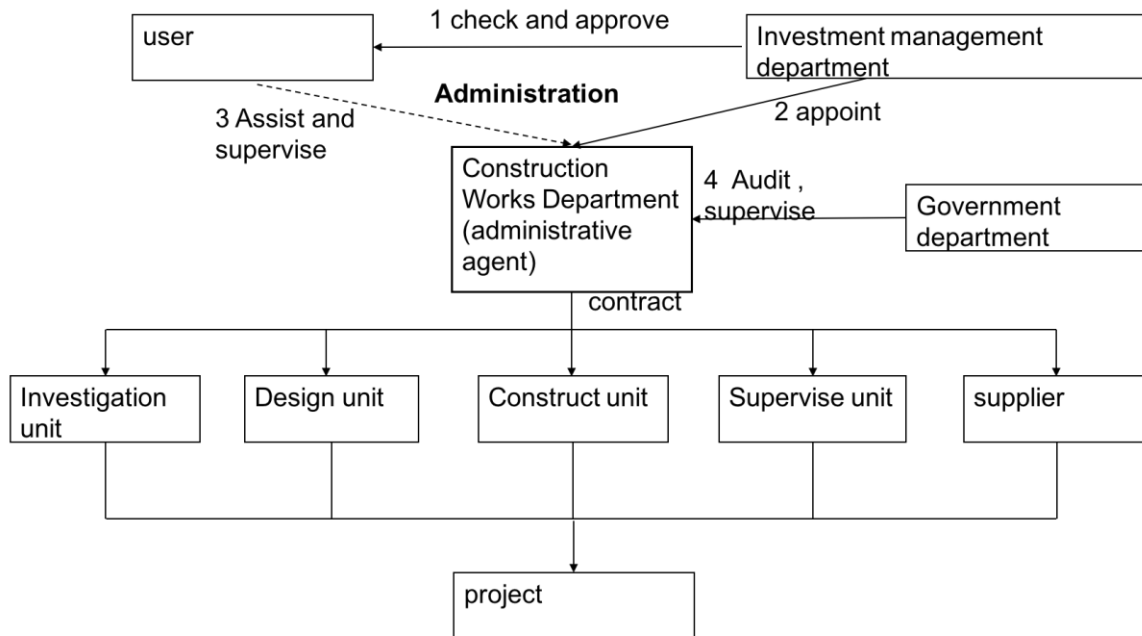


Figure 5-5 Project agency mode in Shenzhen

This model divides the construction process into several steps, such as preparation, bidding, construction supervision, project measurement and payment, completion and transfer, and tracking service. The construction works department breaks the administrative boundaries, and organizes its staffs as several professional groups and the project team. Therefore, the construction works department works very efficiently and professionally, and avoids problems such as waste and project delays.

Compared to the enterprise agent, an administrative agent knows about the willingness of government and government can manage it easier. Because of its administrative status, the construction works department is highly efficient in handling a variety of items on government approval, so as to shorten the construction life cycle. In addition, the administrative agent is non-profit and does not receive payment from the project, so it can avoid any opportunistic behavior.

5.2 Construction agent qualification in five regions

China government implement quality management to the construction industry enterprises.

Every kind of construction project has its qualification requirement. Because the country has no high level and professional construction agent, it has not issued the regulations on qualification management and confirmation to construction agent. So, the government still uses the qualification requirement of construction project as that of construction agent. In accordance with the relevant laws, we observed qualifications' classification for different kinds of industries, as shown in table 5-1.

Table 5-1 Qualification classification of different industries

Company type	qualification class
Engineering supervision enterprise	Three classes
real estate developer	Four classes
Construction project bidding agency	Two classes
Engineering cost consulting enterprise	Two classes
Municipal public works construction general contracting enterprise	Four classes
Housing construction project general contracting enterprise	Four classes

note: this table is formed on the basis of 《Provisions on the administration of qualification of construction enterprises》, 《Regulations on qualification management of Engineering Supervision Enterprises》, 《Measures for the qualification accreditation of engineering consulting units》 instead the table 5-1 lists the requirements of the above five regions for the qualifications and generation of construction agent.

The following Table 5-2 lists the Qualification and Generation of construction agent in the five regions.

Table 5-2 Qualification and generation of construction agent

	Qualification requirement	Generation method
Beijing	Legal person, with industry corresponding qualification	Tender and bidding
Shanghai	With the qualification admitted by Municipal Construction Committee	Market competing
Zhejiang	Legal person, with the corresponding qualifications and funds	Open bidding
Guangzhou	construction agent management organization	Appointment
Shenzhen	Legal person with high quality, high integrity and strong performance	Tender and bidding

"The implementation of the Shanghai municipal engineering construction management agent system implementation stipulation" issued at the end of 2001 claimed that the engineering project management company chosen by project legal person through market competition mode must have the project management qualification certificate issued by the Shanghai Municipal Committee of the construction and management or be listed as the municipal engineering construction management units. In addition, there is a comprehensive assessment system to assess the company from the following aspects: performance, reputation; the qualification and ability of project manager and team members; rationality and feasibility of the construction program; investment, schedule, quality and safety management objectives; management objectives and project management company's economic responsibility.

Beijing 's quality requirements to construction agent are relatively vague. "Measures for the administration of the Beijing municipal government investment projects construction agent system (Trial)" regulated that the project agent should be a legal person with corresponding qualification, and can assume responsibility independently. There is no clear qualification requirement. However, it also regulated that the project should be commissioned to a bidding agency with corresponding qualifications to implement public bidding. The qualification requirement is depending on the characteristics of projects.

It is required by Zhejiang province that the construction agent should have the corresponding qualifications, similar experience in engineering construction management, corresponding construction management ability and financial strength, and be an independent legal person. The " Measures method for Zhejiang province construction agent's qualification" regulated the qualification's application criterion, process and evaluation units.

The government investment projects are managed by the Provincial Bureau of construction in Guangdong province, so it has no regulations for the agent's qualification.

Shenzhen municipal government regulated that project agent must be a legal person with high qualification, high integrity and high contractual capacity.

5.3 Chapter summary

This chapter analyzed the characteristics of project construction agent modes in five regions, such as Beijing, Shanghai, Zhejiang, Guangzhou, Shenzhen. These modes are very different in all the following aspects the project management process, the roles of principal and agent, the responsible body of principal and agent, and finally the contract mode. The difference of the requirements of capabilities to project construction agents in the five regions had also been compared.

Chapter 6: Comparison and Selection of the Construction Agent System

So far, this study has shown that distinct regional patterns have emerged using the project agent system with governmental non-profit investment projects (GNIP) in China, such as the Beijing Model, Shanghai Model, and Shenzhen Model. Among these local agent systems, there are three main differences. First, is the client. It can be an investment department (such as the Zhejiang, Beijing Model), a legal person (such as the Shanghai Model), or a public institution that is a professional institution like a construction bureau (such as the Guangdong Model). The second difference is the construction-agent enterprise. It is a corporation that generally is selected by the tender client. However, Shenzhen is a special case, whose construction-agent enterprise is called the “Construction Affairs Bureau” with the nature of a public institution. It can be regarded as a pipeline that specializes in project production. Third is the difference in project agent contracts. The Zhejiang and Beijing models are tripartite contracts signed by the client, the use of units, and the construction-agent enterprise (the investment department acting as the client). The Shanghai, Guangdong, Hangzhou and Ningbo models uses a bilateral contract signed by the client and the construction-agent enterprise (the client is the legal person or the use of units, except in the Guangdong Model which is the construction bureau). The Shenzhen Model is a way of executive-style entrusted construction, and the construction-agent enterprise is directly assigned by the investment department.

6.1 Two models of general project agent

Although many differences exist in local project agent systems all over China, it can be generally categorized into two main models. This categorization is based on the choice of client and governance mechanism (contract management or administrative management). One model puts decentralized management into practice, and the other implements centralized management. Table 6-1 below shows that the Beijing, Shanghai, and Zhejiang models can take

place in a market competitive project agent model; whereas the Guangdong and Shenzhen models are categorized as an administrative project agent model.

Table 6-1 The project agent categorization model

Construction type	Market competition model (Decentralized management)		Administrative management model (Centralized management)	
	Zhejiang\Beijing Model	Shanghai Model	Shenzhen Model	Guangdong Model
The nature of construction-agent enterprise	Enterprise with project agent qualification		Public institution	Public institution, Enterprise
Governance mechanism	Tripartite contract governance	Bilateral contract governance	Administrative governance	Administrative and contract governance
Client	Investment department	State-owned investment company	Investment department	Construction bureau

In the project agent system, the client chooses a professional project management company by bidding or through direct commissioning, and then gives them construction and management rights. This entire process is defined as the Market Competition Model. The Beijing and Shanghai models are representative of this model. The difference between them is that the Beijing Model is directly responsible for selecting the construction-agent enterprise from the government investment department bid process (DRC) Then the Development and Reform Commission (NDRC), the use of units, and the construction-agent enterprise sign the tripartite construction contract. The Shanghai Model is another method where a state-owned investment company acts as a project legal person and selects the construction-agent enterprise by either tendering or assigning. Yet the bilateral contract is signed by the project legal entity and the construction-agent enterprise.

Comparatively, the administrative management model is where the government establishes a permanent administrative institution, and passes on the relatively centralized management to the government non-profit investment project (GNIP). As with the Shenzhen and Guangdong models, the administrative management model also has characteristics of

centralized management. However, the Shenzhen Model has the Building Public Works Bureau undertake project agent work directly, while in the Guangdong Model the construction bureau selects different construction-agent enterprises to work. This differs from the nature of the construction-agent enterprise. The former is a non-profit public welfare institution; whereas the latter is a for profit institution.

6.2 Market competition model of project agent

When it comes to the model of market competition, the project owner representative (the government functional departments or state-owned investment company) selects the appropriate project management company mainly by bidding, to manage the business the GNIP, and stipulate the rights and obligations of the project management company through contract. To implement this approach requires a mature and complete construction market in the location. In particular, there must be a fully competitive project management company with an excellent performance record. As a construction-agent management mechanism, the government investment department or construction department needs to have project agent management office as the inner organ, representing the government to establish the access conditions of the construction market. In accordance with the principle of market competition, there will be authorized numbers of project management companies participating in the project agent project competition, which have a good track record and are able to bear the investment risks with strong economic and technological capacities.

As regards the market competition model, the construction-agent management has the responsibility for approving, monitoring, and managing the project agent. The client represents the government to exercise the owner's functions, and also has the responsibility for organizing, managing, and controlling the construction-agent project. The using units establish the functional requirements at the design phase, and supervise the entire construction-agent project process. During the project, the construction-agent disburses funds according to the actual progress and in compliance with the project budget. Then when the project user and supervision units confirm the plan, they submit it to the construction management agent to arrange the

construction funds allocated by the finance department. Next, the project agent takes the approved funds and sets up a special project funds account, with strict rules regarding cash management.

The advantages of the market competitive model of project agent include: (1) During the selection process, it is advantageous for the construction-agent enterprises to control the scale of project investment, and improve the level of professional management, and the quality of the project construction; (2) It is beneficial for improving project agents capabilities, and boost the development of construction market; and (3) As the model does not call for the addition of new government agencies, it avoids the overlap of institutions and functions, and curbs corruption to a certain extent.

The main problems of the pattern of market competition are: (1) The construction company is a for profit organization that not only charges for construction management fees, but also for different percentages of commission. Therefore, this can result in less investment, forcing down the price, using lower-grade materials, and reducing the construction standard. Any one of these moral issues are a problem for the end-user if the agent hungers to maximize its profit. Not only will it affect the quality and efficiency of governmental investment projects, but also result in a waste of money from the government investment; (2) Although there are many construction companies in most places at present, the development is still uneven. The vast majority of the companies are weak and have many limitations. For example, most of them do not have highly specialized engineering project management abilities. At the same time, under market economy conditions, unfair competition, even vicious competitive behavior occurs among the construction companies if there is no strict policy system. This definitely has a huge impact on the bidding for construction projects, which could increase the risk of adversely selecting the principal; (3) Since the construction company is an independent entity, it obeys the rule of evolution in market competition. Once the construction-agent enterprise is eliminated from the market, its project agent cannot implement the "quality responsibility for life" rule. This diminishes the attractiveness of the project agent system so greatly that implementing the agent is difficult and the project agent system may not be as good as the traditional fragmented "command" or "infrastructure" model; and (4) When the construction company undertakes the

government investment project, if the process is not highly transparent, or information disclosure is not timely when the project agent is in charge of governmental investment projects, it will be difficult to avoid the opportunistic behavior which leads to corruption.

6.3 Administrative project agent model

The definition of the administrative project agent is that the public institution (region or industry, specifically sets up the construction-agent work) takes the place of government to centralize the management of certain industrial governmental investment projects, aiming to maintain continuity and stability with the government investment projects. The model has three main features: (1) The investment authority lets the public institution-style agent take charge of administrative management for the project agent project. Due to the particularity of the government funding project and characteristics of public use, the project is bound by funds appropriation, bidding, and in management it is more vulnerable to government intervention which can affect the duration of the project. Furthermore, as the project is in the public eye, high transparency is required by the project during the construction process, and project-related information needs to be delivered to the public frequently; (2) Project agency management covers the entire process of construction project, which means it begins from the proposal approval, feasibility study, requisition, design, construction, completion acceptance, until the end of the warranty period. Because of this the entire construction management process can effectively ensure the project agent quality; (3) The government centralizes construction institutions into one specialized construction organization so as to management many projects at the same time.

6.3.1 Two models of administrative project agency

A public institution, such as Shenzhen Construction, which specifically takes responsibility for the government investment project, can set up an administrative agent model. In addition, the management center/office that belongs to a competent department of investment or construction can also respond to the project, such as the Public Welfare Project Construction Management Center in the Anhui province. The public institution may follow two models. In

accordance with the administrative regions to divide, it can form a regional government investment project management center, and centralize to specifically manage the government non-profit investment projects, which fall into the administrative area, as Figure 6-1 shows. In this model, after the using unit proposes the project application, the government investment project management center acts as an owner responsible for investment and management functions of governmental investment projects. The project management company is an independent legal entity entrusted by the government investment project management center, which is capable of design, bidding, construction cost consultation, supervision, and managing project agent projects. In addition, the architects, engineers, and other professionals have the right of supervision in the project management company. This model can strengthen the supervision of the governmental owners in governmental investment projects.

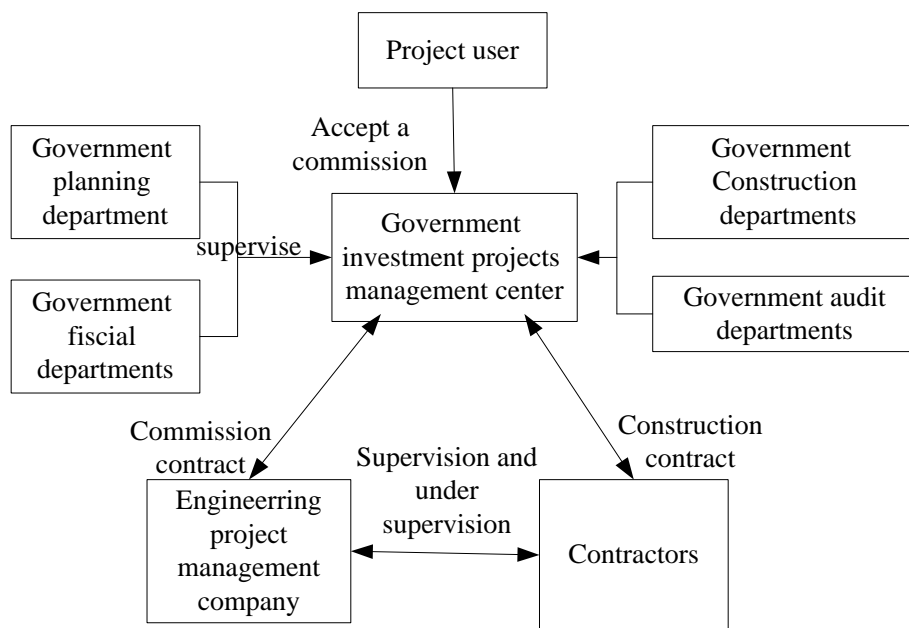


Figure 6-1 The formation of regional administrative-type project agent model

As for the highly specialized governmental investment projects, all kinds of public institutions with industry characteristics can be established by the relevant administrative departments under the macro-regulatory system, and participate in the construction-agent jobs. Figure 6-2 shows that this administrative project agency model differs most from the administrative region concentrated project agent model in that the governmental investment

projects remain the feature of original decentralized management which is more applicable for highly specialized government investment projects.

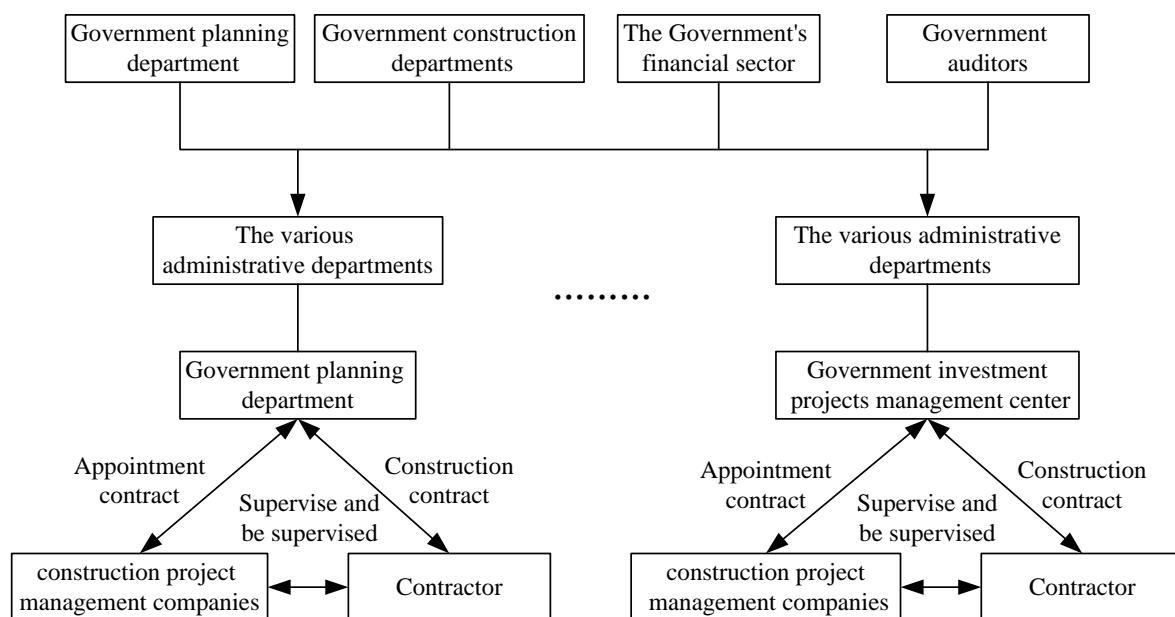
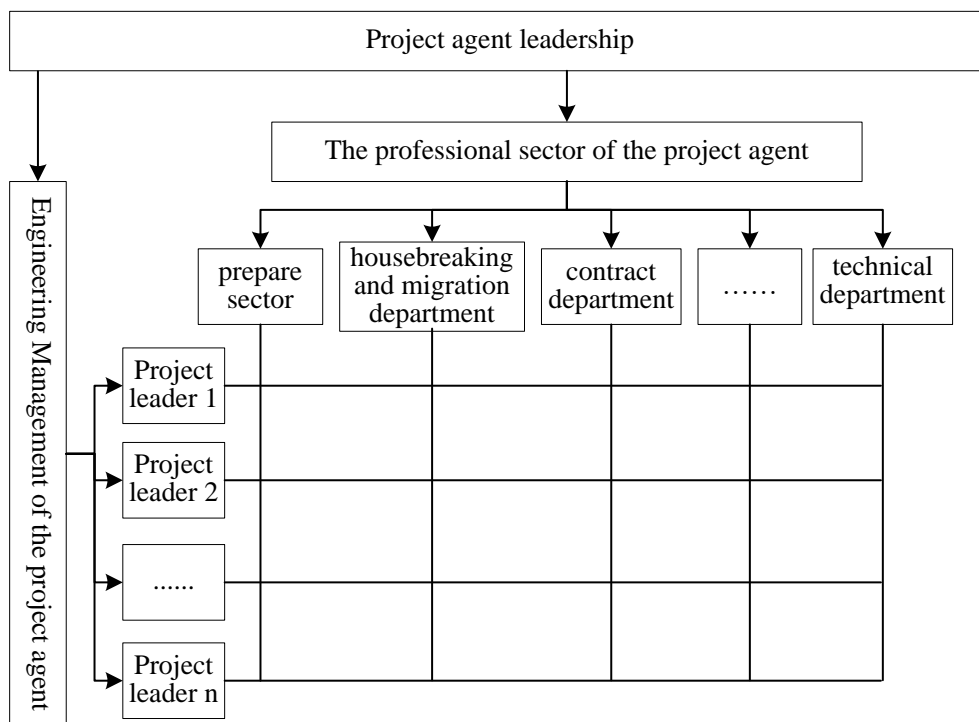


Figure 6-2 The industry established administrative-type project agent model

6.3.2 The analysis of project agent organization structure

The governmental centralized project agent organization generally takes the matrix organization model - all work regards project management as the core, and the functional departments support and collaborate each other's work based on project management. According to the domestic government administrative project agency organization research, the organizational structure reflects three levels (as Figure 6-3 shows). The first level is overall coordination and management of all projects made by the project agency decision-making leadership. The second level is the management coordination layer. Generally, it is the project leader or construction manager who takes the responsibility of project follow-up, organizing their implementation, supervision, and management. The third level is business management. Professionals from functional departments normally take on specific work in a construction project. For instance, they take work applications at an early stage, tender, undertake design review, cost checks, contract management, and other tasks.



Note: Because the constructions are often constructed on the land that already has some houses, the housebreaking and migration department will have to negotiate with the owners of these houses and persuade them to migrate to other places.

Figure 6-3 The organizational structure of a government centralized project agent

6.3.3 The structure of agency contract

The contracting methods of project agent management (Shenzhen model)

In an administrative project agency - contracting parallel model, as a construction organization affiliated with the government department in charge of construction projects, the construction organization respectively signs a series of specific construction project contracts with the supplier of construction project survey and design, construction, supervision, materials and facilities, and other professional contractors. Figure 6-4 describes the contract structure. This contract structure has two characteristics: (1) The project agency takes the responsibility of project implementation and management, respectively signing specific contracts with the suppliers of the construction project survey and design, construction, supervision, materials and equipment, and other professional contractors. There is no direct contractual relationship between the government and the investment management department, the use of the unit, and the professional contractor; (2) Because the government centralized construction organization

as a specialized construction organization of the government has various types of construction projects involving broad areas, they handle numerous contracts. It is difficult for the department to manage the construction project because it lacks the ability to handle all the problems in a project.

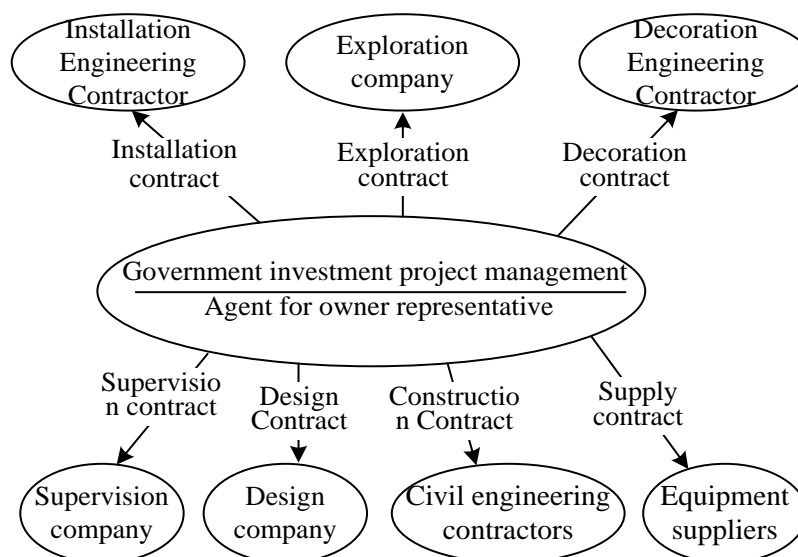


Figure 6-4 The contract structure in the project with a centralized agent

The vertical contracting model of the project agent management (Guangdong Model)

In the concentrated construction - vertical contracting model, a construction organization affiliated to the government departments sign the contract with project management contractor who takes charge of all the works including project planning, feasibility study, designing, procurement, construction completion and transferring. Figure 6-5 shows the structure of the contract. The three character sin this structure are: (1) The construction project only signs a project management contract, and simplifies the management procedures of contracting. The project management contractor is involved in the whole process or project management and is responsible for the project quality, progress, and cost, and should ensure the project’s successful implementation;(2) The contract structure is usually applied in large projects, because it needs professional and experienced project management contractor to implement the contract.(3) The project management contractor also provides consulting service to the units that take part in the projects. Its function is similar to the construction agent in dispersing agency model.

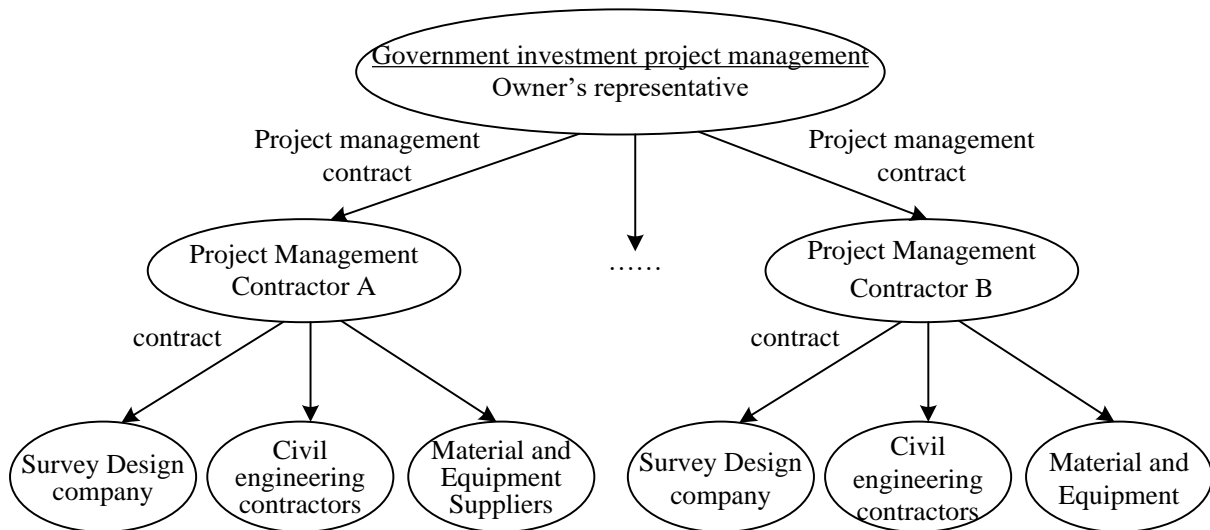


Figure 6-5 The vertical contract structure of centralized project agent project

6.4 The comparative analysis of two general patterns of project agent

On one hand, the main purpose of implementing agents for non-operating government investment projects in China, is to give play to the role of construction market competition and to restrain the government corruption problems in the engineering construction process while in order to improve the economic benefit and social benefit of a public project. Although having the same goal, there are still many differences between the market competitive construction agent model and the administrative construction agent model, which are shown as follows.

(1) The management goal of the construction unit is different.

The project agent in the administrative management model is a government department or unit, not in pursuit of profit as the goal, but the pursuit of the government's target of investment project itself, such as investment, construction period, function, and construction quality, as well as environmental goals and social benefits. Contrarily, the agent in the market competition model is the enterprise with the aim of profitability, and profit maximization is the key management principle. Figure 6-6 displays the two main parts of the agent's revenue. One is the basic construction management fee income. The standard for collecting fees is usually 1% - 3% of the investment. The other part is a variable part, which is spared from the investment savings. The project investment savings reflects the project agent management's performance

or output that inspires by better controlling the total investment amount. For example, from Ningbo, the construction-agent enterprise can participate in an investment surplus, and the city government investment takes no less than 70% of the surplus for the city finance that can be the construction costs for the projects in a particular year. The rest will be rewarded to the build units.

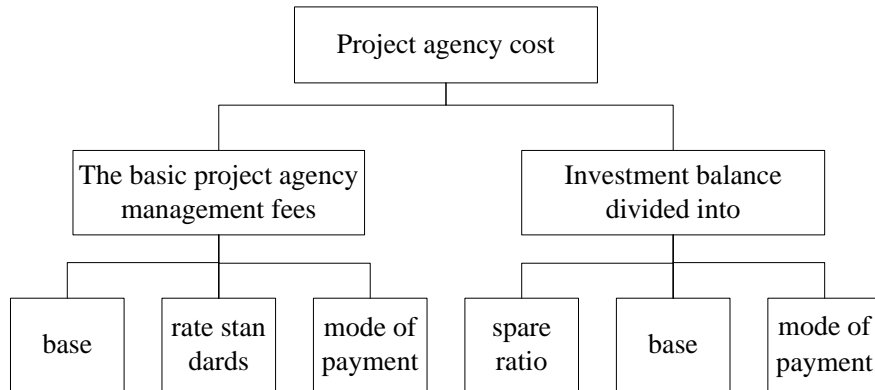


Figure 6-6 The project agent cost structure

The project agents of the two models operate on separate targets, resulting in different problems in practice.

In the administration model, the project agent belongs to the government departments or public institutions without profit. Staff income mainly depends on financial appropriations, leading to a lack of incentive mechanism. Because there is no financial incentive, the staff just plods along and do the minimum amount required as long as they complete the construction projects on schedule and achieve their goals. Employees lack necessary enthusiasm regarding the investment and quality control.

In the market competition model, the construction side's goal is to maximize profit. As a result, if there are unreasonable contract constraints regarding incentives, it becomes easy to let the agent damage the client's interests so that it can gain more profits, which is typical opportunistic behavior. This can result in decreasing the investment, the level and the price, using cheap materials, and lowering construction standards, which will not only affect the quality and efficiency of the government investment, but will result in financial waste.

Therefore, no matter whatever the construction model, the key to the project success is

giving an effective incentive to make the owners' and project agents' interests consistent. At the same time, it is necessary to set up a constraint mechanism and implement necessary monitoring costs to control the agent's moral hazard. Supervision is necessary to reduce an agent's opportunistic behavior, so as to improve the owner's effectiveness and the quality of the construction project. Excessively underestimating the supervisory role will inevitably lead to a proliferation of opportunistic behavior, and ultimately cause the incentive mechanism to fail. In brief, both models need to establish a set of effective incentive and restraint mechanisms. The incentive mechanism is for the investment and time savings, and quality promotion reward, and the constraint mechanism punishes for excess investment, extended construction period, and quality decline.

(2) The difference of entrustment relations

An administrative entrustment relationship between the client and agent results in the administration construction model, in which the client determines the project agent. The government and the project agent have the same legal status but the rights and obligations are different - the government has certain privileges. In an administrative management trust relationship, the government actually has a dual identity, as a party in the equal status with other parties, and at the same time as the management department of public projects. Based on the latter identity, the government has the right to supervise, punish the breach of contract, unilateral change, and terminate the contract while the other does not.

In the market competition model, the client and agent have principally a civil relationship according to the way of market operations. The owner selects the agent through bidding and tendering, and then the two sides are subject to the contract constraints. There is no relationship of management and the management between government and the project agent. Moreover, the project agent does not have administrative obligations to the construction management or operations of the construction project. With profit as its purpose, the project agent gains its revenue through excellent project management skills. The client and the agent partner to achieve their respective objectives in the supply and demand market, freely combining government investment projects. In this case, the government department takes equal status and acts as the civil subject to sign the contract with the agent.

(3) The different ways of risk-taking

Basically, all risks are for the government investors, because it is their inherent responsibility to offer the public products that meet their needs. Improving the efficiency of the public production model is the original intention to introduce the market mechanism, which is key in establishing the construction-agent system. Therefore, in theory, the government should make a reasonable division of the project risk based on the principle of equal market position with the project agent. Table 6-2 illustrates the specific risk allocation.

Although the government investors and the construction management entities both have their own risks to enter the construction-agent model, the consequences of risk-taking liability are not the same for the project agent between the two models. In an administrative management model, the project agent substantially belongs to the government agencies or institutions, so in essence it does not completely solve the confusion about the government's role. Even if the project agent could undertake risks, it would not be able to bear the loss caused by the risk. When it comes to the issue of compensation, it is impossible to solve, so no constraint mechanism is formed. Clearly, this model requires other support systems to strengthen construction project management.

In terms of the market competition model, the project agent takes risks in accordance with the relevant laws and regulations and the construction contract. For example, for investment risk control, in Ningbo, if the investment is more than the contract base, both the construction unit and the project agent will bear 50% of the excess portion. In that case, the project agent will have an incentive to control the risks, and minimize the loss of risks, which is beneficial to the construction project investment control, quality control, progress control, and safety management. However, because the project agent is often a consulting company, it cannot undertake the economic responsibility of the construction management: it cannot assume liability to pay compensation for the significant risk. Currently in the process of practicing the system, the government sometimes transfers more unreasonable risks to the project agent enterprise, no unified regulations or contract documents may also cause irrational risks allocation. Furthermore, there is no adaptive insurance institution for project agent, the project agent may go bankrupt if he/she needs to pay much more than he/she can afford.

Table 6-2 The risk allocation in a project

Risk factors in a project		Risk allocation		
Risk source	Risk factor	Government Investor	Agent Company	
Project Risk	Project planning	Project requirements, Unclear standards	√	
	Pre-decision	Investment decision-making is unreasonable or changes	√	
	preliminary work	Approval formalities delay	√	
		Land compensation conflict	√	
	Pre-tender	Poor choices for agent	√	
		Defect of agency contract	■	
	Tender management	Agent lack of experience and capability		□
		Poor choice for designer, contractor, supervisor and supplier of materials		√
	Schedule control	Delay or shut down		√
	Quality control	Poor quality; Quality accident		√
	Funds management	Delay of approval; Fund shortage;	√	
		Overspend; The cost of people、 material and machine increase		√
	Change management	Defects of design cause changes		√
	Relationship between the parties	Coordination		□
		Interventions come from government investors and user	√	
	The transfer of assets	Mistakes of contractor and subcontractors		√
Building functions do not meet the requirement		□		
	Low productivity	○		

External environmental risks	Political	Unscientific decision-making process; Unreasonable supervision	√
	Society	Public response	○
	Law	Changes in laws and regulations; Adjustment of industry and technical standards	■
	Economy	Inflation; Changes in exchange rates	■
		Price of human resources and material increased	√
	Natural	Emergency; Uncertain geological conditions	□
	Bad weather; Environmental pollution	√	

record : “√” means “undertake the risk alone” ; “□” means “undertake the risk together” ;

“○” means “depending on the facts” ; “■” means “undertake the risk first”

Overall, with the exception of the two models emphasizing the professions of construction-agent organizations, they are quite different in terms of power arrangement and operation mechanism and rely on different ideas. The specialized public institution acting as project agent can take direct participation to improve the construction efficiency in the administrative management model. As for the market competition model, a project agent relying on market competition can also effectively reduce the cost and improve the construction efficiency. Industry practitioners and scholars debate, which is the better model and have still, come to no conclusion. The administrative management project agent model does not mean that the government controls everything. Similarly, in the market competition model stakeholders cannot only rely on the market mechanism to solve all problems. To make the most use of the project agent system, an optimal combination of the government and the market is the key.

6.5 The choice between the two models of project agency system

With the implementation of reform and opening up since 1978, China's economic system has been moving toward the direction of market development. Therefore, the administrative-

type model (non-profit government investment projects) is more likely to be a transition model. Trends of the project agent system should be the market competition model. The reasons are the following: (1) The Chinese centralized administrative model determines that the project agent has a strong subordination and a monopoly. It is not by way of competition in the market to manage construction on a non-profit governmental investment projects applied by using units, so that in governmental investment projects it is difficult to eliminate influence and intervention of rent-seeking projects and administrative powers; (2) The centralized construction-agent model does not resolve the problem that there is no one to undertake the responsibilities in implementing government investment projects. When the project quality problems emerge, it is difficult to determine who is responsible for that. On the other hand, the economic responsibility is borne by the country, resulting in an increase of taxpayer burden - a new injustice.

Whatever happens, implementing a competitive market project agency model must have a more mature and improved construction market that is not only able to complete work in the traditional sense, but also have excellent project management skills and can effectively manage government business. A mature and improved construction market should have five main features:(1) an independent enterprise system; (2) effective market competition;(3) normative functions of government management;(4) good social credit; and (5) a developed legal basis. Currently, the market economy has not been mature, the regional economic development is very uneven, and the country is still trying to implement all aspects of the reform. Therefore, the conditions are still not ripe to utilize the competitive project agency model. In a situation where the construction market cannot provide satisfactory project management services, the government has another choice to adopt the centralized administrative construction-agent model. This is consistent with the current Chinese system of administrative centralization, not only inherited from the original administrative management system model, but also it is adapting to the current stage of development of market economy. Thus, in the current economic environment, China can develop an administrative project agency model in poor areas until the market economy in these areas improves, and it can finally introduce the competitive business project agency model. During the conversion process of the transfer to the market mechanism,

the role of government regulation and control functions cannot be completely ignored. China needs to strengthen the regulatory functions of government departments, but it needs to control the power to prevent corruption. Only if the government and market uphold their roles, the project agent system can achieve a significant result.

Based on the above analysis, we argue that there is no better model in general. The choice of construction agent mode should be a contingent model, as shown in figure 6-7. The effective construction agent mode depends on two factors: the principal's project management capability and market environment.

The principal's project management capabilities include the ability to manage the entire process and contract management capabilities. The whole process management ability of the project is related to the efficiency and quality of the project management. Because the government investment projects generally involved many professions such as preliminary analysis, project design, construction, installation and acceptance process. This whole process of project requires project managers have extensive knowledge structure, being familiar with the several of professional operation methods, and carry out effective supervision to subcontractors. The whole process of project management needs a high-quality project management team. The project contract management ability is related to the agency cost control of the project. Whether it is an administrative or market construction agent system, the principal must use the contract to constrain the agent, so the principal's ability of contract negotiation and implement determines the final agency cost. The market construction agent system needs more abilities in contracts negotiation and execution than administrative construction agent system.

The market environment includes three factors: the number of highly qualified Project Management Companies, the binding force for contract implementation, the level of trust. When there is a large number of highly qualified Project Management Company in a market, they will form fierce competition situation. In order to obtain the agent qualifications, they will use their successful experience and qualification certificate to transfer information in the bidding, and the principal can get agents' information at low cost. At the same time, under the competition, the Project Management Company in the market will also strive to maintain their

reputation by doing a good job in government commissioned projects, thereby reducing the moral hazard in the project management process. In this case, the market construction agent mode is a better choice for non-profit government investment projects. Conversely, when the number of highly qualified Project Manager Company is small, it is easy to form a monopoly or information off situation, and the cost that the principal obtains the real information is high. Due to the effect of ‘bad money drives out good money’ in the market, it is difficult for a good company to survive and evolve in a under developed market. In this case this will result in higher agency costs in the project implementation, so that in such circumstances the administrative construction agent mode is more suitable. The binding force contract implementation refers to the degree how the agents and the laws and regulations that are used to supervise and restrict the execution of the contract are developed. If the market is more regulated, and the binding force of implementing the contract is strong, we can use the market construction agent mode to replace the administrative one. The level of trust refers to the degree of mutual trust between the parties in the market. If there is a high level of trust in the market, people tend to form a relationship through the contract; the contract is also easy to be implemented. However, if the level of trust in the market is low, people are not willing to maintain the relationship through the contract, but are willing to use human or formal administrative means to ensure the relationship. In this case, the administrative construction agent mode is easier to be implemented rather than the market one.

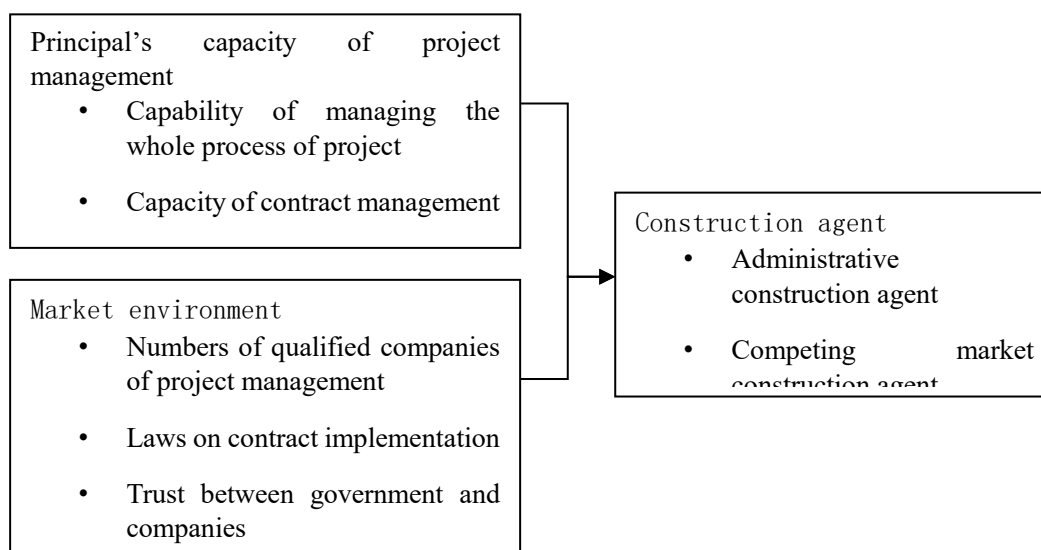


Figure 6-7 Model of construction agent mode choose

6.6 Chapter summary

This chapter analyzed five cases, and concluded the regional construction agent modes into two general models: market construction agent model and administrative construction agent model. The main difference between two models lies in the construction agent. The agent in the market model is a professional company, which can be got from open bidding. The agent in administrative model is an administrative unit, which is found by government specially for managing the non-profit government investment projects. The author also proposed a contingent model for choosing a suitable construction agent mode for non-profit government investment projects depending on two contingent factors: principal's capability in project management and market environment.

Chapter 7: Construction Agent Model in CIXI

7.1 Introduction of CIXI city government investment projects

CIXI is located in the East China Sea on the South Coast of Hangzhou Bay, 60 km east of Ningbo, 148 km north of Shanghai, and 138 km west of Hangzhou. It is in the center of the Economic Golden Triangle surrounded by Shanghai, Hangzhou, and Ningbo, south of the Yangtze River Delta area of Hangzhou Bay.

The government has rated CIXI as a garden city and a civilized city in Zhejiang Province, and the happiest city, the most innovative county, and the most valuable investment county in China. It has also been awarded the best county in Mainland China and one of the ten richest cities by Forbes China.

Table 7-1 below shows data concerning the total investment in CIXI from 2010 to 2014. It suggests that the proportion of investment in fixed assets from the government is more than 10% in the total amount of social fixed assets investment. Therefore, it is absolutely necessary to regulate the management of government investment projects.

Table 7-1 Overview of fixed assets investment in 2010-2014 in CIXI

	2010	2011	2012	2013	2014
Social investment(Billion)	25.1	30.2	44.3	54.5	63.6
Government investment	4.617	7.529	5.583	6.676	7.152
GI/SI	18.39%	24.93%	12.60%	12.25%	11.25%

According to the “Government Investment Project Management Approach in CIXI” issued in 2008, the government investment project is the fixed-asset investment project using the fiscal funds of the city, which includes the comprehensive budget, the government financing and the

use of bond funds, international financial organization and foreign government loans and grants, and government funds of other rules and regulations.

It is organized into four major sections:

(1) Basic projects such as agriculture, water conservancy, energy, transportation, urban, and rural public facilities;

(2) Education, science and technology, culture, health, sports, social security, ecological construction, environmental protection, energy conservation and emission reduction, resource conservation and reuse, disaster prevention and mitigation and other public welfare projects;

(3) Government public service facilities projects;

(4) Other government investment projects.

The representative management rules are:

(1) Continuing to emphasize using instructive plans to manage the government investment projects; the basic construction procedures should be strictly enforced; once approved, the government investment projects must be strictly enforced, and any units or individual may not alter it without the prescribed procedure.

(2) Principles of government investment projects not only comply with relevant national laws and regulations and policies, but also conform to the national economic, social development, and urban planning and practical needs of CIXI. To follow the principle of expenditure according to revenue and comprehensive balance the projects must focus on infrastructure and public welfare projects and must adhere to the approved estimated and final budgets.

(3) Determine the responsibilities of relevant government departments. The Municipal Development and Reform Bureau is the comprehensive management body of government investment projects. Finance, auditing, city planning, land and resources, environmental protection, construction, agriculture, forestry, ocean, water conservancy, transport, health, education, supervision, and other relevant departments in accordance with their respective duties manage and supervise the government investment project.

(4) Project planning management requirements.

1) Application for the project preparing the:

preliminary plan

feasibility study

preliminary design

the total budgetary

the annual plan.

Each of the above project phases requires approval by the planning department. Among them, the project plan and project application must be submitted to the municipal government for approval. Meanwhile, the Municipal People's Congress also needs to approve them.

2) Project classification, project data and project approval must provide the project application, project proposals, and other necessary materials.

3) Democratization of government project decision-making requires improvement. Before the government approves projects that have a major impact on the economy, society, and the environment, the government should solicit opinions from all sectors of the community and the public.

4) Project proposals and feasibility study reports on government investment projects that total 5 million Yuan or less in investment and that have simple technical requirements can be consolidated and approved. High technology projects such as traffic, water conservancy, tunnel and bridges must require project feasibility study reports and reviews, consultation, and assessment in accordance with the relevant provisions.

5) There is a constraint on the quality of the feasibility study: worthwhile projects must be backed by demonstrated technical, economic and engineering rationale meanwhile, the working level must conform to the state standards. Investment estimates made by the feasibility study may not exceed the planned investment, and the investment estimate must stay within approved limits.

(5) Determine the plan management procedures.

1) The requirements for project construction management are to determine the construction management steps, settled as follows:

Government give the investment plan

Design construction drawing

Prepare project budget

Bidding and tending

Begin construction

Government pays the bill

Completion

Settle the account of project

Final accounting of the total project expenditure

2) Investment control requirements: The project budget must not exceed the planned and approved total investment.

3) A bidding system must be implemented for the survey design, construction, and supervision of government engineering. Subcontracting is prohibited.

4) A system for inspecting and approving the initial construction shall be implemented.

(6) The project supervision requirements are:

The Municipal Supervision Bureau shall strengthen supervision over implementing the administrative functions of the government investment project management, construction, other departments, and related staff. According to relevant provisions and regulations, the Municipal Supervision Bureau shall investigate and deal with violations that take place in the construction process. The City Major Project Inspection Office should refer to the relevant inspection methods to supervise the use, management, construction standards, scale control, tendering and

bidding implementation, contract implementation and completion, project quality management, and engineering supervision of the government investment projects.

Municipal departments must manage, investigate, and punish illegal bidding activity in accordance to relevant state, provincial, and city regulations Determination of legal responsibility.

The leaders of government departments, project units, or construction units, and the relevant government departments, and the staff of state bodies, should abide by strict self-discipline, and standardize due diligence.

(7) Claim the law reusability. Any illegal activity in government project management and construction will result in a legal investigation.

Because of endemic government project management and construction problems over the years, there are still government investment management problems to be solved. Meanwhile, the departments which have access to governmental project management are not perfect in their function and duty. There are still many loopholes, therefore, corruption still exists.

7.2 The characteristics of the CIXI construction agent model

7.2.1 Overview of the projects using construction agent

"The Investment Project Management Approach of the CIXI Government "requires that non-operating government investment projects should implement the project agency system. The agency project manager must determine the construction unit through bidding. On October 8, 2003, CIXI established a government public finance investment project construction management center to centrally administer government investment projects. Based on a test run for more than one year, the government formally established the Public Project Construction Center in March 2005. The "Public Project Construction Center" is a department (bureau) in the municipal government and supported by national funding. Their main function is to manage non-operating government construction investment projects that have commissioned by the municipal government. Urban construction, transportation, and water conservancy projects are

not included. Since center was established, there have been 45 key projects, including the CIXI Home Appliance Technology Exhibition Center, the CIXI Public Security Command Center, and the CIXI Human Resources Exchange Center. Thus far, the area of the construction for these projects has been 550 thousand square meters and the total investments of these projects have been 2.2 billion Yuan. The overall quality of these buildings is better, and the investment has been within budget (average unit construction cost is just 4000 Yuan).

From Jan2003 to April2009, there has been 20 completed projects with 154,900 square meter building area, and 553 million Yuan in total investment. Overall, the number of small and medium sized projects accounted for a larger proportion, in which there are 20% of the projects with more than 30 million Yuan investment, 30% of the projects with 5 to 10 million Yuan investment, and 35% of the projects with no more than 5 million Yuan investment. Classified according to the nature of the project construction, use cultural and office projects still occupy a larger proportion of public construction projects, but public welfare, public security, and other projects also occupy a certain share, thus further enriching the project types.

In 2009, the Public Project Construction Center was accountable for implementing 25 different government investment projects, including 13 projects under construction, 274.3 thousand square meters of construction area, with a total investment of 1.162 billion Yuan. The number of proposed projects was 11. There were 154.3 thousand square meters of construction area and the total investment was 432 million Yuan. The annual investment was 430 million Yuan. The numbers of large and medium-sized projects were increasing. There were eight projects with more than 100 million Yuan investments, which account for 35% of the number of projects. The number of projects with more than 30 million Yuan investment account for 31% of the projects, those with 5 to 10 million Yuan investment account for 13% of the projects, and those with no more than 5 million Yuan investment accounted for 4% of the projects.

7.2.2 A typical engineering project

The CIXI Home Appliance Technology City and Exhibition Center, with its novel and unique shape, has become a landmark in CIXI. The conference and exhibition center consists of three single buildings, which include a 22,500-square meter exhibition center, a 12,600-

squaremeter twelve-floor office building, and a semi underground parking lot. The exhibition center is divided into two levels that can accommodate 1000 standard booths.

The commercial office building is a 15-story oblique cone type building, with a total height of 116 meters. The project started in January 2004 being completed in June 2007 was put into use in September 2007. The project won the "National Quality Project Silver Medal".

The CIXI Human Resources Exchange Center project is located on the southwest side of the East Ring Road and the North Outer Ring Quad junction, east of the east outer ring, ERZAO River to the west, north to the North Ring Road. This project serves as the center of labor market. The total area is 23,811 square meters, the total housing construction area is 17,118 square meters, and the main building has eight floors. The affiliated building has two floors and height of 34 meters, and the investment budget for the project is 59.9 million Yuan. The construction of this project started in March 2006 was completed and accepted in November 2007. It won the "Excellent Decoration Engineering Award of Zhejiang Province".

7.2.3 The main functions of the Public Building Center of CIXI

The main functions of the Public Building Center of CIXI are:

- (1) To manage the pre-feasibility study, project initiation, project estimation analysis and other preparatory work.
- (2) To assist the user to complete the works including feasibility study, project site selection, land acquisition and getting funding.
- (3) To take responsibility for the construction project design, preliminary design, bidding, construction management, construction drawing design, geological exploration, and building construction.
- (4) To manage funds for construction projects.
- (5) To organize the leading group that will take charge of the bidding process for the construction projects.
- (6) To complete the paperwork on completion of the project to ensure acceptance. This

includes preparing the final financial accounts and transferring assets, as well as archiving the project.

The Public Building Center has many divisions within including the Finance Division (the Main Office), the Pre-construction Division Office, and the Construction Division. Their main functions are as follows:

(1) The Finance Division (the Main Office)

This division conducts the majority of the business including comprehensively coordinating daily office duties related to secretarial duties, human resources management, archives, information, discipline, labor wages, administration and logistics work. It is also involved in publicity of projects, as well as managing and allocating funds for construction projects. The office also prepares financial statements on a regular basis and prepares budgets for project tenders. It is also responsible for assessing and approving any engineering changes. It closely prepares and monitors the financial accounts for projects. In addition, it assists the Construction Division in selecting materials, and helps the user entity register property and transfer assets. It also works closely with the Pre-Construction Division with bidding.

(2) The Pre-construction Division

This division is responsible for implementing annual construction projects that the Municipal Public Project Construction Center will build. It participates in the preparatory work for the project feasibility study. It takes the findings from the geological survey and design and organizes the preliminary review. The division is responsible for the project land acquisition procedures. Meanwhile, it assists with demolitions, land compensation and other specific work. The division also applies for various permits (such as planning, construction), and fire protection and air defense. It is responsible for bidding, investigation, design, supervision, construction, equipment, and office facilities. It also drafts the various contracts.

(3) The Construction Division

This division assumes all the work in the construction document design phase. It is responsible for reviewing the construction blueprints. It is also responsible for any technical

clarification regarding the construction site. In addition, it implements the approved materials for projects and enforces quality control through inspections during all phases of the projects. It is also responsible for accepting the project and during the building process monitors progress and investment control, as well as safety management. The division is also responsible for the technical management of engineering projects. It assists the Pre-construction division with project construction bidding. It also collects and arranges the engineering technical files and transfers to the office in a timely fashion.

According to the main functions of the Public Building Center, the agent-choose model of CIXI is similar to that of Shenzhen. They are all administrative centralized management models, as Figure 7-1 illustrates.

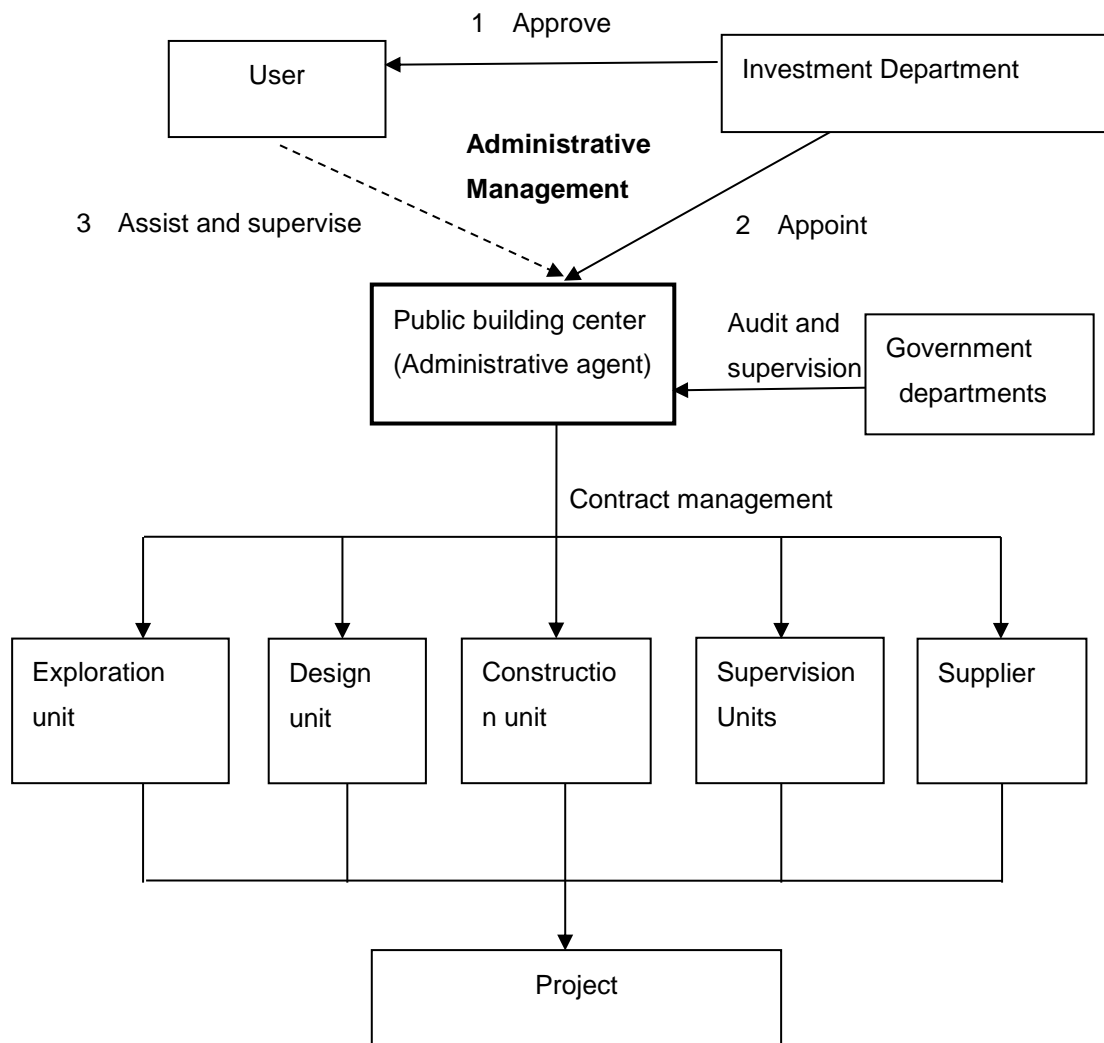


Figure 7-1 Construction agent model of CIXI

7.2.4 Management features and innovation

Since its establishment in 2003, the CIXI Public Building Center has got some experiences innovations in project management.

With project teams, the CIXI Public Building Center continues to strengthen its professional management.

(1) In the past divisions operated independently and lacked professional strength.

The project teams were unable to coordinate in such a manner that projects were successfully and efficiently implemented. With this new centralization and cross-division cooperation, government investment projects are now able to enjoy improved, unified management that offers a professional management level. There is now the ability to control project progress, quality, and investment. The CIXI Public Building Center plays a positive role in improving investment efficiency.

The setting for government investment projects has become more professional and necessitates professional institutions to adapt to new social trends, and also conform technology developments, which require increasing professionalism and knowledge regarding engineering management. At the same time, it also has established a high quality professional management team for the government investment projects. This new system has become relatively stable. The majority of the construction center employees are professional engineering technicians and management personnel. They understand technology and they are able to manage effectively. There is now personnel support for professionally managing government investment projects. The Public Building Center is a professional institution that can give full play to the advantages of professional talents, technology and experience, and effectively control the “safety, quality, cost, schedule, and integrity” of the government investment project. It is conducive to improving the management level, technical level and quality level of, maximizing the efficiency and improving the level of professional management of government investment projects. Therefore, many problems that have been caused by non-professional personnel engaged in the construction will be solved. The professional project management function of a public

construction center is strengthened. Because most of the staff holds college or advanced professional and technical degrees, they are capable of finding and solving problems. Checks and balances are implemented so it is difficult to take advantage of loopholes, and the government interests will be effectively protected.

In May 2009, for the purpose of further innovating and improving the public construction project management model, the Public Building Center piloted vertical project management. This established a management evaluation mechanism that aimed to improve project management efficiency and quality.

(2) Strengthen the communications of cross departments and advance the external environment.

Government investment projects involve many parties, for instance, the Finance, Audit, Planning, and Construction Bureaus, as well as the Commission for Discipline Inspection, and electricity, gas, communications, water supply, drainage and other related units. As a result of so many parties involved, communication has become crucial. In the engineering construction process, each department is responsible for their respective responsibilities.

1) The government investment project shall be incorporated into the national economic and social development plan. The implementation status will be supervised by the Municipal People's Congress and its Standing Committee.

2) The Municipal Development and Reform Department is the government investment project's comprehensive management department, accountable for preparing government investment projects, long-term and annual plans, establishing and managing the government investment project reserve bank, project proposal, feasibility study, preliminary design and budget estimate. It also coordinates and supervises project implementation, and organizes the final acceptance and posts project evaluations.

3) The Municipal Finance Bureau is a functional department that manages the capital and finance of government investment projects, responsible for overall arrangement of government investment projects construction funds and the supervision and management of the construction fund, financial income and expenditure.

4) According to the legal responsibility authority and the audit procedure, the Municipal Audit Bureau implements the government investment project's independent audit in advance, during and after the project. The Professional Audit branch of the city government investment project undertakes the task of supervision on government investment project. It mainly supervises and audits the financial account of government investment projects.

5) The Planning, Land and Resources, Environmental Protection, Construction, Supervision and other relevant departments, in accordance with their respective responsibilities, manage and supervise government investment projects.

Their role is to strengthen communication and coordination with the relevant departments and establish a scientific government engineering construction management system that will jointly promote construction projects. For example, before accepting a project, the budget must be consistent with the investment plans from the government planning departments; otherwise a project will not start. This prevents half-baked projects from emerging and promotes solid, legitimate projects. Different departments shall fulfill their duties and jointly promote approved construction projects.

(3) Optimize the power chain and create a clean project.

Since the Public Building Center was founded, to ensure their "High Quality, Outstanding Team" status, the center staff seriously works to eliminate corruption in the construction field. To address the corruption problem, the Center has established and improved 39 rules and regulations that pertain to areas such as project supervision and management, engineering design change, bidding management, contract management, and project payment. Meanwhile, the relevant laws and regulations and documents, which were closely related to the central work, were also sorted out. It has compiled the "rules and regulations" in order to provide the basis for regulating the daily behavior of all staff members.

To maintain honesty, the Center focuses on building a multi-level supervision platform, through internal and external connections, to implement centralized project supervision. In order to strengthen government honesty in project construction, the Center has implemented the institution of "double contract and double cash deposit". In signing construction contracts,

an engineering integrity contract must be signed, that includes a contract price margin of 1-2%. This helps in keeping costs close to initial estimates.

In addition, the Center implements information disclosure for government investment projects to promote transparency. Every aspect of a construction project, including project bidding, change approval, funds payment, project completion and transfer are published on the government website. The Center takes the initiative to accept the supervision from the community to build a clean and honest project.

(4) Do the preliminary work and meet the use of function.

According to relevant provisions of the government investment and construction projects, the general construction project preparatory work is categorized into four stages, namely project proposal, feasibility study report, preliminary design, and construction drawing design. The Public Building Center strives to complete these stages in a thorough and professional manner. Completing these stages helps lay a solid foundation for smoothly implementing a construction project.

In order to avoid any problems after delivering a unit, the Public Building Center attaches great importance to close cooperation with the end user during the entire construction project implementation process. Under the premise of effective investment control, construction projects will fulfill the end user's requirements and maximize their needs. In order to satisfy the end user, many types of communication can take place, including regular meetings with project representatives. The most important stage is the design stage. The Public Building Center and design units should work together to optimize the design and minimize any problems. In addition, each construction project should appoint a leader to coordinate construction projects related to the design, construction, investment and policies. Before reviewing and approving according to the relevant provisions, the project leader must pay attention to design drawing recommendations, thus further optimizing the design program to ensure the quality of the project before implementation begins.

(5) Strict control of the investment amount and making good use of fiscal funds.

Before establishing a public construction center, the general management model of

government investment projects established a preparatory office by the use unit, which meant a temporary management team implemented the project construction. The Public Building Center is a funding institution, that has no personal interest in a project. As a result, it is able to strictly implement fund plans in the project construction, control the investment with professional management tools, and avoid the phenomena of overspending that often happened in the past.

The Public Building Center strictly evaluates every project with the budgets. If the project's investment is more than the budgets, it should be approved by the joint meeting of municipal government. Without the approval of the joint meeting, the financial sector cannot give a penny, and the person in charge will be held responsible. In order to strictly control the scale of investment, the following measures are taken:

Implementation of the quota design.

Implementation of the total contract price contract.

Strict engineering change.

Establish a multi- sector engineering change approval system.

Implementation by the financial sector for the entire process of project cost assessment and appointing an accounting system.

In the process of implementing a project, to strictly control changes in the project implementation process, the Public Building Center established the "Engineering Change Contact List System" which clearly defines that a single cost change above 5 million Yuan must be decided in an executive meeting where the different divisions involved must approve such changes. There are six divisions must sign in the change documents, which include: constructor, supervisor, designer, construction management department, finance department, and the central leader. All the change should be very clear and has its responsible party.

(6) Pay attention to contract management and reduce legal disputes.

In contract management, The Public Building Center acts according to relevant laws and regulations. Based on the situation of CIXI's construction market, the Public Building Center

try to complete the contracts and update all kinds of standard documents of construction contracts. Contracts include clearly written special provisions that include a contractor performance evaluation system, construction management, engineering settlement time, new compensation liability for breach of contract, new agreements to terminate the contract unilaterally, agreements regarding new construction damage to underground pipes, safe and civilized construction, and compensation for loss. Moreover, unless agreed in the contract, the Public Building Center will conduct a comprehensive evaluation regarding the performance of government contractors quarterly and annually, according to law, in order to further promote the government projects and strictly fulfill the contract obligations.

(7) Beef up construction management and improve the quality of the project.

In order to effectively improve the quality of the project, the Public Building Center works hard in the areas of quality management, safety, and project progress, so that it can achieve the intended targets better and faster.

Consolidate quality management. To strengthen the quality management of construction engineering, the Public Building Center introduced a project performance evaluation system called "Project Performance Assessment Methods", to help maintain quality project management, and encourage construction enterprises to continuously improve the quality of construction. In the course of the project implementation, the Public Building Center urges the supervision units to earnestly perform their duties, and requires the construction unit to manage according to the project quality management objectives. At the same time, the Center holds a weekly supervision meeting, and attends the site meeting held by the supervisor and organizes the monthly quality inspection to strictly control the quality of the project. During the entire construction process, the contractor must follow the practices of "Disclosing before the beginning of construction, checking in the process of construction, and acceptance checking after the construction is completed". From the drawings to the construction site, every construction step must follow regulations and meet the quality standard.

Focus on safety in production. It is important to establish safety rules in signing a project contract. Supervisor and construction units are required to carry out regular inspections at the

construction site to maintain safety. Quality inspections also take place monthly. The Public Building Center has also introduced safety education films that constantly reinforce safety awareness to the site construction management personnel. To date, all projects have been accident free.

Ensure the progress of the project. In preparing project bidding, the tender documents and, contracts, the Public Building Center places realistic deadlines for project completion. All units make their recommendations and work together to put into place an overall schedule that is realistic. Regular weekly meetings help track and check a project's actual progress against the total project schedule. This enables management to analyze various factors that might affect deviation and implications should there be delays. Management teams and construction enterprises strive to take effective measures to adjust the schedule in order to stay on track.

(8) Implement a perfect management system and smooth the operation mechanism.

Since its inception in 2003, the Public Building Center has been able to develop and implement 40 kinds of rules and regulations. It has used its experience with the Shenzhen Works Bureau and other units to develop these. The following is a brief description of the project responsibility system and internal review system.

The Public Building Center is responsible for implementing the project and established a hierarchical management system. The director of the center is the chief responsible to project management. The vice directors, section chiefs and construction managers assume responsibilities within the scope of their respective duties. The project manager manages the project, implement the construction and coordinate the relationships among professional personnel. Project manager is responsible for the field management of project, handling formalities, and managing the project quality, safety, and duration within the scope of his/her duties.

The Public Building Center carries out an institution of documents counter-signing. First there is a thorough discussion at the Center's director meeting or business meeting. Then, the responsible sector accepts to implement the decision and put forward the action plan, and other sectors give their advices to the implementation plan. Finally, the directors check and approve

the decisions and implementation plan. Signatures only are put in place in accordance with the work in process, thus forcing a step-by-step control. Topics covered in the meetings include but are not limited to survey, design, construction, supervision, tender (bidding, direct contracting), design and construction, supervision contract, change contact list in the field, payment progress; project payment costs, project settlement audit, project contracting directly, and guarantee (margin) refunds.

7.3 The bottleneck development of the CIXI model

7.3.1 Environment: the contradiction between standardization and efficiency

In the stages of the government investment project such as decision-making, bidding and project agency management, there is a principal-agent relationship and the information between principal and agent are asymmetrical. Thus, it is important to establish a communication and constraint mechanism to decrease the information asymmetry. Effective supervision mechanism also can restrain agent's moral hazard. Therefore, considering only the internal power balance, or the market competition is not enough to improve the efficiency of government investment project. The supervision from government serves as a force to reduce and eliminate market failure and is an indispensable means to protect the public interest. However, the relationship between supervision and agent's effort is not linear like that the stricter the supervision is, the more the agent's efforts are. Supervision is like a "double-edged sword". On the one hand, it can reduce the risk of government economic operation, and improve economic efficiency; but on the other hand, it will increase supervision costs and reduce market efficiency if it is abused. Therefore, there could be a "moderation" issue in the government's economic supervision. It does not mean that the better the result is, the stricter the supervision is.

At present, the supervision model of government investment projects in CIXI is mainly divided into financial review, audit, inspection, supervision and examination, and construction engineering quality supervision, respectively in charge of the financial sector, the auditing organ, development sector reform, supervision departments, and construction departments.

In actual operation, there are problems such as overlapping of supervisory mechanisms,

cross function, and low efficiency. There are some inherent defects in the bureaucratic organization, but also the problems of China's specific political and administrative environment. The author suggests the existence of a special organization belonging to the People's Congress Standing Committee to supervise the government investment projects. Furthermore, the government administrative functions should be integrated, and the check and approve formalities should be simplified, so as to shorten the life cycle of government investment projects, and improve their efficiency.

7.3.2 Objectives: the contradiction between investment and quality

(1) The accuracy of the investment estimate is not enough.

In project establishment of government investment project, the feasibility study cannot meet the requirement of calculating the investment accurately. There are some reasons: the construction criteria are not scientific and the equipment is not adequate. Standard matching conditions are neglected. Construction items are not complete or not matching each other. There is no detailed geological data. Land development public works have not been finished before the beginning the project's construction. There is no accurate standard for estimating investment. The planning department cannot check the feasible report thoroughly for the limitation in personnel, time and funding. The responsible departments often cut the budget for controlling the amount of investment, but they do not have a reliable basis to decide how much they should cut.

The budget error caused by lacking control in project establishment stage will have some neglect effect on investment control. On the one hand, budget mistake will make the annual plan not scientific and serious, and influence the completion of investment plan and money use plan. On the other hand, budget mistakes decrease the efficiency of investment control in design stage, and the design cannot be well completed. Therefore, it is necessary to improve the decision-making mechanism of the government investment projects, to establish a government investment project repository system that improves the decision-making rules and procedures, and improves the government investment project decision-making process.

(2) Inadequate participation in the preliminary works.

First, the power and responsibilities of the CIXI Public Building Center are not matching, that is, its responsibilities are higher than its power and its power in preliminary work is not enough. The preliminary work has a great influence on the effect of investment control, schedules control, and quality control. Accusations are made to the center because of the losses in preliminary work. This fact does not meet the original intention of the center. Therefore, the government should grant the management power in preliminary works of government investment project to CIXI Public Building Center.

7.3.3 Organization: the contradiction between the task and the power

Since the establishment of the CIXI Public Building Center, many important municipal government investment projects have been built. However, the scope of government investment projects such as the construction unit of the CIXI Public Building Center has not yet been clearly defined. Which sectors of the project should be managed by CIXI's Public Building Center? There is no logical system in place to determine what projects it undertakes. The Eastern Cultural and Trade Zone is currently under construction, but the system of "reversion" phenomenon has appeared, which means the traditional command model is taking the leading role and impacting public building and the scope of construction. Therefore, the CIXI city government still needs to intensify efforts to change various project management departments, thus phasing out other government departments in charge of government project functions. It must eliminate corresponding institutions' participation, or selectively merge some departments and function to the CIXI Public Building Center.

At present, the staff shortage seriously affects the efficiency of the Public Building Center. Taking the Shenzhen City Construction official department-staffing configuration as a reference, the standard is to complete 30 million Yuan per capita in project investments annually. This would require expanding the staff to 300 people. The CIXI Public Building Center currently has only 8 authorized staff members. Their works are very hard. With the deepening of the reform and development, increasing staff is imperative. It can increase its staff to about 60 additional persons according to the staffing allocation standard in Shenzhen City Construction Department.

As a new form of organization, the Public Building Center must pay more attention to its social influence and its administrative imagination. It should centrally manage all the projects with more than 30 million Yuan investment. It also needs to give some professional guidance to the small projects, which are managed by some temporary organizations.

7.4 The development strategy of the CIXI construction agency model

7.4.1 Clear define the functions of the administrative department

One of the original reasons to implement a centralized construction system was to streamline efficiencies and save on costs. However, there are still fears and issues of corruption. When public organizations do not have competitive pressures, non-transparent monopolies often form, thus preventing outsiders from knowing real operating costs within the organization. The monopoly really has no motivation to save, ensures corruption and efficiencies disappear.

In order to prevent this, besides beefing up supervision and transparency, the government should avoid this possible occurrence by distributing responsibilities, and clearly defining the central authority's scope of power in the project construction phase and to allocate reasonably some responsibilities to other departments.

As an example, Shenzhen established a special construction market-trading center to manage public bidding and the project money is paid by the finance bureau. In this circumstance, an administrative monopoly is avoided by reasonably dividing duties and opening up a public bidding process, thus encouraging competitiveness.

The power of the Public Building Center is mainly focused on coordinating and supervising each party in the construction market, and standardizing management rights. In order to create a competitive environment to make the best use of the investment and improve the project's quality, processes like design, research, supervision, and construction must be open to the public. So, one important performance index for the Public Building Center is to improve the competition of construction market.

7.4.2 Increase the autonomy of professional units

After completing a clear definition of responsibilities, autonomy in the professional field of the Centralized Deputy Construction Department should be enhanced. At present, many local governments outsource tasks to other departments, such as preliminary design and land exploration, planning, and use of units. If the project changes and other issues emerge, departments will pass their responsibilities to others, which is not conducive to accountability and improved efficiency. Hong Kong has been successful in this respect. It has focused on hiring professionals in areas such as design, surveying, and construction management for their public works, but give them some discretionary power. Giving the administrative project agency department a more flexible internal management model is also beneficial to improving efficiency. This model has reformed the employment and reward system, has changed the rigidity of the government incentive mechanism and has reduced employees (previously overstaffed). It has also introduced variable pay, bonuses, and other incentives to promote the improvement of organizational performance.

7.4.3 Accurate assess the performance

To give an organization greater autonomy requires accurate assessment of its performance and matched scientific management. Performance evaluation is not only the basis of reward and punishment, but also is an important management tool to diagnose and optimize the organization's operation. For the Centralized Deputy Construction Department, internal performance management is important. That is, through implementing a project director responsibility system and other supporting measures, the construction management responsibility is rationally distributed and assigned to specific individuals, and a scientific system of evaluation is put in place. Also important is performance contract management by decision-making organs. According to the experience of performance management in developed countries, the two sides should communicate, agree on a project agency department's organizational performance objectives, then transform it into specific performance indicators, sign a performance contract, assess and analyze in a certain period of time, and recommend corrective measures. In accordance with the contract, if all parties reach their goals, then the government will reward them and possibly give them more autonomy. If they do not meet their

goals, the government will deduct the performance bonus, replace the person in charge, and implement more stringent monitoring of the organization in the next phase. The following Table 7-2 presents the reference indicator system of management performance evaluation of the project agency.

Table 7-2 The reference indicator system of management performance evaluation of the project agency project

Serial Number	Performance Evaluation Indicators	Contents of Indicators	Method of Evaluating Indicators
1	Process indicators	Cost effect	Reduction rate of the cost of engineering= $(1 - \text{actual cost} / \text{budgetary estimate cost}) * 100\%$
		Duration effect	Advance rate of construction period= $(1 - \text{actual duration} / \text{planned duration}) * 100\%$
		Quality effect	$QE = 1 / (1 + d)$, d refers to number of defects on the date of acceptance of the project
		Safety management	Completion rate of safe labor = $(1 - \text{the labor amount due to accident loss} / \text{the total labor}) * 100\%$
		Contract management	Qualitative evaluation index
		Risk management	Qualitative evaluation index
2	Outcome indicators	Implementation benefit	Production Profit Rate = $\text{total profit} / \text{the workload} * 100\%$
		Project benefit	Qualitative evaluation index (economic, environmental and social impact and sustainability of the project)
3	Structural indicators	Project value	Qualitative evaluation index (project technical progress)
		Management foundation work	Qualitative evaluation index (project management)
		Labor production	Qualitative evaluation index (working layer)

7.4.4 Transparency of administrative acts and regulations

To achieve transparency of implementation of each link in centralized deputy construction management is of great significance to prevent corruption and create a standardization process. As non-profit government investment projects are funded by taxes, the requirement for transparency is a requirement. The public has the right to know how the government is using their money. Transparency will help eliminate corruption and will promote standardization, refinement, and a strong work ethic in the various departments. Administrative transparency should also improve efficiency and effective supervision. Its realization depends on the powerful push of legislation (or local regulations), the transformation of ideas, reasonable incentive mechanisms and the effective participation of all parties.

7.4.5 Project governance in a harmonious environment

From the incomplete nature of the contract of the public property right and the agency problem arising in the project principal-agency relationship, it is necessary to introduce project governance theory, which regulates the right-duty-benefit relationship between the project's main stakeholders by setting the appropriate institutional framework, completing a project transaction, establishing a good order and maintaining this order through a variety of ways and means. By setting up a good institutional framework, project governance regulates the basic network framework, under which project management achieves the project management goal, for the operation of the entire project. If management decides the means of going, then governance decides the destination, management is task oriented, and governance is strategy orientated. Figure 7-2 shows the key link in the design and implementation of the project agency system.

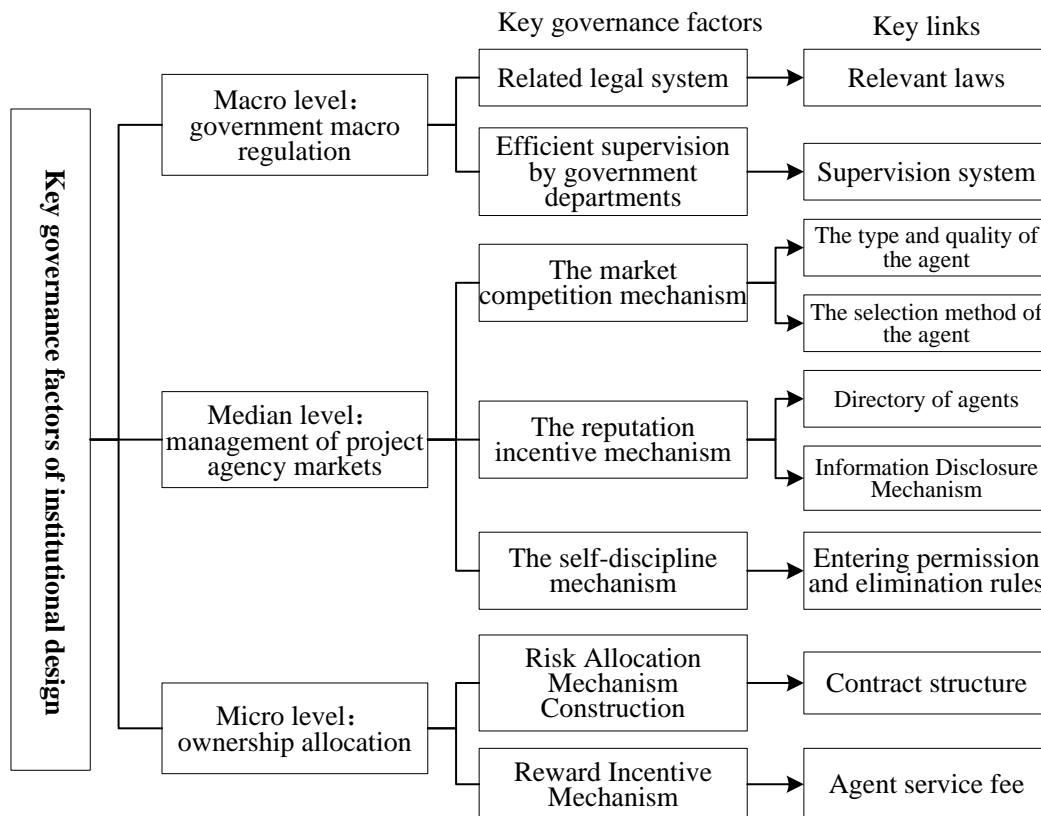


Figure 7-2 Key links of implementation of project agency model based on key governance factors of institutional design.

- (1) Establish and perfect the system of laws and regulations on construction management of government investment projects.

Since the project agency system is an innovation of the government investment project management in China and there is not a comprehensive system of laws and regulations, many problems emerge in the actual operation process. Meanwhile, the project agency system includes service procurement of government investment project management and providing service by agent. Hence, the government should formulate supporting laws and regulations combined with China’s actual situation under the framework of the “Government Procurement law” and “Contract Law”, to avoid the conflict between the existing rules and regulations.

- (2) Cultivate and develop the project agency markets and enterprises

The government should vigorously and comprehensively develop technology and strong consulting service organizations in design, construction, supervision, cost consulting, and other

industries and encourage professionals to combine talents, especially in technology, economy, legislation, and business. It also should establish and perfect the credit guarantee system and professional insurance system, to strengthen the anti-risk ability of consulting organizations and employees, and to standardize the professional ethics of the consulting profession.

- (3) Establish clear responsibilities and rights mechanism, risk and benefit distribution mechanism.

To truly realize the goal of "strict control of project investment, quality, and duration of projects", the government should give full authority in the process of project agency, giving the agent procurement rights on construction enterprises, materials supply and advisory services, implementing the right of the construction unit to use construction funds and approve engineering changes. A strict distinction should be made between the project agency risk and the project risk. The project agency institution should not bear the direct responsibility for changes caused by the shortage of funds supply, the intensification of public relations, and administrative intervention during the construction process. The distribution of benefits of project agency institution should not be limited to the amount of investment surplus, but should comprehensively reflect the success of the project quality, progress, and investment control work.

- (4) Ensure an effective supervision and management mechanism for the project agency institution.

Strict supervision and a management mechanism and a high degree of openness and transparency are necessary to ensure the integrity of construction and management of government investment projects. The project agency should not be free of the supervision and management of relevant departments as a system innovation. Government departments, finance, discipline inspection, supervision, and auditing should exercise supervision procedures according to law to ensure the safety and effectiveness of public investment.

- (5) Establish a scientific evaluation system for the achievement of project agency.

Due to the characteristics of the government investment projects, project agency fees should not be the main basis for the evaluation in the project agency bidding of government

investment projects, and the government should establish a comprehensive evaluation system based on the quality assessment. It can include the following, specifically: (1) evaluating the project quality; (2) the evaluation of engineering construction processes; (3) evaluating investment control of the realized goal; and 4) evaluating performance of the contract, project acceptance and file organization.

7.4.6 Organization structure reform

In order to solve the problem of the interface, which is based on the management level in the project practice, the organization should be reformed. This reform is not committed to changing the organization's structural model, but to changing the organizations drive method into one based on performance.

(1) Evolution of the organizational structure

In order to manage a number of projects that are in the dynamic boundary of the organization, the matrix organization structure is generally adopted. A matrix organization is one where the team reports to a functional manager, but there is also a project manager who has authority to manage the project and lead the team. There are three kinds of matrix organizations: in a weak matrix, the project manager is usually a part-time role. In many cases, the project manager is really a project coordinator, which is more of an administrative role but does have some limited authority over the project and usually reports to a higher-level manager. The budget is controlled by the functional manager, and all major project decisions must be cleared with the functional manager. In a balanced matrix, the project manager is a full-time role with more authority. Project decisions and budget responsibilities are shared between the functional manager and the project manager -- the project manager needs to clear decisions with the functional manager, but the functional manager also needs to clear decisions with the project manager. In a strong matrix, the project manager has more authority over the project than the functional manager. The functional manager's role is more concerned with making sure the team members' professional development and organizational needs are met, while the project manager makes the bulk of the project-related decisions and generally doesn't need to get the functional manager's approval for them. Figure 7-3 shows the difference between a fully

functional organization and a complete project organization, from a weak matrix to a strong matrix.

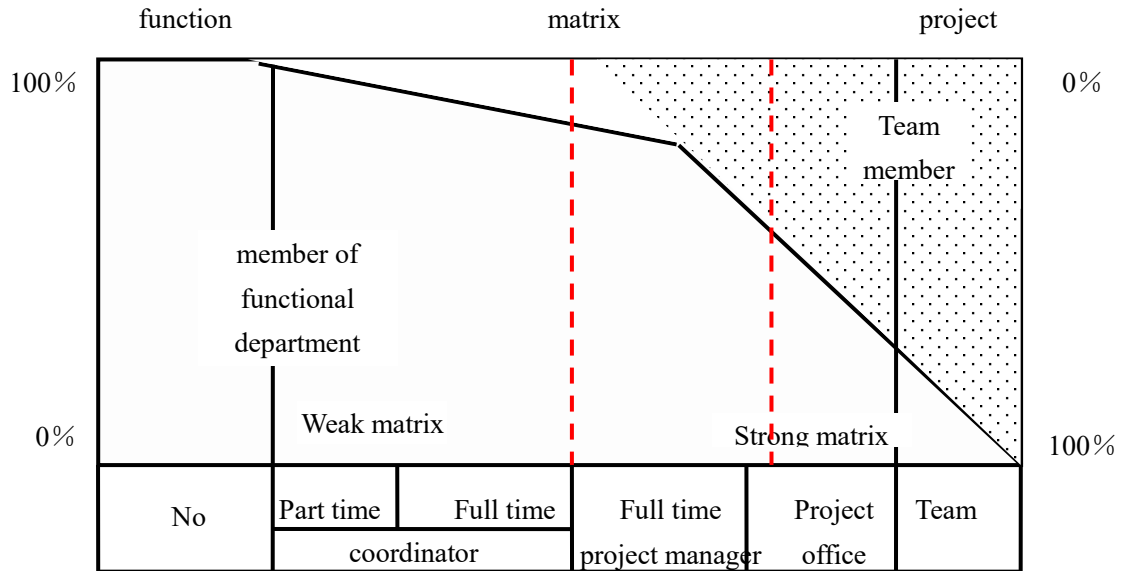


Figure 7-3 The organization spectrum of project-oriented enterprises

The organizational form of the current project organization is generally in the area between the two dotted lines in the figure. Although the organization has a full-time project manager, the overall planning and coordination of all projects is still in charge of the general manager for there is no full-time functional unit, which is responsible for the overall planning and coordination of all projects. Restricted by the principle of an effective administrative range, when project numbers increase to a certain extent, it will inevitably require increasing the level of management to ensure effective leadership. Thus, each deputy general manager must divide and conquer depending on the number of projects. The problem of coordination difficulties still exists, which requires effective coordination within the department.

(2) The establishment of the project management office (PMO) at the enterprise level

Enterprises implement project cluster management. With this structure type, the organization will need to continue advancing right, towards developing a super matrix. In order to avoid setting up a specialized agency for each project to coordinate and integrate the management functions in an organization, as well as take experience obtained from a project

and apply it to another project, it is necessary to establish the project management office at the enterprise level. The project management office is generally composed of managers at the enterprise level, program managers and resource functional managers. They clarify corporate strategies, determine the project's priority, institutionalize the best practices of the project management system and expand the ability of project management. They allocate all the resources from the enterprise global perspective to achieve the overall optimal input-output. The program manager leads the project team members to carry out the project and is responsible for the project team's performance. The resource functional manager acts as a "coach" and a "mentor" in the organization, gives project team members professional skills and cooperates with the project manager group to achieve the project objectives.

In short, PMO is the solution for the entire enterprise, tracking multiple projects in order to realize the company's strategy as the center. PMO is the specific department of the project management implementation, and its specific functions are as follows:

To define contents of the project group

To quantify costs and benefits of the project group

Risk management and evaluation

To clarify project components

To monitor the process

To collect experience and knowledge

To provide professional skills

To maintain the consistency of the project group and the organization strategy

7.4.7 Control the project

In recent years, CIXI has prepared and implemented increasingly more large projects. It generally adopts the "owners plus project supervision" management method. This method exposes the following problems in practice: First, those who provide professional consulting services to the project owners mainly serve a supervisory role. This method of project

supervision ensures quality control in the construction stage. However, problems can arise. Faced with numerous units involved in the project, the supervision unit can lack the ability to control and manage the entire project, thus it is difficult to provide the owners with valuable professional consulting advice about the macro control and management. Faced with numerous units involved in the project, the supervision unit can lack the ability to control and manage the entire project. Large construction projects generally have several engineering supervision units, which provide services for owners according to the projects allocated time period. However, it is difficult to provide integral project management advice for owners, which is the most urgent need of owners. In addition, in the current management method, the means of information collection, processing, storage between the owner and the project implementation unit lag, and information transfer is badly impeded, directly affecting the level of owners' decision-making.

From the above analysis, we can see that in large-scale construction projects, management and control can be weak. That is the major reason why project implementation can be out of control and why many problems exist during the project investment, schedule, and quality control. To solve this problem, it is not only necessary to strengthen the owner party's project management power, but also for the consultants to strengthen their management skills.

Project controlling is a new large-scale construction project management model suited for China's construction environment. Project controlling units for the owners provide planning and control of the overall target goals for project services, thus the engineering management consultant serves at two levels: project controlling and project supervision to meet owners' needs and to manage and control the goals of large scale construction projects. By means of modern information technology, project controlling collects, processes, and transmits large scale construction engineering information. Via the processed information flow's guidance and the material flow controlling the project's construction, project controlling supports the highest decision makers to undertake project planning, coordination, and control. In China, the management model combining owners, project controlling, and project supervision can be abbreviated as "project owners + project controlling + project supervision", as Figure 7-4 illustrates.

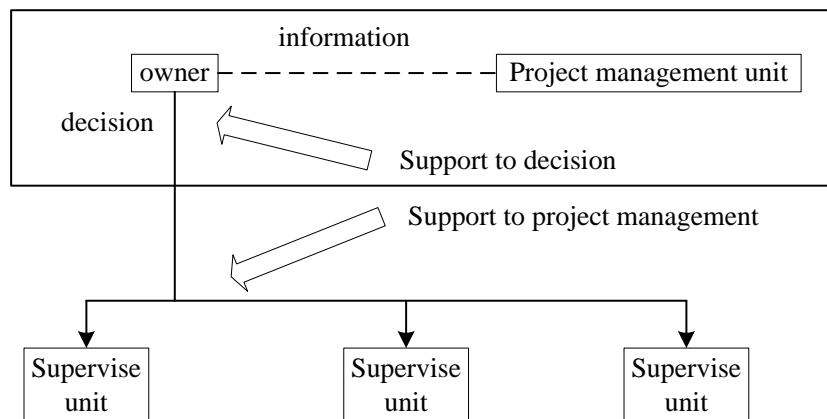


Figure 7-4 The management model combining owners, project controlling, and project supervision.

Project controlling is a kind of organization model of construction project management, and the model is aimed to offer decision support for the owner of the highest decision-making in order to achieve the project investment, schedule, and quality goal. The service object of project controlling is the highest decision-making level of the project.

The core content of the project is information collection, information processing, and preparing various control reports. That is, the status of the material flow can be reflected from information processing.

The central work of project controlling is overall planning and control of the project implementation and of the construction process and the interface between the various construction processes.

Project controlling’s purpose is to strengthen control of the project goal and increase the project’s value. The foundation of this model is the combination of project management, enterprise control theory, and modern information technology. The task of project controlling is to provide information to the owners and to prepare project control reports (including the overall plan of project controlling, the plan of project planning, and the report during the project implementation period). It includes planning and control, i.e., planning and control of schedule, quality and investment targets, as well as planning and control of the organization, management, economy, technology, contracting out, contracts, and funding.

The task of information processing in project controlling is to collect, process and analyze

information, and to form a report of project target information (schedule, investment, and quality). The specific tasks include: (1) establishing the project information system matched to the Internet; (2) responsibility for preparing project information processing handbooks, establishing the classification of project information and coding system as well as a project information management system; (3) collecting and processing information during the project implementation process; (4) developing project controlling reports, including monthly reports, quarterly reports, semi -annual reports, annual reports and the progress control report, the investment control report and the quality control report, the contracting out control report, and other special reports.

7.5 Development prospects of the CIXI construction agent model

The reform of non-operational government investment project management must conform to the trend of government reform and development of a market economy. It must be conducive to the protection of public interest and promote management efficiency through competition. The institutional change of the foreign government investment project management model can provide enlightenment for the development of the CIXI model.

7.5.1 Take marketing construction agent as the ultimate goal

According to the extent of participation of the government and related departments in project construction management activities, the institutional change of the foreign government investment project construction management mode can be divided into four stages, as Figure 7-5 illustrates.

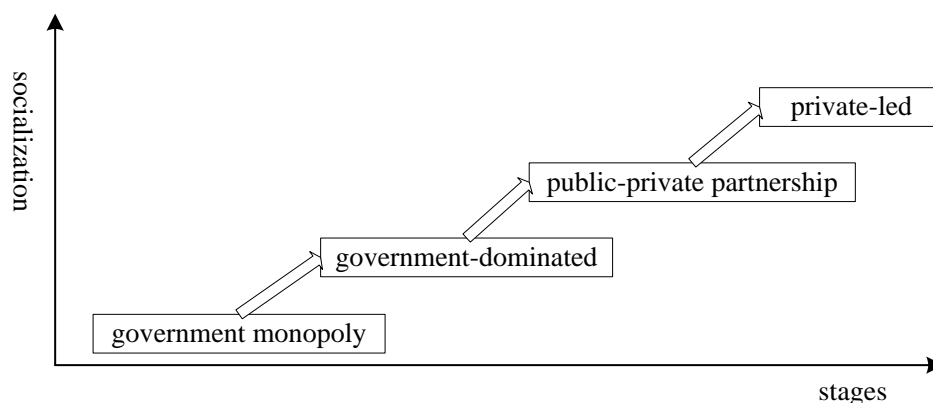


Figure 7-5 Project management model of foreign government investment changes

The stage of government monopoly: Government departments are solely responsible for the construction and management of government investment projects at this stage. By setting up a special construction management department, the government is responsible for constructing and implementing all government investment projects as a project owner. At this stage, there are the following models: self-built/infrastructure model, the engineering command model, and the centralized procurement model, all which belong to the government investment project management model. The socialization degree of these models is low, and private sector participation is at most limited to performing specific construction work. Hong Kong's works bureau model is representative of this type, as well as the administrative project agency model of government agencies represented by Shenzhen.

The government-dominated stage: Characteristics of the government investment project management model at this stage are that the government still acts as project owners and promoters, has decision-making power, and is responsible for investment and management. Meanwhile, the government has the ownership. Specialized project management companies or institutions are entrusted by the government and are in charge of specific aspects of the construction management work. At this stage, there is more in-depth development regarding the degree of socialization and project management specialization of government investment. Project management of government investment in Singapore is at this stage, and the domestic enterprise project agency model also falls into this category.

The public-private partnership stage: The main feature of this stage is that the project is

invested and constructed by the private sector and operates within the concession period. However, the final property belongs to the government. At this point, the project's construction management model includes the transfer of ownership of the project and private sector participation. This is a transition stage between the government domination stage and the private-led stage.

The private-led stage: Project aspects like investment, construction, management and maintenance of government investment projects at this stage are completely done by the private sector and the government is responsible only for supervision and management. The government hands over the project to the private sector to do financing, construction, and operation in areas such as services purchasing and government subsidies. In this model, the government purchases the service provided by the project, but not the owner right of the project. This model is used in British government investment projects.

7.5.2 Centralized supervision to construction agent

(1) Establishing a two-tier project agency model based on the permanent project agency management agency.

The company agent model is a feasible management model of government investment projects in a fully market-oriented environment. However, in current conditions where the market economy is underdeveloped, China is lacking in agent-construction enterprises, which have a comprehensive technical force and powerful comprehensive competitiveness. Establishing a two-tier project agency model based on the permanent project agency management agency is a realistic choice for China. The first tier of project agency is composed of government departments, project using units, and permanent project agency management agencies. The second tier is composed of project agency management agencies, construction enterprises, and service consulting firms like investment consulting, designing, supervision, tender agencies, and cost consulting. Figure 7-6 illustrates the two-tier project agency model.

The agency controls and commands the government investment projects. In the event of emergencies, it handles these situations during the agent-construction process. The agency does not intervene in specific management affairs, but refines the functions of project construction

and management, and subcontracts the affairs related to consulting services enterprises, which carry out the entire consulting services process in their specialized service areas, through open bidding. By establishing the permanent project agency management agency, this model can effectively realize the separation of ownership and management and block administrative interference and rent seeking preference in the existing system through establishing the permanent management mechanism. The model resolves the risk of difficulty in realizing the long-term right of recourse caused by such factors as instability of the social agent project agency and personnel mobility. Also, the model helps solve inefficiency and the losses and waste that arise due to a lack of consistent construction standards and the decentralized allocation of professionals that promote the project agency system. The model also prevents project agent from expanding inefficiently and being busy in administration affairs and routine work. In actual operation, the first-tier project agent should consciously cultivate secondary tier project agents. When the construction agent market matures, the second-tier project agent may sign the project agency contract with the investors and the users directly. Therefore, it is an incremental transform way to establish a two-tier project agency model with a permanent project agency management organization.

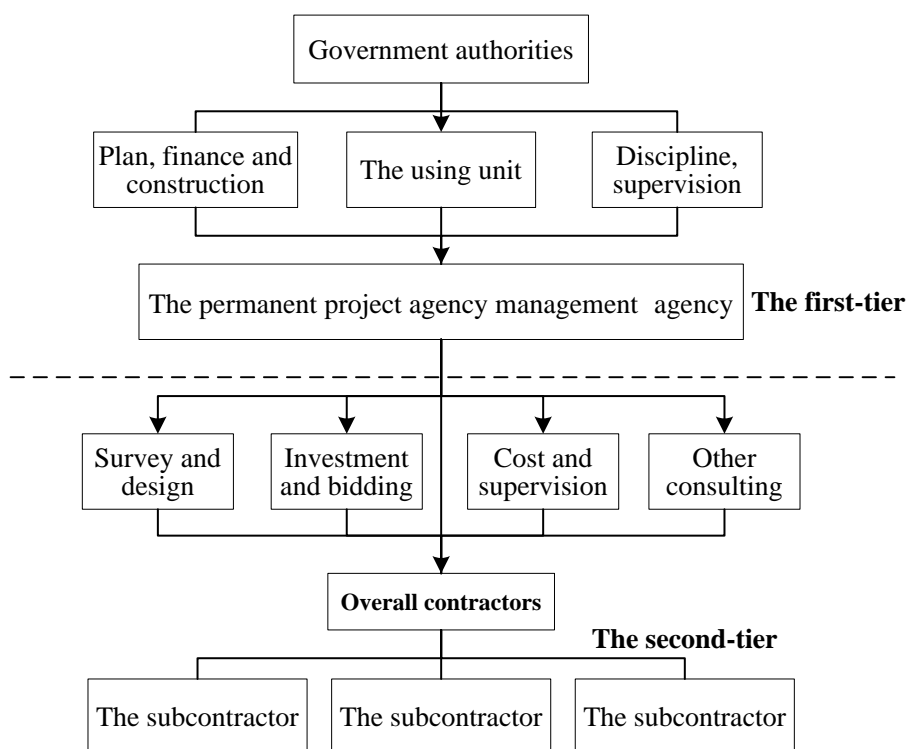


Figure 7-6 The two-tier project agency management model

(2) To actively pilot the general contract project in the DB3 (General Contracting or Design-Build 3) model.

General Contracting or Design-Build model(DB) is an international way to organize and implement project construction projects. In recent years, China has made great progress using the general contracting method and has developed a number of engineering companies with general contracting qualifications. Actively promoting the project general contracting method is important to deepen organizational reforms and implement various construction project methods. It is also an important measure to improve project management levels, to control the scale of project investment, to ensure the quality of the project, and to enhance investment gains.

Design-Build model(DB) can be divided into four models according to the beginning of a project. It is called DB1 if it begins from project's plan design phase. It is called DB2 when beginning from the preliminary design phase. It is called DB3 when beginning from the technical design and it is called DB4 when beginning from construction drawing design stage. However, when the General Contracting is carried out after finalizing construction plans, this model will become the General Construction Contract model, as Table 7-3 shows. Considering factors like the depth of the intervention on the design by the project agency institution and the accuracy of general contract bidding, it is recommended to use DB3 and the general contractor can take the design-construction union approach.

To transform the government agent project agency into the government project agency management agency.

The advantages of the government procurement model are to centrally manage, improve efficiency, and reduce costs, from which the project agency can learn. At present, the project agency system is a decentralized construction and decentralized supervision model, and each project is implemented by the project agency unit and supervised by the using unit. The decentralized construction model cannot be changed, but centralized supervision is possible. Establishing a specialized project agency management agency not only avoids the problem of the using unit lacking professional knowledge and inefficient supervision, but also can reduce

supervision costs. The centralized procurement institution changes from the owner directly managing the project to the principal who chooses and entrusts the agent project agency and supervises the project agency project.

Table 7-3 Types of project general contracting

Project decision-making	Design competition	Preliminary design	Technology design	Working drawing design	Construction
		General contract 1(DB1)			
		General contract 2(DB2)			
		General contract 3(DB3)			
		General contract 4(DB4)			
		Construction general contract			

7.5.3 To carry out the reform process progressively

To regulate and adjust government management in accordance with the requirement for a socialist market economy not only means narrowing and reducing the scope and extent of government intervention, but also means market decentralization and allowing the market to govern itself within a certain scope. It forms a contradiction, namely the contradiction between streamlining administration and delegating powers by construction departments and weakening the autonomy function of construction market.

With this background, the situation that the government is too hasty and disorderly to decentralize not only prevents the desired reform objectives, but also causes construction market disorders, or provides an opportunity for illegal forces to come into play.

The mature project agency market is composed of completed project agency rules and regulations. There are reasonable and normal construction contracts, complete competition between firms, and a mature credit system. An important sign of the maturity of the project agency market is that there are a sufficient number of project agents who have corresponding abilities for the government principal to choose. Therefore, a complete competitive market mechanism and the incentive and constraint mechanism to the project agent are the first steps

to increase the maturity level of the market. Only when the agents significantly improve their project management capabilities can the agent-construction market develop fully. In the current situation when the agent-construction market is not matured, the government should follow the principle of gradual improvement, that is, change the government department infrastructure to some state-owned project management companies first, and as the market develops, the state-owned companies will be transformed to joint stock enterprises with a marketable operating system.

7.6 Chapter summary

Based on former chapter's analysis, we studied the construction agent mode in CIXI city. We showed that in a situation like CIXI, that is characterized by under developed market and low capability of project management, it is suitable to use an administrative construction agent mode. However, the market is developing gradually, so the administrative construction agent mode will be replaced by market construction agent mode in the future. According to this expected evolution, the government should improve their capability in project management, so that the author also gave some suggestions for being undertaken by the government in order to allow a smooth and consistent change.

Chapter 8: Conclusion and Contribution

This chapter summarizes the entire thesis and introduces the findings relative to the research question. Furthermore, it presents the contribution of this work from both theoretical and practical aspects, as well as its limitations. Moreover, provides a brief suggestion for areas of further investigation.

8.1 Review the research question and conclusion

The goal of this thesis was to analyze the construction agent model of CIXI City and raise some suggestions for its development. The literature review highlighted that the construction agent model is relatively mature in western countries. Most studies concentrate on the projects' specific issues and numerous deeper project management problems. On the contrary, in China, the project agent system is still in a start-up stage. Most research conceptually analyzes issues and provides basic model comparisons. There is a lack of in-depth research regarding the project agent system in China. For example, areas that warrant exploration include exploring the contractual relationship and legal problems in the project agent system. Therefore, the objective of this research was to analyze and study the advantages of the current project agent management of non-profit government investment projects in Beijing, Zhejiang, Shanghai, Guangdong, and Shenzhen and then compare, analyze and discuss the issues of CIXI City's current construction agent system in order to provide effective suggestions.

Previous studies show that there are two main principal-agent relationships in government investment projects. At the first level, the people commits the projects to the government. At the second level, the government department commits construction companies.

When it comes to the traditional model of project management, the project's user plays a dual role of both a management agent to government and a principal to the units that carry out the work. Since the user is not a project management professional, the traditional project management model showed serious defects concerning its practices. In this case, the agent

system showed its advantages. The project management agent model solved the problems that the traditional project model could not solve. A professional management agent takes the place of users in the middle layer of double principal-agent relationships. In a sense, the construction agent system should be the preferred market choice because it could avoid the pitfalls of the traditional model through its internal incentive and constrains system.

Although the construction agent system avoids the traditional model's disadvantages, there are several drawbacks, such as moral hazard and less supervision. Meanwhile, the construction agent system is still evolving. In different regions of the country, it could produce different situations. This study presented the construction agent system in a non-profit government investment project by applying the case analysis research method.

First, the author analyzed the construction agent model of non-profit government investment projects in five benchmark areas, and put forward two main models of construction agent as the choice methods for the construction agent model. Then, on the basis of the referred model, the author decided to analyze the particular case of the construction agent model of CIXI City, and put forward some suggestions for its development.

There are three interest parties in the construction agent model, namely the principal, the agent, and the user. Different regions formed distinctive local construction agent models in practice, such as the "Beijing model", the "Shanghai model", and the "Shenzhen model". The difference between those different mentioned models are mainly embodied in three ways: (1) The principal, which sometimes is a government investment department in charge of the project (such as the Zhejiang and Beijing models), sometimes is the project's legal person (such as in the Shanghai model), and in other cases it is a professional institution responsible for the construction work on behalf of the authority (such as the Guangdong model); (2) The agent is a Corporation in general, but in the Shenzhen model it is different as the construction agent is an institution named the "Building Public Works Department"; (3) In their construction agent contract, the Zhejiang province and Beijing had three parties sign- the principal, agent, and user (the investment department is the principal). Shanghai, Guangdong, Zhejiang Hangzhou and Ningbo used a two-party construction contract signed between the principal and the agent (the principal is the project legal person or the user; the principal is the Construction agent

Bureau in the Guangdong model). Shenzhen used an administrative construction agent model, where the Department of Investment Management directly designates the agent.

We can include all the regional construction agent models into two types of general models, namely, "market agent" and "administrative agent" models according to the different characteristics of their principal-agent relationships. The essential difference between them lies in the different ways of selecting and organizing the project agent. In the "market agent" construction model, the construction agent is a professional corporation chosen by market bidding methods. Beijing, Shanghai, and Zhejiang use this model. In the "administrative agent" model, the construction agent is an administrative unit, which the government founded especially for managing their investment projects. Shenzhen and Guangdong use this model. There are significant differences between the two models in the management objectives, the principal-agent relationship and the risk bearing. However, the study did not show any obvious evidence whether one model was better than another. The administrative construction agent model does not mean that the government can control everything, while the market competition agent model does not mean that it is infallible through relying on market mechanisms. Combining the administrative and market mechanisms may be a solution to government investment project management in the future and warrants further study.

CIXI's construction agent model is similar to the Shenzhen model, and uses an "administrative agent" construction model. That means that the market is not developed enough for implementing market competitive construction agent models in many regions. The administrative construction agent model is a contingent way to adapt to the current economic environment. However, government often plays an important role in economic management in a transition economy. Government departments could involve their control of power in managing government investment projects while doing the anti-corruption action during the period.

8.2 The contribution and limitation

8.2.1 Theoretical contribution

This study has three significant contributions from a theoretical point of view. The first summarizes the main project agent models in China. The study further delves into the construction agent system based on Song Jinbo and Fu Yi Wen's (2010) research. It presents two types of construction agent models in non-profit government investment project management. These are the market construction agent model and the administrative construction agent model.

Second, the thesis stresses the difference between the principle-agent relationship in the two types of client models: construction-agent enterprise and project agent contracts. The main difference between the two models is the construction agent. The agent in the market model is a professional company, which the client obtains through open bidding while the agent in the administrative model is a governmental administrative unit, that specializes in managing non-profit government investment projects.

The study's third contribution, based on the above analysis, is that it suggests various improvement measures for government investment projects in the current administrative construction agent model in management and supervision areas.

8.2.2 Managerial Contribution

In developing an construction agent system in the non-profit government investment project management, this study could be of great significance. In practice, the study could suggest that it is appropriate to use an administrative agent constructive model in a situation like CIXI City, where the market is underdeveloped and the city lacks the infrastructure and employees lack the expertise to carry out project management. As the market gradually develops and the city has more experience, it could change further down the road to the market construction agent model.

Meanwhile, this study also suggests and makes recommendations of how to improve and streamline the Chinese government's management of project agents' in the administrative agent

constructive model of CIXI City to create more efficiency. For instance, the two-tier project agency management system would block administrative interference and rent seeking preference in the existing system through separating of ownership and management.

8.2.3 Limitations and Further Investigation

This study has its own limitations. Most significantly, the study only analyzed the various project management models from the government's perspective. In China, the project management system is quite complex, with many bureaucratic layers. Large scale projects take a long period of time to get off the ground. Unfortunately, the author did not have access to interviewing participants outside the realm of government representatives; therefore, the study did not provide a comprehensive examination of all players in government investment project management.

In a sense, the study's limitation could pave the way for further investigation. Therefore, future studies could analyze and examine the construction agent model from different stakeholders' perspectives. This could include feedback from agent institutions, use units, and supervision organizations. The studies could analyze the situation of different stakeholders in various projects and based on qualitative feedback from a series of in-depth surveys and interviews could provide recommendations of how to improve and streamline operations and determine what construction agent model works best in given situations.

8.2.4 Chapter Summary

This chapter summarizes the entire thesis. It presents the study's conclusion, as well as its contribution to field. It also discusses the limitations of this study and makes recommendations for further research.

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