



To create a theoretical framework that can help the Chinese expressway sector approach to success of public-private partnerships. To develop recommendations and strategies of improving the management of expressways which are beneficial for Chinese governments.

Public-Private Partnership and the Management of Expressways in China: An Agency Theory Approach

Rui, Mu
1321552
Engineering and Policy Analysis

mure219@hotmail.com



Public-Private Partnerships and the Management of Expressways in China:

An Agency Theory Approach

How to achieve successful public-private partnerships in China's expressway sector?

Name	Rui, Mu
Student number	1321552
Email address	mure219@hotmail.com
Date	August 2008
University	Delft University of Technology
Faculty	Technology, Policy and Management
Programme	Engineering and Policy Analysis
Division	Policy, Organization, Law & Gaming

Graduation Committee:

Prof. Ernst ten Heuvelhof
Martin de Jong
Altamirano Monica

Professor
First Supervisor
Second Supervisor

Dedicated to my parents

Acknowledgements

I am deeply indebted to my supervisor, Martin de Jong, from Delft University of Technology whose support, encouragement, stimulating suggestions and confidence in my enabled abilities have become a source of my constant motivation and energy. It is impossible for me to imagine completing this work without his guidance and pragmatic advices. I thank him as well for providing me the opportunity of studying on a real Chinese transport infrastructure issue with daily presence and continuous mentorship through over the six-month period. His constructive feedbacks and comments have played a very important role in shaping up my thesis. I also sincerely appreciate Prof. ten Heuvelhof for his positive affirmation and impression which provide me with enormous confidence in finishing the work. I would like to thank Monica for her greathearted contribution of her time, useful comments, seasoned opinions, scientific knowledge on PPP, relevant books and background reading materials. Anyhow, I thank wholeheartedly all my supervisors. Without their help and supports, I cannot favorably complete my thesis work.

I, especially, would like to thank people from the Chinese government and various organizations including Road Design and Plan Institute, Provincial Tendering Committee, Banks, and the Consultancy Firm. I extremely appreciate the help from the leader of the Liaoning Province who introduced me to the officials in the Ministry of Communication and regional department of communication for collecting empirical evidence through interviews. It is thankful for me having valuable and insightful discussions with these interviewees. And their contribution of both published and unpublished (or internal) documents have played significant roles in doing the empirical research.

I would also thank my fellow students, especially Shanshan Xu, who is in the same project with me, for sharing thoughts and showing interests and valuable hints.

Finally, I would like to give my special thanks to my family members whose patient love and encouragement enabled me to complete this work and whose financial supports made possible for me undertaken studies in the Netherlands.

August 2008

Mu Rui

Executive Summary

Since the 20th century China has experienced an uptrend motorization process, which leads to the increase in traffic demand and thus the need to taking faster steps in constructing and extending road infrastructures. Given the requirement of enormous capital investment in these constructions and extensions, achieving such a development in road sector solely depending on public sector has been a beyond-conquering challenge. Indeed, it is also the time for private sector to participate into the market for public infrastructure service along with the arrived open-door policy and a series of institutional reforms during the past 20 years in China. Therefore, innovative approaches of PPP with private financing are attractive for the Chinese government. However, it has given rise problems for effectively and favorably applying the innovative approaches, compared with conventional ones.

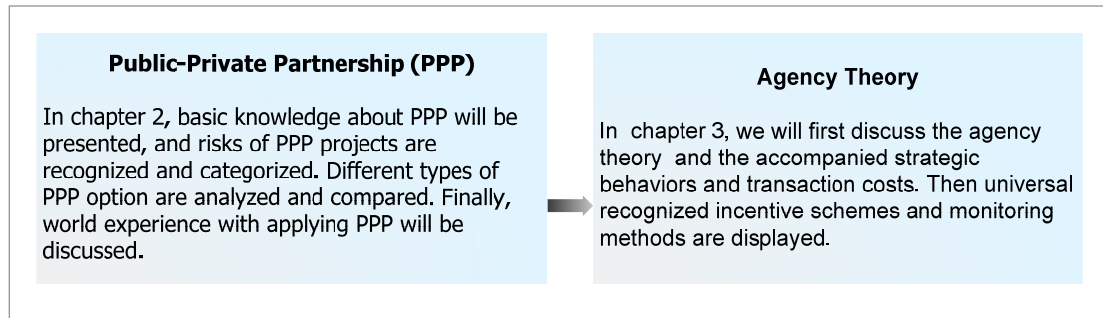
Facing the aroused problems, theory on PPP and principal-agent relation has been studied and a four-level theoretical framework has been created aiming at achieving successes at different levels throughout a project life cycle, including shaping up a favorable institutional environment, selecting the right contractor and ensuring the right project implementation and providing right and adequate incentives, given China's informal institutions with low trust degrees.

Findings from the empirical research reflect two orientations, one is the Chinese disappointing institutional circumstance and another is the emerged strategic behaviors from the private sector. The Chinese institutional circumstance for applying innovative PPPs is characterized by deficient and inconsistent legal laws and cumbersome regulations, the gap of achieving transparency law, and the non-fully independent judiciary. Such a disappointing institutional environment has brought in multi-faceted corruptive behaviors such as bribery, nepotism, breach of confidentiality and collusions between officials and private actors. In addition, both corruption and the underdeveloped regulatory framework result in increasing in transaction costs. Strategic behaviors manifest variously, both in the ex ante contracting period and in the ex post contracting process, in forms of collusions among candidate bidders and shrinking efforts during implementation of the work, known as problems of adverse selection and moral hazard.

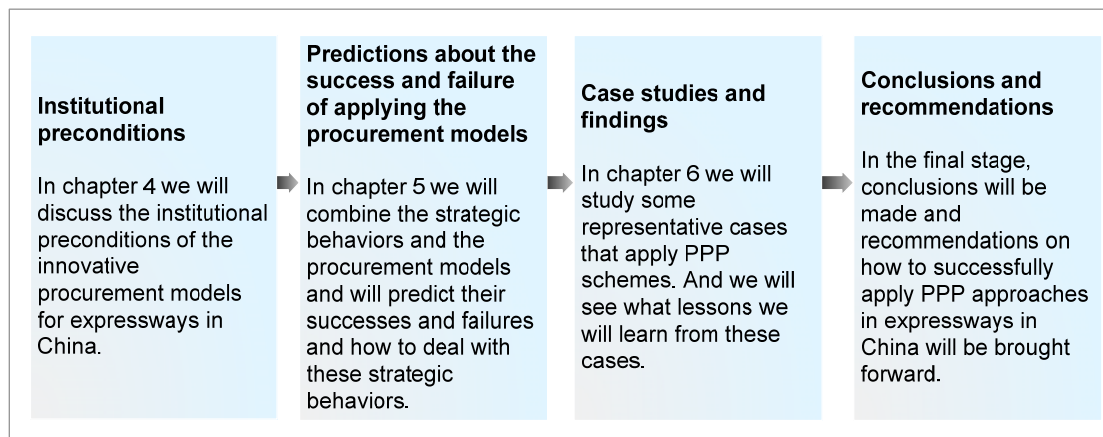
Taken the definition on "good governance" by Word Bank, emphasizing public sector efficiency, transparency and accountability, and using our created four-level framework, recommendations on each level including institutional circumstance, project tendering, construction and operation (maintenance) are put forward aiming at building up an efficient, transparent and accountable institutional environment, giving rise to strategies on dealing with adverse selection, shaping up the incentive schemes and monitoring methods on addressing problems of shrinking efforts and contract incompliance.

Thesis Structure

Theory



Empirical Research in China



CONTENT

SECTION I	1
CHAPTER 1 INTRODUCTION	3
1.1 BACKGROUND	3
1.1.1 Good Governance and Transport Infrastructure Reforms in China	3
1.1.2 Transport Sector in China	6
1.1.3 Highway Sector	8
1.2 RESEARCH BOUNDARY	12
1.3 PROBLEM STATEMENT	13
1.4 RESEARCH QUESTIONS	15
1.5 METHODOLOGY.....	15
SECTION II.....	17
CHAPTER 2 PUBLIC-PRIVATE PARTNERSHIP	19
2.1 INTRODUCTION	19
2.2 PUBLIC-PRIVATE PARTNERSHIP	19
2.2.1 What is public-private partnership?	19
2.2.2 Clarification on PPP actors	21
2.2.3 PPP benefits from the public sector's point of view	21
2.2.4 PPP benefits from the private sector's point of view.....	23
2.2.5 Defining success of a PPP.....	24
2.3 OPTIONS FOR PUBLIC-PRIVATE PARTNERSHIP	26
2.3.1 Design-Bid-Build	27
2.3.2 Service Contract.....	28
2.3.3 Design-Build.....	28
2.3.4 Design-Build-Operate	29
2.3.5 Build-Operate-Transfer.....	30
2.3.6 Design-Build-Finance-Operate.....	30
2.3.7 Build-Own-Operate	31
2.3.8 Comparisons among PPP options	31
2.4 RISKS IN PUBLIC-PRIVATE PARTNERSHIPS	34
2.4.1 Project-specific risks.....	34
2.4.2 Market risks	36
2.4.3 Sector-policy (including major force) risks	36
2.4.4 Capital-market risks	37

2.5	WORLDWIDE EXPERIENCE WITH PPP AND LESSONS LEARNT	38
2.5.1	“Ex ante” evaluation	38
2.5.2	Institutional capacities	39
2.5.3	Regional economic development	40
2.5.4	“Corruption”	41
2.5.5	Renegotiations	41
2.5.6	Optimism bias	42
2.6	RISK MITIGATION STRATEGIES	44
2.7	CONCLUSION	45
CHAPTER 3 AGENCY THEORY		47
3.1	AGENCY THEORY	47
3.1.1	Conception	47
3.1.2	Transaction costs	48
3.1.3	Strategic behaviors.....	51
3.2	MONITORING AND INCENTIVES	54
3.2.1	Cost incentives.....	55
3.2.2	Construction monitoring	56
3.2.3	Operation incentives	57
3.3	A FRAMEWORK	59
SECTION III		63
CHAPTER 4 INSTITUTIONAL PRECONDITIONS, CIRCUMSTANCE, AND LIMITATIONS FOR CHINA'S INNOVATIVE PROCUREMENT MODELS		65
4.1	THE DIVIDING LINE BETWEEN THE CONVENTIONAL AND THE INNOVATIVE PROCUREMENT MODELS IN CHINA	66
4.2	INSTITUTIONAL PRECONDITIONS FOR BOT AND TOT	69
4.2.1	Transparency law	69
4.2.2	PPP regulations	69
4.2.3	Intellectual property right law.....	71
4.2.4	Property law	71
4.2.5	Competition law.....	71
4.2.6	Private contract law.....	71
4.2.7	Company law	72
4.2.8	An independent judiciary	72
4.3	CHINA'S CURRENT INSTITUTIONAL CONTEXT	73
4.3.1	PPP regulations in China.....	73
4.3.2	Legislative framework	80
4.4	GAP, LIMITATIONS AND INFORMAL PRACTICES	82
4.4.1	Gap	83
4.4.2	Limitations	86
4.4.3	Informal practices and the Chinese judiciary system	87

4.4.4	Comparisons among BOT, TOT and TOT(+DB) in terms of institutional preconditions	88
4.5	CONCLUSIONS AND RECOMMENDATIONS	88
CHAPTER 5 PREDICTIONS ABOUT THE SUCCESS AND FAILURE OF THE PROCUREMENT MODELS		91
5.1	PREDICTIONS ABOUT THE SUCCESS AND FAILURE OF CHINA'S PROCUREMENT MODELS	92
5.1.1	DBB	92
5.1.2	DB	94
5.1.3	BOT	97
5.1.4	TOT	99
5.1.5	DBO(M); DBFO; and BOO	103
5.2	DEALING WITH STRATEGIC BEHAVIORS	103
5.2.1	Recommendation on state-owned enterprise accountability	103
5.2.2	Recommendation on tendering to select the right contractor	104
5.2.3	Recommendation on construction to get the project implementation right	105
5.2.4	Recommendation on operation and maintenance to get the project implementation right	106
5.3	CONCLUSIONS	107
CHAPTER 6 CASE STUDIES AND FINDINGS		109
6.1	SHEN-DA EXPRESSWAY	109
6.1.1	Shen-Da expressway between 1984 and 2000	110
6.1.2	Shen-Da expressway between 2001 and 2008	112
6.1.3	Lessons learnt	115
6.1.4	Institutional weaknesses and strategic behaviors encountered	115
6.2	XIANG-JING EXPRESSWAY	116
6.2.1	The prior time and promotion of BOT concept	116
6.2.2	Tendering process	117
6.2.3	Construction phase	118
6.2.4	Operation phase	119
6.2.5	Lessons learnt	120
6.2.6	Institutional weaknesses and strategic behaviors encountered	121
6.3	LE-YI EXPRESSWAY	121
6.3.1	Driving forces for applying BOT	122
6.3.2	Tendering	122
6.3.3	Construction	123
6.3.4	Lessons learnt	125
6.3.5	Institutional weaknesses and strategic behaviors encountered	125
6.4	CITONG BRIDGE	125
6.4.1	Quanzhou: A city surrounded by the Jin River in the west	126
6.4.2	Promotion and establishment of the BOT approach	126
6.4.3	A turning point of the life of the Citong Bridge	127

6.4.4	Competition between the Citong Bridge and the Quanzhou Bridge	127
6.4.5	The struggle of the Citong Bridge.....	128
6.4.6	Debates from the public users	128
6.4.7	Lessons learnt: the opportunities for private enterprises and governmental protection on state-owned enterprises	129
6.4.8	Institutional weaknesses and strategic behaviors encountered	130
6.5	HE-CHAO-WU EXPRESSWAY	130
6.5.1	Actors involved	132
6.5.2	Sacrifice the state asset.....	132
6.5.3	1.2 billion's loss of state capital	133
6.5.4	Debates surrounding transferring the operating right.....	133
6.5.5	End up with nothing definite	133
6.5.6	Lessons learnt and recommendations	133
6.5.7	Institutional weaknesses and strategic behaviors encountered	134
6.6	FINDINGS.....	135
SECTION IV		137
CHAPTER 7 CONCLUSIONS AND RECOMMENDATIONS		139
BIBLIOGRAPHY.....		147
INTERVIEWS		155
APPENDIX 1: MAIN QUESTIONS DURING INTERVIEWS.....		157
APPENDIX 2: CHINA TRANSPORT INFRASTRUCTURE (SOURCE: WORLD BANK)		158

LIST OF TABLES

TABLE 1: INVESTMENT ON TRANSPORT FIXED ASSETS	7
TABLE2: TRANSITIONS BETWEEN MODES.....	8
TABLE3: HIGHWAY NETWORK AT EARLY OF 2007	9
TABLE4: ANNUAL HIGHWAY TRAFFIC FLOW BETWEEN 2001 AND 2007.....	11
TABLE5: PPP ACTORS IN COMMONPLACES.....	22
TABLE6: RESPONSIBILITIES FOR DIFFERENT PPP OPTIONS	32
TABLE7: RISK MANAGEMENT (MARKET AND CAPITAL-MARKET RISKS).....	44
TABLE8: TRANSACTION COSTS FOR PPP INFRASTRUCTURE PROJECTS OF GOVERNMENTS AND PRIVATE ENTERPRISES.....	50
TABLE9: MONITORING AND INCENTIVES OF PROCUREMENT MODELS	55
TABLE10: TRANSACTION COSTS INCURRED BY EXPRESSWAY CONSTRUCTION MONITORING IN CHINA	

(MILLION YUAN).....	56
TABLE11: FINANCING STRUCTURE OF AVERAGE EXPRESSWAY PROJECT IN CHINA.....	76
TABLE12: LENDING FROM AGRICULTURE BANK OF CHINA	76
TABLE13: LENDING FROM OTHER BANKS	76
TABLE14: TOP FOUR PROVINCES WITH NON-PERFORMING LOANS	77
TABLE15: RISK MANAGEMENT (SECTOR-POLICY RISKS)	78
TABLE16: COMPARISONS AMONG THE CHINESE PROCUREMENT MODELS.....	101
TABLE17: RISK MANAGEMENT (PROJECT-SPECIFIC RISKS)	102
TABLE18: TOLL REVENUES AND TRAFFIC DEMANDS OF SHEN-DA EXPRESSWAY FROM 1990 TO 2000.....	111
TABLE19: DETECTED JERRY-BUILDS OF THE OLD SHEN-DA EXPRESSWAY.....	112
TABLE20: ECONOMIC AND FINANCIAL EVALUATIONS OF SHEN-DA EXPRESSWAY RECONSTRUCTION AND EXTENSION.....	113
TABLE21: INSTITUTIONAL WEAKNESSES AND STRATEGIC BEHAVIORS ENCOUNTERED IN SHEN-DA CASE	115
TABLE22: INSTITUTIONAL WEAKNESSES ENCOUNTERED IN XIANG-JING CASE.....	121
TABLE23: STRATEGIC BEHAVIORS ENCOUNTERED IN LE-YI CASE	125
TABLE24: INSTITUTIONAL WEAKNESSES ENCOUNTERED IN CITONG-BRIDGE CASE.....	130
TABLE25: INSTITUTIONAL WEAKNESSES AND STRATEGIC BEHAVIORS ENCOUNTERED IN HE-CHAO-WU CASE.....	135

LIST OF FIGURES

FIGURE1: PASSENGER TRAFFIC BY MODE IN 100 MILLION PASSENGER-KM	7
FIGURE2: CARGO TRAFFIC BY MODE IN 100 MILLION TON-KM	8
FIGURE3: CONCEPTUAL RELATIONS AMONG ROADS, HIGHWAYS AND EXPRESSWAYS	9
FIGURE4: HIGHWAY DENSITY BY COUNTRY (SOURCE: WORLD BANK)	10
FIGURE5: CAR OWNERSHIP IN MILLION.....	10
FIGURE6: COMPOSITION OF PSC	26
FIGURE7: COMPARISON OF EXPECTED COST BETWEEN PSC AND PPP	26
FIGURE8: TWO-DIMENSION FRAMEWORK OF PPP OPTIONS	27
FIGURE9: DBB MODEL	27
FIGURE10: SERVICE CONTRACT MODEL.....	28
FIGURE11: DB MODEL.....	29
FIGURE12: DBO MODEL.....	29
FIGURE13: BOT MODEL	30
FIGURE14: DBFO MODEL	31
FIGURE15: BOO MODEL.....	31
FIGURE16: PPP OPTIONS IN PROJECT LIFE CYCLE (SOURCE: PAKKALA)	32
FIGURE17: AGENCY THEORY.....	48

FIGURE18: ILLUSTRATION ON FPIC AND CPIC	56
FIGURE19: FOUR-LEVEL FRAMEWORK	60
FIGURE20: BOT STRUCTURE IN CHINA	67
FIGURE21: TOT STRUCTURE FOR EXISTENT PROJECTS IN CHINA	68
FIGURE22: TOT STRUCTURE FOR GREEN-FIELD PROJECTS IN CHINA.....	68
FIGURE23: EXPRESSWAY PROJECT APPROVAL PROCESS USING BOT MODEL	74
FIGURE24: PRIVATE ENTERPRISE APPROVAL	74
FIGURE25: OPERATIONAL APPROVAL	75
FIGURE26: COMPARISONS BETWEEN THE INSTITUTIONAL PRECONDITIONS AND CHINA’S EXISTING INSTITUTIONAL CIRCUMSTANCE.....	83
FIGURE27: COMPARISONS AMONG BOT, TOT AND TOT(+DB).....	88
FIGURE28: DEVELOPMENT PATH OF CHINA’S PROCUREMENT MODELS FOR EXPRESSWAYS	92
FIGURE29: PRINCIPAL-AGENT RELATION IN DBB	93
FIGURE30: PRINCIPAL-AGENT RELATION IN DB.....	94
FIGURE31: PRINCIPAL-AGENT RELATION IN BOT	97
FIGURE32: PRINCIPAL-AGENT RELATION IN TOT	99
FIGURE33: SHEN-DA EXPRESSWAY	110
FIGURE34: FINANCING SOURCES OF SHEN-DA EXPRESSWAY BEFORE RECONSTRUCTION AND EXTENSION (MILLION YUAN)	111
FIGURE35: TRAFFIC DEMANDS FORECASTING FROM 2000 TO 2025	113
FIGURE36: CROSS-SECTION OF SHEN-DA EXPRESSWAY AFTER BEING WIDENED.....	113
FIGURE37: SHEN-DA EXPRESSWAY CONSTRUCTION	114
FIGURE38: ACTUAL COSTS AND FINANCING SOURCES OF SHEN-DA EXPRESSWAY RECONSTRUCTION AND EXTENSION	114
FIGURE39: XIANG-JING EXPRESSWAY	116
FIGURE40: INVESTMENT COMPOSITION OF THE CONCESSIONAIRE FOR XIANG-JIANG EXPRESSWAY .	117
FIGURE41: STRUCTURAL ORGANIZATION OF XIANG-JING CONCESSIONAIRE	118
FIGURE42: LE-YI EXPRESSWAY	122
FIGURE43: FINANCING STRUCTURE OF LE-YI EXPRESSWAY AND LOANS INFLOW	123
FIGURE44: CITONG BRIDGE	126
FIGURE45: THE “S” CONNECTING LINK BETWEEN HIGHWAY 324 AND CITONG BRIDGE.....	128
FIGURE46: ILLUSTRATION OF THE DEBATE FROM PUBLIC USERS	129
FIGURE47: HE-CHAO-WU EXPRESSWAY	131

SECTION I

A general introduction to China's transportation infrastructure reform followed by the focus on the expressway sector is presented. After this background information being presented, this section concludes with problem description, research boundary, and research questions.

CHAPTER 1 INTRODUCTION

1.1 Background

1.1.1 Good Governance and Transport Infrastructure Reforms in China

Since the late 1980s with reforms and an open door policy brought forward, the debate on good governance has provided an impetus for new approaches to public sector management reforms in China. During the past 25 years or more, some changes in Chinese governments have taken place aiming at addressing the most serious problems of power abuses and governance failures (Zhao, 2003), including wrongful use of state resources, personalized behavior of key political actors who have unlimited power, clientelism, corruption, opaque government, lack of power delegation and withdrawal of masses from governance (Yang, 2003).

Good governance, defined by World Bank (2003), consists of four fundamental elements:

- Public sector management emphasizing the need for effective financial and human resource management through improved budgeting, accounting and reporting and rooting out inefficiency particularly in public enterprises;
- Accountability in public services, including effective accounting, auditing and decentralization, and generally making public officials responsible for their actions and responsive to consumers;
- A predictable legal framework with rules known in advance and a reliable and independent judiciary and law enforcement mechanisms;
- Availability of information and transparency in order to enhance policy analysis, promote public debate and reduce the risk of corruption.

From the above definition, certain prerequisite conditions that underlie good governance include an efficient and accountable public management system to deliver public services, well defined legal framework and government transparency. In accordance with the first two items of this prescription, the

public management system in China is changing towards market and private sector¹ approaches. Therefore, a high level involvement and participation of private sector, which results from decentralization, privatization, contracting out and partnerships, has offered the Chinese central government an important avenue for ensuring efficient and accountable public service delivery. In addition, within the public sector², the legal framework and government transparency are enhanced and improved, according to the last two items, in order to sustain the favoring development of public management in terms of efficiency and accountability.

China's transport infrastructure, as a fundamental public service object, contributed greatly to the rapid economic growth rate over the past several decades. Consistent with the overall trend of public management reform, the transport infrastructure is also currently undergoing the transformation process (decentralization, privatization, contracting out and partnership).

➤ **Decentralization**

Decentralization can be defined as the transfer of authority or responsibility for decision making, planning, management and resource allocation from central government to regional or local government and non-governmental private organizations (Rondinelli and Nellis, 1983). Until late in the 20th century, the transport infrastructure networks in China were horizontally and vertically integrated by state-owned monopolies under the ministerial control because the guarantee of maximizing public welfare, ensuring the quality of public service delivery, concerning the tremendous economic importance and avoiding potential private monopoly have obstructed the transportation services from free markets. However, the past decade has experienced significant changes in how the transport infrastructure should be financed, owned, operated and regulated. The new model of delivering transportation service depends more on the private financing and operating in order to alleviate fiscal pressure, enhance efficiency, encourage innovation and induce competition.

Chinese state-owned monopolies over transportation services exhibited poor performance (Wang, 1999), with blames for low efficiency, deteriorating fixed facilities and inadequate maintenance, poor service quality, and lack of universal access to the service. The main reasons are lacking of accountabilities and underinvestment (Kessides, 2004). Lacking accountabilities is due to the poor public management system, and underinvestment is caused by the deficiencies in cost recovery because under state ownership, the price of the service is under the level that can recoup the initial investment and thus the following maintenance and network expansion are impossible. Therefore, the long term underinvestment and ineffective dealing with the administrative problems led to a remarkable crisis of sustainable development of transport infrastructure and eventually, the poor performance became the evil consequence.

➤ **Privatization**

Privatization refers to the transfer of control and responsibilities for government functions and services to the private sector (private voluntary organizations or private enterprises) (Hope, 2001). Privatization is driven by the disappointing performance of the government because it is contradictory for the government to be policy maker, regulator and operator at the same time and it is conflicting for the government to behave commercially as well as achieving social goals. In addition, public service norms and procedures restrict the freedom of management and the government budgeting processes limit

¹ Private sector defined in *Business Dictionary* (www.businessdictionary.com/definition/public-sector.html) is that it is part of national economy made up of, and resources owned by, private enterprises. It includes the personal sector (households) and corporate sector (firms), and is responsible for allocating most of the resources within an economy.

² Public sector defined in *Business Dictionary* is that public sector is part of national economy providing basic goods or services that are either not, or cannot be, provided by the private sector. It comprises of national and local governments, public corporations, and quasi-autonomous non-government organizations (QUANGO).

financial autonomy and investment (Paul, 2004). Recognizing the poor performance of state ownership, and also driven by private sector's technical progress, cost saving incentives, market oriented thinking and efficient management mechanism (von Hirschhausen et al, 2004), in transport infrastructure far-reaching reforms have been implemented in terms of privatization. Privatization brings private capital investment in transport infrastructure and thus rebalances the roles public and private sectors play in public service delivery. As a result, the regulations within the government and the private sectors are restructured and reformulated. Furthermore, accompanying with proper regulatory measures and restructuring of the old organizations, privatization can break transport infrastructure monopolies and induces competition in the private sector.

Driven by these reasons, the participation of the private sector in transport infrastructure services in China has emerged widely over the past decade and their sufficient commercial incentives and outstanding efficiency in management system enable them to grow in popularity.

➤ **Contracting out**

Contracting out, which is growing in popularity because of its emphasis on efficiency and service quality, is a method of privatization and it means the out-sourcing or buying in the goods and services from external sources instead of providing such services in-house (Walsh, 1995). Contracting out generally does not sell the public owned assets but it introduces competition into the market through tendering (Domberger and Jensen, 1997). The government usually behaves as the commissioning party, formulating the characteristics of the project and contracting out the following construction, operation and maintenance to a private enterprise on the basis of a clear and straightforward project requirement (van Ham and Joop, 2000). In China, contracting out has been formally adopted in transport infrastructure development by the government since the late 1980s due to fiscal pressure. Although it works generally well, some problems have been encountered (Liu, 2007). First, it is hardly possible to design a contract that incorporates future contingency and unforeseeable situation during the life cycle of the contract. And second, it is risky for the government to ensure the service quality during the contractual period because private contractors have a stronger incentive to reduce costs and thus quality, based on the fact that it is difficult to formulate complete contracts.

➤ **Partnership**

Partnership is different from contracting out in the way that it is impossible for the government to set well the project requirements and objectives unilaterally. In contrast, the private sector should be involved to activate its expertise, innovative capacities and resources to realize the joint objective, because a distinctive feature of a joint product is that through the combination of functionalities of partners, a project is realized which could not have been achieved by single partner acting individually (van Ham and Joop, 2000).

So far, the debates on good governance resulting from the disappointingly inefficient and non-accountable performance of the public sector management induced reforms of the public sector. And consequently, the transport infrastructure in China driven by the uptrend of this reform is undergoing the process of decentralization and privatization, among which contracting out is a way getting in popularity due to its emphases on efficiency and service quality and not necessary to lose the ownership of assets for the government. And partnership is distinctive from contracting out in terms of highlighting the joint functionalities of the public and private sectors. However, this reform needs underlying requirements of appropriate legal framework and government transparency (as stated in the last two items of the definition of good governance).

➤ **Legal framework**

Effective legal framework is a prerequisite condition for good governance and public sector management, and it can also facilitate the process of reform and ensure the successfully carrying out the partnership. The reasons are that an effective legislation system is essential for promoting and fostering the cooperation between the public and private sectors supplying with legal guarantee of their interests and objectives. The private sector is welcomed by the public sector with fulfilling the public sector objective of safeguarding the public interest and the private sector can be protected itself from public sector misconducting its roles with contractual conditionalities (European Commission, 2003).

➤ **Transparency**

There is no commonly agreed definition of transparency. Some of the definitions used by international organizations (OECD, EC and WB, 2003) emphasis ensuring the public access to information, including making information on relevant laws and regulations that are published publicly; notifying interest parties their changes; and ensuring the laws and regulations to be administrated in a unified and reasonable manner (Bellver and Kaufmann, 2005). Based on these, transparency is another precondition for good governance and public sector management, which can facilitate information flowing to the public and raise the public debates on public policies, and thus reduce the probability of corruption that can weaken the success of the partnership.

To sum up, driven by debates on good public sector management and consistent with the World Bank definition of good governance, the Chinese transport infrastructure reform has undergone the path of decentralization, privatization, contracting out and partnership, without fully satisfied preconditions of appropriate legal framework and transparent governance (which will be discussed in chapter 4). In the following part, an overview of transport sector in China is presented.

1.1.2 Transport Sector in China

The public management reforms have brought far-reaching impacts on China's transportation sector. All kinds of traffic modes have experienced their expansions and improvements in order to meet capacity requirement and quality of services. Here we do not present the detailed description of China's transport sector, but we will focus on its investment on transport fixed assets between 2000 and 2006, and traffic flows of different modes and modal transitions between 1980 and 2005.

➤ **Investment on transport fixed assets**

Table 1 shows the status of the total investment (including state budget; domestic loans; foreign investment; and self-financing) on transport fixed assets, and we can see that between 2000 and 2006 the investment has increased, but this investment accounted for a decreasing proportion in the total public investment. Grouped by function, a majority of the investment was spent on highway constructions and if grouped by different sources of financing, the investment mostly came from domestic loans and self-financing while only a small part was from state budget and even smaller from foreign investment.

Regarding the financing sources, here their differences need to be clarified. The state budget comes from the central government and is the revenue through imposing taxes; Domestic loans are investments from the domestic state-owned banks (including the Bank of Agriculture; Bank of Communication; Bank of Construction; Bank of China; and Industrial and Commercial Bank of China), either lending to the governments or to the private enterprises; Foreign investment comes from foreign banks (such as the World Bank and the Asia Development Bank); and Self-financing is the money raised by the private enterprises themselves and the regional and local governments.

Table 1: Investment on transport fixed assets
(Source: Based on the Chinese transport statistical yearbook 2006)

Investment	Year						
	2000	2001	2002	2003	2004	2005	2006
Total investment on transport fixed assets (\$billion)	41.50	47.70	55.00	61.30	76.10	90.20	103.41
Investment on transport fixed assets (percentage of total public investment)	-	-	9.83%	8.75%	8.62%	7.27%	6.72%
Grouped by function:							
Ports and other coastal construction	2.4%	3.2%	3.1%	4.9%	5.5%	8.0%	9.9%
Inland waterway construction	1.6%	1.3%	0.9%	1.1%	1.2%	1.6%	2.3%
Highway construction	68.9%	69.1%	72.1%	74.8%	76.3%	76.0%	87.3%
Railways	23.5%	23.2%	21.6%	16.7%	13.7%	10.7%	N/A
Others	3.6%	3.2%	2.3%	2.6%	3.4%	3.8%	4.0%
Grouped by source of funds (excluding railways):							
State budget	12.4%	15.4%	19.3%	15.5%	14.3%	15.2%	15.2%
Domestic loans	34.2%	38.4%	41.0%	41.3%	40.4%	45.1%	45.1%
Foreign investment	3.7%	3.1%	2.7%	2.6%	1.3%	2.0%	2.0%
Self-financing and others	49.8%	43.1%	37.0%	40.6%	44.0%	37.6%	39.6%

➤ Traffic flows of different modes

The traffic flow of passengers concentrated on railways and highways, while the trend of highway transport has exceeded railway between 1980 and 2005 as shown in figure 1. For cargo transport, although the highway's share of traffic has increased between 1980 and 2005, rail transport still dominated the cargo traffic in China as shown in figure 2, which indicates that very wide highways built for fast long-distance travel (defined as expressways later in part 1.1.3) are inadequate and underinvestment (World Bank, 1994).

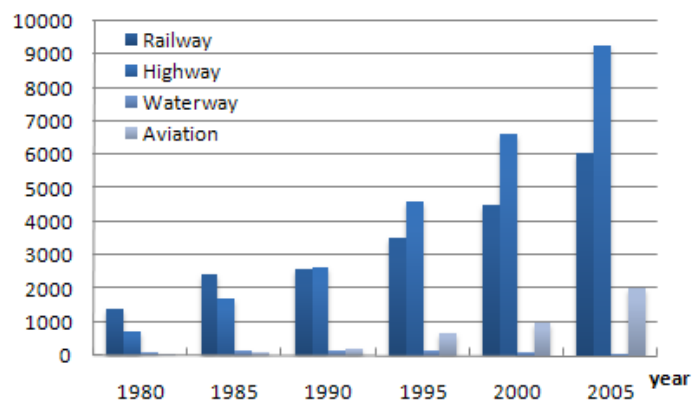


Figure1: Passenger traffic by mode in 100 million passenger-km

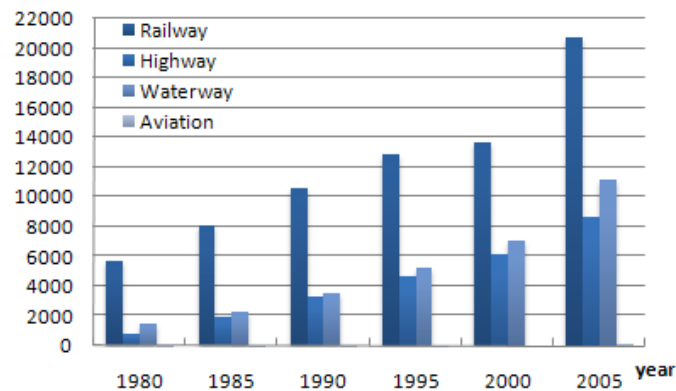


Figure2: Cargo traffic by mode in 100 million ton-km

➤ Modal transitions

Over the past 25 years or more there appeared tremendous transitions between traffic modes in China's transport sector. As we can see in table 2, the share of railway transport both for passengers and for cargoes has fallen by almost 20%, while the highway share of traffic has increased by 20% for passenger and 10% for cargo respectively.

Table2: Transitions between modes

Passenger/Cargo	year	Railway	Highway	Waterway	Aviation
Percentage of total passenger-km by mode	1980	60%	32%	6%	2%
	2005	35%	53%	0.4%	12%
Percentage of total ton-km by mode	1980	71%	10%	19%	0.02%
	2005	51%	21%	27%	0.2%

To sum up, the investment structure shows that the highway sector has attracted more money than other sectors. And the highway traffic flow had a climbing trend over the past 25 years, and even, the passenger volume of highway traffic has exceeded the railway. Moreover, the share of highway transport has increased through shift from other modes. Therefore, highway sector has gained more popularity and has the most developing potential. So in the next part, as a fundamental cognition, a general condition of China's highway sector is presented.

1.1.3 Highway Sector

The highway sector has contributed greatly to China's overall transport with relatively larger amount of investment and its increasing share of passenger and cargo transport. In this part a brief presentation on China's highway sector is provided in terms of highway system; traffic growth; highway development and investment planning; highway finance; highway administration and highway sector objective. However, before such an introduction, we first clarify concepts of "road", "highway" and "expressway" in order to avoid confusions about their meanings in following parts.

➤ Clarification on concepts of road, highway and expressway

Concepts of road, especially highway and expressway, can be varied country to country. In order to avoid confusions on their meanings, here we clarify what they refer to in China. A road is the broadest concept referring to a way along which vehicles can travel and providing mobility between two nodes. A road can be a way within an urban city, known as an urban road, or a connection between two cities such like a highway or an expressway. And a road can be single or bi-directional. A highway is usually

defined as a broad trunk road used especially by traffic going in both directions connecting two important destinations such as two cities. And an expressway is a divided highway for high-speed long-distance traffic (in China the maximum speed on expressways is 120km/h) with at least partial control of access. For instance, in China there are requirements on weight and size of the trucks that are to use the expressway. The technical specifications of an expressway are often higher than other roads such as the higher quality requirements on surface. Their conceptual relations can be seen in figure 3.



Figure3: Conceptual relations among roads, highways and expressways

➤ Highway system

The highway network in China totaled about 3573000 kilometers at the end of 2007, among which 53600 kilometers are expressways (China's Ministry of Communications). Relative to China's breadth and length geographical area and large population size, the network still ranks among the sparsest in the world (World Bank, 1994). According to administrative purposes, the highways are classified into national, provincial, country, village and special-purpose. And according to the design and technical specifications, they are grouped as expressway, class 1, class 2, class 3, class 4 and non-classified. At early 2007, China's Ministry of Communications revealed the highway construction conditions, which is shown in table 3.

Table3: Highway network at early of 2007

Administrative classification			Design and technical classification		
Classification	Mileage(km)	Percentage	Classification	Mileage(km)	Percentage
National	152002	4.25%	Expressway	45300	1.30%
Provincial	239600	6.89%	Class 1	45300	1.30%
Country	506500	14.57%	Class 2	262700	7.56%
Village	2519600	72.49%	Class 3	354700	10.21%
Special-purpose	58000	1.67%	Class 4	1574800	45.31%
			Non-classified	1174100	33.78%
Total	3475702	100%	Total	3475702	100%

China's highways are a series of trunk roads throughout all of mainland China (Wikipedia). The approved Expressway Network Plan (7918 Plan) in 2004 aims to build an expressway system connecting all capitals of provinces with each other with total length of around 85000 kilometers, including 7 expressways radial from Beijing, 9 from north to south and 18 from east to west. At the end of 2007, along with the completion of its five north-south and seven east-west national expressways with the total mileage of 35000 kilometers, it has created new connections over more than 200 cities and major cities such like Beijing and Shanghai have been connected to the autonomous regions and capitals of all provinces of China.

However, although China's total highway mileage is rising depending on the gradual completion of the 7918 Plan, the nation's highway network is still of low density and limited coverage rate (Li, 2000). In early 2007 the highway density was 3.63 kilometer per ten square kilometers. Compared with United

³ China highway density = total length of highway (3480000 km)/geographic area (9.6 million km²) = 3.63km/10km².

States, India, Brazil and Japan, it is still extremely low (Figure 4). Additionally, the nation-wide highway capacity is distributed unbalanced. Currently, highways mainly concentrate in eastern and southern areas, while the highway development in the western area is seriously lagging behind (Liu, 2006).

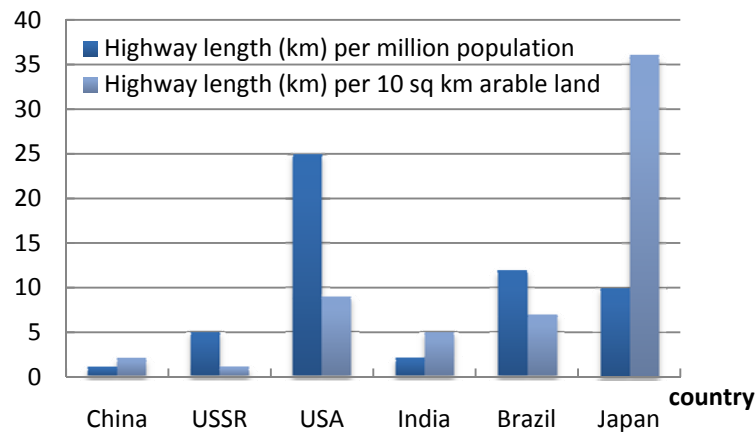


Figure4: Highway density by country (Source: World Bank)

➤ Traffic growth

Along with the development of the national economy into the steady increasing stage, China has come into the motorization age. The automobile industry has achieved an unprecedented progress and people's living standard has also gained tremendous improvement. Because of the falling automobile prices and the rising of people's income, car ownership in China has increased unexpectedly in the past several years, as shown in figure 5 (Button, 1993).

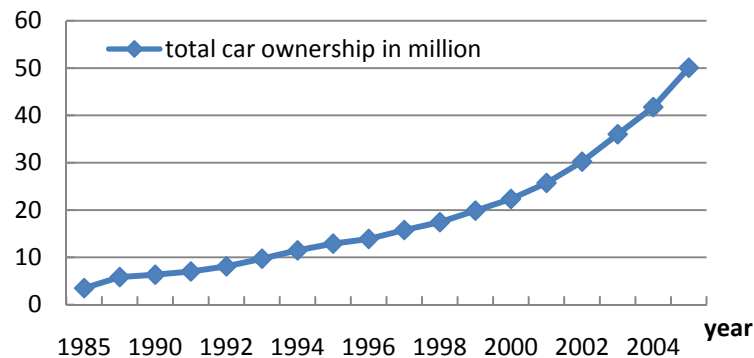


Figure5: Car ownership in million

The growth of car ownership and thus acceleration of motorization, undoubtedly, lead to more traffic demand. As the statistic that is published by China's Ministry of Communications showed in table 4, between 2001 and 2007 alone the annual highway passenger volume has increased from 12.82 billion capita in 2001 to 18.63 billion in 2007, and if measured in passenger-kilometer, the figure has increased from 657.1 billion in 2001 to 1048.78 billion in 2007. Apart from passengers, the cargoes transported on highways have also increased from 9.35 billion ton in 2001 to 14.52 billion ton in 2007, and from 559.9 to 1012.16 billion ton-kilometer. Therefore, compared with 2001, the total highway traffic demand in 2007 has increased by around 50%.

Table4: Annual highway traffic flow between 2001 and 2007

Year	Passengers		Cargoes	
	billion passenger	billion passenger-km	billion ton	billion ton-km
2001	12.82	657.10	9.35	559.90
2002	13.57	716.42	9.77	596.89
2003	13.10	689.56	9.82	615.69
2004	14.90	802.43	10.93	687.72
2005	15.44	849.30	11.85	770.05
2006	16.76	928.00	12.93	862.55
2007	18.63	1048.78	14.52	1012.16

➤ Highway development and investment planning

Highway development in China during the past decade mainly concentrated on constructing and extending expressways, known as the 7918 plan, however, these constructions and expansions were insufficient to make up for several past decades' underinvestment. The total scheduled investment of the 2200 billion Yuan in 7918 Plan would thus serve to build 85000 kilometer expressways, among which 15% is from the state budget and 85% comes from self-financing, domestic loans and foreign investment (China's Ministry of Communications).

➤ Highway finance

A part of China's highway funding comes from earmarked user charges, which are mostly composed by Road Maintenance Fee and Vehicle Purchase Fee. Road Maintenance Fee, introduced in 1950, is collected and administrated by provincial departments of communications and is the central source of highway funding system. It is levied through tax on transportation companies' revenues and tax on ownership. According to the Road Maintenance Fee Regulation released by Ministry of Communications, transportation companies running business on hiring out their vehicles to cargoes and passengers pay 12%-15% of their gross revenues. Other companies and individuals who use vehicles for business and private purposes pay a monthly fee between 105 Yuan and 130 Yuan based on the rated payload of each vehicle. Vehicle Purchase Fee, introduced in 1985, is administrated by Ministry of Communications and is levied from 10% of the selling price of domestic vehicles and 15% of delivered price of imported vehicles in accordance with the ministerial regulation (China's Ministry of Communications, Road Maintenance Fee Regulation and Vehicle Purchase Fee Regulation).

Apart from user charges, tolls are rapid emerging in China and being adopted throughout all provinces as a source of recovering highway development costs and funding highways, particularly for expressways. Until the end of 2007 the nation wide toll highways have reached 180 thousand kilometers and all the expressways under construction are planned under tolls. Toll levels are set by concerned provinces with the overall average of 1.5 Yuan per vehicle per km for cargo transport and 0.7 Yuan per vehicle per km for passenger transport (China's Ministry of Communications, Toll Road Regulation). And the total revenue from tolls in 2007 has reached 66 billion Yuan (China's Ministry of Communications).

Other sources of funding highways are government grants, foreign borrowing, domestic loans and private investment. Government grants account for a very small part for the whole country and most of the grants are provided to highways for defense purpose and for poverty regions where roads are scarce. Foreign borrowings come from three organizations, the World Bank, Asia Development Bank and Overseas Economic Cooperation Fund of Japan. Domestic loans are almost obtained from the People's Construction Bank. And private investment is attracted by opening the transport infrastructures to private sector through competitive tendering.

➤ **Highway administration**

China's practice of highway administration applies provincial highway administrative mechanism, which is driven by decentralization of the central government and which means that provinces have the autonomy in planning, financing, building and maintaining their highways. While, the central government will continue overseeing the provincial sectors and coordinating the overall development of highway system. In addition, the central government still seizes the power of approving highway projects, especially expressways, and the management on national ones. Further, the central government plays a significant role in providing provincial sectors with funding and political support, technical assistant, institutional adjustment, engineering analysis, supervision and staff training.

➤ **Highway sector objective**

The main objectives of China's Ministry of Communications and provincial departments of highway administrations are consistent and they are to ensure that the highway system can contribute greatly to the integration of China's national economy and to improve the efficiency and quality of service for mobility of goods and people. These objectives are planned to achieve by giving substantial attention to designing, financing, constructing, and operating sections of the highway system in accordance with economic priorities; integrating constructing provincial, city and rural level roads into the state highway plans; and continuous reforming regulations and policies that can facilitate financing the highway development and correspond with the energy and environmental strategies.

In sum, China's general uptrend reforms of infrastructures promoted transformations in transport sector, particularly the highway sector which has attracted larger amount of investment and borne majority of passenger and cargo transport. In recent years, China motorization trend led to increasing demand for highway traffic and in response, plan of expanding highways has been brought forwards with unprecedented fund requirement. The current highway finance system concentrates on Road Maintenance Fee and Vehicle Purchase Fee with tolls getting popular and throughout adopted in China. And recent highway development policy emphasizes constructing and extending expressways. Finally, China's highway administration preserves autonomy at provincial level with general control and coordination by the central government aiming at providing better mobility for people and goods and facilitating the integrated economic development.

1.2 Research Boundary

The broad research boundary is the whole highways in China, which is shown in yellow lines in appendix 2. Since during the past decade, Chinese policies on highway development concentrated on constructing and extending expressways with the 7918 plan being brought forward, among those highways, we narrowly focus on expressways as representatives and will do empirical researches (interviews) on expressways.

1.3 Problem Statement

The expansion of expressways requires immense capital investment. The scale of the 7918 plan with its unprecedented need for funds forces the Chinese government to explore an innovative approach using public and private capital. Therefore, the innovative public-private partnership (PPP) is attractive to the government not only because it is assumed to bring value for money, but also because it provides the government with access to additional sources of capital that are not available to the traditionally procured projects. In addition, the extra sources of private capital allow the government to avoid waiting for the future budget cycles for funding and thus speeding up the implementation of the expressway constructions.

Specifically speaking, PPP is usually defined as a long term development and service contract between government and private partners (Maskin and Tirole, 2007). And the government typically engages the private partner to construct the project, operate the project and service it, while for the private partner, it may bear substantial risk and raise private finance through sub-contracting. All PPPs should go through a competitive tendering process (Zitron, 2006) and during the contract period, the interest of the government is to provide public service of high quality and low price efficiently and economically, and the interest of the private partner is to maximize its profits.

However, many problems could cause failure of the partnership both from government and from private sector. Below we briefly introduce these problems and in the latter chapters we will discuss them in greater detail.

➤ **Risks and risk allocation**

Risks exist during the whole life cycle of expressway management including designing, financing, constructing, maintaining and operating. Risks can cause project failure if they are not managed properly. In addition, in the PPP contract, the sharing and allocation of risks assumes greater importance particularly in the investment of transport infrastructures because transport infrastructure investments are inherently capital intensive and they often require large sunk investments whereby their recoup may span over 30-year period (Medda, 2007).

➤ **Agency problem**

Agency problem exists in PPP contracts because it is difficult to motivate the private sector to fully act on behalf of the public sector due to their contradictory objectives. In other words, the public sector hires the private sector on the condition of asymmetric information and self interest, but the private sector performs according to their own interests different from those of the public sector. Therefore, it is the problem in PPP contracts considering that the outcome must satisfy both parties. Consequently, strategic behaviors emerge. In the public sector, for instance, some government officials may have preferences that differ from public welfare maximizing principal and the ideology, social and political ties may induce an official to favor the pet projects (Maskin and Tirole, 2007). In the private sector, it may estimate the costs on a bias basis initially in order to win the bid and use strategies latter to obtain supplementary investment from the public sector (Flyvbjerg, 2003).

➤ **Government weaknesses**

Government in China is afflicted by problems of corruption, nepotism, inefficiency, poor coordination, and poor management, lack of accountability, and abuses of power and public resources, which would also lead to failure of PPP (Transparency International and Cambridge University, 2007).

➤ Institutional deficiencies

Although China has made impressive efforts in building its institutional environment, some prerequisite legislations and regulations are still absent and some are inconsistent with one another for providing the partnership a favorable institutional circumstance. These institutional deficiencies behaving as obstacles will lead the partnership to failure especially when conflicts and disputes between the public sector and the private sector emerge.

Therefore, although there are advantages to PPP, they entail various problems and can eventually lead to project failure (Nora et al, 2006). For instance, the experience of the Bangkok congestion charge is a case that can illustrate the failure of PPP contract between the Thai government and the Bangkok Expressway Company Ltd for a 12-mile 6-lane private toll expressway. The Thai government, after having awarded the PPP contract to this company, depressed the demand for this expressway service by means of an ad hoc regulation of charging users congestion fees and by reducing the agreed toll under the pressure of political lobbies and public discontent (Medda, 2007).

So how to achieve successful public-private partnerships for expressway projects in China, that is to say, what is the favorable and pleasant environment for applying public-private partnerships in China's expressway sector and what are the improvements and recommendations? From the experience of advanced PPP adopters⁴, first, the partnership is an agreement between the government and the private sector collaborating together towards the defined contractual terms, so the partners should well divide up the rights and responsibilities. Second, the concession of the partnership should be defined and designed by clearly and carefully partitioning the rights and obligations of the parties and establish a framework for responding to the new rising unforeseeable situations. Third, the partnership relies on providing credibility for private sector risking their money and legitimacy for the government sponsoring the projects. It means that the partnership projects must be insured to meet the mobility needs of the public, reward for the successful negotiation of risk and provide private sector with a reasonable return on their investment because the legitimacy would be undermined by both high rewards and over interested in the profits derived from lucrative construction contracts. Fourth, the success of the partnership requires strong political support. Because of risks involved and the need to keep legitimacy, government supports are necessary and the government can not look to the private sector alone. And finally, efficient organization, improved decision making and transparent management process are also critical for partnership projects (Perez, 2004).

The application of innovative PPPs in the transport sector in China has been only one decade. Therefore, notwithstanding innovative PPPs have been transplanted into China with the trend of reforming transportation infrastructures, its mechanism is still immature compared with some advanced adopters with the fact that various problems exist and the above discussed conditions are not satisfied. Facing the big challenges of fiscal shortages and tremendous risks of developing expressways, and confronting the increasing of traffic demand, the Chinese government now desires an efficient and feasible public-private partnership mechanism in order to facilitate expressway development.

⁴ Studies carried out by *European Policy Studies* on national experience with adopting PPPs within EU distinguish those countries that apply PPPs into advanced adopters (France; Germany; Ireland; Italy and UK); intermediate adopters (Denmark; Netherlands; Portugal; Spain and Cyprus) and late comers (Austria; Belgium; Finland; Greece; Luxembourg; Sweden and Malta) based on the numbers of PPP projects that have been closed successfully and now in operation. (Abadie and Howcraft, 2004; European Policy Studies, 2006)

1.4 Research Questions

The main research question is thus defined as:

How to achieve successful public-private partnerships for expressway projects in China, that is to say, what is the favorable and pleasant environment for applying public-private partnerships in China's expressway sector and what are the improvements and recommendations?

And there are also several sub-research questions:

1. What is public-private partnership and what typologies exist?
2. What are the risks in public private partnerships?
3. What is the worldwide experience with applying it to transport infrastructure projects?
4. How to judge successful public private partnerships?
5. What is the agency theory and how does it apply for public private partnerships?
6. What are current applied innovative PPP approaches in China's expressway sector?
7. What are the institutional preconditions for these innovative PPP approaches? And what does China's current institutional circumstance look like and what are the deficiencies and limitations?
8. What strategic behaviors exist in each PPP option and how to deal with them?
9. How PPPs applied in practical expressway infrastructure projects (case studies)?
10. How can the situations of application of PPPs in China be improved (recommendations and conclusions)?

1.5 Methodology

Methodology applied in this thesis composes six basic research approaches: grounded theory; desk research; survey; content analysis; analytical induction and case study. Grounded theory is used for studying the expressway administration. Desk research is frequently used for the entire research by searching publications of governmental and non-governmental institutions, documents, annual reports and databases. Although desk research is cheap, sometimes it is less accurate, so it is always used bundling with other approaches. Survey is applied in the analysis on strategic behaviors and institutional environment in China (appendix 1). Content analysis is used for studying the basic knowledge of PPP and agency theory. Analytical induction is suitable for comparing different types of PPP by identifying the similarities and distinctions. And finally the case study approach is used for studying paradigmatic, critical and extreme cases by generalizing from cases and summarizing.

SECTION II

Section II comes from the theories, in which chapter 2 shows the fundamental aspects of PPP theory in terms of its broad definition, various options, risks and worldwide experience, and chapter 3 explains the agency theory including transaction costs and strategic behaviors. This section concludes with a 4-level framework that directs the empirical research.

CHAPTER 2 PUBLIC-PRIVATE PARTNERSHIP

2.1 Introduction

Over the past twenty years the worldwide trend has been to move away from public monopolies over infrastructure industry in favor of the private sector (Burchell, 2000), which was initially led by United Kingdom that launched a public-private partnership (PPP) development policy by creating Private Finance Initiatives in order to encourage private investment in infrastructure and social service in 1992. In the following years, various countries of both developed and transition economies have adopted this PPP policy by setting up a PPP Task Force such as South Africa; creating a PPP Directorate such as the Netherlands; and enacting a private finance law such as Japan. Currently, such partnerships between the public sector and the private sector are an accepted alternative to the traditional state provision of public services. Arguably, this joint working approach allows the public sector and private actors to blend their special skills, resources and expertise for the purpose of achieving a common outcome, which previously can not be reached by any party alone (Akintoye et al, 2003). However, the application of PPP is not easy and straightforward. There are massive issues that need to be addressed by the government to adopt this service deliver approach favorably. Although the PPP approach has been widely used in infrastructure industries like water supply; electricity supply; transport; telecommunications; education and even the health sector, in this chapter, discussions on PPP centralize on the transport infrastructure, considering our research questions stated in chapter 1. Introducing briefly, this chapter presents, firstly, the basic knowledge of PPP in terms of its definition, actors, benefits and success conditions, and second, it presents the various PPP options with comparisons in terms of advantages and disadvantages. Third, Flyvbjerg's typology of risk is introduced. Finally, from worldwide experience with applying PPP, six primary lessons are drawn and global practices at how to deal with the problems during the application of PPP are provided.

2.2 Public-private partnership

2.2.1 What is public-private partnership?

Debates surrounding the definition of public-private partnership are extensive and multifaceted. And the definitions for different nations and organizations also highlight distinctive emphases in accordance with their own interests and objectives. Generally speaking, public-private partnerships (PPPs) are arrangements typified by joint working between the public and private sectors for a long term (HM Treasury, 2005). In a broad sense, for the purpose of delivering public services, particularly delivering infrastructure services with private investment, PPPs cover all kinds of collaboration across the interface between the public and private sectors. Specifically speaking, in the worldwide infrastructure projects, PPPs are regarded as financial models that enable the public sector to make use of private finance capital in long term for mutual benefits (Hodge, 2007). For developing countries, PPPs are adopted largely because government needs for capital and evolve gradually as derivative of privatization which means the introduction of market mechanisms and privatizing the public services, while for developed countries, PPP scheme is relatively more mature and it is luxuriously used to encourage private sector innovation and enhance efficiency (Jamali, 2004). Furthermore, no matter for developing and developed countries, the public sector view PPP as an institutional arrangement which can alleviate fiscal pressure, whereas for private sector PPP is considered an form of contract enabling it to make profit in the market where is previously monopolized by the public sector. The introduction of market mechanism by private involvement makes public officials more accountable for their actions because their actions should be in accordance with market principles but not only the internal rules of their organizations. Therefore, PPPs can help achieve efficiency and accountability of public sector management, which is regarded by scholars as luxurious benefits from PPPs, but it is often inadequate of public sector capacity to address the problems of poor legal framework and governance opacity which exist previously in public management. Actually, appropriate legal framework and governance transparency are the prerequisite conditions of successful PPPs.

Notwithstanding there is no determinate and unified definition of PPP, some underlying implications are presented:

- Public-private partnership is a contractual arrangement

PPPs are contractual arrangements between the public sector and the private sector for the private delivery of the public infrastructure services (World Bank Seminar, 2007), in which the partners should co-operate with each other towards a common goal, but in reality each partner in a PPP is a self-interested player, that means, each partner is capable of bargaining on its own behalf, rather than referring to authorities. Therefore, in some instance especially for the public sector, it has to set up a special agency capable of entering into the partnership (Akintoye et al, 2003).

- Public-private partnership is seeking equilibrium for generating mutual benefits

PPPs, of immense utility in reforming a country's public services and bringing profits to the private sector, should not be seen as a risk-free panacea, however. That means, there is no utopia where PPP features a harmonious perfect equilibrium and PPP produces a "state of objective" which can be reached through unchangeable and steadfast determinations and expectations of both public sector and private sector. Therefore, application of PPP should be designed and accommodated to specific problems in the most effective ways and requires full supports from both partners (Yves, 1994).

- Public-private partnership is an enduring relationship between partners

PPPs are enduring relationships between the partners. There are numerous one-off short and simple transactions between public and private sectors which are actually not PPPs even if the duration is long enough, because PPPs are continuing relationships with clauses that need to negotiate and renegotiate between the partners during the entire process of the partnership. For instance, in some cases of transport service, the concession agreements are usually 30 years for construction and maintenance, and even though the contract is for construction alone, it also takes several years, during which negotiations

are frequent between public and private sectors due to changes in external factors overtime.

- In PPPs, participants are expected to bring something to the partnerships

Because PPPs are genuine relationships, the participants will have to bring or transfer some material and immaterial resources to the partnerships. For the private sector, they are expected to bring their technical and managerial expertise and financial resources into design, construction and maintenance of the infrastructure. And for the public sector, they bring in the public values in the partnership and transfer authorities to the private sector.

- PPPs have some shared and allocated responsibilities and risks

A partnership implies that there are some shared risks and responsibilities. This differs from the traditional public procurement method, in which the public sector controls the decision power and monopolizes infrastructure services and thus bears all the risks and takes all responsibilities. In PPPs, responsibilities are allocated in accordance with the roles that the parties play in the partnership and risks are shared in the principle that they should be borne by the partner who can best control and manage them. In addition, the shared responsibilities and risks are mutually dependent, but not self governed, which also makes it difficult to ascertain accountabilities.

2.2.2 Clarification on PPP actors

Although the involvement of actors in transportation PPP projects differs from various contract forms, this distinction is inconspicuous and in the common cases, the actors and their roles, interests and resources are depicted in table 5.

2.2.3 PPP benefits from the public sector's point of view

Generally, PPP procurement provides governments with a wide variety of benefits, including that services delivered to the public users will be of higher quality and lower cost, more and better projects will be built and more services will be delivered without budget pressure. A detailed analysis on these benefits is discussed below.

- PPPs provide services of higher quality at lower cost for the public users, that is to say, PPPs provide public services more efficiently

A PPP approach provides potential benefit of reducing costs and delivering higher quality for the same cost both in the construction phase and in the operation phase, because a PPP does not only signify reliance upon resources from the government, but also incorporates private actors' skills and managerial expertise in building, operating and maintaining public service projects. International experience suggests that the achieved quality of service using a PPP scheme is usually better than that achieved through conventional public procurement model (European Commission, 2003), because in the conventional delivery approach, projects of a broad scope are broken down into small parts which are managed as separate units and implemented in sequence due to budget constraints, while a PPP scheme offers an integrated solution for expanding the scope of the project. And cost reductions are always attributed to the introduction of economies of scale, innovation in service delivery and performance incentives.

Table5: PPP actors in commonplaces

Sectors	Actors		Interests	Resources	Roles
Public Sector	<ul style="list-style-type: none"> ➤ Central ➤ Regional ➤ Local governments 		<ul style="list-style-type: none"> ➤ Optimization of public welfare ➤ High quality of infrastructure service 	<ul style="list-style-type: none"> ➤ Authorities ➤ Funding ➤ Political support 	<ul style="list-style-type: none"> ➤ Developing and enforcing public policies ➤ Establishing regulations for efficient provision of public services ➤ Authorizing ➤ Imposing taxes ➤ Providing funding for construction (initially, periodically and at the end of the project completion) ➤ Paying back loans
	Customer union composed by public users		<ul style="list-style-type: none"> ➤ High quality of infrastructure service ➤ Low service price 	<ul style="list-style-type: none"> ➤ Public rights 	<ul style="list-style-type: none"> ➤ Protecting the interest of public users who use the infrastructure and pay for the service
Private Sector	Concessionaire	Designer	<ul style="list-style-type: none"> ➤ Profit maximization 	<ul style="list-style-type: none"> ➤ Design expertise 	<ul style="list-style-type: none"> ➤ Providing the design documents for construction
		Constructor	<ul style="list-style-type: none"> ➤ Profit maximization 	<ul style="list-style-type: none"> ➤ Construction expertise (technologies, equipment) ➤ Funding resource 	<ul style="list-style-type: none"> ➤ Providing the construction for operation ➤ Alleviating fiscal pressure to some extent
		Operator and Maintainer	<ul style="list-style-type: none"> ➤ Profit maximization 	<ul style="list-style-type: none"> ➤ Managerial expertise (operation skills) 	<ul style="list-style-type: none"> ➤ Providing services ➤ Maintaining the infrastructure routinely and periodically ➤ Charging users in some cases ➤ Paying back loans in some cases
	Consortia		<ul style="list-style-type: none"> ➤ Credit profits maximization 	<ul style="list-style-type: none"> ➤ Bankroll 	<ul style="list-style-type: none"> ➤ Providing loans of construction for governments or construction contractors
	Insurance companies		<ul style="list-style-type: none"> ➤ Profit maximization 	<ul style="list-style-type: none"> ➤ Insurance provision 	<ul style="list-style-type: none"> ➤ Providing insurance for construction
	Consultancy firms		<ul style="list-style-type: none"> ➤ Profit maximization 	<ul style="list-style-type: none"> ➤ Advice provision 	<ul style="list-style-type: none"> ➤ Providing advices on forecasting demand volume, project costs and benefits for governments or project promoters

Additionally, service provision can be opened to competition by specifying and announcing service requirement, calling for tenders and contracting with the supplier submitting the most favorable bid. The distinguishing characteristic of competitive tendering, compared with intra-government contracts with non-profit organizations, is the openness of market access, supported by a transparent procedure for selecting the supplier (OECD, 2002). Therefore, it will get more efficient for the service delivery because the openness of competitive tendering to all market entrants makes it a stronger mechanism for revealing the true level of project costs. But a drawback is that the efficiency gaining from stronger performance incentives comes with a transaction cost, associating with specifying contractual terms and monitoring compliance (OECD, 2002).

Furthermore, PPPs can benefit from private sector's accumulated managerial and technical expertise (OECD, 2001). The research by OECD and International Transport Forum (2008) has also revealed that efficiency is the key for PPP projects which can be obtained from private enterprises' expertise. And efficiency has the property of two dimensions, the allocative efficiency and the productive efficiency. And PPPs have the potential to enhance productive efficiency due to the essential economic assumption that a private enterprise will have greater incentives to reduce overall costs, based on the pursuit of profits, than a public organization.

➤ PPPs help alleviate the government's fiscal pressure

Apart from the benefit of efficiency of PPP in public procurement, another benefit (also objective) of PPP is to help alleviate the government's fiscal pressure. In some cases of PPP projects, in which the construction responsibility has been transferred to the private sector, the government could postpone the payment of construction until the completion of a project or periodically during the project, rather than has to make the lump sum investment at the beginning of the project because usually, the private constructor would temporarily pay the construction expenditure through borrowings from banks. Furthermore, in other cases where construction and operation are transferred to the constructor together, the government could enjoy the release of fiscal pressure because the private constructor could earn back the borrowings and make profits from the authorization of the government to charge tolls on its own. Therefore, either postponing of the payment temporarily or making the constructor in an "autarky" situation, the government could alleviate its fiscal pressure of lump sum investment in infrastructure.

2.2.4 PPP benefits from the private sector's point of view

The benefits of PPP for the private sector mainly concentrate on two aspects, enlarging business market for the private sector and facilitating innovation within the private sector.

➤ Enlarging business market for the private sector

A PPP offers opportunities for the private sector to do business with the government and thus enlarge the business market for the private sector. The private constructors, in some PPP options, are authorized to build public infrastructure projects which, in the conventional approach, may be not allowed. And even in some PPP options, the private operators, sometimes also the constructors, are offered the operation contract to deliver the service to the public users and allowed to make profits through charging tolls, either in the cases of private toll roads or public shadow tolls. Therefore, these opportunities are absent in conventional public service delivery models and these opportunities expand the market domain where private actors can invest in and earn profits.

➤ Facilitating innovation within the private sector

As mentioned, the transfer of responsibilities of design, construction and operation gives enormous incentives to the private sector to innovate and develop new construction, managerial and operational techniques. Reversely speaking, these innovations and developments make the private sector more competitive in tendering processes. In addition, compared with traditional service delivery model where public authorities make full control on the whole project lifecycle, a PPP scheme theoretically

avoids government interference and provides private actors a self-control environment for developing innovations and practicing expertise.

2.2.5 Defining success of a PPP

In recent years, a survey conducted by the World Bank on worldwide canceled PPP projects revealed that renegotiation, and even more, cancellation of PPP projects have made headlines in the world's financial press (World Bank, 2003) and for various reasons renegotiation of the projects has not been an unusual occurrence. Cancellation of the PPP projects defined by World Bank includes that 1) the private sector transferred its economic interest in the project back to the public sector before the end of the project's expected life; 2) the private sector physically abandoned the project or 3) the private sector ceased to provide services to public users or halted construction of the project for around 20 percent or more of the project's expected life. From this definition, we can learn that a PPP project fails if its contract is not completed and if the project has not been able to serve the whole public. Therefore, a PPP project can be defined as success if it meets two requirements, contract completion and value for money.

2.2.5.1 Contract completion

Contract completion is the most fundamental requirement for defining the success of a PPP. Critical success factors which lead to the contract completion are presented in below.

- Adequate incentives both for the government and for the constructor and operator to remain in projects rather than walk away

A PPP must provide enough incentives for the partners to get involved in the project. Normally, the incentives are high because governments do not want to cancel the project due to substantial payments that are often required in compensation for breach the contract and also due to the concern about public service continuity, while for constructors and operators the incentives would be the huge sunk investment in assets and thus they may be willing to accept some changes in contractual terms (World Bank, 2003). Government involvement is especially important, whether as a partner or a regulator, because a strong political will may support private constructors and operators with sovereign guarantees and subsidies.

- A stable political and macroeconomic environment

A stable political environment is favorable for PPP projects because the outcome of a project is dependent on generic policies (Flyvbjerg, 2003). For instance, for transport projects, changes of political requirements and changes on regulatory framework and complementary investment for constructor will seriously threaten the implementation of the projects. And a stable macroeconomic environment is an external factor that can also influence PPP projects. Macroeconomic shocks may increase the difficulty in implementing the project and accelerating the failure of the project, because these shocks may cause contraction of real income and thus reduction in demands for infrastructure services. Therefore the resulted demand reduction destroys the initial estimate on service demand. In addition, for those projects that are funded by foreign currency loans, these shocks will lead to an increase in debt-service costs in terms of local currency.

Until now, from the above discussion, full involvement of government, constructor and operator, and stable political and macroeconomic environment are essential for success of a PPP contract. We will not analyze them further in this thesis. However, below, another four critical factors which will be discussed in more detail, particularly in the context of China, in the following parts of this thesis are:

- Appropriate transfer of risks

As mentioned before, appropriate transfer of risks is important for the success of a PPP contract because one major attribute of PPP is the opportunity to share risks between public and private sectors. Therefore, it is imperative that risks are allocated validly associated with rewards (US Department of

Transportation, 2007). In part 2.4 of this charter Flyvbjerg's typology of risk is presented in detail.

➤ Commitment of symmetric information

Symmetric information between public and private sectors is a key element in formation of a successful PPP. Failures of PPP contract worldwide are mostly attributed to the agency problem (Schjelderup, 1990), arising under conditions of incomplete and asymmetric information when a principal hires an agent. The application of agency theory in a PPP contract is that the public sector is a principal and the private sector is an agent. Under the assumption that both are utility maximisers, public and private sectors are likely to have different goals. The government would like to ensure social welfare and provide public with qualified services as high as possible. The private actors face the temptation to maximize profits as much as they can. In this partnership, governments are at a disadvantage because they are unable to examine the expertise provided by project constructors and operators. Therefore, governments seek to manipulate and mold the behavior of constructors and operators so that they will behave in the way that is consistent with governments' interests and preferences (Waterman and Meier, 1998). Detailed knowledge and application of agency theory in PPPs will be presented in chapter 3.

➤ Establishment of a transparent and accountable regulatory framework

Establishment of a transparent and accountable regulatory framework is necessary for the private sector participation in a PPP (Jamali, 2004). From a public sector perspective, such a regulatory framework (tendering and administration framework included) is crucial because PPPs generally need a direct organizational and control relationship between public and private to ensure that the partnership operates effectively and efficiently in optimizing the resources available to them in line with the broader policy objectives. In the latter parts of this thesis (chapter 4), special attentions will focus on regulatory framework in the context of China.

➤ Absence of strategic behaviors both of the government and of the constructor and operator

Strategic behavior, without a clear and clarified definition among current literatures, is frequently used to explain why privatization can be so disappointing (ten Heuvelhof, et al, 2007), PPPs included. Strategic behavior in PPPs comes both from the public sector and from the private sector. In the public sector, strategic behavior may be induced by government officials, including power abuse, public resources misuse purposively, corruption, collusion between government officials and their "pet" private companies and so on. In the private sector, strategic behavior includes estimating project costs on a biased basis, lower the level of service quality stealthily, looking for supplementary investments to the government, pseudo announcing bankruptcy and withdrawing from the investment. All these strategic behaviors will lead to failure of PPP contracts and in latter chapter 5 we will discuss them in more detail.

2.2.5.2 Value for money

Another more advanced requirement defining success for a PPP is value for money, which means that total costs of a project implemented by PPPs should be lower than that implemented by the conventional public delivery approach under the same quality level (Leigland, 2006). One measurement that can help the government to determine whether a PPP approach should be applied instead of public delivery is the Public Sector Comparator (PSC). Although this method has come into criticism of its inaccuracy, its lack of consensus on discount rate, its subjective manipulation and time consumption, many countries have still applied it as a benchmark to evaluate the better value for money of PPPs, including Canada, China, Japan, the Netherlands, South Africa and United Kingdom (Grimsey and Lewis, 2005).

PSC estimates the hypothetical risk-adjusted cost if a project were to be financed, owned and implemented by the government (Department of Treasury and Finance, Victoria, 2001). And PSC is composed by transferable risk, competitive neutrality, raw cost and retained risk, as shown in figure 6.

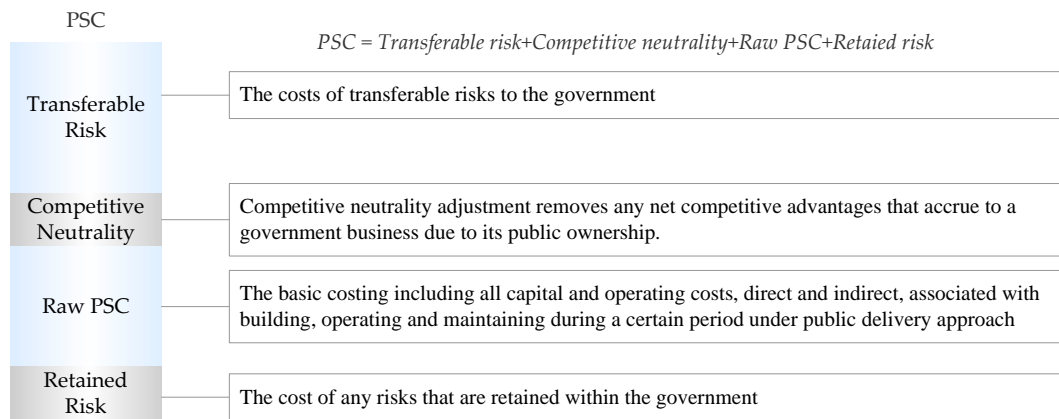


Figure6: Composition of PSC

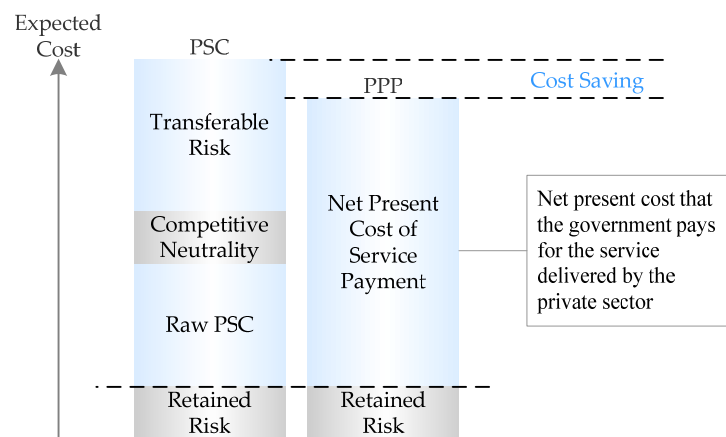


Figure7: Comparison of expected cost between PSC and PPP

Given the benchmark of PSC, the government can evaluate the total expected cost of a project that would be delivered under PPP approaches, see figure 7, including a net present cost of service payment and a retained risk cost. Furthermore, the government could adjust the amount of risks that will be transferred in order to make the total sum of net present cost of service payment and retained risk cost smaller than the PSC, and thus to obtain cost saving, that is, the value for money.

2.3 Options for public-private partnership

Options for public-private partnership are multiple according to different combination of services, roles and responsibilities and different financing methods between the government and designer, constructor, operator and maintainer. PPP options defined here spread in a two-dimension framework (figure 8) which is adapted from the “Quadrant Framework” defined initially by Miller (2000). In this two-dimension framework, the horizontal axis represents the continuum of delivery methods measured by the degree to which the elements (design; financing; construction, operation; maintenance) of PPP projects are unbundled or bundled with one another, while the vertical axis represents the continuum of financing method measured by the degree to which public sector or private sector assumes the financing responsibility. This framework offers two strategy-dimensions for government to promote infrastructure development using PPP schemes, including Design-Bid-Build (DBB); Service Contract;

and Design-Build (DB) in I section; Design-Build-Operate (DBO) and Design-Build-Operate-Maintain (DBOM) in II section; none in III section and in IV section, there are Build-Operate-Transfer (BOT); Design-Build-Finance-Operate (DBFO) and Build-Operate-Own (BOO).

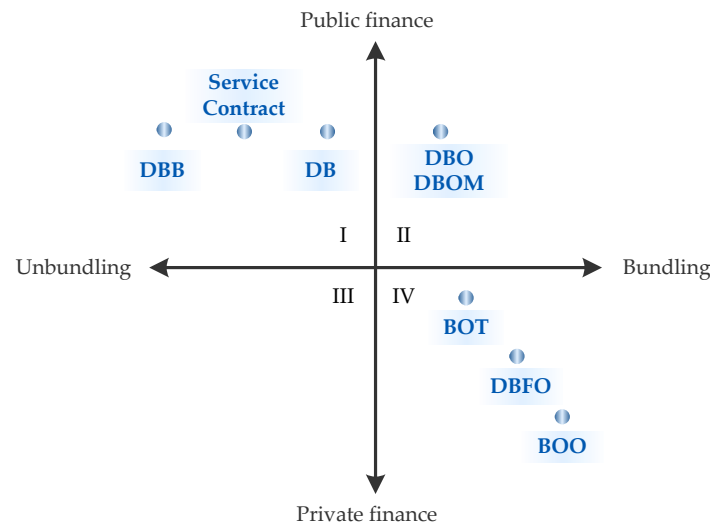


Figure8: Two-dimension framework of PPP options

2.3.1 Design-Bid-Build

2.3.1.1 Definition

Design-Bid-Build (DBB) is a traditional segmented delivery approach in which design and construction are separate from each other and, in turn, both phases are independent from operation and maintenance phases (Miller, 2000). The design and construction responsibilities are awarded to an independent private designer and a separate private contractor. In this way, DBB separates the procurement process into three linear phases: design, bid and build, shown in figure 9.

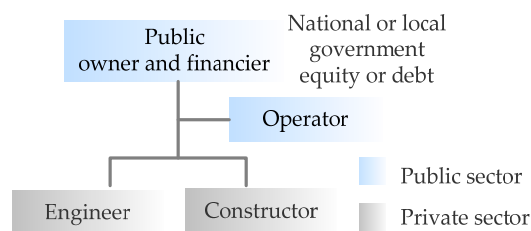


Figure9: DBB model

2.3.1.2 Procurement process

During the design phase, the public sector awards a design contract to a designer (e.g. engineer or architect) who is responsible for completing a final project design and provides a detailed document including drawings, specifications and supporting documentary materials, using a quality-based approach. Once the design phase is finished, the public sector (owner) will use the documentation prepared by the awarded designer to assemble construction bidding documents. Pre-qualified contractors are invited to submit competitive and lump sum bids and the owner will select one bidder with the lowest responsible bid price and the assumed quality level. Then the project moves onto the construction phase, before which the necessary approvals (such as the building permit) must be obtained from all jurisdictional authorities. In many cases, the components of a project are usually supplied by sub-contractors and the general contractor may play its role in managing the construction

process and daily activities. And during the construction phase, the owner will keep on monitoring the awarded constructor's performance.

2.3.1.3 Responsibilities

The government conceives the project and remains responsible for operation and maintenance of the infrastructure on the completion of construction and it is also responsible for financing all the functions throughout the process through equity and debt (Miller, 2000). And as described above, the designer takes the responsibility of designing the project and the constructor is responsible for building. After the construction completion, the whole infrastructure is owned by the government.

2.3.2 Service Contract

2.3.2.1 Definition

Service contract (figure 10) is a kind of short term agreement (usually a few months up to a few years) between government and private operator and maintainer, under which the private actors take responsibilities of operation such as toll collection and maintenance of the infrastructure (European Commission, 2003). It is more appropriate for this contract type to be used for existing projects or those freshly completed. It thus allows the government to benefit from the particular technical expertise of the private operator (and maintainer), managerial techniques and potential cost savings. And the private actors are paid on a fixed fee basis or an incentive basis if it receives premiums for meeting better service levels and targets.

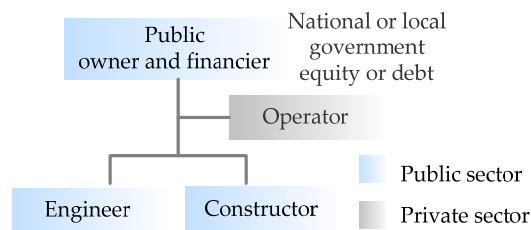


Figure10: Service contract model

2.3.2.2 Procurement process

Service contracts are awarded on a competitive basis. Private operators and maintainers are invited to submit their technical and managerial qualifications and rewards they require from providing the services. The government examines these bidders' documents and then award the contract to a selected operator and maintainer.

2.3.2.3 Responsibilities

Short term responsibilities of operation and/or maintenance of the infrastructure are transferred onto private operators and maintainers. During the whole process, the government maintains the responsibility of financing (equity and debt) and the infrastructure is owned by public sector.

2.3.3 Design-Build

2.3.3.1 Definition

Unlike DBB where design and construction of the project are procured by two separated private contractors without overlap in the project phases, the DB approach combines the design and construction phases into one integrated fixed fee contract with one single private contractor (figure 11) (US Department of Transportation, 2007).

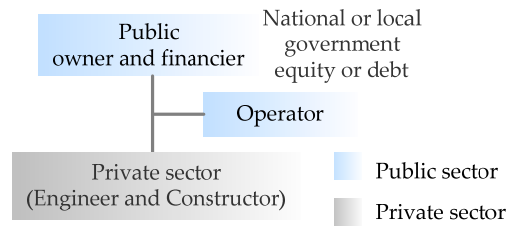


Figure11: DB model

2.3.3.2 Procurement process

In the procurement process, the government (owner) does a certain amount of preliminary engineering and project definition in order to prepare the bid documents. But, the level and scope of project definition are not fixed with design efforts about 10 to 15 percent completion being adequate (US Department of Transportation, 2007), because a project with advanced and fixed design is un-welcome and unattractive for private involvement since there is minimum opportunity for private actors to apply innovative approaches to reduce costs and time. After bid documents are prepared, competitive bids are invited, and one private contractor with best technical capabilities and qualifications is selected for design and build the project. When construction is completed, the infrastructure is operated, maintained and owned by the government.

2.3.3.3 Responsibilities

With Design-Build approach, the private contractor takes the responsibilities of major design work and entire construction activities, while the government keeps the responsibilities of financing (equity and debt), operating and maintaining the infrastructure.

2.3.4 Design-Build-Operate

2.3.4.1 Definition

Design-Build-Operate (DBO) (also known as Design-Build-Operate-Maintain) is a delivery method combining service contract and Design-Build mode, in which the government procures design, construction, operation and maintenance from a single private contractor, but the initial planning and formulation of design criteria are offered by the government (figure 12).

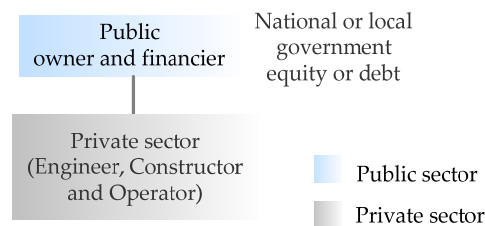


Figure12: DBO model

2.3.4.2 Procurement process

The DBO procurement process is the same as DB except that at the completion of construction, operation and maintenance are continuously retained by the private contractor.

2.3.4.3 Responsibilities

In the DBO model, the private contractor takes the responsibilities of design, construction, operation and maintenance. And the government is responsible for the whole project financing. That means DBO model requires that the government provides sufficient financing for the private contractor directly

either through cash payments or through the equivalent of cash payments such as the right to collect user charges.

2.3.5 Build-Operate-Transfer

2.3.5.1 Definition

The Build-Operate-Transfer (figure 13) is a form of project financing, wherein a single private actor receives a franchise from the government to finance, construct, operate and maintain the infrastructure for a specified period (usually 20 to 30 years), after which the ownership is transferred back to the government. But, the design phase is contracted with another single designer. During the franchise period, the private constructor-operator is allowed to charge user fees to recover its initial investment and operating and maintaining expenses (US Department of Transportation, 2007).

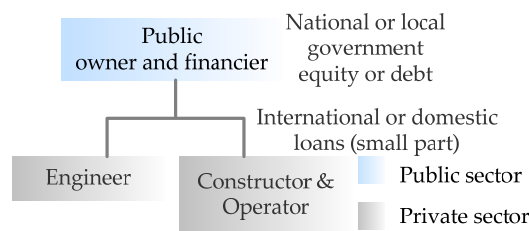


Figure13: BOT model

2.3.5.2 Procurement process

The public sector will first commit the design work to a designer (engineer or architect), so the design documents are prepared. Afterwards, based on the design documents the government awards the BOT contract to another private actor by competitive and transparent tendering process for a relatively long period. Private competitive actors are required to provide a single price for construction, operation and maintenance of the project according to the specifications offered in bidding documents. And the bidders also have to submit their qualifications and project documents and thus the government can compare the costs of various bidders to decide which is able to meet the government's specific needs. Finally one private actor is selected and contract is awarded.

2.3.5.3 Responsibilities

Throughout the project period finance is secured largely by the government, but the constructor (also the operator) is also provided with incentives of financing by the government through mandates, dedication and other measures. Under the contract the constructor is responsible for long term operation and maintenance of the infrastructure after construction completion and it will charge tolls in order to recover initial investment and operation and maintenance expenses. Up to the date of contractual period, the infrastructure is then transferred back to the government and during the whole process, the infrastructure is owned by the government.

2.3.6 Design-Build-Finance-Operate

2.3.6.1 Definition

The Design-Build-Finance-Operate (figure 14) is a delivery method in which the government procures from a single private actor the designing, financing, constructing, operating and maintaining of a project (Miller, 2000). It is also a variation of DBO or DBOM approach with the difference that the private actor takes full responsibility of financing from international or domestic loans.

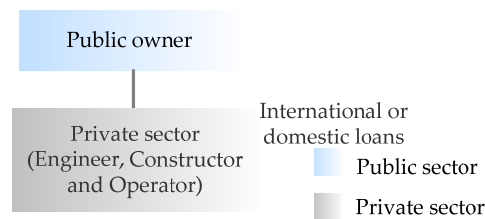


Figure14: DBFO model

2.3.6.2 Procurement process

The procurement process of DBFO is also on a competitive basis as described for the DBO model. The difference lies in that in DBFO approach, private financing is involved. Because of the large financial risks assumed by the private contractor, it participates earlier into project conception and design phase. Although the government should do a certain degree of design for the purpose of preparing the bidding documents, they are expected to do as little as possible and thus leave more room for the private contractor to design and facilitate the latter phases.

2.3.6.3 Responsibilities

Compared with previously discussed delivery methods, DBFO shifts a great deal of responsibilities (especially financing) to the private contractor who will assume responsibilities of design, financing, building, operating and maintenance. And the government will assume few responsibilities and during the whole life cycle, project is owned by the government.

2.3.7 Build-Own-Operate

2.3.7.1 Definition

With Build-Own-Operate method (figure 15), one private actor is approved or granted the right to design, finance, build, operate and maintain a project and even allowed to own the project. During this process, this private actor assumes the risks and all surplus revenues on its own. And it may use separate sub-contractors to conduct the design phase, construction and operation phases.

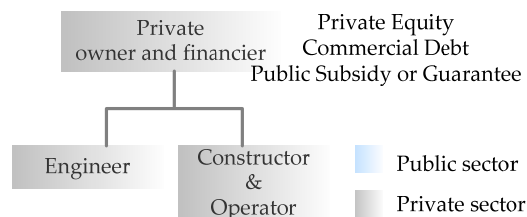


Figure15: BOO model

2.3.7.2 Procurement process

There is no direct transaction between the government and the granted private actor, but the full project needs to be approved by relevant public authorities who must ensure the project being consistent with the overall public policies.

2.3.7.3 Responsibilities

Under the BOO model, all project responsibilities are assumed by the private actor, except that only in the initial conception stage, the government will participate probably in order to put forward the ideas of the project.

2.3.8 Comparisons among PPP options

Seven major PPP options have been defined in the previous part, associated with the transfer of responsibilities from the government to private actors (table 6) and different combinations of project life cycle elements (figure 16). Because each option has its advantages and disadvantages with different application fields, here comparisons of seven PPP options are presented in below in terms of their advantages and disadvantages.

Table6: Responsibilities for different PPP options

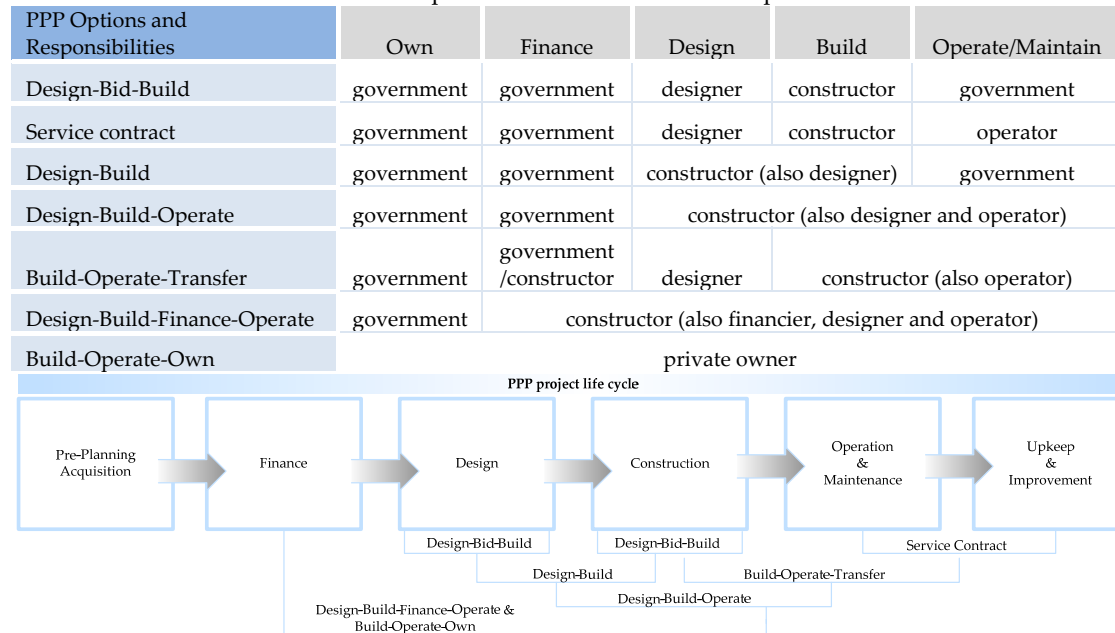


Figure16: PPP options in project life cycle (Source: Pakkala)

➤ Design-Bid-Build

The primary advantages of DBB model include that, first, it has been used for a long history and easy to be accepted by partners (Pakkala et al, 2007); second, division of design phase and construction phase can make the best efforts of specialization and reduce potential collusion between design firms and construction firms during the project delivery process (US Department of Transportation, 2007); third, separation of design and construction limits the scope of the contract and thus attracts smaller specialized firms to compete with larger firms for contract, which will result in more bidder candidates and a competitive bid price.

Disadvantages are that, first, potential dispute may occur due to the conflict between the finished design and practical construction; second, innovative behaviors for the construction firm are limited because the construction work must conform the design documents; third, separation of design and construction may cause cost overruns in constructing.

➤ Service Contract

One advantage of the service contract would be that the government may benefit from private sector expertise in technological and managerial issues and thus potential cost saving. Another advantage would be that service contract often offers an opportunity to encourage further private participation in a future delivery model. In addition, this kind of contract is more suitable for existing ongoing project than other green-field projects and its short-term character provides more performance incentives for private actors because they are easy to be out of the market if their performances are disappointing. Finally, this contract is helpful for the government and private actors in building trust between each other where the experience with PPP is rare and further it also provides private sector to test the waters

in potential risky markets with limited risk exposure from public sector.

The disadvantages of service contract include that, first, it is unable to be applied to all circumstances such as green-field projects which combine the construction and operation; second, it is risky for the maintainer to run the infrastructure that was built by others because the previous constructor may build a poor quality infrastructure and therefore the operation and maintenance expenditure may exceed that estimated by the operator. As a result, it is likely for the operator to reduce service quality on the condition that it has to make profit.

➤ Design-Build

First, combination of design and construction makes earlier involvement of constructor and thus results potential time saving due to the constructability of the design documents. Additionally, some design work and construction work may go concurrently, which will also save much time. Second, continued communications between design and construction engineering team members can save costs in inspection by the government because designer and constructor are the same entity that should be accountable for its actions. Third, this delivery model may bring a potential increase in project quality because involvement of the design phase in construction allows the constructor to incorporate innovative technologies and managerial issues that are based on constructor's capacities.

However, the tendering process combining design and construction phases constraints potential competition and thus may reduce potential bidders and probably increase bid price.

So far, the three PPP options discussed are all *short term contractual agreements* which offer them one additional advantage of less dependence on private actors and thus less sensitive to political policy changes. However, the following four PPP options are more dependent on private operators to deliver the services and they are *long duration contracts* between the government and private actors. Therefore, it is disadvantageous for them to dependent on private actors who are sensitive to policy changes.

➤ Design-Build-Operate

Advantages and disadvantages of DBO (DBOM) model are also involved in the DB model. But, one more advantage is that it also combines construction, operation and maintenance, which can not only mitigate the conflicts between design documents and construction practices, shorten the overall duration and costs via parallel working with design and constructing, but also provide private sector the incentives of increasing the construction quality in order to reduce the frequency of maintenance.

➤ Build-Operate-Transfer

Primary advantage of using Build-Operate-Transfer is that it combines responsibilities of partial financing, construction, operation and maintenance under a single private actor, which allows the private actor to take use of its own advantages. Furthermore, BOT model requires the private actor making a long term maintenance plan with estimated costs. Therefore, it may create incentives for delivering higher quality project plan because the private actor is also responsible for operation and maintenance of the project after construction for a long period. And in BOT the constructor is encouraged to bring in some funding.

However, the disadvantage may be the conflicts between design and construction and lack of maintenance during the contract period and increase in charging tolls due to cost overruns caused by over optimistic cost estimation.

➤ Design-Build-Finance-Operate

The advantages are shared with the BOT model, except that in Design-Build-Finance-Operate method, responsibility and risk of finance are totally transferred to the private sector. And the operating right of the infrastructure does not need to transfer back to the government, so it provides more incentives for the private sector to ensure the project quality and perform adequate maintenance tasks. In addition,

although the ownership of the infrastructure belongs to the government, the method of non-defined expiring date of operating right help build up the foundations for entirely private owned approach (such as BOO below) and thus facilitate the PPP approach developing towards more privatized method.

However, this model is criticized by many private contractors for the reason that it is a difficult development process to find strong financial packages. Many medium and smaller contractors cannot qualify for the best financial packages while often very large or global ones find the best financial rates. Those smaller ones are able to become sub-contractors to delegate some separate tasks of the project if desired, but it is not a preferred choice for them (Pakkala et al, 2007).

➤ Build-Operate-Own

The biggest difference of Build-Operate-Own model from previous ones is that the ownership of the infrastructure belongs to the private sector. In addition, it takes full responsibilities of the project. Therefore, advantage of this model is that the government does not have to interfere during the delivery process and does not have to assume all risks and responsibilities.

Disadvantage may include that the government can not control the service quality delivered by private sector and thus may threaten the social welfare.

2.4 Risks in public-private partnerships

A risk is defined as any factor, event or influence that threatens the successful completion of a project in terms of time, cost and quality (European Commission, 2003). The sound identification of risk is thus at the core of any public-private partnership projects (Estache et al, 2007). In theory, there is a distinction between risk and uncertainty in the way that risk is typically viewed as something that can be described in statistical terms, while uncertainty is regarded as something that applies to situations in which potential outcomes and causal forces are not fully understood (Miller and Lessard, 2008). In this thesis, both risks and uncertainties are referred to as risks not only because the vague understanding of causes, outcomes and driving forces of uncertainties would lead to risks, but because risk is multidimensional and unbundling of risk is necessary for a clear understanding the causal forces and outcomes. Flyvbjerg (2003) defined a typology of risks for megaprojects in his book *Megaproject and Risks*, including project-specific risks, market risks, sector-policy (including major force) risks and capital-market risks. Herein, it is feasible and suitable to apply this typology of risks to analysis risks in transportation projects under PPP schemes because Flyvbjerg also regards the transportation projects as megaprojects. The things remained are those how to allocate the risks between partners under PPP approaches and how the partners can mitigate the risks which are allocated to them. In this section, we will first present the typology of risks and then how to allocate and mitigate these risks.

2.4.1 Project-specific risks

Project-specific risks are defined as those conventionally associated with a project (Flyvbjerg, 2003). Risks associated with a transportation PPP project may include project construction risk and project operation risk. The construction risk primarily comes from the delays in completion and cost overruns (Meredith and Samuel, 2006). The construction risk may be caused by technical difficulties and/or poor management on the one hand, and on the other hand it may be derived from land acquisition, obtaining necessary permissions and licenses. Delays of completion may be caused by delays of some of the construction elements and doing poorly done work over again. Construction cost overruns may exceed the estimated costs for many reasons which include poor identification of the project, unknown geological conditions, loosely defined safety specifications, escalation in cost of raw materials and labors and delays in project start-up and so on. In some developing countries, there are also risks of

unavailability of construction equipment and lack of construction technologies. Moreover, transport projects have substantial environment impacts, which will attract risks of strong opposition of public and environmental groups over the issues of pollution and visual charm. Box 1a shows an example of negative PPP due to project construction risk. The project operation risk may include project demand risk and operating cost overruns. The demand risk is related to the volumes of demand for the service provided by the completed infrastructure. User demand is very difficult to assess and forecast due to the absence of reliable historic information and data documenting the demand level and even with the extensive investigation of the past trend of demand, there will also be a residual risk on how much users the project could actually attract. For transport projects in particular, surveys of traffic demand are not reliable considering that there are multiple factors influencing the predicting results, such like expected macro-economic growth, future competition from other transport modes and user behaviors. In addition, some unforeseeable event such as the oil shocks of 1970s also had dramatic impacts on traffic demand. Additionally, actual operation and maintenance costs may exceed those estimated in the project planning phase. If design has been well identified, construction has been adequately performed and start-up testing has been carried out satisfactorily, expected operation costs would be held in control (Yves, 1994). However, a couple of factors may come into play to induce an increase in the operation costs involving disappointing management, underestimation of costs in purchasing raw materials, repairing and renewing facilities, exceptional climate conditions, and incremental costs due to sub-contracting. Box 1b shows an example of negative PPP due to project operation risk.

Box 1a: Negative PPP due to project construction risk (source: Perez, 2004)



The Vasco da Gama Bridge, shown in the left picture, is European longest bridge crossing on the Tagus River with the total length of 17.2 kilometers. And its purpose is to connect the motorways which starts from Lisbon and which were previously unconnected and also to alleviate the congestion on Lisbon's other bridges. This bridge was built on a partnership basis between GATTEL (Office for the Lisbon Tagus Crossing) and Lusoponte (a concession company) through a tendering process.

The construction risk in terms of project completion in this case is extremely high due to the deadline driven by EXPO'98 with construction period no more than 1371 days. In order to speed up the construction process and thus reduce the completion risk, Lusoponte divided the project into sections so that work could be done simultaneously. However, the construction risk is raised by the relationship between Lusoponte and the Portuguese government because of frequent government interfering on the control of all aspects of the project. This makes it difficult for Lusoponte to carry out smooth construction on its own timetable. And construction risk is also increased by the officials of the new government who believed that the clauses in the financial contract transferred abnormal amount of risk to government, which created an uncomfortable relation with the new government for Lusoponte. In addition, the magnitude of the construction effort was massive. Although the whole construction was divided into different sections, there were thousands of people of different nationalities working on the bridge, so the coordination problems increased the risk of completion. Further, the risk coming from technical challenge is due to the involvement of 826-meter cable-stayed Main Bridge with the design of 45-meter vertical clearance and 420-meter horizontal clearance in order to ensure the maritime traffic and the design of high grade withstanding of earthquake. Finally, the construction risk in this case was increased by one accident that was fatal and involved two children falling into the river.

Box 1b: Negative PPP due to project operation risk (source: <http://rru.worldbank.org>)

The toll road (M1/M15) in Hungary winning the bid in 1993 with committed investment of US\$453

million from World Bank has experienced the concession substitution in 1999 due to the existence of market risk, more specifically, due to the risk of forecasting the demand for transport.

The M1/M15 project was the first toll motorway project tendered and implemented in Central Europe. Its construction phase was completed on time and within the budget following a successful tender and financing. However, the traffic at opening of the motorway and the traffic growth in the successive three years was substantially below expectations, resulting in an impossibility to repay the debt. Additionally, the increase in the toll rates turned out to be politically unacceptable. The private company has experienced the market risk of failure in predicting the user demand and an attempt to restructure the company finances remained ineffective. At the end the concession of this company was substituted after this three-year operation.

2.4.2 Market risks

Market risks relate to the overall economic development that affects economic activities in a country (Flyvbjerg, 2003). Such risks may be caused by general economic downturn and phenomenon of inflation. In a user-pay PPP model, the risk of a reduction in economic activity will influence the demand for the contracted service, which will make the project revenue below projections. In addition, the inflation risk will lead to the value of payments received during the project period devaluated and thus reduce the real returns of the private actor. In some cases such as those in Indonesia, the macroeconomic shock has increased the difficulties of implementation of the projects and accelerated their failures. These shocks, including the financial crisis in 1998 in Indonesia (shown in box 2), led to an unfavorable investment environment for private actors, in particularly for foreign investors.

Box 2: Negative PPP due to market risks (source: Indonesia public expenditure review, 2007)

A seminar on Asian toll road development in an era of financial crisis held by World Bank and Japanese Ministry of Construction showed that the situation in the financial crisis era in Indonesia was that most ongoing construction roads have stopped, many concession companies were on the verge of bankruptcy and private investors lacked confidence in investing in transport infrastructure.

A publication called Indonesia Public Expenditure Review revealed that the efficiency of Indonesia's cities is reduced by severe traffic congestion. In response, the government believed that high-grade highways would help relieve some of the congestion and by enhancing inter-city linkages, provide a boost to growth. However, most of these highways are only in the planning phase. Preparation is underway for private investment, but until now from the financial crisis high financial risk in Indonesia's local environment hindered most of the private participation.

2.4.3 Sector-policy (including major force) risks

Sector-policy risks come from the fact that the outcome of a project is dependent on specific sector policies and there are probably major force risks concerning political policies (Flyvbjerg, 2003). The potential occurrence of policy changes may result in contract termination, output specification changes, withdrawal of government support network, tax and law changes. The reasons for sector-policy risks may include the unstable government, elections, immature institutional environment and any actions of the government that could load impacts on the profitability of a project (Schaufelberger, 2003). The ability of a project to make earnings highly depends on government's concerned policies and regulations. For instance, terminating the contract unilaterally, placing toll price ceilings and increasing taxes on revenues would severely reduce the returns to operators to recoup the costs, repay the debts and earn profits. Incomplete legal systems and unstable institutional environments would cause changes in the rules and norms that applied to the project before and thus cause losses of the project to cater to new rules and norms. Due to the long duration of most contractual agreements and due to the risks

emerging over time, the project configurations will be influenced in a dynamic way and impossible to be predicted beforehand, which will then make PPP projects especially susceptible to sector-policy risks. Further, this is exacerbated when new government oversees the forepart projects which are instigated and approved by previous government or administration. Box 3 shows an example of negative PPP due to sector-policy risks.

Box 3: Negative PPP due to sector-policy risks (source: Tam CM, 1999)

Driven by economic boom, Thailand faced bottlenecks in providing transport utilities to satisfy the rapid increasing in traffic demand. Therefore, one of the transport infrastructure expansion plans, called Bangkok Elevated Transport System (BETS), is brought forward with unprecedented requirement for funds. As a result, PPP is applied by the Thai government.

The core of BETS was to build an elevated rail system and a road with total length of 60 km through the heart of the capital. The project was proposed in 6 phases with total estimated cost of US\$3.2 billion in 1991. The private sector selected is Hopewell Ltd. which would operate the project following the BOT model, and intend to collect the toll revenues for 30 years. The first phase was completed smoothly by the end of 1995 and at the end of 1997 only a few piled foundations have been built, after which the project was terminated by the Thai government. The reasons are:

- Changes of government: The contract of this project was signed in 1990, after which Thailand has experienced several changes of government, including a coup, two controversial elections and the ousting of a military junta. These events seriously hindered the carrying through of the project and it was terminated.
- Changes of the construction scheme: During the ongoing process of this project in the middle of 1993, the Thai government suddenly changed the construction scheme of the project from an elevated to an underground system. Although the government has made a promise of compensation, the huge losses of construction investment were unable to be covered. This change is made by politicians who want to please the public because majority of the public against constructing elevated system due to destroying the city's charm. Anyway, either the waste of the initial investment or the delay of project time caused failure of this project.

The failure of BETS caused huge losses to Hopewell Ltd. There were other reasons like land acquisition and government's lack of cooperation that led to the failure of BETS, but the above two reasons are related to political risk.

2.4.4 Capital-market risks

Capital-market risks are created through borrowing, in particular in the international market, in order to finance projects (Flyvbjerg, 2003). Such risks mainly come from fluctuations of currency exchange rate and interest rate (Schaufelberger, 2003). Debt is a fundamental characteristic of almost all PPP agreements, and if the money is borrowed from abroad, then currency exchange rate fluctuations could threaten project viability, which is exacerbated when weak currency is involved, when the project is implemented in emerging economies and when the government regulates that a part of financing investment should come from foreign sources. Moreover, the PPP agreement is likely to suffer from a convertibility risk, which means that the operator may be not allowed to exchange the local or foreign currency. Furthermore, the revenue of a project which is in local currency may encounter an interest rate increasing risk which could devalue the revenues. One possible solution would set the fixed interest rate beforehand. Box 4 shows an example of negative PPP due to capital-market risks.

Box 4: Negative PPP due to capital-market risks (Source: World Bank Project Finance and Guarantees Department, 2001)

A study, Toll Road Concession: The Chilean Experience, carried out by the World Bank reviewed the Chilean toll road concession projects during the 1990s. It focused on 12 projects at different stages of implementation, representing nearly 2000 kilometers of expressways and an investment of about US\$3.3 billion. One of the conclusions is that:

The small size of the domestic financial market led to a need for an exchange rate guarantee that provided access to foreign financial markets.

According to their research, in Chile, the challenge of construction sector was that domestic bank loans encountered limits on financing capacity and thus accessing to foreign capital became the priority. However, risks of exchange rate fluctuations provided little confidence for foreign investors. Therefore, the government had to offer a hedge against exchange risks to encourage foreign financing. The terms and conditions of new concessions in Chile, thus, included a provision that denominated a portion of the minimum revenue guarantee in dollar terms. Concessions that use the net present value system are allowed to denominate part of the net present value in dollars. The exchange rate guarantee is also available to existing concessions that seek foreign exchange financing. In such cases, instead of paying an insurance premium, concessionaires agree to invest but it is the government who retains the risks of cost increase incurred by exchange rate fluctuations.

In sum, four types of risks for large transportation PPP projects have been identified, including project-specific risks, market risks, sector-policy risks and capital-market risks. Given these identified risks, appropriate risk allocation between the partners and risk mitigation strategies should be further investigated, which are discussed in the following section 2.6 and later chapters.

2.5 Worldwide experience with PPP and lessons learnt

Public-private partnerships are becoming increasingly commonplace in the world with models varying across countries according to national legal frameworks and public administration practices, resulting from their needs for speeding up the development of infrastructures due to changes in economic strength and national relations in the world (US Department of Transportation, 2007). Regardless of which countries are advanced PPP adopters, intermediate PPP adopters or latecomers, and although most PPP projects vastly differ in terms of size, structure and scope, worldwide experience indicates that why projects which incur setbacks and even failures or those which enjoy success are sharing similar reasons (Chang et al, 2005). Herein a summary of worldwide experience with PPP and lessons are drawn from numerous case studies carried out by various international organizations.

2.5.1 “Ex ante” evaluation

Global experience shows that a majority of PPP projects are lacking of “ex ante” evaluation and good preparation, resulting in poor performance of projects (European Commission, 2004). Preliminary evaluation before project is implemented needs a long term strategic planning and actor analysis.

➤ Long term strategic planning

Long term strategic planning is important because it provides a vision and direction and develops specific goals, objectives and actions for achieving the desired vision and seeks to find the major influential factors for the future of the project, such like an appraisal of the project’s internal and external

environment (Haezendonck, 2007). Therefore long term strategic planning should be regarded as a fundamental integrant for project “ex ante” evaluation.

Strategic planning makes possible the creation of public debates, the conflicts of interest and opinions that, otherwise, would tend to be ignored and would appear during later implementation of the project, causing delays or even halt of the project. And during the iterative process of strategic plan, the project plan is amended, adapted and adjusted in the way that it is easy to be acceptable for all partners and thus increase the willingness of partners to resolve the conflicts. That is to say, discussions and debates on basic issues of the project should be solved within the strategic planning phase because fuzzy strategic plan can make future decision making more difficult and even impossible.

➤ Actor analysis

An actor is any individual or group of individuals that can influence and be influenced by the achievement of the organization's objectives (Haezendonck, 2007). Each actor has its own strategic position with one's own interest, perception and objective and can affect the situations and outcomes of the project. Actor analysis is to make clear the tension relations among their interests, resources and objectives and thus crucial for project success. Furthermore, actor analysis can make clear that who possesses the critical resources that are necessary for the project success. In the context of PPPs, in the beginning part of this chapter, we have identified several actors involving the central/regional/local governments, public users, designer, constructor, operator, maintainer, banks and consultancy firms. The governments have the power to provide political supports and authorities for the project; public users have the right to choose the service; banks have financial resources and designer, constructor and operator (maintainer) have specialized technological and managerial expertise and funding in constructing the project, providing services and managing the infrastructure. Therefore, careful actor analysis is important and can make the actors more involved in the project and contribute their resources.

2.5.2 Institutional capacities

Involving greater private participation in the provision of public services is challenging and requires strong and well steered government institutional capacities (World Bank, 2006). Thus, institutions are essential mechanisms in effectively implementing PPP projects. However, institutions in developing nations and those countries formerly part of the Soviet Union are generally inadequate to cope with the wide range of problems concerning PPP projects (US Department of transportation, 2007).

Developing a credible legal and regulatory framework can provide reassurance for private actors (Minassian, 2004). From worldwide experience, many countries have added PPP-related laws and policies to the original legal and policy framework, and for some countries, they even adapted laws in other fields in order to accommodate to PPP laws and regulations. For example, the Italian Merloni Law (dealing with concessions) in 1994 has undergone a great deal of adaptation in order to facilitate private involvement in infrastructure investment; in Spain, the 2003 concession law supplements several laws by extending private financing options; in Brazil, a law dealing with all aspects of PPP, details in box 5, has been passed by congress and in Australia, the policy framework, adequately reflects the service quality requirement, appropriate risk transfer, competition and incentive regulations. Anyway, the legal and policy framework for PPPs should be supplemented by credible and effective disputes and PPP projects in terms of taxation and regulation regimes should be treated in a non-discriminatory way. In addition, institution building also requires development of expertise in managing a PPP project by the government. The private actors often complain that it takes too much time for them to make contract with the government. In response, governments in many countries have taken some actions to improve the managerial efficiency. For instance, United Kingdom has founded a specialized government agency, called Partnership UK, to promote PFI (private financing initiatives) projects by offering legal, technical and financing assistant and advice to support the government to do contract negotiations and

procurement.

Box 5: PPP legal framework in Brazil (Brazilian National Congress, 2004)

Brazil's first PPP legislation came into force in late 2004 promoting private sector investment in public infrastructure, complementing the existing concessions law and procurement law in the fiscal area. This PPP legislation created a new contractual form in Brazil, through which the constructor is responsible for financing and constructing the public infrastructure assets, and operating the assets to a maximum of 30 years, after which the assets are transferred back to the government with or without a final payment.

The approval of this PPP legislation changed the legal institutional framework in terms of the government's roles in PPP projects and financial institutions. It confines the government's role only in overall coordination of the project and approval of specific projects. And through regulatory power of the government, the law sets limits on the exposure of public banks and the National Development Bank. And borrowings from foreign banks should be subject to standard approval process.

In addition, the PPP legislation also provides some policies to minimize the political risk for the constructor, including:

- The government grants seniority to PPP contract payments over other public expenditures, except for constitutionally mandated spending and debt services;
- The government earmarks the revenue for the purpose of PPP contract payment use;
- The government creates trust funds to guarantee PPP contract payment; and
- The government allows constructors to pledge for future payments from a PPP contract.

However, in this law there is no specific risk allocation mechanism and no minimum capital requirement for the private sector, both of which will be negotiated on a contract-to-contract basis.

2.5.3 Regional economic development

Although there is an absence of a direct link between PPP projects and regional economic development (Banister and Nerechman, 2000), Flyvbjerg in his book *Megaprojects and Risks* still argues that the megaprojects⁵ and regional economic development are conditionally related with each other. One of the arguments that infrastructure investment (including transportation PPP project investment) will generate regional economic growth should be treated with caution, learnt from his empirical evidence, because, as Flyvbjerg said, "in modern economies, transport costs constitute a marginal part of the final price of most goods and services". Transportation infrastructure investment would result in generating regional economic growth on the conditions that the regions have serious problems of transportation network capacities; for large urban areas, new capacity investment would lead to significant savings of transport costs; and investments in transport infrastructures go together with the investments in social capitals.

Another argument is that the viability of transportation megaprojects is maintained by sustainable economic growth (both national and regional) and the frequent economic activities, and the demand for megaprojects is affected by the unforeseeable coming economic development situations and unpredictable economic shocks, but this argument is tenable only on the condition that the forecast of project demand is made on a rational basis (further discussion in section 2.5.6). Therefore, although the downturn of economy could have impact on the demand for the project, actual reflection on the demand estimation also plays an important role.

⁵ A megaproject is an extremely large scale investment project. Bent Flyvbjerg defines megaprojects as "typically costing more than US \$1 billion and attracting a lot of public attention because of substantial impacts on communities, environment and budgets". Therefore, in this thesis the investment and construction of transportation networks under PPP schemes can be regarded as "megaprojects".

2.5.4 “Corruption”

Generally speaking, corruption is defined as the exercise of official powers against public interest or the abuse of political power for private gains (Shan, 2005). *The Global Corruption Report* (2005) that focused on the construction sector in worldwide countries has revealed that corruption is greater in the construction sector than any other sector of the economy, and further, it has been painfully aware that corruption in construction contracting is not a problem unique to developing countries, the developed nations have also confronted with this problem.

Under the conventional delivery approach of infrastructure service where project is carried out by the government or project is implemented under public funds, corruption mainly affects the public sector in terms of a symptom of governance failure and weak governance environment. And it can act further not only to raise the price of the infrastructure, but can reduce the quality of the service. The types of corruption under the conventional approach include:

- *Impropriating public fund (belonging to the infrastructure projects) for personal use*
- *Asking for “kickbacks” (from raw construction material providers) when procuring raw construction materials*

Corruption, in the context of innovative approach where private financing is involved mainly concentrates in the tendering process in forms of collusion between officials and bidders. The consequence of the corruption would be that the concession will be granted to the bidder who is incapable to carry out the task of public service provision, and thus would result in adverse selection and degrading the project quality and cost overrun. Corruption manifests itself in several types:

- *Bribery. Bribery occurs mainly during the tendering process, in which the public officials accept the “benefits” provided by the private bidder who intend to win the bid unfairly.*
- *Nepotism. Nepotism also mainly occurs in the tendering process, in which the public officials take their advantages of official powers to award the bid to someone they are in favor.*
- *Breaching confidentiality. Breaching confidentiality also occurs in the tendering process, in which the public officials intentionally provide secret bidding information to some private bidders in order to help them win the bid unfairly.*

The comparison of “susceptibility of different delivery approaches to corruption” could not be done directly because, under different delivery approaches, corruption types, the anti-corruption strength and the supervision mechanism of public officials would differ. But still, from the above analysis on the conventional and innovative approaches, it indicates that projects under innovative approaches are less susceptible to corruption than the conventionally delivered projects, because the procedures of the innovative approaches are relatively more transparent than that of the conventional approaches.

2.5.5 Renegotiations

International experience (Guasch, 2007) showed that in some cases of PPP projects, conflicts have happened because the private actors has not been in line with the contractual terms and has not taken appropriate responsibility of delivering promised quality level of service. In other cases, the government has not abided by the contract to adjust the price indexes and has charged excessive tariffs. And even, many PPP contracts have been cancelled due to private sector’s bankruptcy and thus the project has to be taken over by government. Struggling before cancellation of a contract, either public sector or private sector would bring forward the renegotiation request. Herein box 6 shows the records on the cancelled infrastructure projects under PPPs using either public funds or private capital.

Box 6: An overview of cancelled infrastructure projects

(<https://www.doingbusiness.org/Discussions/Topics/Topic16.aspx>)

Worldwide, 48 private participation infrastructure projects were canceled out of total 2485 projects granted during 1990 and 2001 with total investment loss of US\$19.8 billion, among which 19 were toll roads and 5 were transportation projects other than toll roads, 9 were energy projects, 7 were water projects and 8 were telecommunication projects. Therefore, 2% private participation projects were canceled and among them 50% came from transportation sector.

Renegotiation is defined as the occurrence when the original contract undergoes substantial changes which are not caused by the results of contingencies written in the contract, while the periodic and stated changes such as tariff adjustments due to inflation do not count as renegotiation. In principle, renegotiation can serve as a positive instrument when it is used to deal with the inherent incomplete nature of PPP contracts. Although if used properly, renegotiation can enhance the robustness of the contract, high frequency of renegotiations in PPPs worldwide has exceeded the expected benefits and raised concerns about how to treat them appropriately.

Before lessons on how to deal with renegotiations are drawn, consequences of renegotiation should be first clarified according to world experience. Often, renegotiations, especially those that happen shortly after contract is awarded, largely undermine the competitive discipline of tendering process and sector performance. As a result, costs of renegotiations incurred by both parties induce large dead-weight loss and thus damage consumer welfare and incur public oppositions to private participation in infrastructure.

How to deal with the request of negotiation still remains. The answer is two fold. If the renegotiation is initiated by the private actors, then the government should give some judgment. In a regulated environment where the private actors do not have the right to adjust prices and with the advent of adverse economic conditions which is dangerous for the private actors to earn the expected profits, a change in contract clauses, that is, renegotiation, is regarded as rational to retain profitability (Guasch, 2007). In other cases where the private actors look to renegotiations and submit unrealistic bids, they should be held responsible for their bids. And if the renegotiation request is accepted by the government, the government should give the private actors a free feeling to abandon the contract. Anyway, the appropriate behavior for the government is to accept proper changes due to external factors and not to concede to the opportunistic request of renegotiation. Although refusing renegotiation request may cause risks of abandonment of contract, it is still worthy for the government establishing reputations of not easy to demand renegotiations and thus discourages future potential renegotiation requests. However, a government that adopts this strategy will have a hard time after contract is cancelled because it has to bear substantial increase in political costs. If the renegotiation is brought forward by the government, then one principle for the private actors is to secure its profitability. Small changes are allowed in order to establish a friendly relationship with government for future collaborations, while for substantial changes that will threaten returns the private actors should ask for compensations or subsidies from the government. Even seriously, when the private actors could not make any profits and the government refuses providing any compensation, the contract should be seized. Therefore, to ensure that the contract can be finished successfully, renegotiations sometimes are necessary, but any opportunistic behaviors should be absent from that, and both parties should make efforts in continuing the contract on the condition that self interests are ensured.

2.5.6 Optimism bias

Global evidence shows that transportation PPP projects suffered from optimism bias of project costs, benefits and traffic demand (Lorenzen and Barrientos, 2001; Flyvbjerg, 2003; Flyvbjerg, 2004; EU Conference, 2005; OECD, 2007; PPP Centrum Czech, 2005; World Bank, 2003).

HM Treasury (2003) indicated that there is a global demonstrated, systematic and tendency for PPP project appraisers, particularly for transportation project appraisers, to be overly optimistic and there is a need to redress this tendency and the appraisers should make explicit, empirically based adjustment to the estimates of a project's costs, benefits and traffic demand. The general reason for optimism bias is a combination of how the decision making process is organized and strategic behavior both of the government and of the private actor in the planning and decision making processes (Flyvbjerg, 2004). Specifically speaking, studies on worldwide PPP transportation projects reveal that optimism bias is caused by three key factors (Flyvbjerg, 2005):

- Technical causes. Cost overruns can be partially explained by technical factors including imperfect information (lack of forecasting techniques; inadequate data; errors), changes in project scope and poor project management system.
- Psychological causes. Psychological factor explains cost overruns (or overestimate benefits) that is due to mental bias of project promoters and planners who make decisions of weighting and evaluating project costs and benefits on a delusional optimistic basis rather than on a rational basis.
- Political-institutional causes. Optimism bias caused by this factor can be backward to political powers and prevailing institutional settings that surround the decision making process. This factor assumes that when project promoters and planners forecast project outcomes, they strategically and deliberately underestimate costs and overestimate benefits and demand volume in order to raise the probability of winning the funding and to serve their own interests.

Given the three kinds of optimism bias causes, the project planners can be grouped into two categories. One category is those who have not the capacity (because of technical constraints) to forecast project outcomes (costs; benefits; demand volume) accurately or who do not realize their unconscious irrational forecast. Another category is those who are purposive to estimate outcomes on a biased basis in order to cater to their concerned interests. Facing these two categories of planners, cures are different. For the first category, many scholars have developed advanced technical forecasting methods for them if they genuinely consider it important to get forecasts correct. It is out of our research scope to study those technical approaches, but for the second category, the cure is to enhance public and private sector accountability (Flyvbjerg et al, 2005).

Accountability is both a problem and a solution. As a problem, project promoters lack accountability. They always use "planning" as an instrument of control but not an avenue of democratic participation; they do not make efforts to get forecasts right but get project funded and constructed; they always lie with numbers. Therefore, accurate forecasting techniques are useless here, but improving accountability should be the solution. As a solution, public sector accountability should be achieved by transparency and good public management and private sector accountability should be reached through increasing competition, all of which have been analyzed in the "corruption" part. Herein some additional specific strategies on forcing accountability are presented in box 7.

Box 7: Additional specific strategies on forcing accountability (Flyvbjerg, 2005)

- Forecasting results should be subject to peer review.
- Forecasting results should be benchmarked to comparable forecasts.
- Forecasting results should be presented in front of professionals and experts in periodic organized conferences or meetings.
- Purposively bias forecasting results should be subject to criminal penalties.

2.6 Risk mitigation strategies

Global experience shows that PPP projects benefit from successful risk allocations between the government and the private actors, and good risk mitigation strategies are integral to delivering a successful partnership (HM Treasury, 2005). Given that most of the PPP partners are risk-adverse, a project associated with risks gives rise to an economic cost for the partners to pay something such as the insurance in order to mitigate the risks (Flyvbjerg, 2003). Flyvbjerg (2003) indicated that the risk costs of megaproject investment can be expected to be high. The reasons are that the megaproject investment is basically a sunk cost which can not be retrieved and that the benefits of the investment are often strongly dependent on economic growth. By recognizing the high costs of risks, risks should be managed appropriately by allocating to the right partners and mitigating them tactically. Among Flyvbjerg's four types of risk, market risks and capital-market risks can be regarded as risks caused by external factor changes and uncertainty, while project-specific risks can be regarded as risks caused by potential ex post contractual strategic behaviors, and sector-policy risks are those caused by the possible institutional changes. Therefore, in this section, we only discuss the allocation and mitigation strategies for market risks and capital-market risks (see table 7). And the strategies pertaining to sector-policy risks will be discussed in chapter 4 where China's institutional context is presented. For project-specific risks, their allocation and mitigation strategies will be discussed in chapter 5 where strategic behaviors in each PPP option are analyzed.

Table7: Risk management (market and capital-market risks)

Sub-Risks	Allocation	Mitigation
<i>Market risks</i>		
Overall economic downturn	➤ Government	➤ Before the project is approved, the government should do sufficient evaluations on the trend of overall economic development and include different scenarios in the contract.
Inflation	➤ Government	➤ Before the project is approved, the inflation indexes of past years would be the best indicators for the government to evaluate whether the service price can be linked to the inflation index.
<i>Capital-market risks</i>		
Currency exchange rate	➤ Government	<ul style="list-style-type: none"> ➤ The government could limit the maximum involvement of foreign currencies. ➤ If borrowings from foreign banks are necessary, then tariff should be permitted to make adjustments.
Interest rate	➤ Government	➤ The government could design the contract on the basis of mixed interest rates (fixed interest rate and floating interest rate) in order to hedge the interest rate fluctuations.

2.7 Conclusion

In this chapter, we have analyzed various PPP options and their advantages and disadvantages; risks existing in PPP projects; and worldwide experience with applying PPP schemes. And they form a partial theoretical foundation for the empirical research in the context of China. In chapter 3, we will present the agency theory and strategic behaviors and thus transaction costs as the consequence of asymmetric information between the principal and the agent. Combining different PPP options with the theoretical knowledge of strategic behavior, we will try to identify the relevant strategic behaviors for each of the PPP option, and find out the recommendations on how to deal with them. Another application of this theoretical foundation in this chapter is the world experience with applying PPPs, and we will, in bringing forward recommendations, incorporate them into the context of China and see how to use them as references for addressing the problems of applying PPP schemes in China.

CHAPTER 3 AGENCY THEORY

In chapter 2 we have introduced the conception of public-private partnership along with its various options and their advantages and disadvantages. We know that PPP is a kind of contractual relationship between governments and private enterprises, working together to finish a target project with their own objectives and interests. The delegation of some governmental responsibilities by the private sector, under their divergent goals, may raise our attention on whether the private sector would shrink from efforts or how the private sector performs the tasks. Therefore, agency theory may act as a theoretical explanation to such questions alike. In this chapter, it first presents the basic knowledge on agency theory including its conception, transaction costs and strategic behaviors. In the second part, monitoring and incentive schemes will be introduced as the countermeasures to agency problems. And in the third part, we will put forward the created framework that will direct the empirical part of this thesis.

3.1 Agency Theory

3.1.1 Conception

Agency theory (figure 17) was originally applied in the context of private firms to explore the economic relationship between a manager (a principal) and an employee (an agent). Despite its primal use within the private sector, the agency theory can also be applied in the context of the interfaces between the public sector and the private sector when the public sector (the principal) employs the private sector (the agent) to delegate some of its roles in public service delivery (HM Treasury, 2003). In order to explain the concept of agency theory, we start with its definition. According to Jensen (2003), agency theory is a kind of relationship that ...

“...is a contract in which one or more persons (the principals) engage another person (the agent) to take actions on behalf of the principals that involve the delegation of some decision-making authority to the agent.”

In agency theory, a principal chooses to contract with an agent for reasons of cost and expertise. The principal may decide that their organization lacks the resources and expertise to produce a good or service and that the cost of hiring or developing that expertise in-house exceeds the costs associated with contracting for the expertise. The principal and the agent then agree on the contractual terms including the inputs, processes, outcomes, quality and satisfaction parameters, monitoring, performance requirements, and compensation mechanism.

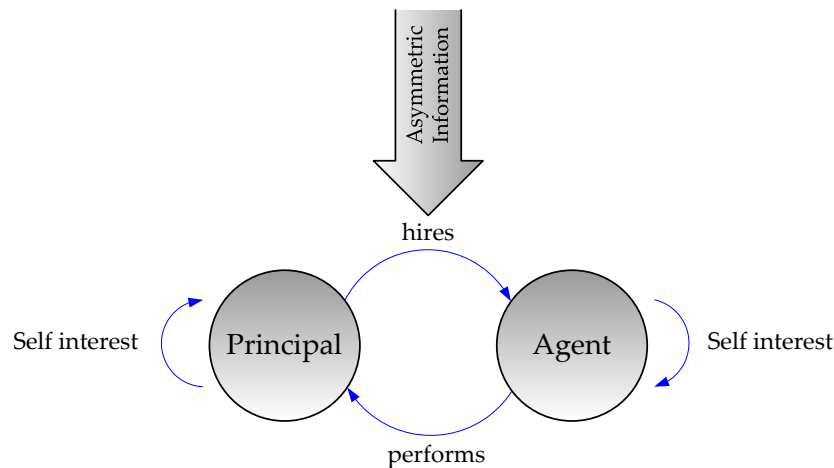


Figure17: Agency theory

The basic assumption for agency theory is the *asymmetric information* between the principal and the agent, which induces adverse selection during ex ante contracting and moral hazard during ex post contracting period. Roughly speaking here, adverse selection refers to the fact that the principal is unable to access relevant information of the agent before signing the contract. And moral hazard refers to the fact that the efforts made by the agent dedicated to the task can not be freely observable by the principal and thus causes the monitoring problems. The information asymmetry is not necessarily a problem if the agent's interests were perfectly aligned with the principal's. However, the "asymmetry" has actually affected the level of benefits streaming toward the principal. That is because another assumption, *goal conflict*, exists between the principal and the agent. So when the agent's behaviors are not controlled or restrained, the goals of the principal are unlikely to be attained. The principal thereby will apply new ways of contracting in order to minimize the deviation from its goals (Caers et al, 2006).

Agency theory will be applied in chapter 5 in order to explore and understand a variety of organizational phenomena and relationships according to different procurement models in China. And in the following parts, we will introduce the transaction costs and strategic behaviors incurred by the agency relationship.

3.1.2 Transaction costs

Given the above assumptions of the agency theory, it is reasonable to believe that the agent will not always act in the best interests of the principal, and thus the principal needs to restrict the goal divergence and interest incompatibility by establishing appropriate and adequate incentives for the agent in the contracts and also by increasing the monitoring strengths to limit the agent's aberrant activities. Moreover, in some circumstances, the agent himself will pay for the costs of expending resources (bonding costs) in order to guarantee that he will not take some actions that do harm to the principal. In other words, bonding costs are those the agent takes upon himself to reduce the goal conflict and are the efforts undertaken at the expense of his own utility. However, these efforts done by the principal to avoid certain actions from the agent are not costless. In contrast, it will incur positive costs, and according to Jensen (2003), these costs are defined as transaction costs, also called agency costs, as the sum of:

1. The cost of creating and structuring contracts between the principal and the agent
2. The monitoring expenditures of the principal
3. The bonding expenditures by the agent
4. The residual loss which means the dollar equivalent to the reduction in welfare experienced by the principal as a result of goal divergence and asymmetric information is also a cost of the agency relationship

Based on these agency costs, a distinction has been made between *ex ante* agency costs and the *ex post*

agency costs. The ex ante agency costs are the costs of the first type, incurred up through the creating and structuring the contractual agreement, including, more particularly, information search, negotiation, and contract formulation. The ex post agency costs are costs of the second, third and fourth types. They are spent on necessary monitoring, execution and enforcement of the contract, safeguarding and settlement of the conflicts and adaptations and renegotiations during the contractual period (Obermann, 2007; Yesilkagit, 2004).

Contracts are costly to write and enforce and likely to be somewhat *incomplete* (Laffont and Tirole, 1998). The reasons for these characteristics of “contract” are the *future contingencies* and *bounded rationality*. First, the harder to foresee future contingencies and to formulate in a clear way, the higher the transaction costs would be. Sometimes agents are not able to describe all the possible contingencies that would affect the functioning of contracts because that may be too costly and also because some contingencies could not be verified by third parties such as the agents’ level of exerted efforts. Moreover, bounded rationality will cause incomplete contract as well. Argued by Guasch in his research “*granting and renegotiating infrastructure concessions*”, the contracting parties are not completely rational and thus they may make mistakes and need a learning period to formulate the contract that may be adjusted and optimized over time. However, argued by Williamson in his book “*The Mechanisms of Governance*”, bounded rationality can, when used for self interest, be applied to disclose information in a selective and distorted way. Calculated efforts to mislead, disguise, obfuscate and confuse are thus admitted. This attribute is variously described as strategic behaviors that are to be discussed in part 3.1.3. In his view, bounded rationality and thus strategic behaviors leads to an incomplete contract, which has played a central role in incurring the transaction costs.

PPP projects have a contractual feature between governments and private enterprises. The transaction costs in PPP infrastructure projects probably amount on average to some 5 to 10 percent of total project cost, a survey carried out by World Bank (1996). Developing a PPP infrastructure project is a complex task requiring governments and private enterprises to prepare proposals, documents, conduct bidding, formulate contract, negotiating deals, and arrange funding. Table 8 shows the procedures of such transactions, from which the costs incurred are transaction costs for PPP infrastructure projects. The World Bank report (1996) and the European Investment Bank’s Economic and Financial Report (2005) further revealed that the technical characteristics of the PPP projects are not the key driving force of transaction costs, while transaction costs vary mainly because of the favorability and stability of the political and institutional environment. Costs are usually about 3 to 5 percent in well-developed institutional environment, while they may reach 10 to 12 percent in unfavorable and unfamiliar institutional environment. Researches from World Bank and European Investment Bank also identified other drivers of PPP transaction costs, including the uncertainties and contingencies of the projects, which are coherent with Laffont and Tirole, and the familiarity of PPP schemes or arrangements by governments. For instance, the private enterprises may be “held” for a long period while the government prepares the tender documents, and once the tender is issued, they usually need to complete and submit the bid within a few weeks with all-night overdriving. Thus, a lack of transparency over government process may greatly induce uncertainties and contingencies for the private enterprises and thus cause the transaction costs. In addition, for some countries, projects under PPP approaches are new ways of developing infrastructures for the governments. The complexity of contracting out compared with the traditional in-house approaches, challenges the government officials in their familiarity with the PPP schemes, which is again consistent with the opinion of bounded rationality held by Guasch. And sometimes governments have to adjust some of the regulations and legislations in order to favor the application of PPP approaches. Therefore, in the countries where the governments are not familiar with how to apply PPPs in an appropriate way, the transaction costs should be quite high.

Table8: Transaction costs for PPP infrastructure projects of governments and private enterprises

	Transaction Costs		Government	Private Enterprise
Conception	The cost of creating and structuring contracts between the principal and the agent	The residual loss	<ul style="list-style-type: none"> >Establish regulatory authorities >Pass enabling legislations >Mobilize public support >Select and identify project 	<ul style="list-style-type: none"> >Assess the market >Carry out preliminary feasibility studies and project identification >Identify key decision makers in the government and build up the project public relations
Feasibility Studies			<ul style="list-style-type: none"> >Select proposals >Conduct integrated project evaluation, including economic, technical, financial, and environmental 	<ul style="list-style-type: none"> >Conduct economic, technical studies >Legal consultation
Bidding			<ul style="list-style-type: none"> >Prepare bidding documents >Prequalify bidders >Evaluate bids >Award bids 	<ul style="list-style-type: none"> >Prepare bid >Prepare proposals including technology, financing, and environment-al assessment
Contract Formulation			<ul style="list-style-type: none"> >Financial negotiations >Technical negotiations >Legal negotiations 	<ul style="list-style-type: none"> >Financial negotiations >Technical negotiations >Legal negotiations >Develop financing plan
Financing Arrangement			<ul style="list-style-type: none"> >Consistent involvement and commitment throughout the financing process 	<ul style="list-style-type: none"> >Prepare documents for loans such as guarantee letters and mortgage statement
Project Implementation	<p>The monitoring expenditures of the principal;</p> <p>The bonding expenditures by the agent</p>		<ul style="list-style-type: none"> >Manage and adjust regulatory structure to facilitate project implementation >monitor behaviors of the contractor >Enforce contract compliance 	<ul style="list-style-type: none"> >Operate infrastructure >Ensure compliance with contractual obligations >Ensure being informed with legal and regulatory changes

However, it does not mean that for the in-house procurement methods, there are no transaction costs. Sometimes PPP projects simply bring the previously hidden costs in traditional procurement models into the open (World Bank, 1996). But currently no attempts have been made to compare transaction costs in PPPs to those in traditional procurement projects (EIB, 2005). Roughly speaking, the projects under traditional methods require intensive and long-period preparation, while PPP projects request more scrutiny and negotiation of the project details. And World Bank indicated that PPP projects are more likely to be completed on time and within budget than those under traditional methods. Therefore, although monitoring PPPs would incur the project transaction costs, it also means less all-in costs.

Thereby, introducing PPPs in developing infrastructures seems to increase the transaction costs, but it may simply bring the public hidden costs into the sun light. And the transaction costs are more related to the institutional environment and governmental favorable policies, but not the inherent technological characteristics of the projects. It also suggests that even with higher transaction costs of project monitoring under PPPs, it means over-all gains due to the increased incentives for efficiency of the private enterprises because under PPPs they have to assume certain risks transferred from the governments. After our introduction of transaction cost and the explanation of its relation with PPPs, and combined with the Chinese institutional circumstance to be discussed in chapter 4, we will further bring forward the recommendations on how to improve China's institutional environment for PPPs taking concerns with reducing transaction costs.

3.1.3 Strategic behaviors

As a consequence of information asymmetry in agency theory, strategic behaviors emerge since the agent will use its information advantages to act strategically toward its own interests over the principal's. Strategic behaviors can be either defensive or offensive (Williamson, 1996a). The former involves the efforts to protect the strategist from being harmed and loss of interests, while the latter entails the efforts of establishing and moving to advanced positions by the strategist and do harm to and influence other's interests. Such behaviors are backward from pursuing satisfaction and protection of self-interests. However, there is no unified definition of "strategic behavior". Nevertheless, ten Heuvelhof *et al* (2008) distinguish strategic behaviors by providing six characteristics:

- *Strategic behavior is reflexive.* The strategist reflects on his own behavior and takes into account his opponent's reflexive behavior and adapts his behavior to it.
- *Strategic behavior is relational.* Strategic behavior thrives in a circumstance, in which the actors are aware of each other and can mutually anticipate each other's behavior and react to it.
- *Strategic behavior has a time dimension.* A time dimension of strategic behavior is derived from its interactive character. Because of the bounded rationality, the actors can not fully anticipate other's behaviors and thus can not spell out everything in an arrangement (such like a contract), thus the arrangement need to be supplemented over time. Also, the moves and countermoves can not happen at the same time among the actors, but the countermoves would usually be after moves. And the actor would like to seek a "position" that is advantageous to him at the later stage.
- *Strategic behavior is unilaterally aimed at narrow self-interest.* The core of strategic behavior is that it serves the strategist's self-interest. It needs to clarify that not all the behaviors that serve self-interest are strategic behaviors, only when they harm to the public interest, they are regarded as strategic behaviors.
- *Strategic behavior is ambiguous.* As clarified in above, strategic behaviors have two interpretations. The first one is that the strategic behavior does not harm the public interest, and another one is that the strategic behavior serves the strategist's self-interest but at the expense of prejudicing the public interest.

- *Strategic behavior is intentional.* Known very well the ambiguity of the strategic behavior, the strategist emphasizes that his behavior poses no harm on the public interest and denies that the second interpretation is relevant.

These characteristics of strategic behavior manifest in government procurement projects in several ways. First, private enterprises have their *unilaterally narrow self-interest* of profit maximization, and the behaviors of private enterprises in pursuing their interests may harm public interests by delivering lower quality of service, reducing maintenance activities or increase service price in a hidden way. Second, because of strategic behaviors' *ambiguity* and *intention* private enterprises may argue that their behaviors in pursuing profit maximization do not harm on the public interest. Third, in the contract structuring process, behaviors both of the governments and the private enterprises are *reflexive* and *relational* because they have to negotiate with each other on project details such as project quality standard, project output specifications, project completion date, project costs, responsibilities and risks allocations and financing structure. They are reflexive and relational since they should take into account the other side's responses and act strategically in order to ensure their own objectives. Fourth, during the whole contractual period including the project implementation phase, since the contract is usually incomplete and both parties can not foresee all future contingencies when it was formulated, the contract needs further adjustment and changes in contractual terms over time. Therefore, it has a *time-dimension* character as well.

Apart from these characteristics, Laffont and Tirole (1998) in their book *A Theory of Incentives in Procurement and Regulation* defined two types of strategic behaviors in government procurement projects, adverse selection and moral hazard.

- *Adverse selection.* Adverse selection arises when the private enterprises possess more *exogenous* information than the governments such as their technological possibilities and project's actual costs, which enables them to extract a rent from its interaction with governments even if their bargaining power is poor. In government procurement projects, adverse selection is an *ex ante-contractual* strategic behavior which usually takes place in the tendering process and leads the governments to select a tender that is not optimal.
- *Moral hazard.* Moral hazard is a kind of *ex post-contractual* strategic behavior and refers to the *endogenous* variables of the private actors which can not be observed by governments. Private enterprises take discretionary actions such as reducing *efforts* which may influence project cost and quality. In government procurement projects, moral hazard usually happens during the process of project implementation, and thus necessary control such as monitoring by the government need to be enhanced, although this would incur the monitoring cost.

The presence of adverse selection and moral hazard and thus the accompanying loss of government control create a requirement for information gathering. In some countries both public enterprises and private enterprises are periodically subject to public audits. Audits can verify that costs are recorded inconsistent with the standard accounting procedures and no improprieties have been taken place within the enterprises.

Confronting with these strategic behaviors, we further explore their breeding grounds introduced by ten Heuvelhof et al. "Breeding grounds" constitute the "background" that the strategist is given the opportunity to display his (strategic) behaviors. They provide three breeding grounds in normal industries:

- *Fewness*

Fewness refers to two market competition results, *monopoly and oligopoly*, for strategic behaviors. Monopoly, the most obvious breeding ground for strategic behaviors, provides a firm a "comfortable position" to offer a product or service. Oligopoly, with a limited number of players in the market

competing among the few, is another breeding ground for strategic behaviors. In the oligopolistic market form, players (actors) are strongly competitive-oriented with their own utility functions, and by realizing the disadvantages of competing the market share individually, they usually compete and cooperate simultaneously. Therefore, this limited number of firms may together form a breeding ground for strategic behaviors.

The strategic behavior on the basis of “monopoly” is that the monopolist is the sole provider of a product or a service, which enables it to charge relatively higher price and thus to earn higher profits in a normal market. Although the monopolist realizes that the increase in the price would lose some customers, he still does that because the additional profits from charging the “right” higher price can compensate the loss of customers. In oligopolies, the strategic behavior is the temptation of colluding, such as the “cartel”, in which agreements are made among the limited competitors on the price and quantity of the product or service, there are also risks for the oligopolies that some of the competitors may treat others by privately breaking up the collusion and decreasing the price and increasing quantity, though.

In PPP projects, “fewness” will substantively reduce competition among providers and thus efficiency. In cases of monopoly, the service provider would strategically reduce service quality and increase charging price. And in cases of oligopoly, the few providers would collude with each other strategically in the tendering process in the way that they agree with each other upon winning bids in turn, or they would collude in setting the service price. In China, before 1980s the market for providing public service was monopolized by the state-owned enterprise, although it did not discretionally increase the service price, it has resulted in not only inefficiency, but also less accountability. Thus, China opened its market and let new entrants of private suppliers in. As a consequence, the dated state-owned enterprise manifested its weakness and lack of competitiveness in the fresh competitive market. Therefore, “fewness” is rather unfavorable for public service delivery and governments should regulate market entry on a competitive basis.

➤ *Position*

A strong (or good) position can provide the actors with “positional gains” derived from the strategic behavior, thus the actors aggressively make effort towards a “strong position”. Therefore, in this sense, a strong position or a change towards the strong position provides the breeding ground for the strategic behavior. As stated in the previous part, firms as monopolists or oligopolists occupy a strong position and wish to retain this position in order to have a range of strategic behaviors available, such as the prevention of new entries by displaying a creditable treat or signal. However, the government, competition authorities and regulators aim at introducing more competition in the market and thus would discourage the firms from changing towards those strong positions.

In PPP projects, changes of position toward a powerful and advantageous situation are desirable for service providers. As discussed above, changing positions toward monopoly or oligopoly offers opportunities for these providers exerting strategic behaviors both in the contract structuring process due to their strong bargaining powers and in the implementation process due to their market powers. Therefore, on the condition that governments should provide essential public services to customers, it is also necessary to formulate feasible and effective governmental regulations and legislations (such as on merger and acquisition) discouraging providers’ temptations and trials changing towards positions that can weaken governments’ control. Currently such regulations and legislations in China are still imperfect, and at present few private providers have enough power to challenge monopolistic position of state-owned enterprises.

➤ *Information asymmetry*

In the process of regulating the market, the government, authoritative and regulators may interfere into the companies based on their observations. However, as we analyzed in *agency theory*, the agent (i.e. the

private enterprise) possesses more information than the principal (i.e. the government) on how they perform the tasks and takes use of the asymmetric information to stealthily display strategic behaviors that are hard and costly for the principal to detect. As a consequence, agency costs increase in the forms of *residual loss, monitoring costs and bonding costs*. In addition, adverse selection and moral hazard have been induced as the consequences of asymmetric information, which have been analyzed in PPP projects previously.

To sum up, in this section we have analyzed strategic behaviors' characteristics, types and breeding grounds. The purpose is to thoroughly realize the properties of "strategic behavior" and its relations with PPPs and to further apply in chapter 5 in studying various government procurement models accompanying with strategic behaviors.

3.2 Monitoring and Incentives

Since it cannot be assumed that the agent will perform perfectly according to the contractual terms in agency theory, the principal will need some measures to ensure the agent's actions do not harm the principal's interests. The principal may attempt to monitor the agent's actions but a couple of problems have emerged. First, unless there is a clear physical product it may be difficult to judge whether or not the work has been done adequately or it has met the required quality level. In expressway PPP projects, quality monitoring is hard not only because these works are technically professionalized, but also because it is impossible to fully detect the project quality due to the concealed nature of some elements of the projects. Second, it may be rather costly to monitor contract performance during a long contractual period. The situation is even worse when the monitoring is needed in projects requiring technical and professional skills such as those under PPP schemes because it needs to employ monitoring staffs who also have a professional training and who are capable of assessing the work of the contact professionals (Walsh, 1995). Another effective means is to create a structure of positive incentives for the agent to perform. The stronger the incentives, the less needs there will be for monitoring. And sometimes monitoring and incentives need to be combined with each other together inducing the agent to comply with the contractual terms. In this section, we will explore the monitoring and incentive methods for projects under various procurement models and its purpose is to build up a theoretical foundation for the following research in chapter 5 on how to deal with strategic behaviors.

In chapter 2 several government procurement models have been identified. Because in different models transfers of responsibilities and risks are diverse, the demands for monitoring instruments and incentives are contingent on them. Table 9 shows the requirements for monitoring and incentives of different procurement models. Projects under all procurement models, even under BOO, need construction monitoring because governments need to ensure the project quality and thus public interest. For models of DBB, service contract, DB and DBO(M), cost incentives are required because the funds of these projects are directly from the public. And in other models cost incentives are not mandatory because the projects are privately financed and thus the private enterprises take their own responsibilities of cost overruns, although to some extent this will reduce the total social welfare. In addition, in order to ensure service quality during the operation phase, governments need to provide the private enterprises with incentives under the models of DBO(M), DBFO and BOO.

Table9: Monitoring and incentives of procurement models

	Cost incentives	Construction monitoring	Operation incentives
DBB	√	√	
Service Contract	√		√
DB	√	√	
DBO(M)	√	√	√
BOT		√	√
DBFO		√	√
BOO		√	√

3.2.1 Cost incentives

Cost incentives are required in the DBB, service contract, DB and DBO(M) models (If the projects under BOT and DBFO models are jointly financed by the government and the private contractor, then cost incentives are required as well.) and can be achieved through signing incentive contracts. The current available types of incentive contract consist of the *Fix-Price Incentive Contract* and the *Cost-Plus Incentive Contract* (figure 18). However, it is not always true that both these incentive contracts are applicable for government procurements of expressways. In below we will explore how “incentives” work in both types of contract and find out which one is more applicable for our research on expressways.

➤ Fixed-price incentive contract (FPIC)

A fixed-price incentive contract is a fixed-price contract that provides for adjusting profit and establishing the final contract price by application of a formula based on the relationship of total final negotiated cost to the total target cost. The final price is subject to a price ceiling, negotiated at the outset. The assumption of a degree of cost responsibility by the agent will provide a positive profit incentive for effective cost control and performance. The elements of fixed-price incentive mechanism consist of the target cost, the target fee and the share formula. The share formula is the most common way of inserting financial incentives into fixed-price contracts in the way that the share formula defines how to increase the fee to be gained by the agent resulting from the difference between the actual cost and the target cost. For instance, with a share formula of the order of 50/50 (principal/agent), the effect on the profit margin of the agent can be dramatic if there is a considerable variation between the actual and target cost. So this scale of share formula could be only used when the risk of cost overrun is low. If there is a high risk of cost overrun, then the scale can be changed to implement the 90/10 (principal/agent) while the incentive would be very weak.

➤ Cost-plus incentive contract (CPIC)

A cost-plus incentive contract is a cost-reimbursable contract that provides for the initially negotiated fee to be adjusted later by a formula based on the relationship of total actual costs to the total target costs. When the contract is completed, the fee paid to the agent is determined according to the “fee-adjustment” formula which provides, within limits, for increases in fee above the target fee if the total actual costs are less than the target costs, and decreases in fee below the target fee if the total actual costs exceed the target costs. Therefore, this “fee-adjustment” formula is intended to provide an incentive for the agent to manage the contract effectively and make cost saving. In the end, the agent is paid the total actual costs plus an increase or a decrease, within the maximum and minimum fees.

As can be compared from figure 18, FPIC provides more incentives than CPIC since under FPIC if actual costs exceed to a certain amount, then profits gained by the private contractor would be below zero but under CPIC there is at least a guarantee on the minimum fee. From this point, FPIC would be better than CPIC in providing incentives. Additionally, CPIC is usually applied in the situations with an experimental nature where the project outcomes are subject to substantive uncertainties such as

developing a new technology, while the FPIC is used in the circumstances where there are no essential uncertainties of the outcomes. In DBB, DB, DBO(M) models, outcomes of design and construction of expressways are relatively certain and thus a fixed-price character should be emphasized. Moreover, setting cost incentives in fixed price contracts may help the governments lessen the problem of adverse selection, but it may also increase the possibility of moral hazard during the ex post contracting period. So how to set the “share formula” is actually to balance the problems of adverse selection and moral hazard (Cohen and Loeb, 1989). Box 8 provides an example illustrating the application of FPIC in an expressway service contract.

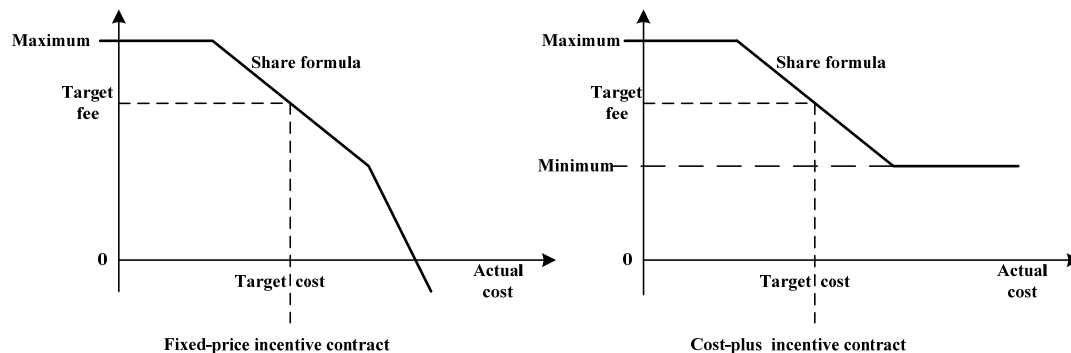


Figure18: Illustration on FPIC and CPIC

Box 8: Application of FPIC in service contract for Xinhui-Taishan-Yangjiang (X-T-Y) Expressway
(Source: Li, 2005)

The X-T-Y expressway is located in the west of Guangdong province, China, and its completion was in 2002, after which its operating right was transferred to Guangdong Western Inshore Expressway Operation Corporation (GWIEOC), a private expressway corporation, under the model of service contract by Guangdong Department of Communication. The Department benchmarked the required service against similar projects, studied the requested performance, and established the degree of risk and extent of the profit and saving that might accrue. In the contract, the monthly price was fixed and incentives for sharing savings were established with a 50/50 ratio. After 5 years in operation, the statistic shows that the saved operation costs per year had reached 6 million Yuan, compared with those expressways under operations of the government in western Guangdong. In addition, the saved yearly labor costs have been 22.2 million Yuan, also compared with those operated by the governmental staffs. In sum, the total saving is 28.2 million Yuan per year.

GWIEOC's achieved saving and efficiency have offered an extra value both to the corporation itself and to the public. Therefore, it has been concluded and certificated as a supplier with better performance and efficient service by the regional government as an extra “reputation” reward.

3.2.2 Construction monitoring

Construction monitoring is required in all procurement models. Monitoring is effective in ensuring project quality because the construction phase usually lasts a few years and concomitant monitoring will timely check out the project quality and schedule.

Table10: Transaction costs incurred by expressway construction monitoring in China (million Yuan)

Construction distance	20 km	40km	60 km	80 km	100km
Monitoring costs	4.32	8.64	12.96	17.28	21.60

Construction monitoring has become an international standard approach to oversee the actions of the constructor and evaluate the quality of the construction timely (Xinlong, 2003). The monitoring group may be a state-owned enterprise or a private enterprise employed by the government or the general contractor to supervise the constructor or sub-constructors. And the monitoring group is usually composed by multidisciplinary technical professionals, and thus hiring a monitoring group also means the increase in procurement transaction costs. However, this monitoring strategy has been demonstrated as the most effective one and in some countries construction is not allowed to start until the monitoring group is ready (He, 2002). Table 10 shows the transaction costs incurred by construction monitoring in expressway projects in China. And in box 9 is an example illustrating how construction monitoring works for expressway projects in normal circumstance and its accompanying incurred costs.

Box 9: Construction monitoring in Jing-Jin-Tang expressway

(Source: The Ministry of Communication; Tianjin Department of Communication)

The Jing-Jin-Tang expressway, running from Beijing through Tianjin to Tanggu, is the first expressway project in China adopting construction monitoring method under the DB model. It is also the first expressway that used the loans from the World Bank. The design-build contract was granted to a project company leagued by four private constructors from Beijing, Tianjin, Japan and France through invited tendering. The total length is 142.69 km and the total investment is 2.25 billion *Yuan*, among which 0.15 billion *US dollars* were from the World Bank.

At that time in late 1987, there are no domestic construction-monitoring groups (or enterprises). With the decision of using monitoring method during construction from the Ministry of Communication, the Ministry successfully invited 9 construction monitoring groups that have registered with the World Bank to attend the limited competitive tendering process. After tendering, a monitoring enterprise from Denmark, called COWI Group, was selected because of its advanced expertise in technology and project management and thus the entire monitoring group for this expressway was built up composing Jinshuo, the leader of highway section of the Ministry and some experts from national road research institutes. The transaction costs incurred by using this monitoring method were 29.6 million *Yuan*. Although the monitoring costs were substantial, during construction plenty of technical difficulties had been addressed by COWI and those domestic experts and this project was completed within both budget and schedule.

Since successful monitoring method during construction, lots of public and domestic private construction-monitoring enterprises have been built up. And from the experience gained from this project, the Ministry adjusted the regulations on expressway construction in 1988 stipulating that construction monitoring must be adopted and the selection of the monitoring group must be through competitive tendering.

3.2.3 Operation incentives

Operation incentives are demanded under the models of Service Contract, DBO(M), BOT, DBFO and BOO, as stated, because these models have included the “O & M” phases by private enterprises in the public service projects and governments need to ensure the service quality, service continuity and adequate maintenance to protect public interests from being harmed. Monitoring is unfavorable here because the operation phase will usually last 20 to 30 years. So the more effective means is to provide incentives for private operators (and maintainers).

One approach to control the behaviors of the agent during the ex post contractual period is to lay down the agreed rules in the form of written contracts, but writing long-term complete contracts and contract compliance are both problematic, as already discussed. In such cases, “*reputation*” that is based on the past behaviors is central to contracting (Parker and Hartley, 2002). A reputation may become a business

asset and may substitute for detailed contractual controls (Powell, 1990; Klein, 1997; Ranjay, 1998) and it is assumed that the more stable the supply market, the faster reputation-building will occur. Reputation may serve as a form of capital that can be used in competitive tendering when governments select long-term suppliers. Reputation-building may be not, however, conducive in low frequency of contracting and in some social and economic context of transaction (Lane, 1997) because of the underdeveloped legislative and regulatory environment.

In addition, Williamson (1996a; 1996b; 1998; 1999; 2008) has also acknowledged that contracting with private enterprises with good reputation may reduce ex post strategic behaviors and thus transaction costs, and thereby the “relational contracting” has been formulated that places more reliance on reputation, although threats of strategic behaviors still remain. Concretely speaking, the increase in the contract duration and complexity has progressively resulted in the displacement of the classical and neo-classical contract laws in favor of the relational contract law that is of a more thoroughly transaction-specific and ongoing-administrative characteristic. By contrast with other contract laws, where the reference point for adaptations remains the original contract, the reference point of relational contract law is the entire relation and reputation as it has developed over time. The “original contract” can be absent, and if there is an original contract, it may not be given much deference.

Moreover, in relational contracting, although the parties have their own appropriate profit streams, both parties feel the incentive to sustain the relationship rather than to break up the contract. During the ongoing administration, adaptations on quantity and adjustment on service price are permissible and should be proposed. Although not all these adjustments are strategy-oriented since some exogenous and verifiable events (such as the general economic conditions), the intentions of moral hazard can be detected and recognized by the accompanying proposals. Therefore, in order to continue the contractual relationship, contractors need to build up their reputation and thus act restricted in proposing strategic adaptations and adjustments.

The importance of reputation in relational contracting can be illustrated by introducing a UK example (Zheng, Roehrich and Lewis, 2008). In late 1990s, a hospital in UK was built under the DBFO model and the contractual relationship is a long term agreement with UK National Health Service (NHS) with concession period of 30 years. During the tendering process, the relationship between the public and the private was characterized as supplier-dominant because only two bidders attended and both partners had little experience with PPP procurement. For instance, NHS did not inform the private enterprise about the affordability problem that arose in early phase of the project, as a result of which the miscommunication led to time-consuming and costly re-design and renegotiation. In design and construction, the relationship was still characterized by a lack of reputation, and short-term oriented behaviors were common. For instance, the sub-constructor installed a cheaper hospital lift, which in short-term produced a cost-effectiveness but led to higher maintenance costs and service disruptions in the long run in the operation phase. This problem occurred because the contract did not specify the detailed requirements for selection of construction materials. However, once the contract entered into the operation and maintenance phases, both the contractor and NHS began realizing the previous problems and started working with a different approach. The awareness of benefits from a long term and collaborative relationship has been recognized. A more informal approach, reputation building, still in combination with contractual governance mechanisms, was applied as a more effective method in solving daily operation and maintenance difficulties. From the evidence of the 5-year benchmarking and market testing, this relational contracting with emphasis on reputation building did facilitate achieving objectives of the parties, but still, not full reputation has been developed because sharing information on life cycle costs was poor, which hindered further development of this “reputation” incentive approach.

However, reputation may not be sufficient for effective partnering and needs to be supplemented by other incentive instruments. Another available approach is to provide the contractors with *financial incentives* (Fumagalli, Garrone and Grilli, 2007). The financial incentive specifies service quality targets

and sets rewards and penalties for exceeding or failing to achieve these targets. Theoretically speaking, when the rewards or penalties exceed the costs and benefits of quality increase or decrease, the profit-maximizing operators will expend the service quality to the point where they can achieve the rewards. Usually, consumer surveys are preferred by regulators to collect information on service quality and their willingness to pay for the service. The schemes on how to calculate the magnitudes of the rewards and penalties depend on countries, and here is an example that Italy uses as their reward-penalty scheme in electricity and gas sectors (Fumagalli, Garrone and Grilli, 2007). The Italian reward-penalty scheme, designed by the Italian Regulatory Authority for Electricity and Gas (AEEG), is based on a mathematical formula composing basic indicators such as the average number of interruptions per customer per year and the average unavailability of the service supply per year. The indicators are measured separately in different regions in Italy, and in this way the regulators can take into account the exogenous factors such as regional economic development that will influence provider performance and different levels of service quality in various regions. At the beginning of the four-year regulatory period, the regulators set yearly improvement targets of service quality for each region, the baselines. These baselines have been designed so that greater improvements are required in the regions where the initial quality levels are low. When providers improve the quality than required, financial rewards are gained. In contrast, if they do not meet the requirement, they need to pay for penalties. And the rewards and penalties are proportional to the distance between the “measured” performance levels and the “target” levels. A fund, which comes from the penalties of the under-performing providers, has been set up and used to provide rewards for those providers who have good performance. This incentive scheme was successful in achieving the targets set by AEEG, and the average duration and numbers of interruption has been reduced especially in the regions where the initial quality levels were low at its beginning years. This scheme thus has been determined to be applied to following years with few adaptations.

3.3 A Framework

Currently, we have introduced the theory on different types of procurement model accompanying with their comparisons in chapter 2 and the agency theory that is applied in those procurement models in this chapter. These theoretical foundations will be further used in the following empirical researches in the context of China. In this section, before we go on to the empirical researches, in this section a framework is built up firstly aiming at directing the following researches. This framework consists of four levels with one deepening step for each level toward achieving our main research question defined in chapter 1 (figure 19).

➤ Level 1: Taken as given

This first level is the social embeddedness level where the informal institutions (such as norms, customs, traditions, religions) and degree of trust are located. Since such informal institutions and trust levels change slowly, requiring 100 to 1000 years, in this thesis, we do not aim at challenging them but take them as given. Although they are all non-calculative and always spontaneous and influence people’s behaviors in an informal way, degree of trust, passing through the formal institutional circumstance, much strongly relates to the following research on strategic behaviors in that a nation’s trust levels will affect how policies should be made by government to deal with strategic behaviors. Thus, in this given level of social embeddedness, we need to briefly introduce and clarify the trust levels in the context of China in order to better understand the following empirical research.

Definitions of trust abound, but with the essential of a psychological state comprising the intention to accept vulnerability based upon positive expectations of the behaviors of another. In the context of

project, trust is a disposition and attitude concerning the willingness to rely on the actions or behaviors of another party, under the circumstance of contractual and social obligations with the potential to collaboration (Smyth and Edkins, 2007). Thus, the concept of “trust levels” or “degrees of trust” can be defined as the extent or magnitude of the willingness to rely upon or to accept the vulnerability of the behaviors of other people or organizations. In China, trust levels are regarded as relatively lower compared with some countries such as German and Japan, argued by Francis Fukuyama in his book *Trust: the Social Virtues and the Creation of Prosperity*. The fundamental characteristic of the low trust levels of China is that trust ends up at the border of “family”. Within the “family”, actors trust each other, and if an actor outside the “family” wants to obtain trust from the “family”, then “Guanxi” (personal relations) plays a significant role. Thus, low levels of trust in the entire society are caused by the small scope of the “family”. The disadvantages of a nation with low trust levels include that transaction costs would be higher; reliability on institutions such as legislations and regulations would be lower; organizations would be inefficient; and corruption would be more.

Confronted with the given informal institutions and trust levels in China, in the following steps we will try to study the Chinese institutional context and strategic behaviors concerning PPPs.

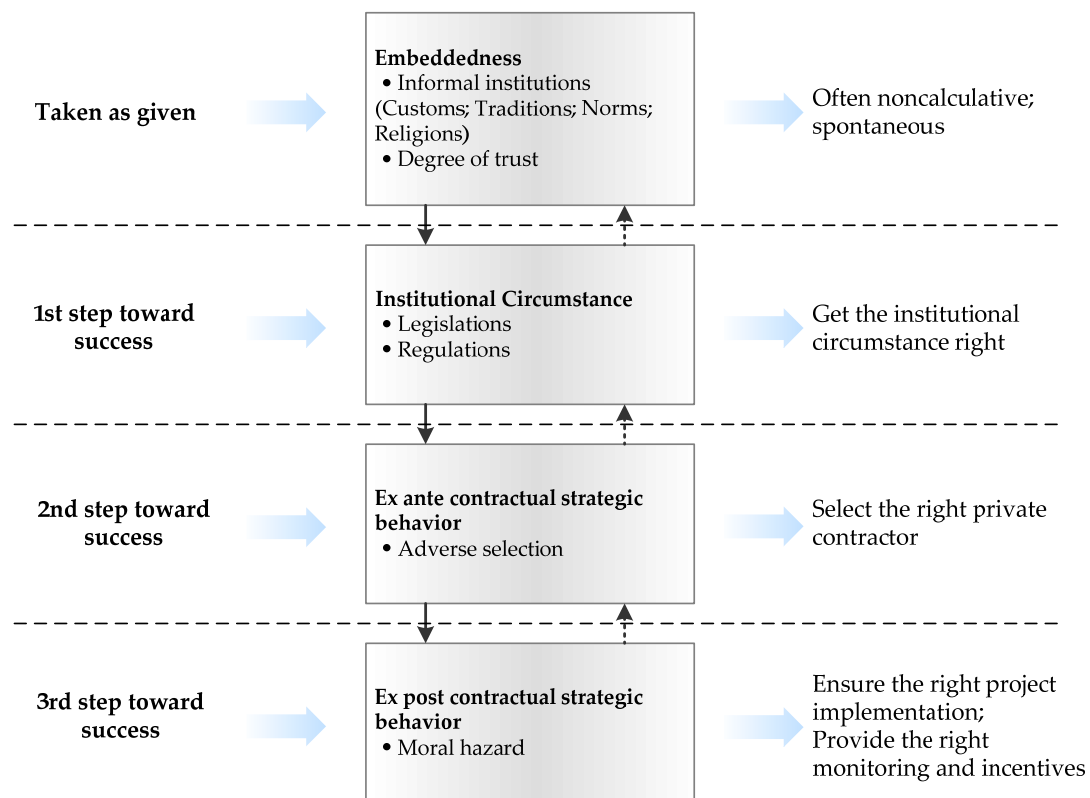


Figure19: Four-level framework

➤ Level 2: 1st step toward success

At level 2 is our first step toward success. This step aims at dealing with institutional circumstance including legislations and regulations. Since a well developed institution environment is much more favorable for successfully applying PPPs, we will first figure out the institutional preconditions for PPPs and then see what the Chinese institutional environment looks like. After comparisons between the preconditions and China’s current institutional circumstance, the deficiencies, gaps and limitations will

be detected, based on which recommendations will be put forward in order to get the institutional circumstance right. Thereby, in chapter 4, institutional preconditions, the Chinese institutional circumstance, comparisons, deficiencies and limitations will be discussed.

➤ Level 3: 2nd step toward success

Going on to the second step is to treat with the ex ante contractual strategic behavior, the adverse selection (sometimes automatic selection). When PPPs (other procurement models also included) enter into the tendering phase, governments face big challenges in selecting the optimal contractor due to the existence of adverse selection. In order to award the contract to the right private enterprise, in chapter 5 we will see what behaviors in tendering process will cause “adverse selection” according to various procurement models and then provide advices how to deal with them.

➤ Level 4: 3rd step toward success

Assume that the 2nd step has been achieved, we are still unable to ensure the success of PPPs because of the ex post contractual strategic behavior, the moral hazard. After the contract is awarded, during the phases of design, construction, operation and maintenance, the contractor would also exert strategic behaviors that are inconsistent with the clauses defined in the contract or they may shirk and display less effort in performing the tasks. In order to ensure the right implementation of the project, also in chapter 5, we will detect what kinds of strategic behaviors will emerge in different models, based on which appropriate monitoring instruments and incentive schemes will be brought forward dealing with them.

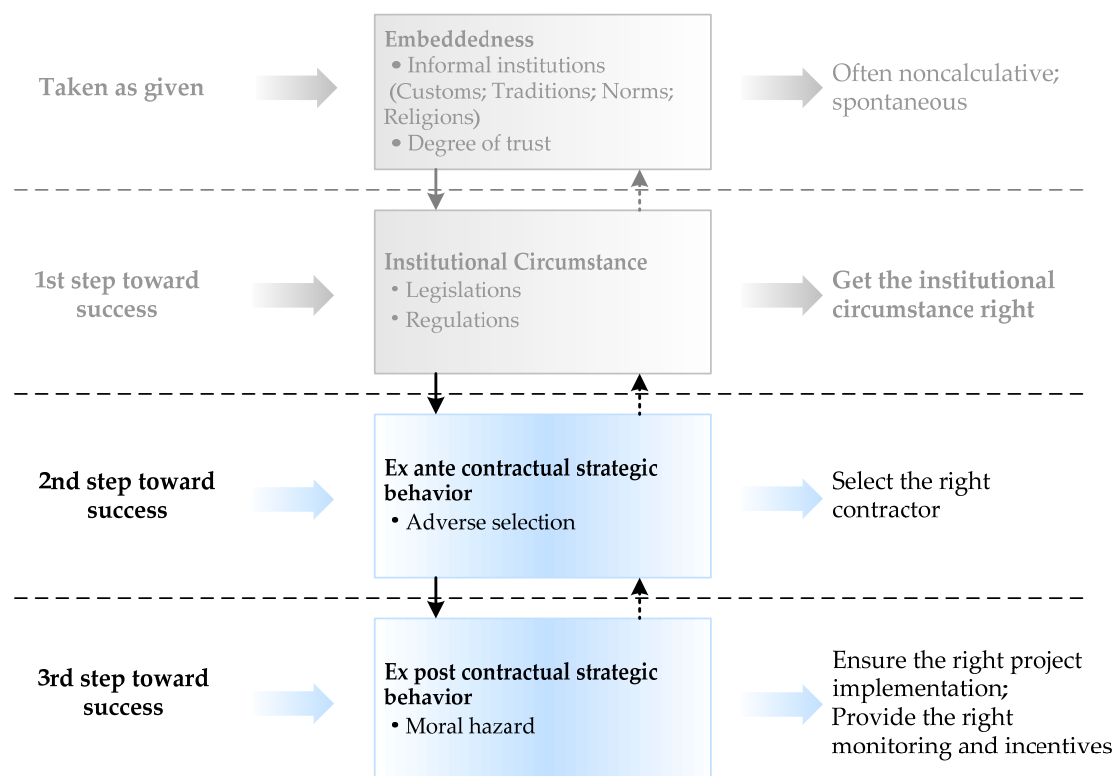
Therefore, taking together strategic behaviors both in ex ante contracting and in ex post contracting processes, in chapter 5 we will formulate predictions about the success and failure of different procurement models because they compose different types of strategic behaviors, and find out solutions for how to deal with them.

Throughout this framework, aiming at achieving the successful application of PPPs in China's expressways, we will help Chinese governments get the institutional environment right, select the optimal contractor and ensure the right implementation of the project. In addition, in chapter 6, several case studies will be carried out in order to supplement and enrich the previous research. Finally, in chapter 7 we will summarize the findings and give the conclusions.

SECTION III

This section composes three chapters 4, 5, and 6 which present the empirical researches in China. In chapter 4, the institutional preconditions for China's application of PPP in expressway sector are drawn. In chapter 5, PPP options are combined with their accompanying strategic behaviors and the recommendations on dealing with them. In chapter 6, real cases of China's expressway using PPPs are studied.

CHAPTER 4 INSTITUTIONAL PRECONDITIONS, CIRCUMSTANCE, AND LIMITATIONS FOR CHINA'S INNOVATIVE PROCUREMENT MODELS



In late chapter 3, a framework directing the empirical research has been built up. Given the informal institutions at the first level, at the second level we intent to get the formal institutional circumstance right for China to apply innovative procurement models in expressways as the first step toward success, including legislations and regulations.

Research of this chapter has been assembled through interviews with government officials, academicians, experts, consultancies, and bankers, together with the review of primary project documentation and other written materials that are provided by the interviewees. Generally speaking, China has made impressive progress in developing its legislations and regulations in recent years, but the institutional circumstance sometimes still acts as obstacles or bottlenecks for the innovative

procurement models and thus restricts their favorable applications. In this chapter we will examine what institutions are prerequisites for favorably applying the innovative procurement models for expressways with clarifying in advance how the innovative models are distinguished from the conventional ones. And then, based on the institutional preconditions that have been defined, we will see what the limitations of China's current institutional circumstance are and which kind of procurement model will be more appreciate and more favorably applicable for China.

4.1 The dividing line between the conventional and the innovative procurement models in China

Before 1978 when the "open door" policy was brought forward, working elements of roads (expressways did not appear yet) including design, construction, operation and maintenance were assigned separately to the state-owned enterprises (SoE), which is regarded as the most thoroughly conventional approach by Chinese academicians (Zhang, 2005). From 1978 to the late 20th century, along with a series of institutional reforms and policies being put forward, the elements of design and construction were transferred to private enterprises (PE) by the governments in a separate or an integrated way through tendering, known as the DBB model and the DB model. Since late 20th century, confronting big challenges of extending the expressway network with fiscal pressure, private financing for expressways has been attractive for the Chinese governments and therefore, two innovative procurement models have emerged, BOT and TOT (transfer-operate-transfer), especially in southern China. The BOT model was first created by foreign countries and was transplanted into China, while the TOT model was first created by China. *Compared with the conventional approaches, we can see that the dividing line that distinguishes the innovative approaches is that whether the private capital is involved in expressways.* As for the DBO(M), DBFO and BOO models that we have discussed in chapter 2, currently they do not appear in China in the field of expressways. In this chapter, we only focus on BOT and TOT.

➤ BOT

The BOT model has been generally discussed in chapter 2, and here the Chinese BOT structure is illustrated in figure 20. The conception (and design) of an expressway project is done by the regional or local government and is then approved by the central government. After project approvals, the construction responsibility is transferred to a granted private enterprise through tendering process with normally 30-year (the concession period) operating right and charging tolls in order to recover its initial investment. When the concession is expired, the operating right is transferred back to the government. The financing structure for Chinese BOT is that usually 30% comes from the governments at the central and regional levels, 65% comes from the domestic banks (that lend money to the granted PE), and another 5% is from foreign banks and the granted PE itself, data coming from the officials of China's Research Institute of Road Transportation Development (Beijing). With the granted concession, the PE may employ a consultancy firm to estimate the project benefit and cost and buy insurance for project construction. The granted PE may separately contract with other constructor, supervisor, operator and maintainer as subcontractors. The significance of BOT for China includes that, first, it can fill the gaps of public budgets and speed up the expressway development; and second, it alleviates the debts of the SoE; third, competition leads to more efficiency and clear procedures of the model brings higher transparency; finally it may attract foreign investment in expressways and encourages the adoption of foreign advanced expertise in design, construction and management.

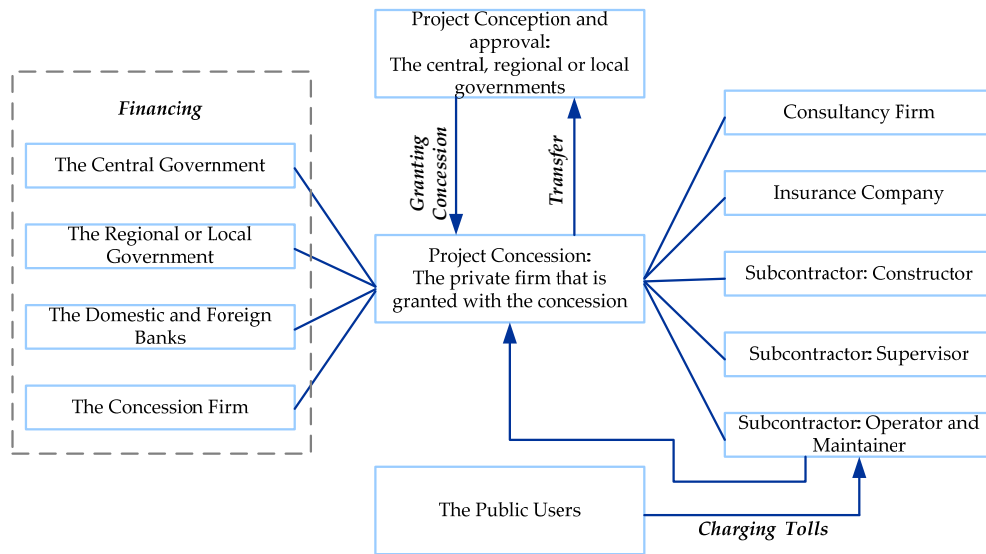


Figure20: BOT structure in China

➤ TOT

The TOT model is new in the thesis and has not been analyzed in chapter 2 as a PPP option, because TOT model is not worldwide commonly used but only applied in China. The TOT model is described in figure 21. It is often used for existent (or old) projects in order to raise money for new expressway projects. The government transfers the operating right of these old projects to the private operator at a certain price (remaining the ownership) and during the concession period, the private operator can charge tolls to return its investment in buying the operating right. After the contractual (or concession) period, the operating right is then transferred back to the government. The money paid by the private operator for the operating right is lump sum and then used by the government to develop new expressways. Therefore, the advantage of this approach for the government is that it needs not to wait for the return of the initial construction investment through operating the expressway itself, while it can obtain money as soon as the operating right is transferred. This is a special method of using private capital and it also benefits from private operator's expertise in operating and maintaining expressways. The disadvantage would be that it is difficult for the government to intervene and fully supervise the operating process and thus needs to structure incentive schemes to ensure adequate service quality and maintenance.

TOT is distinguished from service contract in several aspects. First, the contract period for TOT is usually around 20 years while for service contract it is usually no more than 10 years. And it is rare under TOT to change private contractor during the whole charging period while the contractor under service contract can be changed for others when its contract with government is expiring. So under service contract government can contract with several private actors during the charging period. Second, expressways under TOT are a kind of privatized toll roads, under which the revenue from tolls belongs to the private contractor (to recover its initial lump sum payment for buying the operating right). But expressways under service contract are a kind of public toll roads, under which the revenue from tolls belongs to government who invests the expressway. For the private actors under service contract, they are just employed by government to provide services such as toll collection and maintenance. And such of their work are paid by government periodically. Third, the transfer of risks under TOT emphasizes the market risks, that is to say, the TOT private actor will take the risks of toll revenues to a large extent, while under service contract the market risks remain in the government.

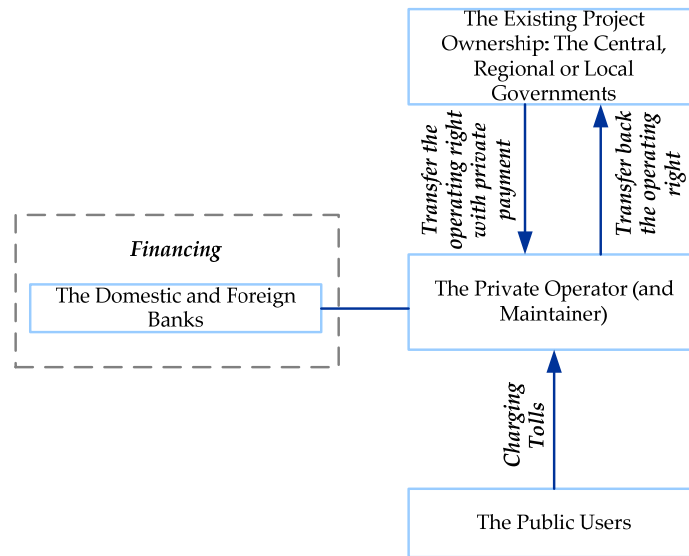


Figure21: TOT structure for existent projects in China

When projects are green-field ones, TOT can still be used but combining with the DB model (TOT+DB), according to China's current practice. The structure is shown in figure 22. The expressway is designed and constructed under the DB model. When the project is completed, its operating right is transferred to a private operator with lump sum payment. Then the government can use this money to repay debts from bank loans when it invested during project construction. Thus, public debt is filled by private debt (because the lump sum payment of the private operator is also from bank loans). This method of combining DB and TOT for green-field expressways frees government from public debts and thus fiscal pressure as soon as the operating right is "sold", but somebody may give rise to the question-then why government does not solely use BOT as the procurement model for new expressways? We will give the answer in the end of chapter 5, while in this chapter we focus on their institutional preconditions.

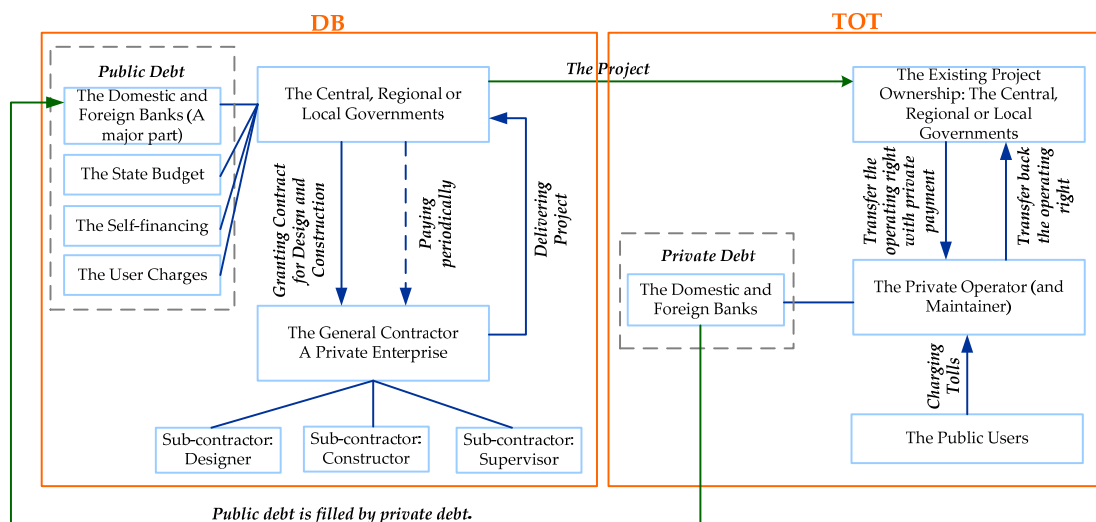


Figure22: TOT structure for green-field projects in China

4.2 Institutional preconditions for BOT and TOT

The establishments of appropriate and effective institutional frameworks for BOT and TOT are prerequisite to create an environment that fosters private investment in public infrastructure. Even for the countries where such an institutional environment already existed, it is important to ensure that the laws are sufficiently flexible and responsive to keep pace with the developments in various infrastructure sectors, especially in China where such an institutional circumstance is still incomplete and some relevant laws have not been established yet. This section presents the institutional preconditions for both BOT and TOT in order to see in the next section what are institutional gaps (or deficiencies) and limitations for China to adopt the innovative procurement models.

4.2.1 Transparency law

Transparency law in the field of public procurement refers to the mechanism aiming at preventing corruption. The underlying logic is that the possibility of monitoring the public sector would reduce the incentives to engage in corrupt practices, and thus this would lead to a better public sector output and improve the interactions with the public sector by private enterprises and thus a better business and investment environment could be built up, revealed by the World Bank Enterprise Surveys (Djankov, 2007). Therefore, the transparency law may ensure that the institutional environment is guaranteed by clear and readily accessible rules and by efficient procedures for their applications. In addition, it should create predictability of the administrative procedures and thus enable potential investors to estimate their benefits, costs and risks of the investment (United Nations Commission on International Trade Law, 2001). The purpose of establishing transparency law is thus to guard against corrupt actions or arbitrary decisions by government authorities and to help build up a confident institutional environment for public procurement and private investment.

The transparency law is a prerequisite for both BOT and TOT because both models require the selection of the private concessionaire (under BOT) and the private operator (under TOT) through competitive tendering procedures. When the tendering procedures and evaluation criteria are either not clearly established or are based on subjective judgments, corruption may emerge and potential bidders will be unprotected against arbitrary treatment and may be faced with transaction cost increase due to the extra money spent on bribery. As a consequence, such a tendering process subject to corruption will discourage potential bidders from submitting the actual offers and hereby adverse selection may occur (European International Contractors, 2003). Furthermore, even if the right bidder is selected, during the operation process corruption may occur because some government officials who accept the bribery from the operator may turn a blind eye on the level of service quality. As a result, moral hazard would be nourished.

Therefore, the transparency law may act as a cure for corruption during the procurement process and reduce opportunities for corruptive actions. In China, however, the transparency law is currently an ongoing research which has not been formally established yet, and corruption is not restricted only to "bribery", other corruptive crimes also exist such as discretionary decisions on putting forward projects, sacrificing state assets or transferring state assets to personal belongings.

4.2.2 PPP regulations

Apart from the transparency law, a broad spectrum of PPP regulations is pre-requested for BOT and TOT projects. United Nations Commission on International Trade Law; the European Commission; the European International Contractors; and the World Bank revealed the following regulations that are pre-required for projects under PPPs (2001; 2002; 2003; 2006).

- Regulation on tariff

Many countries have only set broad tariff principals in their legislation framework while leaving their actual implementation to the regulatory agency because the formulas for tariff are sector specific and may require adaptations during the life cycle of the project. Typically, the tariff formula is required to be advised by the bidders in their proposals that will be incorporated into the project contract. The most common tariff regulation methods consist of the rate-of-return regulation and the price-cap regulation.

Both regulatory approaches are used by regulators to prevent infrastructure service providers from charging excessively high prices. Under the rate of return regulation, regulators fix the rate of return that the supplier can earn on the infrastructure by adjusting the price to be charged. Under the price cap regulation, the regulated price is subject to a ceiling which needs to be periodically reviewed and is adjusted by the changes of inflation rate every year and regardless of the supplier's profits. The price cap regulation subjects the supplier to more risks because if the costs rise, its profits will fall considering that the price is not allowed to rise to compensate for cost increase until the next review. The rate of return regulation provides the supplier a cost-compensation price and thus its profits will not change too much. However, if the costs of the supplier are reduced, then price cap regulation is more advantageous to the supplier than rate of return regulation because it can retain the resulting benefits as profits. Therefore, consumers under rate of return regulation bear some of the risks that the supplier would bear under price cap regulation. And the supplier under price cap regulation has a stronger incentive to reduce its costs than that under the rate of return regulation, but its assuming of more risks would also tend to increase its costs. In addition, regulators under rate of return need to balance the trade-offs between the level of the rate-of-return which will influence the willingness of private investment and the risks that the consumers need to bear. For the regulators using price cap, they also need to consider carefully the level of the price cap because suppliers under this approach are subject to greater risks and if they suffer profit losses, then the quality of the service would also suffer (Ian and Irwin, 1996).

➤ Regulation on performance standards

Public service providers generally have to meet a set of technical and service standards, which are in most cases too detailed to figure in laws and may be incorporated in regulations or instruments. Service standards are usually spelled out in the project contract, including the service quality (such as the frequency of maintenance; the number of complaints; etc.), safety and environmental issues. Actually, the laws (or legislations) may set the general principals that can guide the regulations to be established. Monitoring on the performance of the concessionaire is done by the regulatory authority, while the concessionaire will be interested in avoiding as much as possible any interruption in the operating process of the infrastructure and will need to ensure that the monitoring will not cause any undue disturbance in operation and thus additional costs.

➤ Regulation on extension of services

The private operator under a governmental concession to provide services to the public in a community or in a region is held to assume an obligation to provide the service system that is adequate to meet the demand of the region. This implies that the operator needs to extend the service system keeping pace with the growth of the region served. In some legal systems, this obligation has the nature of a public duty (duty of the governments) and in others, this may be an obligation that is involved in the contractual agreement enforced by the regulatory authority. For expressways, extensions are not easy and depend on various factors including the costs of the extension; the concessionaire's financial status; and the public's interest in such an extension. Extensions for expressways may be increasing the length of the expressway to other cities, or connecting with other roads surrounding the expressway. The costs of carrying extensions may be absorbed by the concessionaire, and then passed on to the end users in the form of a tariff increase, or by means of subsidies and grants by the authority. Therefore, given the complicated factors in service extension, project contract should define the circumstance under which extensions are required and the appropriate method for financing such extensions.

➤ Regulation on continuity of service

Another obligation of the operator is to ensure the continuous provision of the service. In some legal system, this obligation has a nature of statutory duty even if this is not spelled out in the project contract, under the general principals of contract law. But regulations are still needed to define the circumstances under which the concessionaire may discontinue the service, such as economic hardship or changes in public policies. Moreover, in other legal systems, it is held that a public service provider may not be required to operate where its overall operation results in a loss. However, this termination typically requires the consent of the regulatory authority or a judicial decision.

Such regulations are required for BOT and TOT because both models involve “O & M” phases, during which the ex post contractual strategic behaviors (i.e. moral hazard) may emerge, as we have discussed in chapter 3. In China, PPP regulations have different emphases from what has been presented above, focusing on project approval and issuing loans from state-owned banks.

4.2.3 Intellectual property right law

Private participation in infrastructure under BOT usually involves the use of new and advanced technologies in construction protected under patents or property rights, and the private enterprises may also formulate and submit their original and innovative solutions and ideas which may be the proprietary information under the intellectual property right protection. Therefore, the private enterprises, both domestic and international, need to be assured that their intellectual property rights will be protected when they bring them to the project country. And they also need to enforce those rights against infringements, which may require the enactment or enhancement of property right law. However, if protection of such innovative and advanced solutions and technologies can not be guaranteed, then the bidders will be discouraged from offering them due to the risk of “theft of ideas” and loss of the time and resources that have been invested in those ideas without compensation.

4.2.4 Property law

Property law is the area of law that governs various forms of ownership in real property and in personal property. For projects under BOT, it is desirable for the property law of project host country to contain adequate provisions on the ownership and use of the land, because where the new roads are to be built, land is needed. In some countries, the ownership of the land is private, so the concessionaire needs clear proof that the land will not be subject to dispute. In countries where the land is public, it is also necessary to provide effective provisions for the enforcement of the property and possessory rights granted to the contractor. In addition, for the projects using the BOT model, the ownership of the infrastructure is the government, so property law should clarify how the granted private enterprise can use the infrastructure during the concession period and transfer the operating right to subcontractors.

4.2.5 Competition law

Competition exists in BOT and TOT when the bidders compete for the contract to construct or operate the project. Usually, the winner of the tendering process is determined by fair competition based on selection criteria such as the lowest rational bidding price, the lowest charging price, or the shortest operating period. As a result, the competition among bidders can ensure higher efficiency with lower investment costs. If fair competition can not be guaranteed, some potential bidders (such as some small private enterprises) have few opportunities to compete in a market economy. Competition law deals with practices that prohibit free competition among the private enterprises. Also, it bans the behavior by a firm dominating a market and the practices that tend to lead to such a dominant position. Therefore, the competition law is required to protect private enterprises and is regarded as a way to provide better public service.

4.2.6 Private contract law

The law governing private contracts plays an important role for the granted contractor that needs to contract with subcontractors, suppliers and other private parties, as BOT and TOT. The private contract law can provide solutions to the need of the contracting parties on how to construct and operate the infrastructure by subcontractors. Apart from some essential elements of contract law, such as the recognition of party autonomy; judicial enforceability of contract obligations; and sufficient terms for the breach of contract, the private contract law may create a favorable environment for privately financed projects by facilitating contractual arrangements likely to be used in those projects. Where new projects are to be constructed, the granted private enterprise needs to purchase large amount of raw materials and equipment. Greater legal certainty for such transactions will also ensure obtaining materials and equipment. Therefore, either from the perspective of subcontracting or from the view point of buying materials, the private contract law is preferable to form a legal-guaranteed environment for private enterprises.

4.2.7 Company law

For most of the new projects that use BOT, the project promoters (in China it is the government at central or regional levels) will establish a project company as a separate legal entity. It is thus particularly important for the government to have adequate company laws dealing with essential matters such as establishment procedures; corporate governance; issuance of shares; transfer of operating rights; financial statements; and the protection of minority stakeholders. Regardless of the types of company, a common characteristic is that the granted private enterprise will require the limited liability if the project company will offer shares to the public or other investors. Thus the company law is needed in order to clarify the limitation of liability for the granted private enterprise and govern (or facilitate) the project company to issue bonds or other securities that help the financing of project. Furthermore, the law should have provisions aiming at addressing conflicts of interests in corporate governance, which is relevant for infrastructure projects under BOT because in some countries the granted private enterprise has the freedom to select its subcontractors (such as in China), which may favor the interests of the private enterprise to use “cheaper” subcontractors but sacrifice the interest of the public due to their non-qualification. However in other countries, the freedom of selecting subcontractors is restricted by the government in the way that when bidders submit their tendering documents, they should identify which subcontractors they will contract with, including the information on their technological capacity and financial standing. Therefore, provisions of the company law are required in order to avoid potential disputes between the government and the granted private enterprise, and to ensure the successful implementation of the project company and thus the public interest.

These laws are prerequisite for projects under BOT and some for TOT because the functions of these supportive legislations are to ensure the right legal environment for dealing with various aspects of project construction and operation, including fair competition and intellectual property right protection during the tendering process, land use for construction, sub-contracting issues, buying construction materials and the limited liabilities of the contractor. However, it is necessary for these laws and regulations to be enforced and strengthened by an independent judiciary for effective PPPs. And the prerequisite laws and regulations that are needed for BOT are also required for green-field projects using TOT because it combines DB process in the preceding phase of operation.

4.2.8 An independent judiciary

Apart from the above laws and regulations relevant for PPP, an independent judiciary is needed for its effective application. The judiciary system, composed by courts which administer justice in the name of the state, is a mechanism for resolution of disputes. The partnership between government and private actors needs such a judiciary that should be independent of the state. This means the judiciary should make fair arbitrations and cannot be influenced by politicians in protecting interests of both the public

and the private actors. Thus an independent judiciary can improve public sector management and consequently a favorable environment for PPPs. In addition, an independent judiciary is able to effectively enforce and strengthen the executions of laws and regulations. Withdrawing a judiciary system from a country's public sector, laws and regulations are meaningless and non-operational. In this thesis, we did not analyze deeply the role of judiciary, but an independent judiciary system is still recognized as a precondition for effective PPPs.

In the next section, we will analyze China's current institutional context with the purpose of comparing it with the preconditions that have been discussed in this section.

4.3 China's current institutional context

China's existing institutional circumstance for expressway projects under the innovative approaches includes the discussions on regulations on approval; finance; risk management and governance, and introductions on the legislations and other regulations on which their applications rely.

4.3.1 PPP regulations in China

4.3.1.1 Regulation on approvals

The approval process for expressway projects in China is a confusing, frustrating and time-consuming (usually 18~36 months) experience because private participation in Chinese public infrastructures is still at its initial stage. Generally speaking, the Chinese approval process runs through the project, but concentrates on the preparation and "ex ante" evaluation phases. And it has three stages: project approval, private enterprise approval and operational approval.

➤ Project approval

Project approval applies to BOT projects. Before getting approval, some documents need to be prepared, including the *feasibility study report* and the *project proposal*. In China, the expressway administration adopts the decentralized governance style, so expressway projects are usually brought forward by Provincial Department of Communications (PDoC). Then the PDoC will commit the feasibility study of the conceived project to the appointed Provincial Road Planning and Design Institute (PRPDI). If the project is approved to be feasible by the PRPDI, then the project proposal will be worked out and submitted to the national government, as we see below.

State Development Planning Commission (SDPC) approval is required for expressway projects with investment exceeding 240 million Yuan and State Council (SC) approval is required for those exceeding 800 million Yuan and those that involve foreign capital. *Expressways that apply BOT model must have approvals from SDPC*. If the expressway project involves foreign financing, then it needs two other important approvals. The first is from the State Administration of Foreign Exchange (SAFE). Before granting the approvals for currency conversion and profit remittance, the SAFE must ensure that the financing terms are competitive, that is to say, the SAFE concerns that the financing terms should be negotiated by the parties and be addressed through market by competitive tendering. The second approval coming from banks is required to guarantee financial standing of the project, which is also needed for the domestic private financing. Behind each of the main approval steps are many smaller approvals, consultations and fillings with various government agencies. Figure 23 shows the basic structure of the approval process for a BOT expressway project.

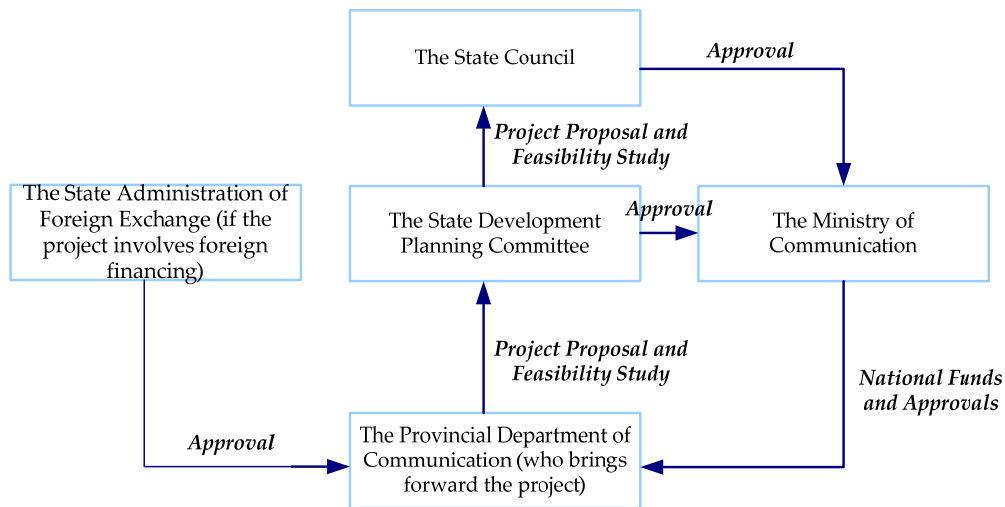


Figure23: Expressway project approval process using BOT model

➤ Private enterprise approval

After required approvals are all ready, the PDoC will commit the Provincial Tendering Committee (PTC) to organize the tendering process to granting the contract (figure 24). Both BOT and TOT projects require private enterprise approval because it needs to select the right private constructor (also the operator and maintainer) under BOT and the right private operator under TOT. The criterion, on which the contractor is selected, differs from project to project, generally including the rational lowest bidding price; the lowest charging price; and the shortest operating period. Box 10 is an example illustrating the private enterprise approval under BOT using the shortest operating period as the criterion.

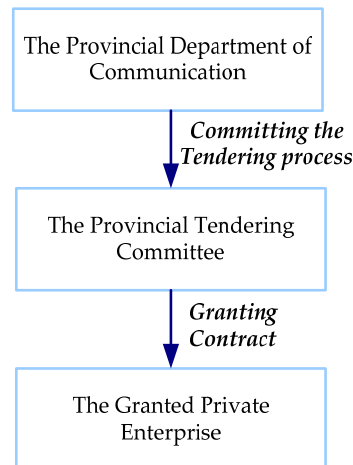


Figure24: Private enterprise approval

Box 10: Sichuan Le-Yi expressway: Private enterprise approval
(Source: the Ministry of Communication)

The Le-Yi expressway (from Leshan to Yibin) is the first expressway project using BOT model in Sichuan province with the total length of 138 km and total investment of 5.98 billion Yuan. The private contractor was selected through competitive tendering. What made this tendering different from others is that it applied the selection criterion of the shortest operating period. And it is also the first project using this criterion without experience from previous ones. The purpose of the tendering

authority is to shorten the period of charging users and thus protect the interest of the public users and prevent the private contractor from making excessive profits. In addition, it would provide incentives for the contractor to reduce costs both during construction and during operation phases because it limits the charging period.

In 2006, the Shandong Expressway Group Corporation, a private enterprise running construction and operation of expressways, won the bid at the shortest operating period of 27 years and 286 days with the price cap regulation in the contract. At present this expressway is under construction and planned to be completed in 2010. Although this shortest operating period will bring benefits for users, it still has potential risks of moral hazard while its operation after 2010 because the contractor will have the motivation to reduce its operating costs.

➤ Operational approval

Operational approval is the last approval process required for BOT projects. After one private enterprise is granted with the contract, the contractor will get additional approvals to start construction. In addition to SDPC, a wide range of ministries, bureaus and commissions and agencies are involved in granting the operational approvals, including the relevant line ministries and authorities responsible for safety, planning, land use and environment (figure 25).

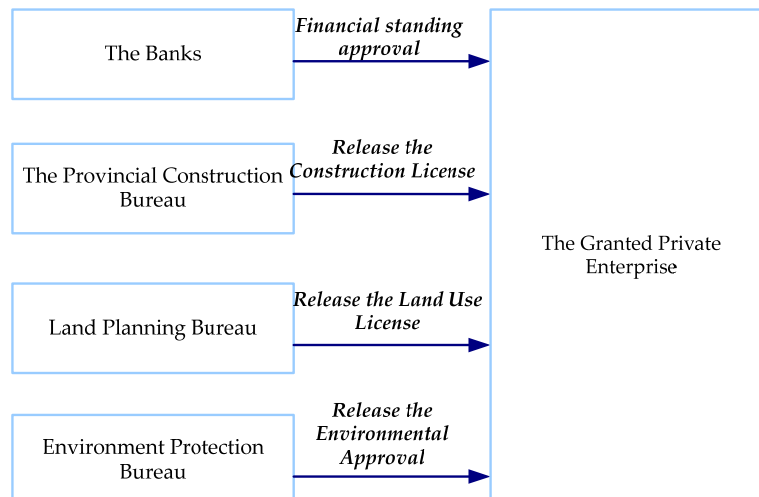


Figure25: Operational approval

4.3.1.2 Regulation on financing

Expressway projects have high requirement of investment costs to make profits over the long run. In chapter 1, we have mentioned the “earmarked user charge” as one component of expressway financing, but it is only a small part (10%). 70% financing comes from loans of domestic banks. The detailed financing structure is shown in table 11. The difference in project financing between BOT and TOT is that under BOT the 70% domestic loans are borrowed by the granted private enterprise, while under TOT these loans are initially borrowed by the state at the stages of design and construction, and after selecting the private operator, these loans are repaid to the banks by the state using the lump sum payment of the operating right from the selected operator who borrows the payment from these domestic banks as well. Actually, under TOT the private operator may help the state repay the public debts immediately as the operating right is transferred. And the long term responsibilities of charging tolls and thus paying back loans are transferred to the private operator.

As we can see, domestic loans constitute a large part of the financing. To further understand and explore the problems during lending, officials from Agriculture Bank of China and Communication Bank of

China have been interviewed in this research. The loans from the Agriculture Bank of China for expressways are shown in table 12. The lending amount in 2007 has reached 129.142 billion Yuan, and compared with 2000, the amount has increased 99.79 billion Yuan and the increase rate has reached 339.9%. The lending from other domestic banks is shown in table 13.

Confronting such amount of money issued to projects, even though pledges and mortgages from the contractors are required, there are also serious problems of non-performing loans (or dead loans) which mean that the loans cannot be returned. In China, the top four provinces that have non-performing loans for expressway projects are listed in table 14. And box 11 shows a series of reasons for these non-performing loans.

Table11: Financing structure of average expressway project in China
(Source: The Ministry of Communication)

Financing Source	Component
State budget (including national and regional budget) 15%	<ul style="list-style-type: none"> ➤ National non-profitable fund ➤ National debt ➤ Regional budget
Loans from domestic banks 70%	Banks that lend money to private contractors: <ul style="list-style-type: none"> ➤ Industrial and Commercial Bank of China ➤ Agriculture Bank of China ➤ Bank of China ➤ Construction bank of China ➤ Communication Bank of China
User charge 10%	<ul style="list-style-type: none"> ➤ Road maintenance fee comes from the Provincial Department of Communication ➤ Vehicle purchase fee comes from the Ministry of Communication
Others 5%	<ul style="list-style-type: none"> ➤ Loans from foreign banks ➤ Foreign investment ➤ Self-financing

Table12: Lending from Agriculture Bank of China
(Source: Agriculture Bank of China)

Year	2000	2003	2004	2005	2006	2007
Lend (billion Yuan)	29.352	57.913	84.234	93.892	116.714	129.142
Increase compared with 2000	-	28.561	54.882	64.540	87.389	99.790
Increase rate compared with 2000	-	97.31%	187%	220%	297.73%	339.9%

Table13: Lending from other banks
(Source: Communication Bank of China)

Banks	Lending in 2007 (billion Yuan)
Industrial and Commercial Bank of China	298.990
Bank of China	88.710
Construction bank of China	207.465
Communication Bank of China	39.066

Table14: Top four provinces with non-performing loans
(Source: Agriculture Bank of China)

Province	Total Loan (billion Yuan)	Non-performing loans	Percentage
Hei Longjiang	15.60	14.77	94.66%
Sichuan	27.45	14.74	53.70%
Hebei	90.41	11.19	12.38%
Henan	142.38	7.77	5.46%
Total	275.84	48.47	19.94%

Box 11: Reasons for non-performing loans of expressways (Source: Agriculture Bank of China)

- *Lack of effective expressway loans.* Influenced by the conventional approaches used by expressway projects, it starts late for banks to provide loans to privately financed projects and lacks of experience in issuing effective loans. For one thing, sometimes loans are issued to the project where the regional economy is underdeveloped and thus due to the disappointing performance of the profitability of the expressway, the loans can not be repaid. For another thing, many of the loans have been issued to the private contractors that have relatively small market share in the expressway business and thus it is hard to make profits.
- *Serious competition between banks.* Currently, banks in China are competing for those expressway projects that have excellent estimated performance (or demands) and that are operated by the private contractor who has larger market share. Therefore, banks loose their lending policy in order to attract those private contractors. As a result, it affects the quality and effectiveness of the loans.
- *Single source of the repayment.* Currently, the repayment only comes from the single source of the tolls in China, which increases the risk of non-performing loans because once the tolls are insufficient for repayment, return of the loans will be delayed.
- *Intra-bank administrative problem.* Generally speaking, China's state-owned banks lack research in the expressway business and expressway loans. For instance, it lacks the administration on entry for loans, and "ex ante" evaluation on risks is inadequate. In addition, it is hard to monitor the use of the loans and "ex post" administration on loans can not be carried out because the provincial departments of communication usually do not cooperate with the banks to obtain the accounting data of private contractors.

4.3.1.3 Regulation on tariff

Tariff regulation on expressways in China is included in the Law on Highways and the Administration Ordinance of Toll Roads (see box 12). And the tariffs are different according to various provinces. Rate of return regulation was originally applied in China's expressways, but because of the lack of incentives to reduce operating costs, many provinces are now turning to the price cap regulation. However, no matter what regulation methods are used, the Chinese governments are facing the challenge of setting the optimal rate-of-return and price ceiling, since the governments need to balance the tradeoffs between providing cost reduction incentives and ensuring public interests. In addition, setting the optimal rate and ceiling needs long term observations on profits of the PE and on prices in market mechanism, which is still on an exploratory stage in China.

4.3.1.4 Regulation on risk management

In chapter 2 we analyzed Flyvbjerg's typology of risk, among which sector-policy risks are grouped as risks caused by institutional changes in terms of laws, regulations and policy instruments. In China the allocation and mitigation strategies for such risks are shown in table 15.

Table15: Risk management (sector-policy risks)

Sub-Risks	Allocation	Mitigation
<i>Sector-policy risks</i>		
Contract termination	<p>Depending on who terminates the project, it may be:</p> <ul style="list-style-type: none"> ➤ Constructor ➤ Government 	<ul style="list-style-type: none"> ➤ The construction company should evaluate itself to determine whether its financial structure is capable (qualified) to undertake the construction work. ➤ The construction company should be evaluated by the government to see whether its qualifications and past experience have good reputations. ➤ If the government terminates, the constructor should be compensated according to the clauses that have written in the contract.
Changes in output specifications	<ul style="list-style-type: none"> ➤ Government 	<ul style="list-style-type: none"> ➤ The government should minimize the changes in project output specifications. ➤ If changes have to be made during the project, then the government should use the short-term contract. In this way, changes can be made in new contracts. ➤ If changes have to be made near the completion of construction, the government should make the changes accommodate to the original design.
Withdrawal of government support	<ul style="list-style-type: none"> ➤ Government 	<ul style="list-style-type: none"> ➤ The government should reserve the supporting resources for contracted projects. ➤ If the support from the government (such like subsidies) can not be guaranteed continuously during the contract, then the support should be not written as a contractual clause, but as a bonus for better project performance or quality achievement.
Changes in law	<ul style="list-style-type: none"> ➤ Government 	<ul style="list-style-type: none"> ➤ Changes in law should permit a “transitional period” for projects, which means that the projects under implementation (within the contractual period) should be subject to the old law, and new projects under plan should be attached to new laws.
Changes in tax	<ul style="list-style-type: none"> ➤ Government 	<ul style="list-style-type: none"> ➤ The same with “changes in law”. ➤ In some use-pay cases, tax could be linked to the price that is charged from users.

4.3.1.5 Governance

The involvement of private actors in infrastructure relates to the interests of not only the private sector but also the government and the public users, so governance serves as another important aspect to ensure successful application of the innovative approaches. In China, one purpose of the governance is to ensure reasonable returns of the private contractors and provide incentives for them to increase service performance and efficiency and to reduce costs. Another purpose is to protect the continuity of the service delivery, prevent monopoly and regulate the service extension. Nowadays, three aspects are regarded as effective factors for good governance by the Chinese government, including *independence*, *coverage* and *location*.

Independence means the credible commitments from the government that the private investors' investment may generate a reasonable return. This factor is especially important in expressway infrastructure because of the large-scale and long-term requirement of capital investment. Only independent governance can assure the private investors that their rights will be honored based on fair rules and contract provisions. Therefore, to ensure the independence, the regulators' mandate should be clearly defined by laws and regulations, rather than the discretion of government authorities. However, the interviewees of this research indicate that building such independent governance is difficult and requires a long time consideration of China's current institutional context and further institutional reform and legislation construction are needed.

Coverage means the scope that one regulator regulating industrial sectors. For instance, some countries have separate power regulators (such as one regulator for gas and another regulator for electricity), although the energy forms are convergent. In China's transport sector, since transport is characterized by divergence, currently, the regulatory coverage is narrow and only for the expressways, the regulator "Expressway Administration Bureau" is especially designed for the governance of expressways. However, the Chinese experts who have been interviewed suggest that in China (and also in other developing countries), because of the limited sector capacity, a multi-sector regulator should be encouraged in order to achieve economies of scale and reduce the interfaces from line ministries.

Location means the located level of the regulator (national, regional, or local). The centralized regulatory system may provide consistency at the expense of flexibility and knowledge of the regional and local conditions and needs. But the decentralized system may place the regulator close to the service provider and the mass public users but may not benefit from the larger pool of expertise in management and techniques and may suffer from higher corruption. For the expressway management in China, the regulator is located at the regional level under the control of the national governance. Each province has its own expressway administration bureau which is regulated and controlled by the Ministry of Communication.

Appraisingly speaking, China's PPP regulations concerning expressway projects are, to some degree, cumbersome and unorderly, which would lead to some consequent impacts on projects. The complex and cumbersome approval process would increase project preparation cost, scaring away potential investors (including banks) and placing an extra financial burden on the public users, which will, in the end, result in the increase in project transaction costs. The consequence of non-performing public bank loans would be that the money is not used in an effective way where it might produce better results. The difficulties for government to figure out the optimal rate-of-return and the most rational price cap would raise disputes and risk of renegotiations between government and private actors when they face risks of potential profit losses. Notwithstanding, it still emphasizes aspects on risk management and finds its revenues towards good governance.

Such a PPP regulatory framework for expressway projects under BOT and TOT are regarded as a direct outcome of its underdeveloped institutional environment, which leaves many important and routine decisions to administrative authorities. *Therefore, the first step in improving China's PPP regulations should*

be to develop a unified law, the concession law according to the officials from Liaoning Expressway Project Tendering Committee, defining comprehensive and orderly legislative provisions pertaining to all relevant aspects of a PPP, which will be discussed in part 4.4.2.

4.3.2 Legislative framework

Since late 20th century, China has made great progresses in establishing laws and regulations for private participation in infrastructure. The legislative framework relevant to the innovative procurement models involves a series of laws, regulations, notes, circulars and implementation rules issued by the governments at the central, regional and local levels, which are presented below chronologically.

4.3.2.1 The Intellectual Property Right Law (1982)

Intellectual property rights (IPRs) have been acknowledged in China since 1979 and it was established in 1982 by the National People's Congress in the areas of trademark, copyright and patent, among which the Patent Law of China is relevant to BOT where the innovative technologies, solutions and ideas are involved in the tendering process. The reason is that the patent law is to encourage invention-creation and to promote the development of science and technology (Zhu and Liu, 2004). The implementation of this law is enforced by the State Intellectual Property Office. In order to address cases of infringement of intellectual property more efficiently, special courts have been established in some cities and provinces including Beijing, Shanghai, Guangdong, Fujian and Hainan. However, the enforcement of intellectual property rights in China is particularly difficult (Zhang, 2003). Apart from people's low awareness of infringement being a crime, the Intellectual Property Right Law, in itself, sometimes conflicts with other laws and incompleteness in terms of protection of the intangible assets.

4.3.2.2 The Law against Unfair Competition (1993)

China's Law against Unfair Competition was established in 1993 by the National People's Congress aiming at ensuring the healthy development of socialistic market economy; encouraging and protecting fair competition; deterring strategic competition; and protecting the interests of various economic entities (National People's Congress, 1993). This law is to be applied to BOT and TOT in order to ensure fair competition during the tendering process of selecting the contractor, evaluating its prequalification and granting contract, because fair competition increases efficiency, ensure choosing the right contractor and thus prevent adverse selection. But the real practice of its application in PPPs in China is somewhat pharisaism because currently no matter for collusions between officials and bidders or for collusions among bidders that influence fair competition seriously, they have not been put an end.

4.3.2.3 The Company Law (1994)

China's Company Law was passed by the National People's Congress in 1994 dealing with the issues of behaviors of companies; protecting interests of companies; and prescribing their liabilities (National People's Congress, 1994). As we discussed in section 4.2.7, the company law is required for projects using BOT because new separated project companies need to be established for BOT projects in China and this law acts as a basis to stipulate the liabilities of these companies and standardize company behaviors in order to ensure consumers' interests. Therefore, to some extent, the company law may provide some legal restrictions for project companies from moral hazards during the ex post contractual period.

4.3.2.4 The Tendering Law (1999)

The Tendering Law was developed relatively late in China until its pass by the National People's Congress in 1999. Its purpose is to standardize the procedure of the tendering process; protect the interests of the involved actors in the tendering process; and increase efficiency. The application of this law is only valid for domestic projects within China, but not feasible for international projects (National People's Congress, 1999). And this law plays a particularly important role in BOT and TOT projects not

only because tendering is a crucial process to select the right contractor in order to avoid adverse selection, but also because it may increase efficiency by selecting the rational lowest bidding price. However, this law actually did not fully deter strategic behaviors in tendering process through setting up effective tendering procedures.

4.3.2.5 The Contract Law (2000)

In order to protect the interests of the contractors; keep a stable economic order; and facilitate the construction of infrastructures, China's Contract Law was brought forward and passed by the National People's Congress in 2000 (National People's Congress, 2000). Its establishment is relatively late and its provisions are now under revision. For the BOT and TOT projects in China, the Contract Law is required because it can protect the interests both of the government and the private enterprise. On the one hand, the government needs to ensure that the granted private enterprise will comply with the contractual terms to prevent moral hazard and the private enterprise also needs to protect its own interests through the contract in cases of appearance of risks. And on the other hand, the granted private enterprise needs the protection of the contract law when they subcontract with small constructors and operators in order to ensure the project quality and service quality.

4.3.2.6 The Property Law (2007)

The Property Law of China was passed by the National People's Congress and went into effect on October 2007, and now it is under construction over time to be integrated into the legislation system. The drafting of this law was controversial and subject to a constitutional challenge because of the disputes over its content. Thus it needed a long time to pass since 2002. The tenet of this law is particularly to cover both state property and private property which facilitates privatization and asset stripping from the state-owned enterprises. The law does not change the system of land tenure by which the state owns the whole lands, however, it deals with the problems about how to use the land for infrastructures of private entities, and that is to say, it still stipulates that private parties can possess use functions of the land. BOT projects which include the construction phase in contract require this law because it guides the private contractor as to how to obtain the land and on how to use the land accompanying with the surrounding areas.

So far, the existing legislative framework in China that is relevant for the innovative procurement models was presented above. Apart from this legislation, some other laws and regulations have been also issued especially for road projects (expressway included) (box 12).

Box 12: Laws and Regulations for Road Projects

- Administration on compensable transferring expressway operating right (1996), issued by the Ministry of Communication.

Its purpose is to create a new financing method for expressways, standardize the procedure of transferring the operating rights, and protect the interests of the stakeholders. It clarifies the definition and the boundary of the transfer, stipulates the approval process and the method of evaluation of the expressway's value and how to use the operating right by the private operators.

- The Law of Highways of People's Republic of China (1998), issued by the National People's Congress.

This law aims at strengthening administrations on highway (expressway included) construction and operation and promoting the development of highway infrastructure. It contains regulations and instruments on road design, construction, operation and maintenance, and it also stipulates the administrative and monitoring methods of toll roads.

- Government Procurement Law (2002), issued by the National People's Congress.

The purpose of this law is to help increase efficiency of government procurement, protect public interest and anti-corruption. It deals with the issues including tendering and contract making of the procurement.

Here, some people may be confused about China's separated laws of tendering and government procurement. In China, these two laws are both distinguished from and connected with each other:

- i) The laws differ from their boundaries. The Tendering Law provides legislative provisions for all procurement projects that satisfy the requirements of tendering, serving all entities including governments, enterprises, and individuals. The Government Procurement Law only aims at offering legislative provisions for government procurement projects and Government Procurement Law also defines alternative ways of government procurement such as auction.*
 - ii) The laws have different specific provisions. The Tendering Law mainly emphasizes standardizing the tendering procedures, while the Government Procurement Law concentrates on procedures of government procurement process, including the requirement on financing sources, the use of the capital and auditing.*
 - iii) The laws connect with each other in the way that they both aim at effective and fair tendering. And the Government Procurement Law stipulates the conditions on which government procurement must be through tendering, but the Tendering Law stipulates that all government procurements should undertake tendering.*
- **Administration ordinance of toll roads (2004), issued by the National People's Congress.**
- The ordinance plays a role in strengthening the administration on toll roads in terms of charging user fees and maintenance in order to protect the public interest.*
- **Measures of administration on road construction market (2004), issued by the Ministry of Communication.**
- The measures aims at standardizing the road construction market and thus make it as a uniform, open, competitive and ordering market. It contains the information on project registration, tendering administration and contract performance.*

As the Chinese central government is now still in the process of developing the legal framework based on the principles of the market economy, laws and regulations are subject to changes, adaptations and improvements according to the changes in the economic policies. Actually, the regulatory framework is intentionally drafted in a broad style to allow future legislative flexibility. However, the underdeveloped institutional circumstance has left many important and routine decisions to the governments (or administrative agencies). In the next section, we will compare the Chinese institutional circumstance with the predefined institutional preconditions in section 4.2 and detect what its gaps, deficiencies and limitations are.

4.4 Gap, limitations and informal practices

Given the institutional preconditions analyzed in the preceding section and combining the empirical researches in China in its institutional context, in this section we will analyze what gaps, limitations and informal practices the current Chinese institutional environment has. Figure 26 shows an overview illustration.

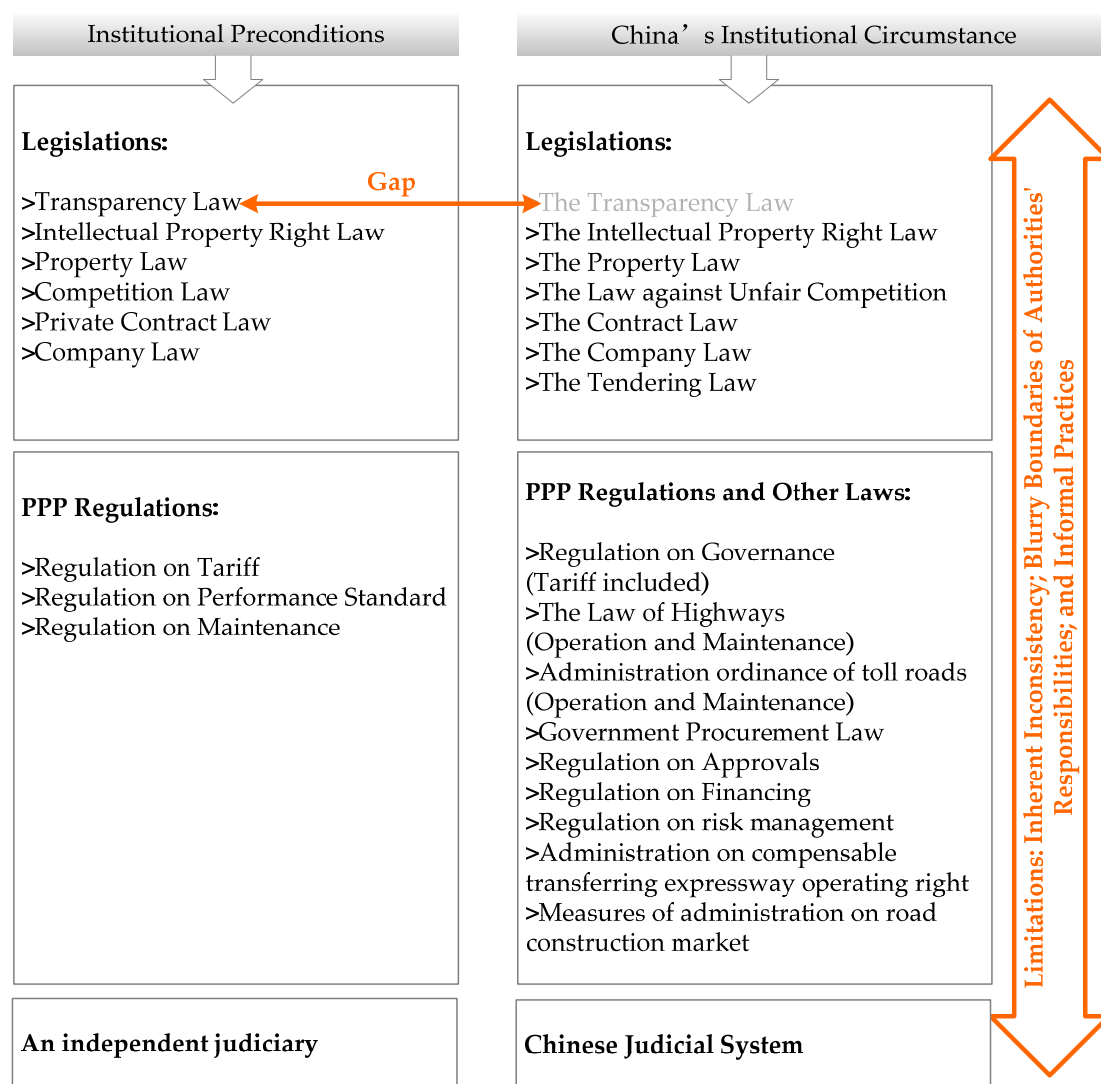


Figure26: Comparisons between the institutional preconditions and China's existing institutional circumstance

4.4.1 Gap

The gap that needs to be filled in, aiming at building a favorable and complete institutional environment for BOT and TOT projects in China is *Transparency Law*. Without transparency law, the public sector would be subject to corruption which takes various forms including abuse of powers, bribery, nepotism and breaching confidentiality. The consequences of these corruptive behaviors would put obstacles in the way of selecting the right contractor in tendering process and thus lead to ex post contractual strategic behaviors during project implementation. In China, the corruption in public procurement for expressways does not appear from the tendering process, but emerges from the stages of project conception, ex ante evaluation and feasibility study before tendering.

In the very beginning stage of project conception, corruptors would put forward the "political achievement" projects. "Political achievement" projects refer to those expressways that were brought forward by some political elites who desire to pursue the "political achievement" in order to show that they have "good" performance on their posts. It is necessary to clarify that not all these kind of projects are "bad", irrational, and a kind of "improvident" investment, but indeed the purpose of bringing

forward such projects is not based on considering public welfare and the real increase in traffic demand, but for political performance. Although in China these projects constitute only a small proportion, the negative effects on resource allocation and public welfare really deserve our attention. As we defined previously the concept of “corruption” which may mean the abuse of political power and misuse of the public resources in a large scale, the “political achievement” projects can be regarded as a kind of corruption because the investment on constructing such expressways is rather huge and reckoning without the public’s real traffic demand, the public users are often rare. As a consequence, the initial investment cannot be returned. Currently, there are no criteria on how to judge which projects are the “political achievement” ones, but from all interviews of this research, the interviewees reflected that they indeed exist in China (box 13 shows an example) and the recommendations would be to build up the transparency law which may stipulate a clear decision making process on the reasons why projects should be put forward.

Box 13: “Political achievement” project corruption: An example
(Source: Shandong Department of Communication)

“Political achievement” project corruption is a kind of “Misprision Crime”, which is defined in the Criminal Law of China, the item 397, stipulating that public officials who abuse their power and whose misprision behaviors resulting in substantial loss of public and state interests commit a crime of misprision. The example below is an illustration of “political achievement” project corruption that has been criminated.

In February 2008, the leader of Qingdao (the capital city of Shandong province), Shicheng Du, was convicted for a corruption crime of abusing substantive public funds (2.27 billion Yuan) in a political achievement project called City Expressway running through Qingdao with total length of 6.2 km. It was detected by the Central Committee for Discipline Inspection (a central organization responsible for inspecting corruptive behaviors of government officials) for the reasons that this expressway did not play a role in sharing the traffic flow on other roads and did not attract the “estimated” demands. Actually, this gap between the real demands and the estimated demands has been realized by the local research institute of road development that carried out the feasibility study for this project, but confronting with big “political pressure” from this “leader”, the research institute gave in and submitted the “produced” demand estimation to the Shandong Department of Communication. Bringing forward this project thus did not take into consideration the public interest and the real project demand, but was simply because of pursuing political promotions, which has been confessed in court by Shicheng Du.

In reality, it is hard for those “political achievement” projects to pass their feasibility studies and ex ante evaluations because they do not depart from public interests and real project demand. However, their passes of feasibility studies and evaluations are the results of “optimism bias”, caused by political pressure and the shortage of evaluation criteria.

In China, after project conception, the project is handed on by the local government to the appointed agency to do the feasibility study. From the interview with the expert specializing in expressway feasibility study and who works in Liaoning Institute of Road Design and Plan, we know that the appointed agencies feel big political pressure imposed by the local government that requires the agency to pass the feasibility study of the planned project, even if the project outcome cannot meet the criteria of the feasibility study actually. The political pressure may, on the one hand, come from the political elites who give rise to the “political achievement” project and on the other hand, come from the local government that desires the local economic development through constructing expressways. As a consequence, the agency has to forecast the traffic demand in a biased way. As we defined in chapter 2, this kind of optimism bias should be classified “political-institutional” (box 14).

Box 14: Political-Institutional Causes

Optimism bias is caused here by political power structures and prevailing institutional settings that surround the decision making process. This factor assumes that when project promoters and planners forecast project outcomes, they strategically and deliberately underestimate costs and overestimate benefits and demand volume in order to raise the probability of winning the funding and to serve their own interests.

Apart from political pressure, the shortage of evaluation criteria is another reason. Currently, the evaluation criterion for feasibility study of expressway projects is only based on the regional economy. If the project can speed up the development of regional economy, even if the accounting evaluation of the project does not meet, the project is regarded as feasible and can pass the feasibility study. However, as we analyzed in chapter 2, the relation between regional economic development and the expressway constructions is conditionally influenced with each other. That means, the expressways do not necessarily promote the regional economy and only based on this single criterion, the evaluation outcome would be biased due to optimistic evaluation on regional economic development. This kind of bias could be classified as “psychological”, as we defined in chapter 2 (box 15), because of the optimistic mental bias on the relation between regional development and expressway constructions.

Box 15: Psychological Causes

Psychological factor explains cost overruns (or overestimate benefits) due to the mental bias of project promoters and planners who make decisions of weighting and evaluating project costs and benefits on a delusional optimistic basis rather than on a rational basis.

Corruption has also taken place in the tendering process. The corruption mainly concentrates on collusions between officials and bidders including breach of confidentiality, bribery and nepotism. First, breaching of confidentiality means that the official who works out the tender document and knows the “base price on bid” would tell this “base price” to one bidder who offers bribery to this official and thus greatly increase its possibility of winning the bid. Second, sometimes, the officials from tendering authorities will grant the contract to the bidder who has nepotism relations with them. Such behavior of officials could be regarded as corruption which would make the tendering process on a basis of unfair competition and which will increase the probability of risks such as time overrun, delay of completion and low level of project quality, because these winners may be not qualified and not the right ones to carry out the project. Box 16 is an example of tendering corruption.

Box 16: Tendering corruption: An example (Source: Shaanxi Department of Communication)

In April 2008, the directorate of Shaanxi Expressway Group, Shuangquan Chen, was convicted by the Intermediate People's Courthouse of Xi'an for corruption in tendering processes of Xianyang Airport Expressway project; Huang-Yan Expressway project; and Xi-Han Expressway project with the total bribery amount of 17.364 million Yuan. Shaanxi Expressway Group is a state-owned enterprise authorized by Shaanxi Department of Communication taking responsibilities of organizing tendering and granting contract for expressways in Shaanxi province. And Shuangquan Chen was appointed as the leader of this enterprise. Between 2001 and 2007, in these three projects, he respectively breached confidentiality of the “base line of the bid” to the bidder providing bribery for him, granted the contract to the bidder with nepotism with him, and offered a loan guarantee to a bidder who provided a bribe for him and who was incapable to repay the loans. His corruptive behaviors have resulted serious disorder in the competitive tendering processes and increased the risks of ex post contractual moral hazards because these bid winners were not the right ones to carry out the projects.

4.4.2 Limitations

Except for the gap of China's institutional circumstance in creating a favorable legal environment for projects under the BOT and TOT models, there are also limitations of the existing legislations and regulations, including the vacancy of a concession law, inconsistent legislative provisions, the blurry responsibilities between authorities, informal practices and the corruptive judiciary.

4.4.2.1 The vacancy of concession law

Projects under BOT and TOT models are subject to the cumbersome and complex PPP regulations and a unified law is absent in defining all relevant issues concerning granting contracts. BOT and TOT are kinds of concession because concession, for the Chinese central government, refers to constructing or operating infrastructure using the franchise approach under the monitoring and control of the government. Because of fiscal pressure and government inefficiency, concessions are also regarded as a way to attract private capital and foreign investment and increase efficiency through introducing the competition mechanism. Although the laws and regulations discussed above are relevant and can be relied upon to address some problems pertaining to BOT and TOT, until now, China has not legislated for infrastructures and public utilities a unified law regarding concession, thus some questions can not be clearly answered, such as what are the procedures to grant concessions; which government authority should have the granting right; how to monitor the concessionaire; and how to address the conflicts and disputes among actors during the concession period.

In addition, the established laws such as the Intellectual Property Right Law, the Company Law and the Property Law lacks of specific provisions regarding issues of concession, but only provisions on general civil-code circumstances. Thus applications of these laws into concession are sometimes farfetched. Furthermore, the Tendering Law and the Contract Law are extremely relevant to concession, but both laws were drafted as trial legislations and needed to be further developed. Therefore, along with the frequent use of innovative models to develop expressways, a special and unified law, the concession law, is desirable to build up tackling all issues concerning concession.

4.4.2.2 Inconsistent laws and regulations

Apart from the absence of the concession law, the established laws and regulations are, in some cases, inconsistent. For example, the Tendering Law stipulates that the contractor who obtains the right to construct and operate infrastructures and public utilities must be granted through competitive tendering, while the Government Procurement Law permits appointing one or few concession bidders and then granting one of these bidders after comparisons among them. So these two laws are inconsistent with each other in terms of whether adopting competitive tendering to determine the contractor. In reality, the Tendering Law argues that granting should be undertaken through competitive tendering in order to ensure fair competition and thus efficiency and building an orderly market environment, but the Government Procurement Law claims that some government procurement projects are impossible to adopt competitive tendering because of the complexity of techniques and financing requirements involved in the projects.

4.4.2.3 Blurry boundaries of responsibility between authority agencies

Another limitation is that among the authority agencies, the responsibility boundaries are not clearly defined because there are no clarifications in the laws and regulations on *which authority takes what responsibilities*. Therefore, the questions facing the BOT and TOT project carriers such as which authorities at the central or regional levels should be involved in the approval process, and what are those authorities' scope to approve are hard to answer. Even, the jurisdictions of those agencies tend to overlap, and thus resulting in unnecessary delays and inconsistent decisions. In addition, the blurry boundaries of responsibility would make the private actors confused about what protections and resources are available for them from various government agencies and delegated authorities.

4.4.3 Informal practices and the Chinese judiciary system

Although the laws and regulations set the formal rules on how PPPs should be applied and how various organizations' interests could be protected, informal practices have acted in defiance of those formal ones. As an old saying in China, laws are one thing and behaving according to them is another thing. First, the tenets of the Tendering Law are to combating corruption, and for the Law against Unfair Competition it is to increasing competition. However, the actual practices for many projects are that the private enterprises that can afford substantial capital investment are rare and very often such projects are directly assigned to large state-owned enterprises without tendering. And even tendering is organized among private enterprises and state-owned enterprises, collusions between officials and bidders largely reduce competition and disorder the tendering procedures. Second, the formal regulations on approvals are strict with project feasibility studies and emphasis relevant matters such as land compensation on green grassland and farmland and environmental issues. But the actual practices are that the evaluation criteria on feasibility reports have been loosened, appraisals on environmental issues have become formality processes and many projects under construction did not resolve the matters of land compensation. Third, formal regulations on sector-policy risk allocation emphasis bearing such risks by government to a large extent (table 15). However, in reality the "under-table" rules of the government are usually "who invests, who assumes risks". Fourth, China's location of governance in expressway sector is put on the regional level, emphasizing decentralized governance. However, such a decentralized system sometimes actually provides regional governments with breeding grounds of corruption and arbitrary decision making because the central government cannot reach its arm's length in supervising the works in regional governments, and thus some decisions made at the regional level may be even not known by the central government.

Such informal practices and defiance on formal laws and regulations could be regarded as a result of China's weaknesses in its judiciary system. The judicial system in China means law enforcement activities conducted by the Chinese judicial organs responsible for investigation, prosecution, trial and execution of cases. It is composed by the four-level court system including the Supreme People's Court in Beijing; higher people's courts in provinces, autonomous regions, and special municipalities; intermediate people's courts at the prefecture level and also in parts of provinces, autonomous regions, and special municipalities; and basic people's courts in towns, and municipal districts. Theoretically speaking, the judicial power of the court system should be independent and should not be interfered by administrative organs, public organization and individuals. However, the actual practices are that the judicial system is characterized by "dependent" and "non-energetic", or even corruption. Its dependent feature means that the Chinese public sector has put large interferences and influences on the judiciary system and its non-energetic character refers to its non-energetic status on investigating, prosecuting and trialing. There is an informal rule of the judiciary, "no disclose, and then no investigate". Furthermore, it is difficult to overstate the negative impacts of a corruptive judiciary. It erodes the ability of the public to work with private actors. Examples are numerous. The executive may influence the independence of the judiciary by appointing members of judiciary not based on objective criteria, outright selling of judgeships and removal of judges critical towards the government. A judge may solicit bribes to delay or accelerate court hearings, or to simply decide a case in favor of a particular party. Lawyers may expedite or delay cases, sometimes working in unison with a judge and/or a prosecutor. Court clerks may ask for bribes to perform a task they are already paid for. Judicial systems debased by bribery undermine confidence in governance by facilitating corruption across all sectors of government, starting at the helm of power. In doing so they send a blunt message to the people: in this country corruption is tolerated.

For PPPs these informal practices concerning not only the actual executions of the laws and regulations, but also the dependent and non-energetic judicial system may act as institutional obstacles of applying effective PPPs.

4.4.4 Comparisons among BOT, TOT and TOT(+DB) in terms of institutional preconditions

In the previous parts, we have discussed two innovative government procurement models (BOT and TOT, sometimes TOT(+DB)) for China; their institutional preconditions; China's current institutional circumstance; and its gap, limitations and informal practices after comparing with the defined preconditions. In this part, we will make the comparisons among BOT, TOT and TOT(+DB) in terms of their institutional requirements.

Figure 27 shows the comparisons among BOT, TOT and TOT(+DB) of their institutional requirements. As can be seen, BOT and TOT(+DB) need more supportive legislations than TOT, including Intellectual Property Right Law; Property Law; and Company Law; and regulations on project approval and operational approval. However, TOT's such fewer requirements on institutional preconditions are due to its application in existent expressways. When it is applied to green-field projects, TOT(+DB) is used and then needs as many institutional preconditions as BOT does. Therefore, at this point we cannot conclude which innovative model, BOT or TOT, is better, but we may safely conclude that TOT is more appropriate to be used for existent expressways to raise money for green-field projects.

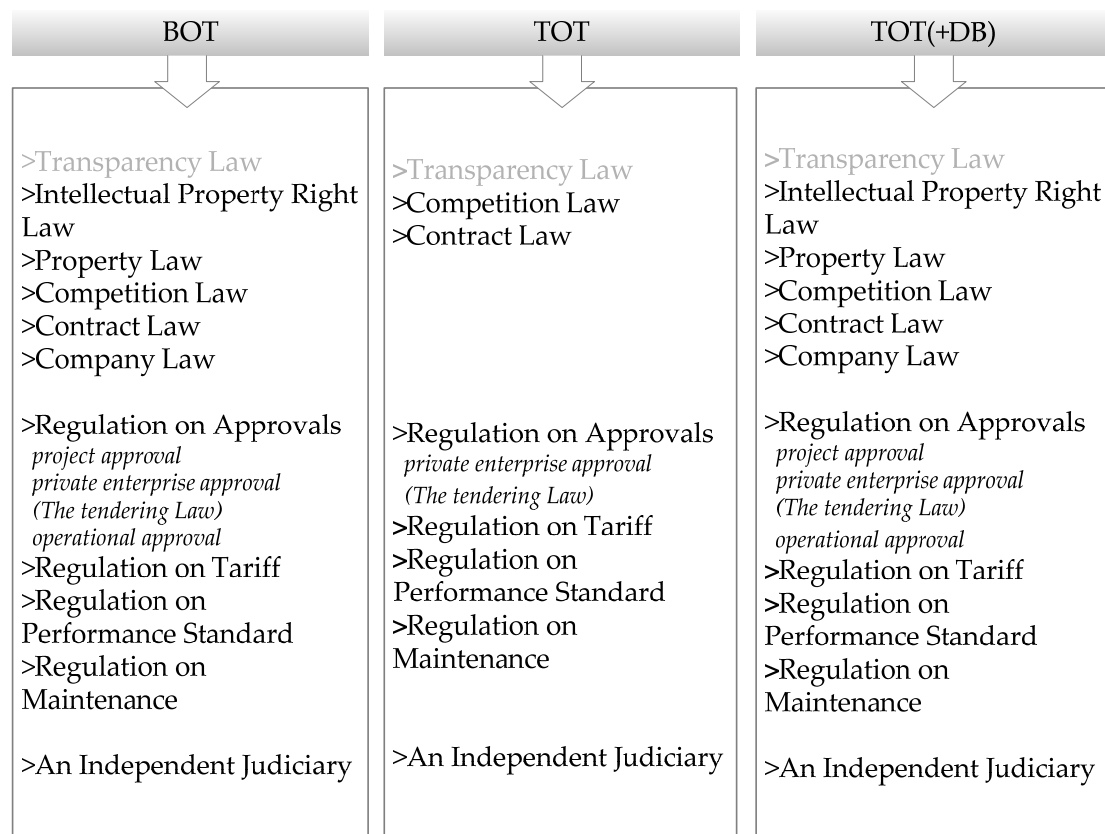


Figure27: Comparisons among BOT, TOT and TOT(+DB)

4.5 Conclusions and recommendations

Based on the above analysis, in this section we can conclude that *the gap, limitations and informal practices of China's existing institutional circumstance have become obstacles in providing favorable environment for applying the innovative procurement models, BOT and TOT. The gap needs to be filled in is the transparency law and the limitations are the inherent inconsistency of the existing legislations and regulations, and the blurry responsibility boundaries of the regulatory authorities. Furthermore, the informal practices are regarded as a result of China's judicial system which failed in providing an independent law enforcement environment.*

In the beginning of this chapter, we have presented our objective at the 2nd level of the defined four-level framework, which is, getting the institutional circumstance right. To achieve this objective, here in this final part we put forward our recommendations based on the above analysis as follows:

➤ *Building up the transparency law*

Our first recommendation is to build up the transparency law. The Transparency law, being emphasized by many public sectors around the world, however, has been legislated by few countries. The idea of building up the transparency law comes from reports of *Transparency International and OECD* pertaining to the issues of anti-corruption and new public management. Publicity and transparency are crucial for sound and open procurements and act as a deterrent to corruption in the public sector. Transparency law may create transparent, clear and open procedures that allow a wide variety of actors (the public also included) to scrutinize public officials' and contractors' performance and decisions. In addition, such a scrutiny mechanism may help officials and contractors to be accountable.

In designing the rules and procedures, it is necessary to clarify the reflections on what information is required to be disclosed, and when, where, and to whom the information is made available. Only like this, the transparency law could be enhanced and could reduce the scope of non-competitive practices. As a result, corruption of the officials and corruption among the bidders may be not favored and be discouraged.

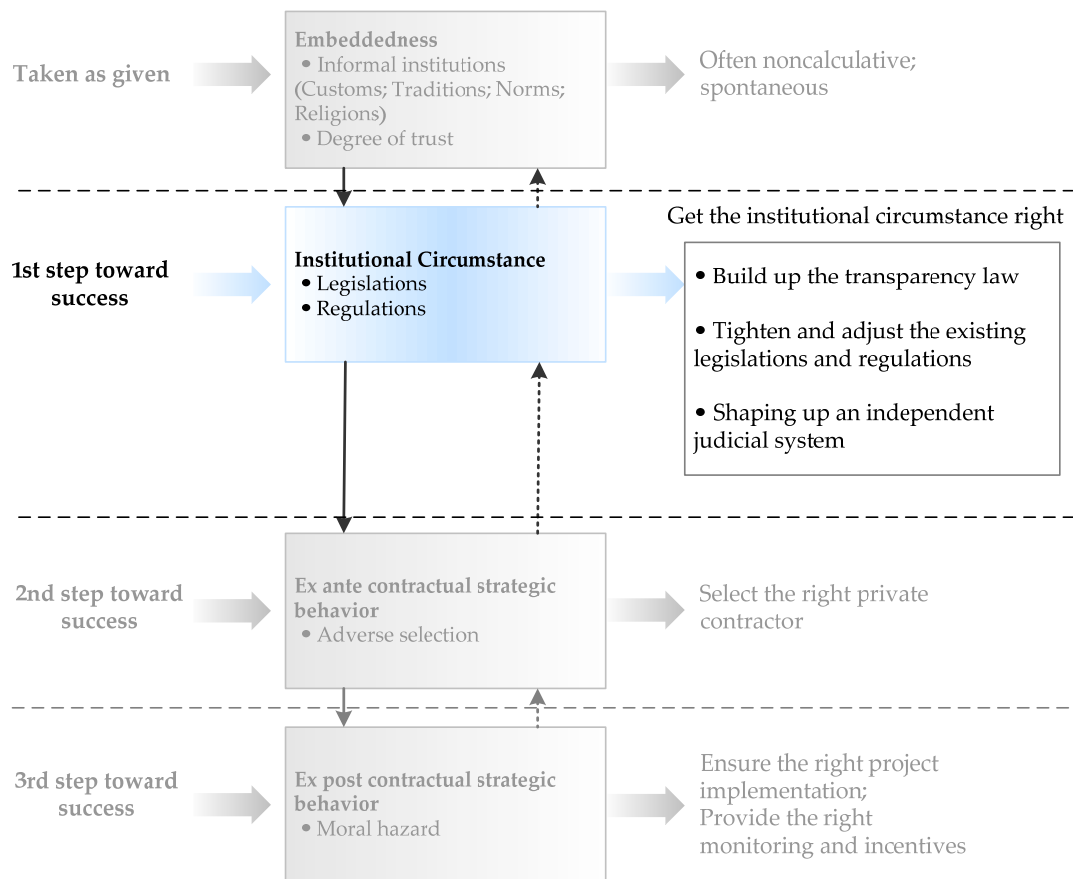
➤ *Tighten and adjust the existing legislations and regulations*

The second recommendation is to tighten and adjust the existing legislations and regulations. First, inconsistent and overlapped provisions in the laws should be adjusted or explained in more detail in their application conditions, because such provisions will cause confusions of the officials and contractors on which provision should be followed. Second, the responsibilities of the authorized governmental agencies should be clearly divided up. Clear scope of responsibilities may not only offer a better regulative environment for contractors but also increase accountability of officials because when their responsibilities are clear defined and divided, liabilities of misconducts and nonstandard behaviors are easier to be found out. Third, the approval process should be streamlined especially for BOT model. Complex and time-consuming approval process would cause increase in transaction costs of the projects in their preparation stages and would scare away potential investors.

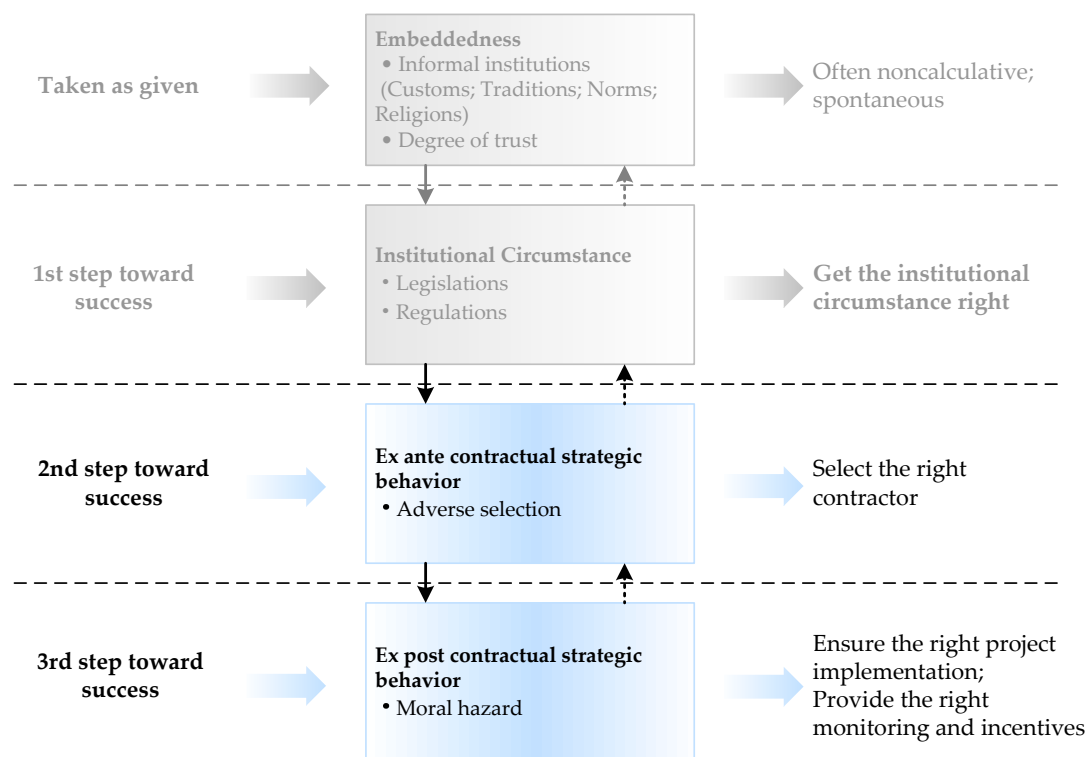
➤ *Shaping up an independent judicial system*

Laws are enforced by judiciary. An independent, non-energetic and even corruptive judiciary cannot enforce and strengthen laws and formal regulations. As a consequent, informal practices, as a misprision of formal laws and regulations would infest and the weak judiciary would send a signal to the public that informal practice and corruption are tolerate. Thus we finally recommend on shaping up an independent judicial system in effectively enforcing laws and regulations that may provide PPPs a legal-ensured business environment.

Therefore, we enrich our framework as follows:



CHAPTER 5 PREDICTIONS ABOUT THE SUCCESS AND FAILURE OF THE PROCUREMENT MODELS



In the previous chapter we have given rise to the recommendations on how to get the Chinese institutional circumstance right for applying the innovative procurement models. Suppose that we have achieved this 1st step toward success, then here we enter in the 2nd step of selecting the right contractor and the immediate 3rd step of providing the right incentives and thus getting the project implementation right. Research in this chapter combines strategic behaviors both during the ex ante contractual period and during the ex post contractual period with different types of PPP that have been used in China (DBB; DB; TOT; and BOT), in order to predict the success and failure of these models. Based on those predictions, we will bring forward recommendations on how to ensure their success in the 2nd and 3rd steps to select the right contractor and provide the right incentives to insure the right implementation of the project.

5.1 Predictions about the success and failure of China's procurement models

The development path for China's procurement models has been introduced in the beginning of chapter 4, here again we sum them up in figure 28 before making the predictions.

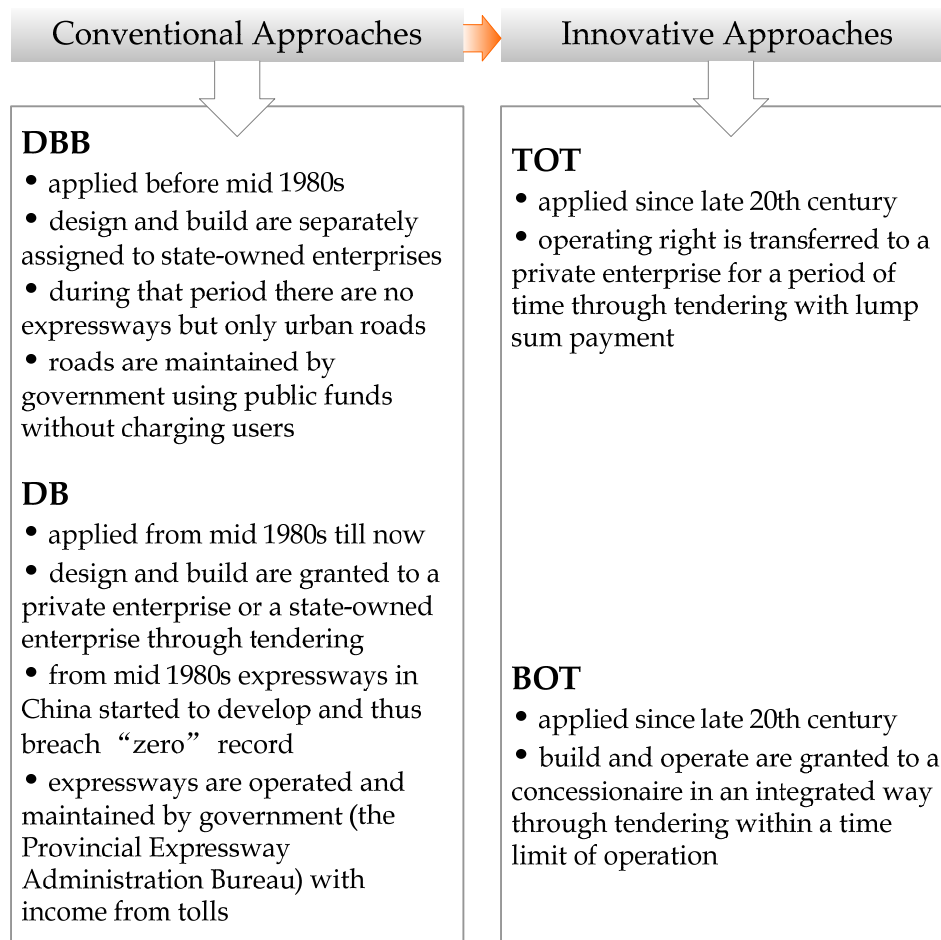


Figure28: Development path of China's procurement models for expressways

5.1.1 DBB

The principal-agent relation in DBB is illustrated in figure 29. The agency is “selected” through assigning and commanding but not competitive tendering, which could be defined as “automatic selection”, referring to China's special historical times of planned (or command) economy, under which public works were automatically assigned to state-owned enterprises regardless of their capacity, qualification and efficiency. “Automatic selection” thus could be compared to “adverse selection” in terms of selecting the right contractor because it is even more risky for the government selecting a non-optimal contractor (or agency) under DBB since the government as the principal has no alternatives. After the state-owned enterprises were automatically selected, moral hazard problems may occur due to their shrinking efforts, lacking accountability and thus lowering efficiency and productivity. Therefore, strategic behaviors existing in this relationship include the “automatic selection” and moral hazard.

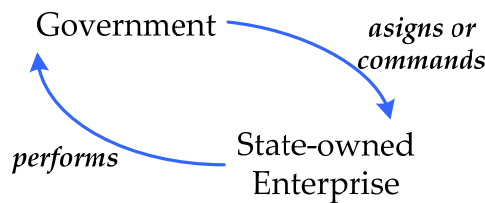


Figure29: Principal-agent relation in DBB

Debates surrounding the reasons engendering moral hazard in DBB are two-sided including the old-styled ownership structure of the state-owned enterprises and their monopolistic positions. Some economic literatures have demonstrated both theoretically and empirically that ownership is essential for providing incentives and thus performance (North and Thomas, 1973; Grossman and Hart, 1986; Li and Zhang, 2000; Li and Xia, 2008; Su, 2005). And moral hazard exists as long as the owner and the manager are not the same entity. It is even worse for state-owned enterprises because there are no income incentives for managers, which means that their incomes are changeless and regardless of their performance. Without both ownership and income incentives, those managers would take their advantages of expertise and access to inside information to use the resources of the enterprises for personal gains because their interests are to maximize their own utility functions. Since state-owned enterprise managers are not only the agents but also the state officials, and in their latter role they have to follow the administrative guidance and governmental policies, tendencies of moral hazard cause them to make indiscreet managerial decisions which are inconsistent with those guidance and policies.

However, this argument on ownership has been criticized by other scholars since they claim that moral hazard is caused by the monopolistic position of the state-owned enterprises without the overriding objective of profit maximization but the functions of social service. Before late 1970s, there were no private enterprises in the road sector in China, which provided a “favorable” and “reliable” environment for state-owned enterprises where they were fed with the entire road projects. The absence of competition pressure led to few efforts from managers and thus lower efficiency and productivity. In addition, state-owned enterprises’ functions of social service without pressure of maximizing profits required large amount of government subsidies and supports. These easily obtained supports such as public bank loans and appropriation of public funds sometimes made the managers use these resources inefficiently and ineffectively.

Therefore, the breeding grounds for managers’ moral hazard are fewness and information asymmetry. Fewness fails in inducing the managers to exert efforts in managing the state-owned enterprises in order to make the enterprises more competitive for obtaining projects. And information asymmetry makes it difficult for the governments to monitor managers’ behaviors, which causes them to reduce efforts and accountability and to pursue their own interests by using the resources from the state-owned enterprises. These strategic behaviors will thus incur the transaction costs of monitoring expenditures and residual losses.

The judgment on the success or failure of the DBB model in its application time can not be concluded because the emergence of DBB was adjusted to the institutional arrangements and market environment at that time before 1987. However, it still failed in several aspects (listed as follows) and if it was to be used in the modern institutional environment fully of competition, then the following aspects should be addressed in the first place. And in section 5.2 we will discuss in more detail on how to deal with them.

Failure 1: Automatic selection did not depend on competitive tendering and thus rules of competition, and the agent was selected in such a way regardless of its capacity, qualification and efficiency.

Failure 2: It did not design and provide incentive schemes for the managers of state-owned enterprises, and as a

consequence, they were less accountable for their work and exerted fewer efforts in performing the tasks. As a result, moral hazards were taken place and project costs would be subject to high risks of overrun.

5.1.2 DB

The appearance of the DB model in China was around mid 1980s accompanied with reforms of state-owned enterprises and institutional changes in the ownership structure. State-owned enterprise reforms have undergone a series of transformations toward commercialized enterprises with remaining state ownership and have kept the big ones in strategic industries within the state hands and privatized the small ones in non-strategic industries. In addition, institutional changes of ownership structure were not primarily achieved by converting state-owned enterprises into privately owned enterprises, but through allowing new enterprises to choose new forms of ownership structure (Song, 2007). In the road sector, DB is currently still used, especially in northern China, and its principal-agent relation is shown in figure 30. The principal is the government and the agent is selected by competitive tendering from the pool composed by both the state-owned enterprises which have been reformed and commercialized and the private enterprises. Strategic behaviors involved in this relationship contain both adverse selection and moral hazard. Adverse selection may take place during the tendering process due to the inability of the government to assess the actual capacities of both the state-owned and private enterprises. And moral hazard may occur during the construction period due to the contractor's hidden actions.

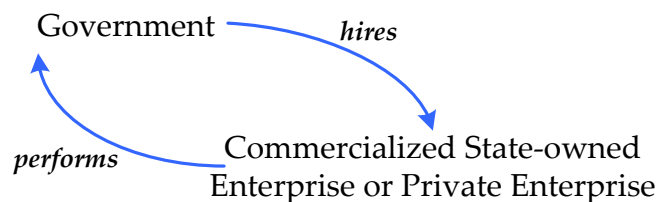


Figure30: Principal-agent relation in DB

Apart from the reasons (collusions between officials and bidders in forms of corruption of breaching confidentiality and bribery) we have discussed in chapter 4 that would lead to adverse selection, adverse selection with the high risky consequence of choosing a non-optimal contractor in the Chinese road sector is also caused by collusions among the bidders and the government interference.

Collusion among bidders breaks the essential objective of tendering, the fair competition, which will thus hinder the government from knowing the real information of the bidders and consequently result in selecting the non-optimal contractor. The forms of such strategic collusion include (Qiao, 2008; Huang, 2007; Dang and Zu, 2006; Zu, 2005):

1. *Collusion between bidders on raising the submitted bid prices together. Such collusion would force the government to choose a bidder from those whose bid prices are all high. In such cases, the government would not know the real price that each bidder may offer and could not make comparisons among them to select the optimal one since they are all at relatively the same high level. Fair competition does not exist in such circumstance and thus transaction costs would be increased because of the reduction on incentives of controlling project costs with higher bid price than real to be obtained from the government.*
2. *Collusion among partial bidders on submitting their bid prices substantially lower than the normal price in order to exclude other bidders who offer at a reasonable price from winning the bid. Such collusion sometimes may deceive the government against selecting the serious bidders, but choosing the fallacious lower-price bidder. This would greatly raise the risk of moral hazard during the post contractual period because the selected bidder would be subject to cost overruns and thus probability of renegotiation would be increased as a result. Therefore, transaction costs would be also increased. In addition, such a fallacious lowest price may*

cause the so called problem of “investment trap” for the government because in construction the contractor may ask for supplementary investment.

3. *Collusion among bidders on winning the bid by turn. Such collusion strategically provides bidders with average opportunity of winning the contract even if the bidder is incapable to carry out the project. Tendering in such cases is meaningless and competition is absent because the winner has been determined under table among the bidders by themselves. The government is kept from selecting the optimal bidder and as a consequence moral hazard might occur in the construction process.*

The breeding grounds for these strategic behaviors include change of position and asymmetric information. Collusion among the bidders may provide them a more advanced position individually or jointly against the government to either raise the bid price or win the contract. The asymmetric distribution of the information on the actual capacity of the bidders also offers the bidders the motivation to collude. Box 17 shows an example illustrating collusions among bidders during tendering.

Box 17: Collusions among bidders during tendering (Source: Guangdong Tendering Committee)

An expressway (name not indicated) in Guangdong Province was determined by the local tendering committee that its initial tendering result was cancelled and a new tendering process should be organized because the local tendering committee has detected the collusion behaviors among bidders. In the original case, the selection criteria is the average value of the ceiling price (A) that is maximum price the government may pay for the project (85.5 million Yuan) and the average bidding price submitted by bidders (B) (i.e. $\text{criteria} = (A+B)/2$). Eight bidders attended the tendering process and each submitted their bids, among which four bidders who bided independently submitted the bidding price respectively of 24.83, 36.66, 42.13, and 35.47 million Yuan, and another four bidders that colluded with each other delivered the bids with respectively 78.43, 77.68, 77.19, and 76.87 million Yuan. With such eight submitted bidding prices, the selection criteria was then 70.83 million Yuan and thus the bidder with bidding price of 76.87 won the contract.

Collusion in this case is to raise the bidding price jointly and to reduce competition through excluding some part of bidders. Apart from problems of bidder collusion, corruption also took place in the way that some officials told the collusive bidders the ceiling price determined by the government. Such collusion and corruption resulted in selecting a wrong bidder and fortunately it was detected, but transaction costs would increase due to the repeated tendering.

Since in DB model the potential bidders are mixed with commercialized state-owned enterprises and the private enterprises, fair competition business environment between them is required. However, this environment in China is characterized by government interference. Commercialized state-owned enterprises tend to have greater access to government-allocated resources such as public bank loans and subsidies than private enterprises. Such a discriminatory treatment of resource allocation between state-owned enterprises and private ones has resulted in an unfair competition environment. As a consequence, adverse selection might occur if a state-owned enterprise that heavily depends on government supports was selected because such an enterprise would not be the optimal one if removed from these supportive resources. And thus transaction costs incurred by equipping these resources would be high. Box 18 is an example of adverse selection caused by government interference.

Box 18: Adverse selection caused by government interference (Source: Hubei Tendering Committee)

In 1987, a short length of the Huang-Yi expressway construction (from Huangshi to Yichang) in Hubei Province adopted tendering to select the contractor using DB model, at which time tendering had emerged only for a very short period. The contract was finally awarded to a state-owned enterprise, China Water and Electricity Construction Enterprise No. 11 (CWEE11), with its bidding price at 6.177 million Yuan that was 37% lower than the bidding price (10.086) set by the government.

After project completion, CWEE11 lost money of 1.07 million Yuan and the construction schedule was overrun by one year. Confronted with such a loss in the 80s, CWEE11 faced high risk of bankruptcy, but due to the possible incurred social problems such as unemployment, the government filled up the loss using cross-subsidies.

In this case, the contractor is selected based on the lowest bidding price, which provided incentives for the contractor to submit the fallacious bidding price and latter to ask for supplementary investment from the government. For CWEE11, it knew in its mind that the government would offer protections even if it had a bad performance. Therefore, government's protections on state-owned enterprises by offering subsidies and tolerance on bad performance would cause project failure and raise the probability of adverse selection.

After contractor selection, strategic behavior would take place in construction period, known as moral hazard, in order to save construction costs strategically or wrongfully. Several forms of moral hazard that would impair project quality have been detected (Wei, 2001; Liu, 2000; Ouyang, 2007):

1. *Technical jerry-build.* Such strategic behaviors are usually done by contractors who are technically advanced and thus accurately and exactly know to what extent and what elements of the construction could be built and be equipped with lower level materials (such as lower-grade concrete) and fewer-amount of materials (such as lower-magnitude steel or reinforcement). Such technically professionalized information is only possessed by the contractor itself, but not by the government. The consequence would be that the project quality could not be ensured according to the quality specifications defined in the contract and the maintenance work would be subject to higher frequency and costs.
2. *Experience-dependent jerry-build.* Such strategic behaviors are usually made by contractors who have abundant experience in constructing, but are not technically advanced. They might use lower-level materials or slightly reduce the amount of materials to be used in order to save construction costs (and thus make excessive profits) fully dependent on their experience of past projects. During construction, information on the locations where the project is jerry-built is only known by the contractor but not by the government. And the consequence would also be the reduction of project quality, which would be more serious than the situation of technical jerry-build because technical factors are even not taken into consideration. Risk in maintenance work would be thus higher and costly.
3. *Other jerry-builds.* Except for these above jerry-builds, other types also exist. Contractors with the purpose of earning excessive profits and who do not have advanced technical expertise and experience would jerry-build depending on their arbitrary discretion, as long as their work would not be discovered by the government. Such strategic behaviors would cause the most serious problems of project quality and latter maintenance. In China, such projects are called "Doufuzha" projects, which means that the construction is compared to "bean curd" that is not solid (or firm) and easily destroyed.

The breeding ground for above strategic behaviors is the asymmetrical information. Since the government is unable to monitor the construction process timely at every detailed working procedure and many contractors possess more advanced technical expertise than the government, strategic behaviors emerge as a consequence. And transaction costs would be high during the operation phase since normal maintenance might be not enough in low quality projects. Box 19 shows moral hazard problems of jerry-build investigated by China Audit Office (2008).

Box 19: Moral hazard of jerry-build (Source: China Audit Office, 2008)

Investigated by China Audit Office, problems of jerry-build are usually caused by subcontracting. Among a project sample in 34 provinces, 36% projects have been jerry-built with the total project investment of 9.035 billion Yuan. For instance, Xinjiang Road-Harbor Construction Enterprise that got the contract of the expressway from Bengbu to Guangming has subcontracted the project with 36

small construction firms that are not qualified and thus reduced the actual project cost from 84.97 to 65.51 million Yuan, strategically obtaining 19.46 abnormally extra profits. The reduction on project spending led the subcontractors to build in a cheaper way by using less materials or lower level materials. In addition, in Chongqing, the Chang-Wang expressway (from Changshou to Wanzhou) has been transferred between four-level constructors and for each level, the sub-contractor drew a certain amount of project costs. Eventually, the money available for project construction was reduced by 69%.

The DB model is still be used in a majority of provinces in China at present. Generally speaking, it has been successfully applied in many projects, but still problems have emerged as challenges to be faced in the future. Therefore, the prediction on its success or failure in the coming projects depends on whether the following failure points will be addressed. If these points could be successfully dealt with, then we can say that it might be favorably used for a certain period of time. Otherwise it would fail.

Failure 1: Selection criteria and tendering procedures did not effectively prevent strategic behaviors such as collusions and thus raise the risk of adverse selection.

Failure 2: Continuously protecting the commercialized state-owned enterprises through government supports of easily access to resources made them loss the real survival capacity in the competitive market, and if such a state-owned enterprise was selected (adverse selection resulted), then ex post contractual problems might be raised such as bad project performance.

Failure 3: During the construction period, effective and timely monitoring methods and incentive schemes are not adequate to prevent jerry-built behavior.

5.1.3 BOT

BOT emerged in China in late 20th century and is primarily applied in southern provinces. The emergence was largely determined by the substantive demands for capital to develop expressway infrastructure with the upward trend of motorization and thus the increasing demand for traffic. The principal agent relation is shown in figure 31. The principal is also the government, while the agent is solely selected from private enterprises through tendering, state-owned enterprises excluded, at least at present. Strategic behaviors existing in this relationship involve both adverse selection and moral hazard. Adverse selection is mainly caused by collusions among bidders, as we have discussed in part 5.1.2. And moral hazard is induced not only in forms of jerry-build, but also the service performance during operation phase. Although the combination of build and operation can reduce jerry-build behaviors to some extent because the constructor will bear the consequences of jerry-building in itself during operating, jerry-build would still exist as shown in part 5.1.2. In this section, we do not repeat discussions on bidder-collusions and jerry-build, but we will focus on the following strategic behaviors in BOT, the moral hazard on service delivery and maintenance.

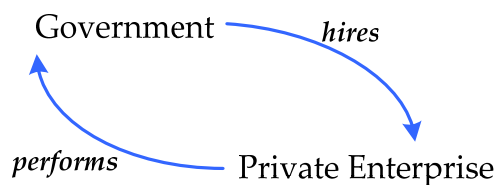


Figure31: Principal-agent relation in BOT

1. *Strategically extending the charging period. Theoretically speaking, the charging period (i.e. the operating period) has been defined in the BOT contract, but the operator still wants to extend this period in order to*

make excessive profits at the expense of public interests. They may strategically claim that it should be extended because some external uncontrollable factors occur and normal profits can not be ensured (such as cost increase in dealing with the bad weather or predicted-profit loss due to overestimate traffic demands). If an operator puts forward the extension requirement, then extra work load would be incurred in the government to audit the operator's accounting sheet or organize renegotiations. Such tasks would as a result increase the transaction costs.

2. *Strategically increasing the number of tollbooths. The number of tollbooths should be determined in the contract as well and relevant legislations (the Highway law and the Administration on Toll Roads) have also stipulated the method of determining tollbooths according to the length of the expressway. However, the operator can often strategically increase toll income and thus to shorten the length between payment points. Increase in tollbooths could be easily detected if the government took actions. But regulatory lags and oversights provide an opportunistic environment for the operator to set extra tollbooths. In addition, administrations on tollbooths at arm's length in China will be extremely costly and transaction costs would grow substantially.*
3. *Strategically reducing maintenance. Regulation on expressway maintenance in China is classified into four levels: routine maintenance; periodical maintenance; special maintenance; and amelioration maintenance. Currently, according to the opinion held by the officials from Liaoning department of communication, only amelioration maintenance can be insured because when it is the time to do the amelioration maintenance, the government will join and provide technical and managerial supports for the private operator and thus can monitor their work. But routine and periodical maintenance can not be guaranteed because the transaction costs of monitoring are too high for the government to join on a routine and periodical basis. Therefore, the operator will behave strategically and reduce the frequency of maintenance, and as a consequence, the poor road condition leads to degrade in service quality.*

The breeding ground for such moral hazard problems depends largely on information asymmetry. Asymmetric distribution of the information on how the operator performs the service delivery and maintains the infrastructure between the operator and the government has brought on strategic behaviors of earning excessive profits by increasing price, tollbooths, charging period and reducing costs on maintenance. Box 20 is an example illustrating strategic behaviors in expressway operation.

Box 20: Moral hazard in expressway operation (Source: China Audit Office, 2008)

Under the same investigations performed by the China Audit Office in 2008, it further revealed the moral hazard problems during project operation and maintenance. It showed that the most serious problem in China is to strategically increase the number of tollbooths. The investigation was done within 18 provinces, among which 16 have this problem. The figures indicated that in these 16 provinces, 158 tollbooths have been detected without license permits and until late 2005 the incurred fees charged from users have been reached 14.9 billion Yuan. It still estimated that if these non-permitted tollbooths were not cancelled, then they would charge 19.5 billion Yuan extra till their expiring dates of operating rights. And for some expressways whose charging periods have been expired, there are still 66 tollbooths that have not been cancelled.

Therefore, taking into consideration our discussion in chapter 4 on institutional deficiencies for using BOT, and confronted with possible strategic behaviors in tendering, construction and operating processes, here we predict that BOT would be subject to high risk of failure with the points that need to be addressed include:

Failure 1: Selection criteria and tendering procedures did not effectively prevent strategic behaviors such as collusions and thus raise the risk of adverse selection.

Failure 2: During the construction period, effective and timely monitoring methods and incentive schemes were

inadequate to prevent jerry-builds.

Failure 3: Although it is difficult for the government to monitor service quality and maintenance work during operating process not only due to the long-period nature of the contract but also due to the substantive transaction costs incurred by monitoring, strong and continuously enforced incentive schemes should be designed to induce the contractor to be compliant with the contractual terms. Or, the contracting law failed in providing incentives for operators and deterring motivations of strategic behaviors.

5.1.4 TOT

TOT has also been used since the late 20th century with two complexions. One is that TOT can be directly and independently applied for old expressways, and another is that TOT can be used for new expressways but combining with the DB model for construction. Its principal agent relation is shown in figure 32 with the government as the principal and the private enterprise as the agent that is selected from private operators through competitive tendering.

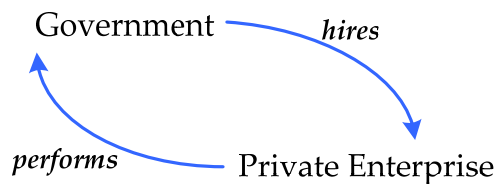


Figure32: Principal-agent relation in TOT

For old expressways, strategic behaviors in this relationship include both adverse selection and moral hazard. Adverse selection for old expressways using TOT can be caused by officials' corruptive behaviors that have been discussed in chapter 4. Apart from corruption, the non-standard selection procedures and prequalification methods would also lead to high risk of adverse selection. Moral hazard problems in the operating process are the same as defined in BOT. For new expressways to be constructed, TOT can be used after completion of project construction which is under the DB model. In such cases, strategic behaviors consist of not only those under TOT and those under DB.

Therefore, the initial prediction on its success or failure simply according to their accompanied strategic behaviors depends on whether the expressway is new constructed or existent. For existent (or old) expressways, it would be predicted with relatively higher possibility of success on the condition that the operating right is transferred on a transparent basis and incentives for the operating process are provided. For new expressways, it would be subject to lower possibility of success because it includes and thus needs to overcome the failure points that belong to both TOT and DB.

But why China still uses TOT as its procurement model for new constructed expressways? The answer concerns the especial considerations and tradeoffs of the Chinese governments on trust issues as we discussed in the first level of our framework in chapter 3. Given China's informal institution context of low levels of trust, the Chinese players cannot be entrusted with long-term, extensive and high-degree of freedom contracts. As Lane (2000) claimed in his book *New Public Management*, since the government cannot simply trust the agent to live up to all its contractual expectations, especially when some of these expectations remain implicit and the future contingencies are unpredictable, a shift should be encouraged from long-term contracting to short-term contracting for the public sector. It further indicated that the shift towards short-term contracting can raise competition in the private sector because the private actors who have bad performance will loss out and others will win. In our circumstance, based on Lane's theory, to develop a new expressway in China it is better using TOT plus DB than BOT because short-term contracting provides with the governments more opportunities to choose a better contractor on the condition that the governments have adequate capacity in tendering

and it offers more motivations for the contractors to well perform since they are easily lost out under short-term contracting.

In chapter 4, we have made comparisons between BOT and TOT on their institutional preconditions but did not conclude which one is better to be applied in the context of China. From the above analysis in the perspective of their accompanied strategic behaviors, TOT also seems no necessarily better than BOT since it still could not deter problems of adverse selection in tendering and moral hazard in operating, and additionally, it does not radically address strategic behaviors in the construction stage. However, from the viewpoint of Lane, TOT could be regarded as a better solution than BOT for China's given informal institution environment with low levels of trust. Therefore, we can lastly predict that TOT would be conditionally successful under China's formal institution context (chapter 4) and the given informal institution environment with low levels of trust, if its accompanied strategic behaviors could be appropriately addressed.

So far, we have analyzed different types of strategic behavior in each procurement model in China and we have predicted their success with conditions of dealing with the listed failure points. Here we make some comparisons among these models in table 16. Recalling the remaining issue in chapter 2 pertaining to the risk management of project-specific risks which may be caused by the accompanied strategic behaviors of PPPs, in this section we add the allocation and mitigation strategies for such risks in table 17.

Table16: Comparisons among the Chinese procurement models

	DBB	DB	BOT	TOT (TOT+DB)
Adverse Selection	√	√	√	√
Moral Hazard in Construction	√	√	√	(√)
Moral Hazard in Operation and Maintenance			√	√
Prediction	Rarely used at present, if it was to be used for now, the following failure points should be tackled at the first place	Conditional success if the following failure points were addressed	High risk of failure with the failure points listed as follows, except that they were addressed	Conditional success if the following failure points were addressed
Failure Points	<p>Contractor selection did not depend on competitive tendering with clear and standard selection procedures and rules.</p> <p>Workers in state-owned enterprises are lack of accountability and efficiency.</p>	<p>Selection criteria and tendering procedures did not effectively prevent strategic behaviors such as collusions and thus raise the risk of adverse selection.</p> <p>Continuously protecting the commercialized state-owned enterprises through government supports of easily access to resources made them loss the real survival capacity in the competitive market and thus bad performance.</p> <p>Effective and timely monitoring methods and incentive schemes were inadequate to prevent jerry-builds.</p>	<p>Selection criteria and tendering procedures did not effectively prevent strategic behaviors such as collusions and thus raise the risk of adverse selection.</p> <p>Effective and timely monitoring methods and incentive schemes were inadequate to prevent jerry-builds.</p> <p>Strong and continuously enforced incentive schemes should be designed to induce the contractor to be compliant with the contractual terms in the operating process. Or, the contracting law failed in providing incentives for operators and deterring motivations of strategic behaviors.</p>	<p>For existent expressways:</p> <p>Selection procedures should be well designed in a transparent way in order to prevent adverse selection.</p> <p>Strong and continuously enforced incentive schemes should be designed to induce the contractor to be compliant with the contractual terms in the operating process.</p> <p>For new expressways:</p> <p>Also failure points under the DB model</p>

Table17: Risk management (Project-specific risks)

Sub-Risks	Allocation	Mitigation
<i>Project-specific risks</i>		
Delay of completion	<ul style="list-style-type: none"> ➤ Constructor if the delay is due to the internal management inefficiency and wrongful work in the construction company ➤ Government if it makes tremendous changes in outcome specifications 	<ul style="list-style-type: none"> ➤ The constructor should make sure that all the requirements have been met before construction (such as land, building license, etc.). ➤ If the government makes tremendous changes in output specifications during construction, then the government should allow certain extension of the construction period and provide some degree of financial compensation.
Construction cost overrun	<ul style="list-style-type: none"> ➤ Constructor if it does the cost estimates ➤ Government if it makes tremendous changes in outcome specifications 	<ul style="list-style-type: none"> ➤ The general constructor may sub-contract with several small constructors and in this way it may transfer the cost overrun risk to sub-contractors. ➤ The constructor should estimate project costs on a rational basis. ➤ If the government makes tremendous changes in output specifications during construction, then it should offer certain compensations for the constructor at least the constructor can make some profits from building this project.
Project demand risk	<p>Depending on who does the estimates, it may be:</p> <ul style="list-style-type: none"> ➤ Constructor ➤ Government ➤ Consultancy firm 	<ul style="list-style-type: none"> ➤ Estimates from the constructor should undergo the peer reviews and expert examinations. ➤ Estimates from the government should be presented periodically on the table of conferences and should undergo the scrutiny examinations. ➤ Estimates from consultancy firms who provide estimations for the constructor and the government should be not only based on historical data, but more on public consultations.
Operation cost overrun	<ul style="list-style-type: none"> ➤ Operator 	<ul style="list-style-type: none"> ➤ Operator should increase the efficiency of the operation team by increasing the productivity of the staff and the equipment. ➤ Operator should adjust the operation costs periodically in order to check the costs with the benchmark. ➤ Maintenance schedule should be designed on a scientific basis, neither too frequent nor too seldom.

5.1.5 DBO(M); DBFO; and BOO

At present, some discussed procurement models including DBO(M), DBFO, and BOO in chapter 2 have not appeared in China's expressway sector. The reason for DBO(M) and DBFO is that in the regulation Administrations on Toll Roads it is stipulated that road infrastructure can be only charged in the cost-recovery period. Once the costs have been recovered, the operating rights have to be transferred back to the government. Shadow tolls, which are initially applied in UK and also now adopted in other countries, under the DBFO model, are payments made by government to the private operator and the system of shadow tolls eliminates the need for road users to pay tolls directly and thus avoids the cost incurrence of toll collection but to pay through fuel taxes and vehicle registration fees. Therefore, another possible reason for the absence of DBFO may be that there are no fuel taxes currently in China. Supposing that shadow toll systems were built up, then the available payments made by the government to the private operator only include vehicle purchasing taxes and the yearly road maintenance fees (known as user charges in China), which are dramatically inadequate for recovering the initial project investment of the private operator. And for BOO, the reason is that in China the property law has stipulated that lands are owned by the state and thus all the road infrastructures belong to the state

5.2 Dealing with strategic behaviors

In the previous part we have analyzed types of strategic behavior in the procurement models and concluded with some failure points that might result from these behaviors and that need solutions for improvements. Here recommendations are put forward to deal with them.

5.2.1 Recommendation on state-owned enterprise accountability

Lack of accountability in state-owned enterprises would lead to negative effects on the performance of the DBB and DB model. Although in DB the state-owned enterprises have been commercialized, problems of inefficiency can result from non-accountable behavior still. Therefore, motivations and incentives should be designed to encourage accountability and thus efficiency. In chapter 3, theory on monitoring and incentives does not refer to dealing with problems of state-owned enterprises since they are not universally applied due to the international status of state-owned enterprises, here we reinforce them according to the empirical research in part 5.1, which is special for the context of China with currently 60% design and construction enterprises being state-owned ones.

The incentive method being used is the *performance contract* between the government and the state-owned enterprise. The "performance contract" is a written agreement that specifies the targets that the enterprise pledges to achieve during the contractual period and that defines how performance or project outcome will be measured at the end of the contract. And normally the performance contract acts as a component of the procurement agreement. Before late 1970s, China's state-owned enterprises were run without any forms of performance evaluation, thus the emergence of performance contract seemed a logical solution to accountability. Although its logic is persuasive, the reality has been disappointing with empirical studies from the World Bank (1998) showing that no evidence that performance contracts had obvious improved accountability and efficiency was found. The reasons were that performance contracts did not reduce the information advantages the managers enjoy; did not include motivations through rewards and penalties to achieve targets; and did not convince the managers with credible promises of these rewards and penalties. For China, the most serious problems are that the incentive (wage increases linked to profits) was set too low to motivate improvements in accountability and efficiency (World bank, 1998) and the government did not adhere to the performance

contracts after they were signed. Therefore, here we will give raise our first recommendation on increasing accountability and efficiency in state-owned enterprises:

Dividend policy: Dividend policy connects the wages of managers and workers in state-owned enterprises with profits made in the enterprises.

Dividend policy may provide motivations and incentives for staffs in state-owned enterprises because their performance will influence the gains that are to be distributed to them, and thus, it will reduce agency costs for the government to adhere to the contract. In China, some state-owned enterprises have applied this policy and usually the dividend is distributed by the capital share determined within the enterprises according staffs' past performance and positions. One thing that needs to be carefully considered while using this policy is that sometimes the Chinese governments cannot withhold the temptation to control managers and thus political interference would lead to increase in agency costs. In such circumstances, managers might reserve cash for the purpose of covering their mistakes, doing favors to politicians or having financial flexibility, since dividend policy may reduce free cash flow in the enterprises and thus add discipline to the managers.

5.2.2 Recommendation on tendering to select the right contractor

Strategic tendering in forms of collusion between bidders would not occur in a vacuum. To a large extent, collusions are strategic and reflexive response to the tendering environment. The friendlier the environment for such actions is, the more likely are emergence of collusions. Therefore, an environment with adequate incentives of giving up collusive behavior needs to be built up. In chapter 3 we did not talk about incentives for tendering processes because there are no universally appropriate theoretical standards on tendering procedures or selection criteria that must be effective for dealing with strategic behaviors, but the measures are closely linked to countries' institutional circumstances. In this part, aiming at the three types of collusion discussed in part 5.1, here we will try to put forward possible recommendations on how to avoid collusion among bidders and thus to select the right contractor.

The first recommendation is to credibly increase collusion-costs of the bidders who are attempting to collude relative to their potential benefits from collusions.

Since the motivation of collusive bidders is the potential benefits gained from their collusive actions, increase in their venture costs of such behaviors relative to their potential benefits will discourage bidders from colluding because they will be subject to high risk of loss. The more costly the actions are, the less is the attempt. Manners of raising venture costs may include setting a disclosure system and extremely heavy penalties. Bidders who are disclosed due to colluding will suffer from high degree penalties involving not only economic punishment, but also the administrative and legislative sanction. Economic punishment is in term of money and administrative and legislative sanction is related to the forbidden of attending future project tendering in a certain time limit. Given the constant benefits of bidders from colluding, such a heavy venture cost will provide bidders strong incentives to feel unworthy to collude (Feng, 2005; Song, 2005; Sun, 2007). In China, such a disclosure-penalty system has been built up, called Administration Ordinance on Strategic Behaviors in Tendering, which has been planned to be formally legislated and put into effect on January 1st, 2009. The challenging problem, how to prove collusions, has also been stipulated in this Administration Ordinance. It stipulates that the bidders who have been disclosed with strategic behaviors should be transferred to provincial or national judiciary departments and if they are judged with crime of disturbing the orderly tendering procedures and thus influence the tendering results, then the disclosure-penalty system will start up.

The second recommendation is to apply a broad range of bidders, and if possible, in a larger territory area.

Tendering among a small scale of bidders will increase the possibility of collusion because it creates an easy environment for bidders to communicate and collude with each other. The information obtained through such strategic communications among bidders makes bidders move onto an advanced position

over the government during tendering process and thus collusions might occur. Therefore, a broad range of bidders are recommended in order to reduce communication among bidders since the costs for communicating with all bidders would be substantive. In addition, bidders in other regions where the project is not located need to be invited because in some cases in a certain region bidders have been familiar with each other and strategic communications and exchange of information have been commonplace. One shortcoming of this method is that it will increase transaction costs of tendering for that number of bidders increase with increased submitted documents (Song, 2005; Sun, 2007; Li et al 2007).

The third recommendation is to use the semi-transparency policy in the way that the government knows the total bidders but each single bidder does not realize others.

It has been acknowledged that strategic behaviors are caused by agents' information advantages. Therefore, one effective measure to avoid strategic behaviors is to reduce the information advantages of the agents. Semi-transparency policy is thus recommended in the way that the government reduces the information possessed by the bidders through holding up their awareness on who are other bidders. Thus the bidders are insulated from each other and back-to-back. Here, "semi-" does not mean that the tendering procedures and selection criteria are opaque in the government, but means that information between the government and bidders is single directional and positive to the government. In China, few project tenders have adopted this insulated manner to select contractor, so it still needs time and channels to get popularity (Li et al, 2007).

The fourth recommendation is to adopt the two-dimensional evaluation method to determine the optimal contractor, but not solely depends on comparisons among bidders.

Another effective measure to recognize whether the bidder is in collusion is to adopt the two-dimensional evaluation method, which means that the evaluation is according not only to comparisons among bidders (horizontal dimension), but also comparisons of intra-bid (vertical dimension). The purpose of intra-bid comparisons is to examine whether the submitted bid price is in consistent with the bidder's capacities in its technologies and management. If there is a substantial gap between the bidding price and the actual price that is accordance with the bidder's capacities, then there is a high probability of cheating. Currently in China, the vertical evaluation of bidder is rather rare or ignored, but largely focuses on the horizontal evaluation (Song, 2005).

The practices of other counties for preventing adverse selection usually emphasize the design on selection criteria. The commonly used selection criterion is the lowest net present value (NPV) such as Canada, Norway, Finland, Australia and England. The United State applies the "Best Value" selection method during tendering, which means the mixed selection criterion emphasizes 50% price and 50% quality. Some other countries like Poland emphasize that the selection criteria should not pertain to the characteristics of the potential bidders.

5.2.3 Recommendation on construction to get the project implementation right

Strategic behavior (ex post contractual moral hazard) during the construction phase is the primary problems of asking for investment supplement and jerry-build (discussed in part 5.1). Combining the theory of monitoring and incentives in chapter 3, here we give rise to the following recommendations for cases in China.

The first recommendation is to use the fixed-price contract for projects under DBB and DB models with periodical payment from the government.

In chapter 3 we discussed the fixed-price incentive contract that may provide private constructors with cost-saving incentives. In China, fixed-price contract is applied in most provinces, which offers the

magnitude of incentives when the share formula is 0/100 (principal/agent) in the case of a fixed-price incentive contract. Therefore, incentives for cost-saving are not the problems, but the problem is that when the constructor realize that it is unable to profit from the project due to its bad performance in cost management, it may give up the project unilaterally. And because of the asymmetrical information on the actual project costs that have been spent, the government may not take back the initial investment. Therefore, we recommend using a short-term periodical paying system, in which the government may pay the constructor for its work monthly after evaluating project quality and schedule. In such a way, the constructor will not strategically terminate the contract because it may only obtain the amount of payment according to the work done. Even if the constructor terminated the contract, the government might also continue the project by contracting with others.

The second recommendation is to employ a construction monitoring group to ensure project quality and thus to prevent jerry-build.

As discussed in chapter 3, construction monitoring may be effective in timely supervising project quality and provide technical supports for the constructor. In China, expressway construction has been regulated in the way that construction can not start until the monitoring group is ready. The construction monitoring group that has advanced professions in building techniques and technologies is able to prevent jerry-build of the constructor. However, a new problem has been appeared. The relation between the government and the monitoring group is also a principal-agent relation and thus the government may be subject to moral hazard from the monitoring group as well, and even there is the possibility that the constructor and the monitoring group may collude with each other. Therefore, this recommendation needs complementary measures to be discussed in below.

The third recommendation (not universally applied theory) is to implement the policy of "liable for project during whole life of the project legal person and the monitoring legal person".

Another effective method of providing incentives for constructor and also the monitoring group is to legislate for their legal representatives' liability for projects during their whole lives. Such a method will provide great incentives for them to be accountable for their work during constructing and monitoring because even if the project is finished, they are still linked to personalized responsibilities for project quality. For instance, if a project suffers from quality problems during the latter process of operation, and if the project sample has been tested and concluded with jerry-build, then both the project legal person and the monitoring legal person will be accused by the government and be taken on the legal duty. Therefore, it is still possible for project legal person and monitoring legal person to be traced and punished even after many years' operation if they behaved strategically at that period of construction. And thus this policy recommendation will incentivize them to act much more accountable for the project in case they were accused.

5.2.4 Recommendation on operation and maintenance to get the project implementation right

As we discussed in part 5.1, strategic behaviors in the process of operation and maintenance concentrate on strategically and wrongfully increasing operation profits through charging more than normal or reducing maintenance. And since the long duration of an operation contract makes it difficult and costly to monitor operator's performance timely, relational contracting, introduced in chapter 3, is thus recommended in such a circumstance to provide incentives for operator to behave accountably. In addition, we also recommend that public hearings are effective either as an independent solution for motivating operators or as a supplementary manner for relational contracting.

The first recommendation is to adopt "reputation policy" and Williamson's relational contracting law.

It is recommended to build up a reputation credit mechanism, which will make a record on private contractors' "reputation" accounts depending on their past performance. Such an account may indicate

the level of reputation for each private contractor to be referred by future projects. And the private contractor who is linked to a reputation account would act carefully to perform tasks and be more accountable because moral hazard that may cause a bad performance will reduce the reputation level and further influence its involvement in future projects. Therefore, the reputation policy would lead the private contractor to think and behave in a perspective of long-term strategy. Williamson's relational contract law emphasizes the ongoing-administrative characteristic taking into account the reputation that has been accumulated by the contractor even not after contract completion, but during the contract implementation. Therefore, it would be effective to incentivize the contractor especially in a long duration contractual relationship.

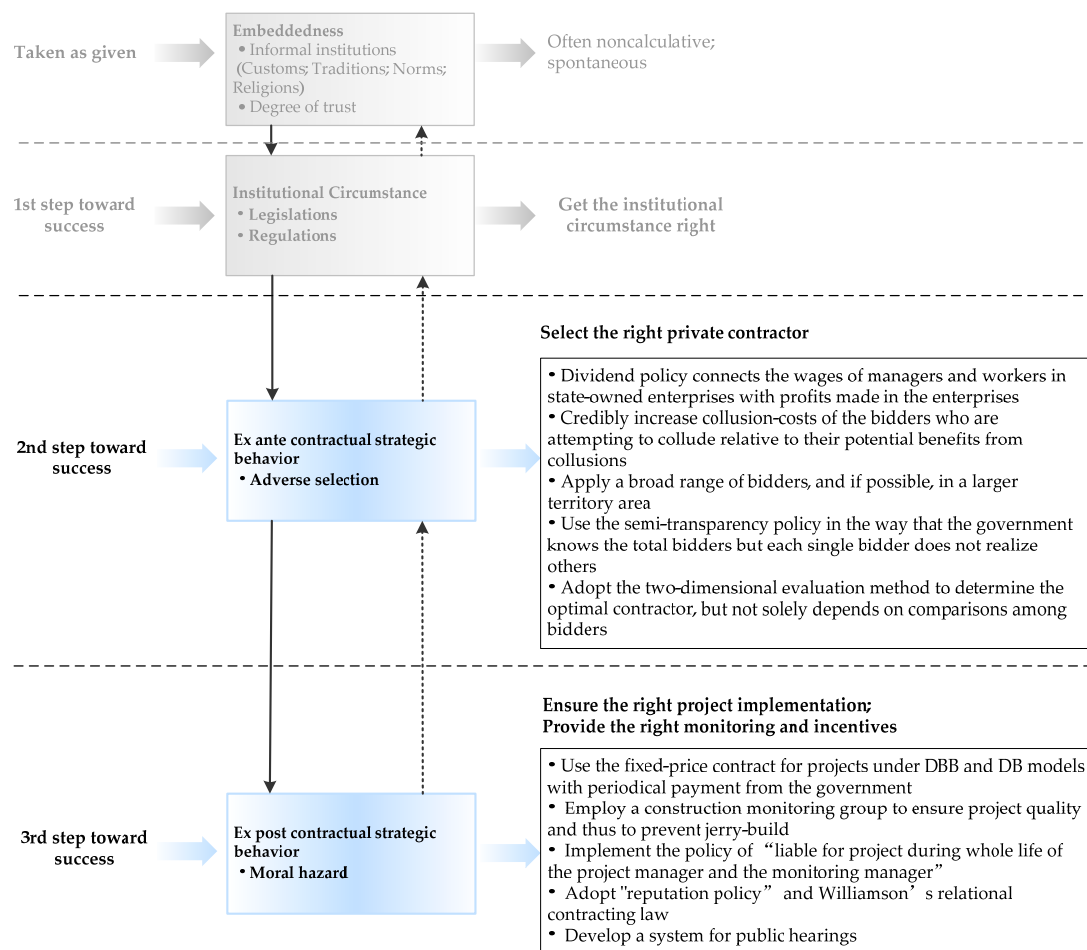
The second recommendation is to develop a system for public hearings.

A system for public hearings is recommended because the public is the direct beneficiary of the road infrastructure and could directly experience the service performance and the road quality status while using the road. Usually opinions from the Chinese public will become stuck during transmission because there is an absence of a governmental system for the public to deliver their opinions. If such a system was built up, the public users could easily reach the government and reflect their complaints about supplier's bad performance and poor road status. Therefore, the public users would be the best timely monitoring group. In addition, public hearings could be used as a supplementary method for Williamson's relational contract law because supplier's reputation during the on-going administrative management could be reflected through getting public opinions.

In the preceding sections, we have explored various types of strategic behaviors running through the life cycle of an expressway project and recommendations on how to deal with them. They are the findings we found out at present through the empirical research and interviews, thus they may be incomplete and need further investigations. And these strategic behaviors may be dynamic depending on the institutional changes or legislation environment improvements over time. In the next chapter we will have five case studies to make some complementarities and to see how some of these empirical findings behave in real cases.

5.3 Conclusions

In this chapter we have explored a number of strategic behaviors accompanying each procurement model, predicted their failure or success with possible failure points, and put forward the recommendations on dealing with them for the purpose of selecting a right contractor and getting the project implementation right through monitoring and providing incentives. Recalling our mission presented at the very beginning of this chapter in the framework, we can therefore enrich it as follows.



CHAPTER 6 CASE STUDIES AND FINDINGS

In the preceding chapter 4 and 5, we have completed our four-level framework via exploring institutional deficiencies and strategic behaviors against favorably applying PPPs in China through empirical research. In this chapter, we extend the empirical research by studying five Chinese expressway cases. Theoretically speaking, methodologists are strict with the selection of cases in analytical and comparative research in terms of their critical and representative properties. But in reality it is to some extent hard to access to ideal cases illustrating all the aspects of the preceding discussed theory. *In this thesis, the selection of cases is based on other grounds, including the availability of data and empirical materials; the practical feasibility of content analysis; and the accessibility to the interviewees.*

The selected cases are Shen-Da Expressway in Liaoning; Xiang-Jing Expressway in Hubei; Le-Yi Expressway in Sichuan; Citong Bridge in Fujian; and He-Chao-Wu Expressway in Anhui. Shen-Da Expressway is the first expressway in China, experiencing its first construction in 80s and extension in 21th century. Xiang-Jing Expressway is the first expressway in China developed under the BOT model. Le-Yi Expressway is the first expressway in Sichuan Province under BOT. Citong Bridge, under BOT model and located in Fujian, is a representative case illustrating the unfavorable business environment offered by the regional government to private actors that has been broadly reported and discussed by the Chinese media. And the He-Chao-Wu Expressway is also a typical case revealing corruption in transferring operating right of the expressway and has been also disclosed by media. Furthermore, in the end, several cases under TOT are introduced without detailed presentation but analysis on their success.

6.1 Shen-Da Expressway



The Shen-Da Expressway (figure 33) connecting Shenyang and Dalian is the first expressway in China that was planned in early 80s. Its construction started in 1984 and completed in 1990 with the total length of 375 km, including 27 interchanges, 148 bridges, 451 culverts, 7 rest areas and 7 control centers. It locates in Liaoning province with significances for facilitating the regional economic development

(Liaoning Department of Communication, 2000) because one of its terminals is in Shenyang which is the economic, cultural and political centers of Liaoning province and another terminal is in Dalian where there is a harbor with throughput of 0.2 billion ton until 2006 (Li and Xi, 2001). It was designed with 4 lanes for both directions initially in 1980s, and after 10 years operation, in 2000, the traffic volume has reached 6739 cars per day with yearly traffic amount increase by 11.8%, and thus the traffic amount in 2000 has been already 20613 cars per day. Confronting such an increase in traffic volume, the expressway was widened into 8 lanes for bidirectional carriageways in 2002 after careful evaluations in terms of costs and benefits by Liaoning People's Government and Liaoning Department of Communication. After 3 years, the expressway opened again in 2005 with fully new constructed lanes and supporting facilities such as new rest areas and computerized monitor systems. In the following parts more detailed information on this expressway will be presented.



Figure33: Shen-Da Expressway

6.1.1 Shen-Da expressway between 1984 and 2000

In 1984 Shen-Da expressway started constructing on a DBB basis. The design responsibility was automatically assigned to Liaoning Transportation Plan and Design Institute and Liaoning Road and Bridge Construction Corporation was also automatically selected as the constructor. Operation was taken in charge by Liaoning Department of Communication, the department of expressway administration bureau. The total investment of the expressway was 2.2 billion Yuan composing 3% public funds from the central government, 16% public funds from the Ministry of Communication, 73% fiscal funds from Liaoning people's government and 8% bank loans (figure 34). Going through 6-year construction, the project was inspected without quality problems and then entered into its operation phase.

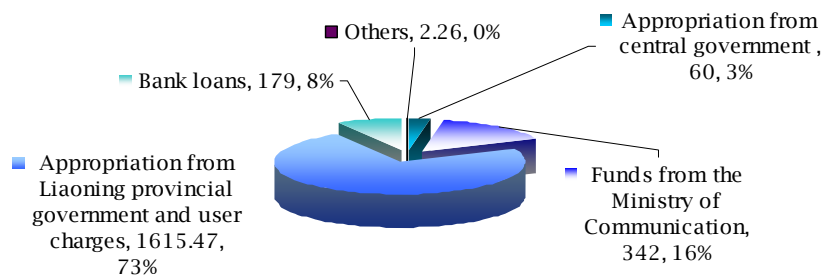


Figure34: Financing sources of Shen-Da expressway before reconstruction and extension (million Yuan)

During its operation from 1990 to 2000, this expressway helped Liaoning to achieve significant economic improvements and contributed a lot to Liaoning governmental revenues. The revenues from tolls have increased by 32% each year from 1990 to 2000 and the accumulated revenues from tolls until late 2000 have reached 2.92 billion Yuan (table 18). Along with the economic reforms in Liaoning province, known as the "Northeast Rejuvenation Policy", traffic demands for this expressway during this period have also increased dramatically (table 18), compared with 1990, the amount of car equivalent per average day in 2000 has raised by 205.83%.

Table18: Toll revenues and traffic demands of Shen-Da expressway from 1990 to 2000

Year	Revenues from tolls (million Yuan)	Traffic demands (car equivalent per average day)
1990	16.3	6740
1991	51.6	8194
1992	96.2	11558
1993	160.9	11042
1994	178.9	13640
1995	199.6	14944
1996	320.6	15178
1997	371.2	13949
1998	368.4	17456
1999	513.2	19219
2000	639.4	20613
Total	2916.1	-

In late 1999, Liaoning Department of Communication commissioned Liaoning Transportation Plan and Design Institute again to carry out the periodical inspection of the project quality. The applied technologies to inspect the road conditions included the probing into sampling rationality in drilled core testing of the road; deformation measuring; and pavement condition index (PCI) measuring in order to examining road foundation stiffness; road surface deformation degree; and road surface condition respectively. The inspection results showed that the minimum surface deformation value along Shen-Da expressway was 40, which was much larger than the designed maximum value of 30. And there was 174-km length of the expressway with deformation value around 70, and 137-km with deformation between 70 and 120, 38-km with deformation more than 120, even. Furthermore, the results obtained from probing showed that the foundation thicknesses of some parts of the expressway were smaller than the designed value and that the asphalt layer and the foundation layer have been separated with each other. Moreover, PCI revealed that 233-km length of the expressway had low and middle degrees of surface condition. Furthermore, results also showed 222 locations of jerry-builds (table 19).

Table19: Detected jerry-builds of the old Shen-Da Expressway

Project Quality Problems Detected	Types of Jerry-builds	Jerry-builds
Foundation deformation and thus Road surface sink	Experience-dependent jerry-build (depending the experience from constructing urban roads)	Reduction on concrete strength class and Insufficient solid-stressing on the foundation
Road surface crack	Experience-dependent jerry-build	Experience-dependent calculation on the mixture ratio of sand and asphalt and Insufficient used antifreeze agent

Challenged by these results, deep reasons on why the road quality was much lower than expected were found out. First, it should be clarified that the poor quality was not resulted from lack of maintenance because the maintenance work has also been examined by the Institute with good maintenance performance. Second, at the time when the project was completed in 1990, inspection techniques for road quality were still under developed and thus unobvious and non-significant quality problems could not be detected (Liaoning Road Plan and Design Institute, 2000d). Third, the most rooted reason is that the constructor did not take its responsibility and was not accountable for its work due to the absence of monitoring, incentives for accountability and appraisal of their performance (Liaoning Department of Communication, 2000). In sum, during the operating period, Liaoning Department of Communication had the following conclusions in 1999:

1. *Shen-Da expressway during the past 10 years has indeed contributed a lot to Liaoning Province not only in terms of economic development, but also the increase in government revenues.*
2. *Traffic flows on Shen-Da expressway has increased by 11.8% per year between 1990 and 1999, and the amount of car equivalent in late 1999 has been two times larger than that of 1990.*
3. *In late 1999, the results of the inspection of road quality have shown that the quality has been lower than the normal expected level. The rooted reason has been owing to the lack of accountability of the constructor.*

Confronting the increasing traffic demands and decreasing road quality, Liaoning Department of Communication had the intention to heavily repair and extend the existing expressway, which needed substantial researches on its feasibility (Liaoning Road Plan and Design Institute, 2000a). Thus we will discuss how the Department made this decision in part 6.1.2.

6.1.2 Shen-Da expressway between 2001 and 2008

Before reconstructing and extending the Shen-Da expressway has been determined, a series of feasibility studies were organized in 2000 by Liaoning Road Plan and Design Institute (LRPDI) that was committed to Liaoning Department of Communication. The first feasibility study was on forecasting traffic demands from 2000 to 2025, which is shown in figure 35. The overall trend would be climbing with traffic demands of 97.265 thousand cars per average day in 2025 that was increased by almost 5 times more than the traffic demands of 20.613 thousand cars per average day in 2000 (Liaoning Road Plan and Design Institute, 2000b).

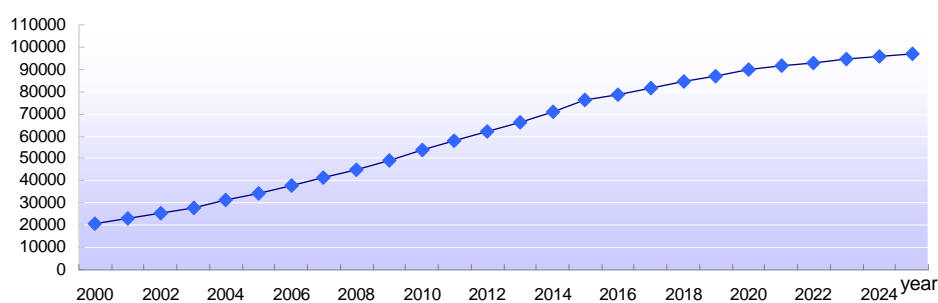


Figure35: Traffic demands forecasting from 2000 to 2025

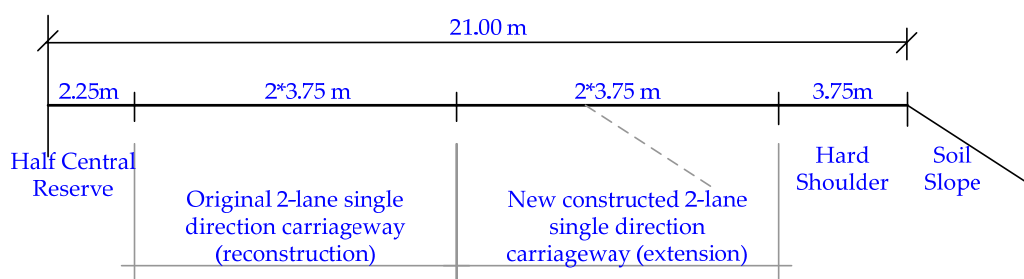


Figure36: Cross-section of Shen-Da expressway after being widened

Apart from the forecast of traffic demands, LRPDI also did the study on whether the geographical conditions would be feasible for extending the existing expressway and to what extent the expressway should be extended. The results showed that the existing expressway should be widened into an 8-lane bi-directional carriageway with 4 lanes of the original ones to be paved with a fresh surface and another 4 lanes to be newly constructed (figure 36) (Liaoning Road Plan and Design Institute, 2000c). These results were regarded as optimal ones because the process of feasibility study has taken into consideration of not only the estimated traffic demands, but also construction costs, economic and financial benefits. The budget costs was 7.2 billion Yuan, among which 2.6 billion was used for paving the new surface on the original road and 4.6 billion was used for constructing the new 4-lane carriageway (Wei, 2001; Liaoning Road Plan and Design Institute, 2000e). The evaluation of its economic benefits showed that this project's economic repayment period was 16 years with net economic present value of 8.2 billion Yuan and economic benefit-cost ratio of 2.76. And the financial evaluation revealed that its financial repayment period would be 18 years, the net financial present value was 7.6 billion Yuan and the financial benefit-cost ratio was 3.38. As can be seen in table 20, both the economic and the financial evaluations satisfied the base requirements of project investment. Therefore, the Shen-Da expressway reconstruction and extension in terms of traffic demands forecast, economic and financial evaluations thus could be considered feasible.

Table20: Economic and financial evaluations of Shen-Da expressway reconstruction and extension

Evaluation	Project value		Baseline value
Economic evaluation			
Net economic present value	8.1 billion	>	7.2 billion
Economic benefit-cost ratio	2.76	>	1.00
Financial evaluation			
Net financial present value	7.6 billion	>	7.2 billion
Financial benefit-cost ratio	3.38	>	1.00

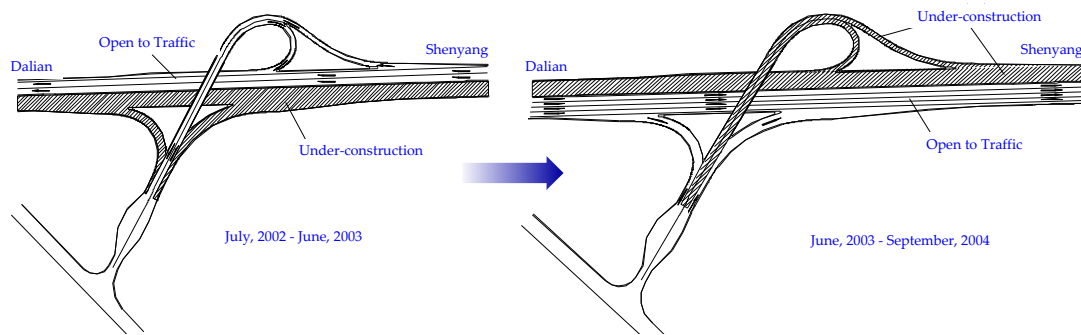


Figure37: Shen-Da expressway construction

In late 2000, the Shen-Da expressway entered into its process of reconstruction and extension. The constructor responsible for both reconstruction and extension was also automatically selected and it was the same constructor as it was originally built, Liaoning Road and Bridge Construction Corporation. During construction period from 2001 to 2004, in order to alleviate losses from tolls, some parts of the expressway where construction was not carried out still opened to traffic (figure 37). After project completion, results of project quality inspection showed no significant problems but the actual project costs (figure 38) has exceeded by 1.23 billion Yuan than the estimated costs, which has been subsidized by Liaoning Department of Communication. The risk of cost overruns was allocated to the government because the budget cost was estimated by the government. And in this project, cost overruns were caused by over optimism of the government on estimating the costs due to its regardless of the costs incurred by applying foreign techniques and construction materials to which the workers were unfamiliar and had little experience in using them. In Shen-Da expressway reconstruction and extension, new technologies and construction materials that were used included the Germany SMA⁶ anti-slip technology for anti-slipping the road surface; the US DALWORTH⁷ improved asphalt for increasing road surface quality; and the French SECMAIR⁸ crush technology for enhancing the stickiness among different layers of the foundation (Liaoning Road Plan and Design Institute, 2000f).

Since September 2004, the expressway has been fully opened again to traffic. Until April 2006, the total toll revenues have reached 1.48 billion Yuan. And in 2005 the average daily traffic amount has been 30 thousand car equivalents, which approached to the forecasting amount of 34 thousand car equivalents per day. However, after the reconstruction and extension, the toll has been raised from 120 Yuan for the entire way to 125 Yuan with 32 tollbooths in total. Although it has been only three years since its second opening, a couple of lessons were learnt from this case's reconstruction and extension.

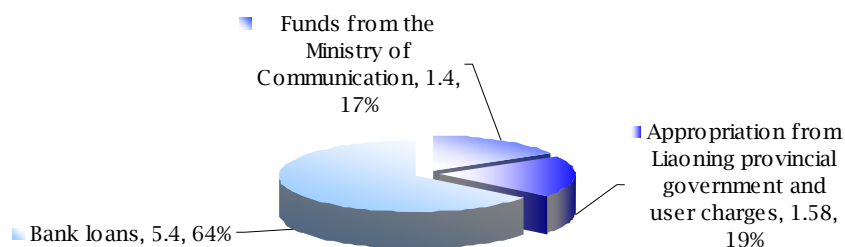


Figure38: Actual costs and financing sources of Shen-Da expressway reconstruction and extension

⁶ SMA is a kind of method to mix road surface construction materials in order to reduce the slip property of the road, which was invented by German and is now often used for advanced level of road, such as airport runways, expressways and bridge surfaces.

⁷ DALWORTH improved asphalts which was invented by US not only can increase the stiffness and the property of anti-high temperature of the road surface, but also increase the property of anti-abrading.

⁸ SECMAIR crush technology was invented by France which is used for increasing the stickiness of the detritus materials.

6.1.3 Lessons learnt

From the perspective of economic achievement, both the old Shen-Da expressway and the one after reconstruction and extension have become the critical expressway in Liaoning since the old one has contributed greatly to the achievement of economic development in Liaoning province and it had significant meanings for transport sector as the first expressway in China and the new one has assisted in accommodating to the increasing traffic demands and improving the poor condition of the road surface. However, from the standpoints of our preceding discussed theories it still cannot be regarded as successful because problems have emerged, as we summarized below:

1. *As we discussed in chapter 5, automatic selection of the contractor may cause even more serious problems during project construction and operation. In our case, the constructors for the old expressway and the new one were the same state-owned road construction corporation and were automatically appointed. During the construction of the old expressway, the state-owned enterprise performed lacking accountability for project quality, although the consequences resulted from non-accountability were not detected at project completion in 1990, yet they led to implicative quality problems in the future. During reconstruction and extension of the old road, this state-owned enterprise thus exerted greater efforts in dealing with the old rudimental quality problems. In addition, the first-time application of foreign techniques and materials has caused increase in total costs due to its knowledge and experience restraints for those techniques.*
2. *The cost overruns (the actual cost has exceeded the budget cost, 7.2 billion, by 1.23 billion Yuan), not only because of state-owned enterprise's lack of knowledge and experience, but also because of the government's over optimism on their application, were thus allocated to the government who did cost estimations.*
3. *After 10 years from 1990, project financing has moved far from government fiscal financing but turned in favor of bank loans, but this raised new problems of increasing the load of government debt.*
4. *Although the expressway was reconstructed and extended into a much well-status condition and a better capacity for mobility, the toll price and number of tolls were both increased. Such increases would be transferred to the end users.*

6.1.4 Institutional weaknesses and strategic behaviors encountered

In the preceding theory chapters, we have focused our attentions on institutional preconditions and strategic behaviors, in studying this Shen-Da case, in this section we will summarize what institutional weaknesses and strategic behaviors have been encountered in table 21.

Table21: Institutional weaknesses and strategic behaviors encountered in Shen-Da case

Theory	Shen-Da Case
Institutional Weaknesses	
Lack of regulations	The old Shen-Da expressway was planned in 80s at which time there were few laws and regulations pertaining to construction and operation to ensure the right institutional environment for expressway projects.
Lack of laws	
Bias optimism	Government's bias optimism on estimating project costs has resulted in cost overruns by 1.23 billion Yuan
Strategic Behaviors	
Automatic selection	The designer and constructor for both the old Shen-Da expressway and the one reconstructed and extended were automatically selected, which has resulted in lack of accountability during

Lack of accountability	project construction. Lack of accountability has been inspected and resulted in problems of jerry-builds.
Jerry-builds	222 locations of jerry-builds have been inspected after years' operation, concentrating on foundation deformation and surface sink and crack.

6.2 Xiang-Jing Expressway



The Xiang-Jing Expressway is the first expressway project being developed under BOT in China. It is located in Hubei province and runs from Xiangfan to Jingzhou with the total length of 185 km and total budget investment of 4.485 billion Yuan (figure 39). The project construction started on January 2001 and opened to traffic on June 2004, and features two-lane dual carriageways, 148 bridges, 385 channels, 595 culverts, 30 interchanges, 2 rest areas, 9 barrier tolls and one central control system. It connects the Han-Shi and Xiang-Nan expressways on the north, Hu-Rong National Road on the south and reaches the No.207 National Highway through the Changjiang-River Bridge. In addition, Xiang-Jing expressway is the key transportation project in the tenth five-year plan of Hubei province because it fills the missing link in central areas and thus facilitates its economic development (Wu, 2002).



Figure39: Xiang-Jing Expressway

6.2.1 The prior time and promotion of BOT concept

During the ninth five-year plan from 1996 to 2000, the governmental investment in road infrastructure in Hubei province has reached 25.47 billion Yuan, but the total expressway mileage was only 569 km.

When it came into the tenth five-year plan from 2001 to 2005, new roads were projected with an estimated investment requirement of 78.96 billion Yuan. Compared with the ninth five-year plan, total investment in roads would be increased by 210%. In expressway sector, the mileage has been raised by 1080 km and reached 1649 km till 2005. Apart from expressways, Hubei government planned to build 11 bridges and 5000 km 2nd grade highways and 14000 km country roads, with total estimated investment requirement of 50 billion Yuan at that time. Thus the total investment requirement in roads during the tenth five-year plan would be 128.96 billion Yuan in total, which gave rise to the Hubei government great fiscal pressure. As a result of such a big investment requirement, the Hubei government determined to try BOT as a solution for alleviating fiscal pressures and Xiang-Jing expressway was the first one using this solution that was approved by the National People's Congress. However, the BOT concept was not put forward without deep consideration and arbitrarily. Along with the continuous deepening of the investment reforms in China and previous studies by experts in infrastructure field on multi-source financing, the Hubei government successfully garnered supports for this concept from the central government and the local department of communication. In 2000, the Hubei government released terms of reference for pre-feasibility study of using BOT to construct Xiang-Jing expressway, which attracted attention from private investors. In addition, the government committed design to the Hubei road design and plan institute (a state-owned enterprise) with funding to complete necessary engineering and environmental studies, and to workout the tender documents for this project.

6.2.2 Tendering process

Officials at the Hubei government were encouraged by the results of the studies and moved the Xiang-Jing project as a privately financed expressway under BOT. Thus competitive tendering was launched in late 2000. Given the fundamental differences between the traditional public procurement process and the BOT approach, the government relied on services of consultancy firms that have foreign experience with applying BOT. Going through the qualification, the BOT contract was granted to a new established company composed by five independent private enterprises with investment proportions of 55%, 20%, 10%, 9%, and 6% (figure 40), depending on the multiple selection criteria of proposed technical solutions, financing standings, and proposed regulation on profits.

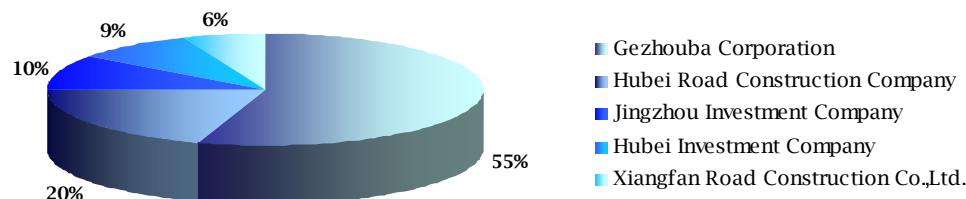


Figure40: Investment composition of the concessionaire for Xiang-Jing expressway

The concessionaire, Hubei Xiang-Jing Expressway Co., Ltd, with registered stakeholders has been shown in figure 40. Apart from their financing responsibilities, there is a series of other construction and operation responsibilities for different players in the concessionaire, among which Hubei Road Construction Company and Xiangfan Road Construction Co., Ltd. took in charge constructing and Gezhouba Corporation assumed the responsibility of operating, collecting tolls and maintaining since it occupied a dominant position in the concessionaire as it was a major shareholder and the largest contractor. And they divide potential profits according to their investment proportions. Figure 41 shows the structural organization of the concessionaire and its various agreements, which governs the relationships of its stakeholders. The concession period is 35 years, including construction. And 35% of the investment came from self-financing of the concessionaire and other 65% was from bank loans.

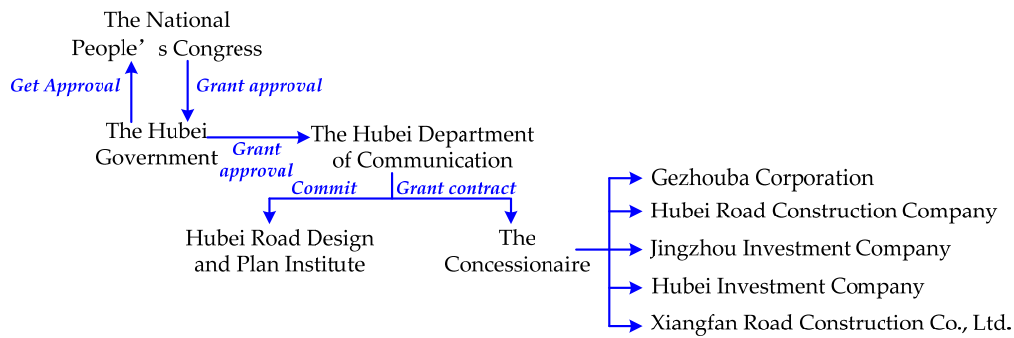


Figure41: Structural organization of Xiang-Jing concessionaire

The concession contract as well as the negotiation process defined responsibility and risk allocation and profit regulation between the government and the concessionaire. Project-specific risks, market risks and capital risks were assumed by the concessionaire, while the political risks were bore by the government. Such an allocation method has brought the contractor into bearing a majority of risks, the reason for which was that the governmental policy for this project advocated “who invests, who assumes risks”. Regulation on profits adopted the “fixed price incentive contract”, and a certain profits level was established. When profits are lower than this level, the government will provide with subsidies and when higher, extra profits will be divided according to the share formula. In addition, the responsibility of land acquisition should be bore by the contractor, but considering that property right of land belongs to the nation and Administration on Land Use stipulates that the farmland that is levied for other purpose must be compensated in else areas with the same acreage, thus this responsibility was determined to be taken by Hubei Department of Land and Resources along the project line in order to avoid unnecessary project delays. And the contractor obtained a use right of the land not only where the project occupied, but also where the construction activities carried out (Beijing Construction Project Investment and Consultancy Firm, 2002).

Some people may put forward the question – why state-owned enterprises are kept out during tendering under BOT model? The practice in China is that there is no domestic state-owned investment enterprise at present. The state-owned enterprises involved in DB and DBB models only take responsibilities of design and construction, but not investment or financing, that is to say, rare state-owned construction enterprises have investment or financing capacities. Thus, expressway projects using BOT are usually tendered among private enterprises that could be private construction and operation enterprises and that could be also private investment enterprises that obtain BOT contract and then subcontract with constructors and operators.

6.2.3 Construction phase

The concession agreement took effect on early January 2001, inaugurating the project construction. The general contractor, Gezhouba Corporation, divided the construction into two segments, one for Hubei Road Construction Company and another for Jingzhou Road Construction Company. Going through almost four-year construction, the project was completed in 2004 and inspected by Hubei government in 2006. From 2004 to 2006 was the trial period to detect whether project’s technical indicators have reached the defined terms in the contract. The results showed that the project quality has achieved the standards and strictly accorded with the design documents. Detailed construction process, techniques, and solutions are out of our scope, but two things have distinguished this project from others under traditional approach. First, motivations to lengthen the charging period as long as possible with constant contractual period made the contractor to save construction period and finish the project within schedule more efficiently. Thus it substantively reduced the risk of time overruns. Second, this project has achieved large cost saving by 17.8% with respectively the actual costs of 3.685 billion Yuan and the budget costs of 4.485 billion Yuan. Although project schedule and costs have been both reduced,

during auditing by China Audit Office in 2005, no problems of appropriation of construction budget; balancing non-existent concealment construction elements; or changing project design unilaterally appeared. And costs were saved from the following managerial instruments (Gezhouba Corporation, 2005):

➤ Collective decision making

First managerial instrument used by the Gezhouba Corp. is collective decision making. The decision making within 200 thousand Yuan could be done by project managers. The decision making between 200 thousand and 1 million Yuan should be done by the “project fund management committee” and decision making beyond 1 million Yuan must be done by the Directorate. In addition, meetings are organized once per month, composed by the Directorate and representatives from banks, in order to examine the project costs for the last month and make decisions collectively on how the project funds should be used in the next month. Authorized by the Directorate, meetings of project managers are also organized in order to make decisions on project arrangements in the coming month and share experience among project managers.

➤ Full process monitoring

The Gezhouba Corp. worked out several project regulations, including “Administration on accounting”; “Administration on project funds”; “Administration on fixed assets”; and “Details of project monitoring”. In addition, it created independent bank accounts for subcontractors and monitored their cash flows. The reasons include that, firstly, the bank could help inform the Gezhouba Corp. with the information on large amount of cash flowing out from which subcontractor and secondly, it could reduce the probability of completion delays because the Gezhouba Corp. could ensure that money will be paid to the works and material providers if some subcontractors have poor credit.

➤ Cost economizing

The Gezhouba Corp. advocates cost economizing through several small instruments. First, the construction work will not start until all approvals were got. Second, construction materials should be bought after comparison of price among various providers. Third, making use of the difference of the interest rates between the short term loans and long term loans, the Gezhouba Corp. has saved 2 million Yuan through repaying the interest of the long term loans of one bank by borrowing short term loans from another.

➤ Incentive mechanisms

The Gezhouba Corp. has set up the “Encouragement Mechanism”. This Mechanism works in the way that the person who finishes the work ahead of time with required level of quality and/or whose advices on cost and time savings have been adopted will obtain the reward amounting to 5% of the money saved. During the construction period, rational advices that have been adopted have reached more than 90 items and thus costs saved over 12 million Yuan.

The above four instruments of the Gezhouba Corp. are the essential managerial measures for achieving the project cost saving. Generally speaking, the Gezhouba Corp. emphasized the “cost management” during the whole construction process, which also caused problems, however. First, the formality of the construction fund use is overfull and complex, which sometimes caused inconsistent opinions among the decision makers and thus need substantive negotiations and auditing. Second, it was sometimes impossible to address the conflicts during the construction process until it was up to the meeting time of the Directorate, thus affected the continuity of the construction process. Third, due to the strict monitor of the construction process, monitoring costs have increased.

6.2.4 Operation phase

Although project development and construction phases seemed to foretell nothing but success, the

concessionaire was plagued with profit loss since the expressway formally opened in 2006. The unpleasant reality is that some governmental agencies and those authorities from transportation sector arbitrarily enlarge the scope of special users who may enjoy free toll without being charged or reduced charging fees. According to the statistic revealed by China Audit Office, from 2006 to 2008 the Hubei department of communication wrongfully issued 5900 “free toll” cards to car owners who strategically declare that their purposes of travelling through the expressway are to perform official duties or to cars that are awarded with privilege. In 2007, 9926 cars have been detected on this expressway evading from being charged with wrongfully issued “free toll” cards. And from 2006 to 2008, the total losses of turnover of the concessionaire, resulting from these privileged cars, have reached 40.72 million Yuan (China Audit Office, 2008). With this evidence from Audit Office, Gezhouba Corp. brought forward a renegotiation with Hubei department of communication about the issue of profit reduction due to releasing free-toll cards and asking for subsidies, however, the Hubei department of communication did not accept the request from Gezhouba Corp. claiming that not all these free-toll cards were released from them, but also other governmental agencies. Thus the liability of wrongfully releasing these cards was passed on like a ball among relevant governmental authorities. And no responses have been made for the Gezhouba Corp.

6.2.5 Lessons learnt

Strategic behaviors from the contractor were not found out in this case during tendering and construction phases. The reasons are that, on one hand, both the central government and the Hubei people’s government have paid a great many attentions with big magnitude of monitoring costs on this project as it is the first expressway in China using BOT, and on the other hand, its success may provide valuable experience for future ones. This project was also deeply concerned by the officials from the Ministry of Communication in terms of its contractor selection and construction. Thus the political concerns and special attentions have played a role in deterring strategic behaviors. It was the first time for the private enterprises as well to participate in a BOT project in expressway sector, therefore touching hot water and exerting strategic behaviors may be risky for themselves. Problems of corruption during tendering and construction were not encountered because powerful officers did not try to corrupt in such a project with substantive attentions and monitoring efforts not only from higher government but also from the public where corruption may be easily manifested. However, corruption emerged in the operation phase in arbitrarily issuing free toll cards to the people they are in favor.

This project was successful in managing construction costs, which benefited greatly from the fixed-price incentive contract and Gezhouba Corp.’s cost managerial instruments. However, during its operation in the first two years Gezhouba Corp. has suffered from profit loss due to issuing free-toll cards by some government agencies. Incomplete contract and institutional deficiency may explain this unpleasant reality. First, just like what we have discussed in chapter 3, contracts are likely to be somewhat incomplete due to future contingencies and bounded rationality. In our case, bounded rationality of the concessionaire failed in foreseeing the free-toll event and thus did not spell out in the contract about compensations. Second, according to chapter 4 we know that institutional deficiency provides an unfavorable environment for private sector to participate in PPPs. In our case, arbitrary decision on releasing free-toll cards may be regarded as a consequence of institutional deficiency because in China the Law of Highways and the Administration Ordinance on Toll Roads did not regulate relevant issues on free-toll card, such as the maximum number of free-toll cards; what organizations and individuals are able to enjoy free toll; and what travelling purposes should be allowed without being charged. Therefore, we summarize the following points that we have learnt from this case:

1. *Tendering and construction phases were successful but on the condition that the government spent a great many costs and paid much more attentions than projects under the traditional model in monitoring the contractor’s performance and thus ensuring project quality. Without these substantive concerns and attentions from the government, we cannot say it would certainly succeed.*

2. *The unpleasant reality in the operating process (from 2006 to 2008) may be resulted from China's institutional deficiency in the area of toll road administration and regulation. In order to avoid future disputes between the government and the concessionaire, it is recommended that relevant laws and regulations should be adjusted or added with new rules on the free-toll issue.*

6.2.6 Institutional weaknesses and strategic behaviors encountered

In this Xiang-Jing case, strategic behaviors from the Gezhouba Corp. did not be inspected during tendering and construction phases. However, it encountered some institutional weaknesses during its operating, compared with out theory discussed in preceding chapters (table 22).

Table22: Institutional weaknesses encountered in Xiang-Jing case

Theory	Xiang-Jing Case
Institutional Weaknesses	
Lack of the transparency law	Lack of the transparency in China has resulted in corruptive behaviors of officials from various government agencies who issued free toll cards to the persons in favor based on arbitrary decisions. And the Administration on Toll Roads and other regulations do not offer the relevant provisions on the criteria and procedures of issuing free toll card.
Incompleteness of current legislations	

6.3 Le-Yi Expressway



Le-Yi expressway is now under construction and is planned to be completed in 2010. It is the first expressway project in Sichuan province applying BOT, running from Leshan to Yibin. The 137-kilometer system is planned to be built at a cost of 4.98 billion Yuan and includes 75 bridges and 11 interchanges (figure 42). The significance of Le-Yi expressway is that it is the key access to Chengdu Economic Zone and it connects the Cheng-Le expressway (from Chengdu to Leshan) and the Nei-Yi expressway (from Neijiang to Yibin), forming a circle (Chengdu-Leshan-Yibin-Neijiang-Chengdu) in the travel industry sites. This BOT project was approved by the State Development Planning Commission (SDPC) and Sichuan Department of Communication has authorized Sichuan Tendering Committee to organize the tendering process and to grant the BOT concession agreement.

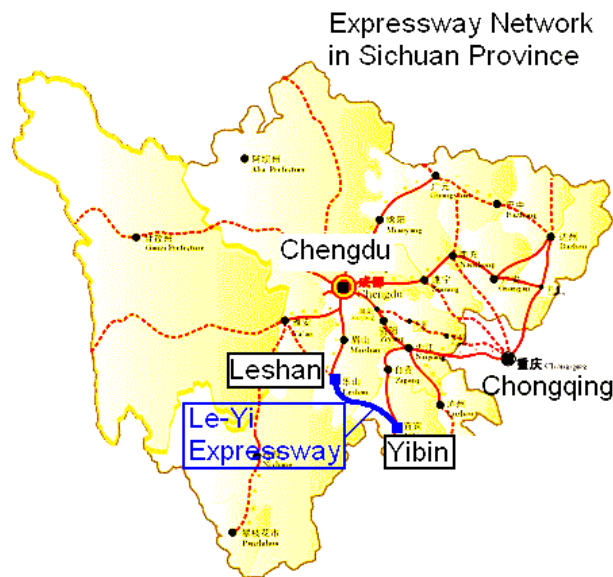


Figure42: Le-Yi expressway

6.3.1 Driving forces for applying BOT

Applying BOT in Le-Yi expressway was driven by two factors, the *financing bottleneck* of the Sichuan government and the *inefficiency of the traditional approach*. The development of the expressway network in Sichuan has an increase in the total length by 7% each year since 2000 and such an increase has brought bid financing challenges for the Sichuan people's government. In addition, over the past 7 years before 2005, the Sichuan people's government has invested more than 10 billion Yuan in expressway infrastructure and further investment with substantive requirement has caused big fiscal pressure. Therefore, approved by the State Development Planning Commission, the Le-Yi expressway is determined to apply BOT with full investment from the concessionaire. Another driver is the inefficiency of the traditional approach. Before 2005, all expressway projects in Sichuan used the DB model. As we discussed in chapter 2, the separation of construction and operation provides few incentives for the constructor to complete on time, make cost savings and ensure project quality. In addition, the DB model does not benefit from private operator's expertise in operating expressways. Therefore, in 2005 the willingness of participation in BOT of private enterprises was investigated by Sichuan Department of Communication, which was used as reference to design the tendering process (Sichuan Department of Communication, 2003a).

6.3.2 Tendering

The concessionaire was selected through competitive tendering with selection criterion of "the shortest concession period". This selection criterion was adopted for the first time in China's expressway tendering with the purpose of reducing toll period, ensuring public interests, and providing incentives for saving construction time. In August 2005, in response to the tender submissions, Sichuan Tendering Committee produced a report documenting its evaluation procedures, together with scores of the various bidders, and then published this report on the Committee's official website. As the head of the Committee comments in local news, the tendering had to be very transparent, the free flow of information was a priority, and the bidders were followed the same procedures at the conclusion of each subsequent phase of the tendering process. After evaluation, the concession was eventually granted to the Shandong Expressway Corporation Limited⁹ with the bidding concession period of 27 years and 9

⁹ The winner, Shandong Expressway Corporation Limited (SECL), is one of China's top 500 private enterprises with over

months including the construction period that was the shortest proposed concession period among the bidders. In addition, SECL was also with the relatively high score of its technical solutions for construction, financing standing and expertise in managerial skills (Sichuan Department of Communication, 2003b).

During the whole tendering process, transparency of selection procedures and free flow of information were put on a priority in order to combat collusions among bidders or collusions between officers and bidders. Apart from these, Sichuan Tendering Committee built a couple of anti-corruption instruments. First, in each procedure of giving marks the experts in the Committee are linked to the marks that they gave to each bidder and the abnormal highest and lowest marks were eliminated from others. In such a way, collusive behaviors could be restrained because it was obvious that which expert gave abnormal marks and those marks were regarded as invalid. Second, the bidders who were not selected had the right to access to the winner's bidding package (but still protecting the winner from being plagiarized of its technical solutions) to compare the difference and were permitted to appeal to supreme tendering administrative organization.

With these instruments, the tendering process could be considered successfully in selecting a relatively optimal contractor. Thus in September 2005, SECL inaugurated and entered into the construction phase.

6.3.3 Construction

The financing structure and the inflow of bank loans for construction in 2006 and 2007 are shown in figure 43. A larger part of project costs, 80%, were borrowed from two state-owned banks (Industrial and Commercial bank of China and Agriculture Bank of China) on behalf of SECL with its fixed assets and some expressway operating rights as the mortgage and the guarantee from Sichuan people's government, and a small part, 20%, came from the contractor's self-financing. In February 2006, the first bank loan (0.5 billion Yuan) from Industrial and Commercial Bank of China was used for pre-construction works including cleaning construction fields, building construction tents and purchasing construction materials. The following loans perceptively with the amount of 1, 2 and 0.2 billion Yuan and the self-financing of 0.98 billion Yuan were used for construction. In mid 2007, SECL went into trouble of land acquisition in one section of the expressway and thus borrowed 0.3 billion Yuan from Agriculture Bank of China to compensate farmers and industrial factories.

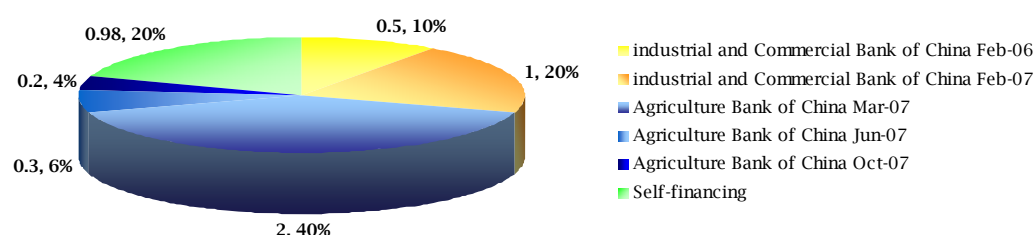


Figure43: Financing structure of Le-Yi expressway and loans inflow

Although tendering and construction in 2006 went smoothly (Sichuan Infrastructure Project Inspection Group, 2008), project was delayed by two unpleasant events in 2007 and 2008. In early 2007, SECL met difficulties in land acquisition for one segment of the expressway. The unique geological feature of Sichuan province is that it locates in the mountainous region. As a consequence, during construction, it was usually geographically impossible and costly to exploit tunnels and relatively speaking the more feasible solution was to collect flat land (most of the flat land has been occupied by farmers in Sichuan). In China the property of land belongs to the nation and farmers only have a use right. Therefore, SECL asked for a renegotiation with Sichuan people's government concerning land acquisition. The

1500-km other expressways on operating and more than 500-km other expressways under construction at present. Until 2007, its total capital has reached 80 billion Yuan, operating revenue of 11 billion Yuan and profits of 2.5 billion Yuan.

conclusion of the renegotiation was that SECL was issued the license of collecting land. However, even though the land is approved to be used for expressway construction, it is hard for SECL to obtain the land because it met great challenges to persuade the farmers to move. Together with the regulation issued by the Ministry of Land and Resources of China, if the farmland is occupied by constructions, then the farmland should be compensated in other areas in order to ensure the total farmland areas constant. Therefore, at the time when the farmland is approved for construction purpose, other areas should be designed for farmland and issued to the farmers. With such difficulties and regulations confronted by SECL, Sichuan people's government sent a special letter to the Agriculture Bank of China stating and requiring that 0.3-billion more loans should be released to SECL under the interest rate of special-purpose that is much lower than the normal ones. Actually, when formulating the concession agreement, the risk of land acquisition was allocated to SECL, but considering that it is usually impossible for farmers to be persuaded by private enterprises and it needs to ensure the rational return of the private enterprise, Sichuan people's government helped to collect land along the expressway and allowed more favorable bank loans. Although lands were eventually obtained by SECL with the help of the local government, construction costs were still increased not only due to the increase in costs of leasing construction machines but also the increase in bank loans. The reason why the risk of land acquisition became into effect was that SECL did not wait until all lands being available before starting construction. That is to say, it did not get prepared for construction and thus caused future cost increase.

The second unpleasant event happened in May 2008 when 80% of the project has been completed, which was caused by the "Wenchuan Earthquake" in Sichuan. Although the epicenter was relatively far from Le-Yi expressway and the project was not destroyed by the earthquake, it was still influenced in terms of project schedule because construction materials were unable to be transported due to collapse of other expressways and railroads in the province. As a consequence, SECL and the local government renegotiated again in late June (after rescue has been completed) and the result was that SECL gained three-month extension of the concession period. This unpleasant event was a force major and a future contingency that could not be foreseen when formulating contract.

Apart from the unpleasant events, between 17th and 21st, March 2008, Sichuan Infrastructure Quality Detection Station and Sichuan Department of Communication jointly carried out the first large-scale quality detection through experimental inspections. The inspection mainly concentrated on the consistency between the practical work and the requirements defined in the agreement, including the selection of construction materials, reinforcement of the steels and concretes, construction technicality of both underground and surface-ground elements, as well as bridges. As the inspection results indicated, nine locations of jerry-builds have been detected and have been informed to the constructor. These jerry-builds are problems of disputes between the experts and the constructor on selection of reinforced concrete indexes, load coefficients, and waterproof treatments of the piers. The constructor unilaterally adjusted those indexes and coefficients to a little lower level compared with the technical requirements formulated in the contract without discussion and permission with the local government. According to the response of the constructor, it claimed that they have tested the quality and the selected indexes and coefficients can fully satisfy the safety factors and normal quality standards. Furthermore, they argued that it would be a waste of resources and materials if they performed according to the design documents. As we analyzed in chapter 5, SECL's behaviors of jerry-build could be regarded as "technically jerry-build" because SECL was technically advanced in calculating to what extent they were able to decrease material consumption but not affect project quality. Still, Sichuan Department of Communication as a representative of Sichuan local government, determined to inform SECL that they needed to improve the work as defined in the agreement and thus refused the adjustments of the construction details. In addition, during detection, the inspection group realized that the project costs (except for the cost increase due to the earthquake) and schedule were both within estimation and under control (Shandong Expressway Corporation Limited, 2007)

6.3.4 Lessons learnt

This project will enter into its operating phase in one and half years latter, but still we can learn some lessons from its tendering and construction phases, as summarized below:

1. *Transparency tendering procedures and free flow of tendering information can effectively deter bidders from collusion and officers from corruption.*
2. *The innovative selection criterion, the shortest concession period including the construction process, can provide incentives for the contractor to complete the project on time and thus enter into the operating phase earlier. In addition, this selection criterion can ensure public interest because the government's motivation is to minimize the toll period in a rational scale.*
3. *Although tendering process can be considered successful because the acknowledged optimal contractor has been selected with consideration of its general capacity in technical solutions and managerial skills, strategic behaviors of jerry-build have been still taken place and such jerry-builds can be grouped into technical ones.*
4. *Project preparation failed in playing a role in smoothing following processes in this project. In China, collecting lands especially farmlands for construction is difficult if done by private enterprises, therefore the government sometimes needs to offer assistance. Well project preparation thus can help save time in project implementation and also project costs as well.*

6.3.5 Institutional weaknesses and strategic behaviors encountered

This Le-Yi expressway is still under construction. During tendering transparency has been emphasized through specially designed instruments combating corruption with the innovative selection criterion of the shortest concession period. Compared with the theory in preceding chapters, strategic behaviors encountered in this case is shown in table 23.

Table23: Strategic behaviors encountered in Le-Yi case

Theory	Le-Yi Case
Strategic Behaviors	
Jerry-builds	9 locations of jerry-builds have been inspected, and these jerry-builds could be regarded as technical-dependent.

6.4 Citong Bridge



At 1503 meters, the Citong Bridge is one of the largest bridges in Fujian province with 6 lanes for both directions and the technical classification as expressways crossing the Jin River and is the first bridge that applied the BOT model in China. The crossing is located approximately 10 kilometers downstream of the existing Quanzhou Bridge (figure 44) and traverses the Jin River at the point where the river is 22

meters wide (figure 44). The bridge links the outside areas of the Quanzhou city with the inside areas. It currently lacks the connections with the national highway No. 324 and the Xia-Quan expressway (from Xiamen to Quanzhou).

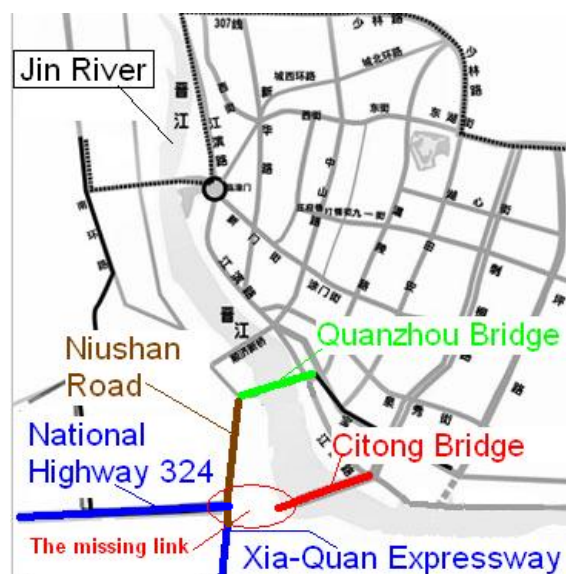


Figure44: Citong Bridge

6.4.1 Quanzhou: A city surrounded by the Jin River in the west

Quanzhou, in which the Citong Bridge is located, is a city surrounded by the Jin River in its west. The Jin River is the biggest river in Quanzhou city and the fourth biggest in Fujian province with the drainage area of 5629 km². This river has significant meanings for Quanzhou because it is the source of drinking water and irrigation, and it has been also developed into a fishing industry area and a travel industry site (Xie, 2004). While the river favors daily and industrial purposes, it creates difficulties for surface transport-difficulties which have become more challenging for the local government since 1990s as incomes and thus the demand for mobility have increased. Traditionally, the city has been linked to the outside areas by the Quanzhou Bridge, but the increase in mobility demand has made the Quanzhou Bridge unable to afford the increasing traffic flows and congestions on the Quanzhou Bridge frequently took place. Therefore, Quanzhou people's government (i.e. the Quanzhou local government) determined to build a second bridge to separate the traffic flows, and thus the idea of constructing the Citong Bridge was brought forward.

6.4.2 Promotion and establishment of the BOT approach

By late of 1990, Fujian Department of Communication was informed and recognized that a new crossing was needed when the Citong Bridge was brought forward by People's Government of Quanzhou. However, no definitive actions have been taken regarding the location and design of the crossing and the funding for this project remained uncertain. Nonetheless, the department of communication still believed that duplicating the bridge would encourage more development of the Quanzhou city and would solve the congestion problem of the existing Quanzhou Bridge. Since the construction of the Citong Bridge was one of the largest infrastructure projects attempted in Quanzhou city, at the time when the local government was facing the difficulty in financing this project, the private sector showed great interests and enthusiasms in financing this bridge and thus the "Mingliu" Corporation, which was composed by 15 small private firms, proposed building the new bridge (Citong Bridge) on a BOT basis. Given the recent BOT projects in other provinces being proposed, the department of communication approved this proposal and granted the concession to the "Mingliu" Corporation after pre-qualification but without tendering in 1994. The financing structure of this project was that the Mingliu Corporation

accounted for 60% and the remained 40% was made up by the Fujian Department of Communication with the total investment of 0.25 billion Yuan. The concession period is 30 years and after that the operating right of this bridge should be transferred back to the government, and during the concession period, the Corporation has the right to charge tolls.

6.4.3 A turning point of the life of the Citong Bridge

The construction of the Citong Bridge was completed in late 1996 and then came into the operating stage. Just in the year 1997, the toll incomes have reached 0.1 billion Yuan and the profits in the future were very promising for Mingliu Corporation. However, this good performance did not last long and there happened a turning point of the life of the Citong Bridge when the right of charging tolls for the Quanzhou Bridge was decentralized from the Fujian provincial government to the Quanzhou local government. When the Quanzhou Bridge was operated by the provincial government, the revenues from tolls belonged to the provincial government, but after decentralization, the tolls belonged to the local revenues. Therefore, facing the substantive amount of tolls, the Quanzhou local government wanted to set its monopolistic position over the traffic flows and thus make greater revenues from tolls. Therefore, due to the imperfect competition between the two bridges (the Quanzhou Bridge is operated by the state-owned enterprise of Quanzhou local government and the Citong Bridge is operated by the private enterprise), the Citong Bridge has lost many of its users. Actually, the imperfect competition was caused by government protection on the Quanzhou Bridge with discriminatory policy instruments that favored the state-owned enterprise that operates the Quanzhou Bridge. In the following part we will see how the Quanzhou Bridge competed with the Citong Bridge.

6.4.4 Competition between the Citong Bridge and the Quanzhou Bridge

Above the Jin River, two bridges are located, the Quanzhou Bridge which is operated by a state-owned enterprise, called Quanzhou Bridge Toll Office (QBTO) which is authorized by the Quanzhou local government and the Citong Bridge which is operated by the Mingliu Corporation (MC). And in Quanzhou city, there are two important roads that provide mobility, the national highway No. 324 and the Xia-Quan expressway (figure 44). Therefore, competitions were aroused between these two bridges for the traffic flows from these two roads. With the operating right obtained from the provincial government, the Quanzhou local government constructed a new road connecting the terminal of the national highway No. 324 with the Quanzhou Bridge, the Niushan Road (figure 44), in order to lead traffic flows from the highway and charge tolls. For the Citong Bridge there is still a 300-meter missing link (figure 44) between the terminal of the highway and the Citong Bridge, therefore the Mingliu Corporation brought forward the application of building this missing link. However, this application has not been approved by the local government.

Additionally, as the Xia-Quan expressway was completed in late 1997, the Niushan road was extended from the terminal of the highway 324 to the terminal of the Xia-Quan expressway by the Quanzhou local government in order to lead the traffic flows from Xiamen to the Quanzhou Bridge. Facing this extension, the Mingliu Corporation lost users coming from Xiamen and so the Corporation also applied to construct a connecting link between the terminal of the expressway and the Citong Bridge, which was, however, not approved as well.

During the construction of the Citong Bridge, since the Xia-Quan expressway was also under construction at the same time and its designed terminal was very near to the Citong Bridge, the Mingliu Corporation (MC) made additional investment of 7 million Yuan for designing and constructing the bridge in order to connect it to the Xia-Quan expressway as soon as the Xia-Quan expressway was finished. But the application of the connecting-link project put forward by the Mingliu Corporation with the 7-million-Yuan investment was not approved and thus the Corp. had nothing returned.

Therefore, we can see that the competition between these two bridges rather favors the Quanzhou

Bridge with connections with both of the highway 324 and of the Xia-Quan expressway. Quanzhou Bridge's dominant position is resulted from its preferable political instruments and the obstacle instruments for the Citong Bridge, set by the Quanzhou local government. For Mingliu Corporation, confronting with the obstacles from the local government, it has made greater efforts in order to "search" an outlet (see part 6. 4.5).

6.4.5 The struggle of the Citong Bridge

In order to save the Citong Bridge, the Mingliu Corporation applied for an approval of the connecting link between the highway 324 and the Citong Bridge from Fujian provincial department of communication over the head of Quanzhou local government and finally the application got passed. However, the terminal of the highway 324 has been connected with the Niushan road and thus the Citong Bridge has to link the highway 324 at somewhere else near the terminal (at point A in figure 45). In addition, between point A and C, the only available access through the Niushan road is just at point B which is 20 meters far from the terminal of highway 324, so the link between highway 324 and the Citong Bridge must go through point B and thus an "S" shaped linking road formed. Compared with the original designed link (shown in the dotted line in figure 45), the extra costs of the "S" link were 5 million Yuan and the project time was overran by one year. Although the missing link between the highway 324 and Citong Bridge has been connected, there is still another missing link from Citong Bridge to Xia-Quan expressway and the application of this linking project has not been approved yet. So far, we can see that the Mingliu Corporation has made great efforts and struggles in saving the Citong Bridge by constructing linking roads and thus attracting traffic flows.

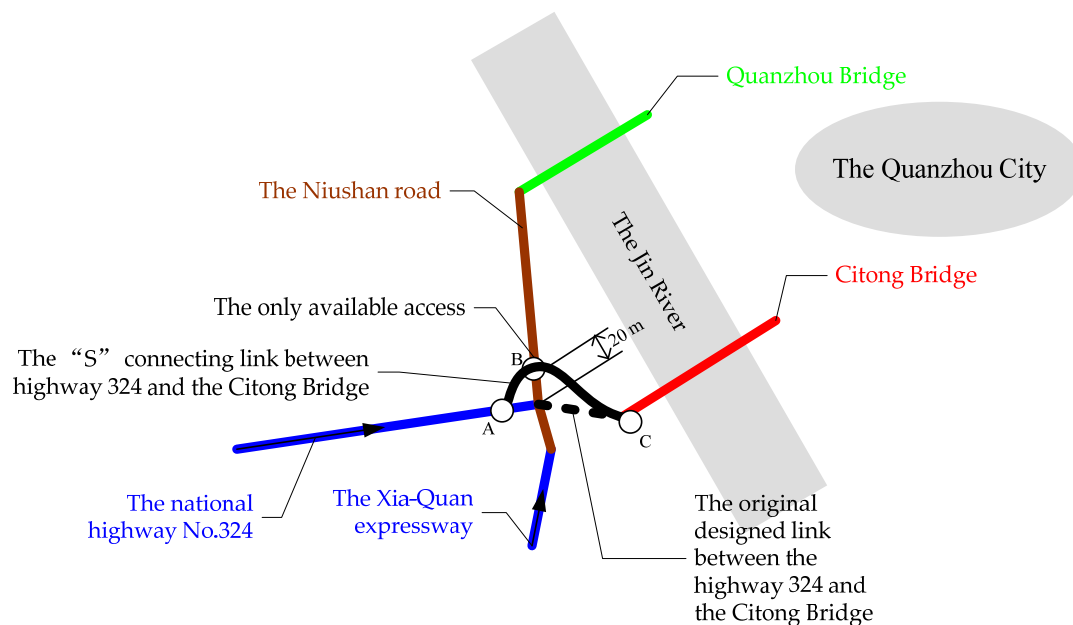


Figure45: The "S" connecting link between highway 324 and Citong Bridge

6.4.6 Debates from the public users

With the comparisons of the Niushan road and the "S" shaped linking road, there aroused two debates from public users. One debate claims that the Niushan road is much longer than the "S" linking road and thus it takes 15 minutes longer for the users driving on the Niushan road than on the "S" linking road, so why the original designed link between the highway 324 and the Citong Bridge, which is even shorter than the "S" link, was not approved by the Quanzhou local government? Currently, towards this debate, no responses have been made from the Quanzhou local government. Another debate is that the "S" shaped linking road is dangerous for users and traffic accidents have frequently happened, so why

the Quanzhou local government did not reserve the terminal point of the highway 324 (point D) for the Citong Bridge and connected the Niushan road at point A (figure 46)? Aiming at this debate, there is also not any response from the Quanzhou local government.

Apart from these two debates, the public users also inquire about the unapproved linking project from the Citong Bridge to the Xia-Quan expressway (i.e. from point E to C in figure 46) because in order to cross the Jin River, it is much shorter from point E to C than using the Niushan road and then crossing the Quanzhou Bridge. For this question, the Quanzhou local government gave an explanation. It claimed that from the statistical data of the urban traffic inside the Quanzhou city, traffic is busier in the southern areas of Quanzhou than the northern areas, therefore, the connection between point E and C will not help the urban traffic inside the Quanzhou city, that is to say, the connection will lead to a much busier traffic status in Quanzhou's southern areas.

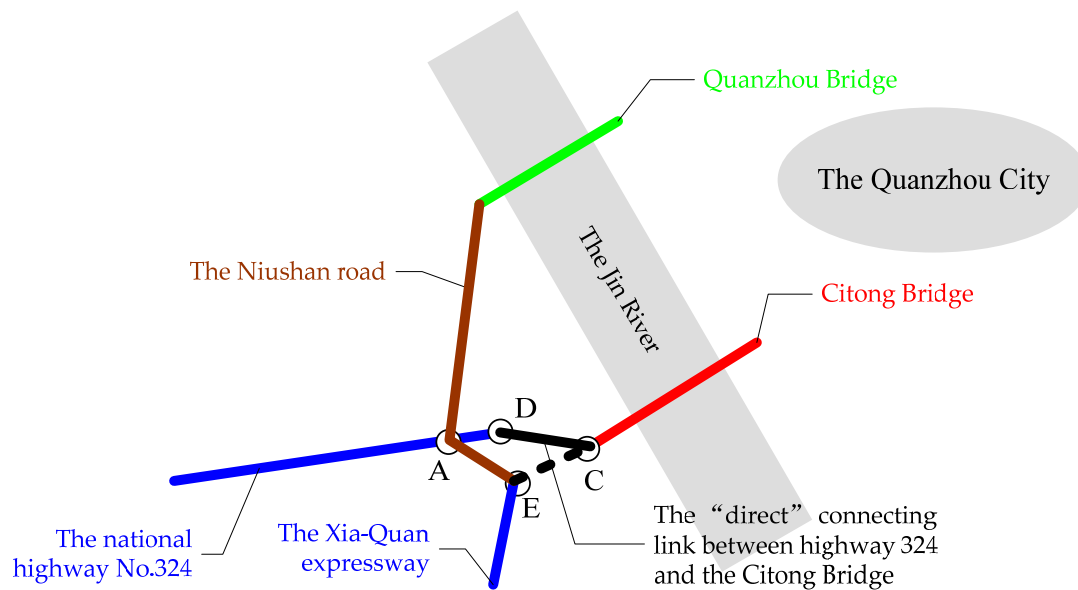


Figure46: Illustration of the debate from public users

6.4.7 Lessons learnt: the opportunities for private enterprises and governmental protection on state-owned enterprises

From this case study, we can see that sometimes the competition between the state-owned enterprise and the private enterprise favors the former not because the state-owned enterprise does better in providing the service and is more efficient, but because the local government purposively protect the state-owned enterprise by setting up favorable policy instruments and setting obstacles for the private enterprise. The opportunity for the private enterprise of making profits from providing the public service is uncertain and thus it is risky for it to recover the initial construction investment on a BOT basis. If the TOT model is used, the private enterprise can avoid the risk of returning the construction investment because the construction is finished by the government. In addition, on the basis of the TOT model, when the operating right is to be transferred to the private enterprise, the private enterprise can evaluate the potential performance of the project before paying the price. In our case, if the construction of the Citong Bridge was completed by the government and after project completion its operating right was to be transferred to the Mingliu Corporation without connections with the national highway 324 and the Xia-Quan expressway, it is believed that the Mingliu Corporation would not buy this operating right.

Another revelation is that the government should provide enough space or opportunities for the private enterprise when the project come into the operating stage in order to ensure that the private enterprise

will earn back its initial investment on the BOT basis, because it is disastrous for the private enterprise to complete the project without project demands. In addition, the procedures for making decisions of the government should be more clear and transparent in order to insure that unfair and strategic decisions are absent. And only in this way public interests can be ensured and private enterprises can be given more confidence of doing business with governments.

6.4.8 Institutional weaknesses and strategic behaviors encountered

The case of Citong Bridge revealed several institutional weaknesses. The comparison between the theory in the preceding chapters and these weaknesses is in table 24.

Table24: Institutional weaknesses encountered in Citong-Bridge case

Theory	Citong-Bridge Case
Institutional Weaknesses	
Lack of Transparency Law	Government decisions of issuing approvals in this case are largely arbitrary-oriented and are in favor of state-owned enterprises. The decision process and procedures are not transparent, which has resulted in the loss of public interest and an unfavorable business environment for private actors.
Weak enforcement of the Law against Unfair Competition	The tenets of the Law against Unfair Competition were not enforced; as a consequence, unfair competition between the state-owned enterprises and the private ones has resulted.
Lack of an independent judiciary	The judicial system in Fujian Province is non-energetic and influenced by government to some extent.

6.5 He-Chao-Wu Expressway

In chapter 5 we compared TOT with BOT and from the perspective of low trust degrees TOT is considered more favorable than BOT, but it does not mean that TOT contracts will be always successful. Since 1996, 106 TOT contracts have been made between provincial governments and private enterprises that specialize in expressway operating and management. According to China Audit Office (2008), 42 contracts were grouped in the dossier without problems while 64 contracts were audited with different types of problems in its audit report (box 21). However, comparisons between BOT and TOT in terms of numbers of successful projects are hardly to make because BOT projects in China can be counted on fingers nowadays and some of them have been inspected with jerry-build problems. In this section, we provide one case study, He-Chao-Wu expressway (figure 47), which has presented serious problems while transferring expressway operating right and that has been disclosed by China Supreme Court in 2004.

Box 21: Partial audit report on toll roads in China (Source: China Audit Office, 2008)

- *Shanghai: 12 expressway operating rights were transferred without approvals from relevant governmental authorities.*

- *Anhui: Between 1996 and 2003, 4 expressway operating rights were transferred by the local government without approvals from the Ministry of Communication. These approvals should be obtained because these projects involved financing from the Ministry. And the local government broke down one expressway into several small operating rights in order to avoid open competitive tendering.*
- *Zhejiang: Until late 2005, through transferring 4 expressway operating rights, the local government obtained 12.575 billion Yuan payment from the private sector, but among these 12.575 billion, 8.66 billion was from state-owned bank loans with the operating right as the mortgage. Therefore, actually the government did not attract the private capital.*
- *Anhui: An expressway's operating right, the He-Chao-Wu expressway, was transferred without standard procedures and transparent selection criterion. The consequence was that 1.24 billion state capitals have been sacrificed.*
- *Hubei: An expressway's operating right, the Wu-Huang expressway, was transferred under the government interference. The consequence was that 1.45 billion state capitals have been lost.*

He-Chao-Wu expressway, located in Anhui province, is one of the transportation infrastructure projects belonging to the nation's eighth five-year plan with the significance of accessing to the regions where the economies are well developed (such as Shanghai and Nanjing). Project construction was started at late 1992 and completed in middle 2000. It runs from Hefei, through Chaohu, and then to Wuhu with a total length of 100 kilometer and a total investment of 3.2 billion Yuan (figure 47).

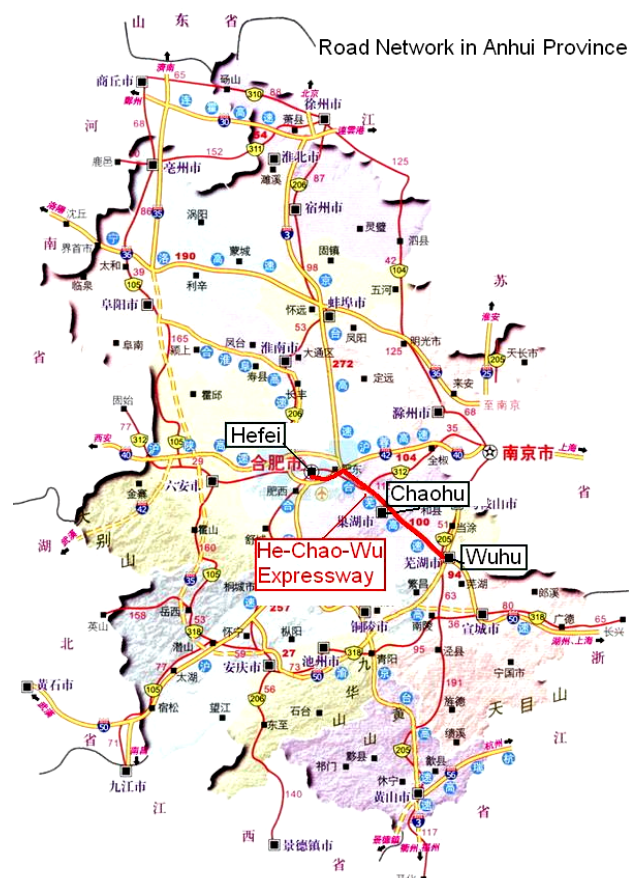


Figure47: He-Chao-Wu expressway

6.5.1 Actors involved

He-Chao-Wu expressway is a typical project using TOT model. After its completion in 2000, the Anhui people's government tried to operate by itself, but with the fiscal pressures for its maintenance and construction of other new roads, the government determined to transfer its operating right to a private operator with the lump sum payment in 2003. The actors involved in this transfer process include:

- Anhui Expressway Company (hereafter: Company)

The Company was set up in 1992 and is a state-owned company running construction and operation of the expressways in Anhui province with the authority of the Anhui People's Government. And in 2003, it transferred the operating right of the He-Chao-Wu expressway to the Shanghai Eastern Holdings Limited at the price of 1.9 billion Yuan through tendering.

- Shanghai Eastern Holdings Limited (hereafter: SEHL)

The SEHL is a private firm relating to multiple industries. In 2003 it successfully won the bid of the transfer of the operating right and promised that it would invest 0.6 billion Yuan in this expressway maintenance. Therefore, for SEHL the total transaction price was 2.5 billion Yuan. The period of the operating right, according to the contract, was 30 years, after which the expressway should be transferred back to the government. And during this period, the SEHL had the right to charging user fees in order to recover its investment and maintenance costs.

6.5.2 Sacrifice the state asset

In some circumstance, the state assets are sacrificed at a loss (Qian, 2006). First, some state assets are sold without value evaluation. Second, although the state assets are evaluated in their value, the estimated value is actually lower than the real value. The evaluation report is then approved by some relevant government authorities and the assets are sold at a lower price. Third, in some cases, the seller of the state assets who is authorized by the government is also the buyer (that is, the seller and the buyer are actually the same entity), and the value evaluation and transaction process are just formalities. Thus the seller intends to reduce the value of the asset purposely when he sells it. Sacrificing state assets could be regarded as strategic behaviors that harm the nation. And the approval of the inauthentic evaluation report by government officials is a kind of corruption because it would cause the loss of state capital.

In February, 2008, the National Audit Office of China reported the auditing results for China's toll roads and revealed four main problems for operations of these toll roads (box 22), among which the third problem is just the case of the He-Chao-Wu expressway. In part 6.5.3, we will analysis how the strategic (or nonstandard) transfer of the He-Chao-Wu expressway's operating right resulted in the state capital loss of 1.24 billion Yuan.

Box 22: Four main problems for operations of the toll roads in China (Source: National Audit Office of China, 2008)

Problem 1: Some regional governments overly emphasis the development of the expressway development, which thus results in the increase in social operating costs and the risk of repaying loans because excess-assuming the transportation network would aggravate the use of natural resources and the demands for bank loans.

Problem 2: Some local governments stealthily increase the quantity of tolls, raise the charging fees, and extend the period of operating right without the approvals of the national or regional governments.

Problem 3: *The operating rights of the toll roads are sometimes transferred in a strategic and nonstandard*

way, which leads to potential operation problems and thus the failure of the corporation between the government and the private operator. (which is consistent with our case)

Problem 4: The administrative mechanism of toll roads is underdeveloped and thus the construction and maintenance of the toll roads are inefficient currently.

6.5.3 1.2 billion's loss of state capital

Audited by the National Audit Office in 2008, the transfer of the operating right of the He-Chao-Wu expressway has made 1.2 billion's loss of the state capital. In 2003, the operating right was transferred to SEHL at the price of 1.9 billion Yuan with additional 0.6 billion for maintenance costs. However, after two years, the operating right was reversely bought back by the Company (authorized by Anhui People's Government) at the price of 3.58 billion Yuan. The reason for this reverse buying is that the SEHL went to bankruptcy; the operating right is not allowed to be transferred to the third parties; and the government wanted to ensure the continuity of the service.

Revealed by the workers from tollbooths, before transferring the operating right, the income of the charging fees has increased by 40% every year. People felt surprise and doubt that why the government transferred the operating right and why transfer at such a low price. After the investigation by China's National Congress, the things have been clear out. The reasons for the loss of state capital are that, firstly, the asset appraisal of this expressway was intended to be reduced and the appraisal result was approved by the government; and secondly, the transfer of the operating right was pulled wires by a government official, Fusheng Chen, from Anhui Economic Commission who accepted the bribery from SEHL and whose behavior could be regarded as corruption.

6.5.4 Debates surrounding transferring the operating right

There are still two debates surrounding the transfer of the operating right, one is that why the invited tendering were used instead of open tendering and another is that whether the period for charging user fees should be extended by 28 years.

We have known that the invited tendering reduces competition and thus people think that transferring the operating right should be done through open tendering. According to the respondent from the Company, the tendering document for transferring the operating right has been posted openly on the website of Anhui Foreign Investment Office, but there were few firms that are interested in. Therefore, the Company determined to tender by inviting 5 private firms and only 3 attended (including SEHL).

Another debate happened because after reversely buying the operating right, the government intended to extend the period of charging user fees by 28 years in order to recover the buying price (3.58 billion Yuan). However, some people think that the public users do not have the responsibility to pay for the bill that was induced by the government's breaching of duty.

6.5.5 End up with nothing definite

Although this event of sacrificing the state asset in the case of transferring the operating right of He-Chao-Wu expressway has been disclosed by the National Audit Office, in the Anhui political circle, no political officials have been accused so far. Ridiculously, the officials who participated in this transaction all reflected that the transfer of operating right is a normal economic behavior under the development conditions at that time. In addition, the person called Fusheng Chen has settled down in Hong Kong after he accepted the bribery without taking any responsibilities. Thus, this event has been ended up with nothing definite.

6.5.6 Lessons learnt and recommendations

From this case study, we have learnt that strategic and nonstandard transfer of the operating right of

state assets would cause loss of state capital and reduction of the social welfare. In addition, acceptance of bribery as a kind of corruption would aggravate the consequence. Further reforms on administration of state-owned assets (expressway included) are recommended and advices on combating corruption need to be brought forward. Specifically speaking, in this case we recommend:

- Enhance the control on regional and local governments by the central government

China's governance on expressways is decentralized to the regional and local levels, thus it is more probable that strategic behaviors and nonstandard operations happen at these levels (Wang, 2003). As this case indicates, strategic and nonstandard transfer of the operating right was done by officials from the People's Government of Anhui Province and until the audit by the National Audit Office, the loss of state capital was not disclosed. Therefore, the control on the regional and local governments by the central government should be enhanced by selective examining the performance of regional governments without informing beforehand. In addition, transferring state asset for construction and operation with large transaction price should be reported to and approved by the national government.

- Sign the anti-corruption contract

From this case, we have known that at least two government officials had corruption behaviors. One was the person who approved the report of value evaluation of the He-Chao-Wu expressway (which is non-real and the estimate value is lower than the actual value) and another is Fusheng Chen who pulled wires and helped the SEHL connect to the government because he accepted the bribery from SEHL. Therefore, the recommendation would be that the government officials should sign the anti-corruption contract which has been popularized recently, when they get involved in the projects. The purpose of the "anti-corruption" contract is to clarify who should take what responsibilities in the project approvals and what government officials' behaviors are regarded as corruption. Signing the anti-corruption contract can effectively restraint the strategic and nonstandard behaviors of the political officials and once corruption happened, the corruptor can be found out and given penalizations according to the contract. However, the popularity of the anti-corruption contract needs consistent and complementary legislations, which, currently, are lacking in China's legal framework (Dai, 2001).

- Ineffective tendering with few and invalid bidders

In this case, there were only 3 bidders who participated in the tendering process. Although the Tendering Law stipulates that the fewest number of bidders should be no less than three and although substantive amount of bidders would reduce efficiency, the validity of these bidders is recommended to be examined, rather than just depending on the numbers (Li, 2007). The reason is that some of these bidders are there just to make up the number without required qualifications. Therefore, the tendering process, during which only few bidders are involved and some of them are just to make up the number, should be regarded as ineffective tendering and the result of the tendering should be invalid. Actually, if in such a case, the tendering is recommended to be cancelled.

6.5.7 Institutional weaknesses and strategic behaviors encountered

The He-Chao-Wu case is a typical case in China illustrating the wrongfully transferring of the operating right of expressway. The encountered institutional weaknesses and strategic behaviors, compared with the theory, are summarized in table 25.

Table25: Institutional weaknesses and strategic behaviors encountered in He-Chao-Wu case

Theory	He-Chao-Wu Case
Institutional Weaknesses	
Inconsistency between the Tendering Law and the Government Procurement Law	The case should be tendered under open competition according to the Tendering Law. But based on Government Procurement Law, it was transferred from open tendering to close invited tendering, which has resulted in reduction on competition.
Lack of Transparency Law	Government decisions did not base on transparency, which has had the serious consequence of 1.2 billion loss of state capital due to corruption.
Lack of an independent judiciary	Such serious corruptive behaviors during operating right transfer actually did not attract attentions from the judiciary, which has provided breeding grounds for following –up corruption.

6.6 Findings

In this chapter we have studied five expressway cases. Although they did not cover the whole empirical research results in chapter 4 and 5, yet they have illustrated some points that coincided with our empirical research (table 21/22/23/24/25). In addition, they have indicated some new results that we did not find out in the empirical research. Herein we summarize the lessons learnt from these case studies in the following points:

1. *In the old style procurement options such as DBB model used in Shen-Da expressway, especially in northern China the contractor is usually automatically selected from state-owned enterprises. Although it is absent from adverse selection, the method of automatic selection may exert more serious strategic behaviors during contractual period. Lack of accountability and low level efficiency may cause jerry-builds and thus quality problems may be taken place. In addition, lack of knowledge and experience in applying foreign advanced techniques and construction materials may lead to cost overruns and thus the government may assume bigger project costs.*
2. *In some expressway projects such as the Xiang-Jing expressway, during the tendering and construction phases, although strategic behaviors of bidder collusions and jerry-builds may not exhibit, but it is on the condition that the government has made great efforts in monitoring and providing incentives for the contractor, which thus incurs the transaction costs. If such efforts of monitoring and offering incentives were absent from projects, no guarantees could be made in terms that there are no strategic behaviors.*
3. *In the operating process, renegotiations may take place. Some renegotiations could be addressed but some could not because China's institutional circumstance is still incomplete and while contracting, it is impossible for both parties to formulate complete terms due to unforeseeable future contingencies and sometimes the bounded rationality as well.*
4. *Transparency is significantly important in ensuring selecting the relatively optimal contractor and deterring corruption in the tendering process, but still it sometimes could not fully combat strategic behaviors such as jerry-builds in the contractual period.*

5. *Project preparation is also extremely important because it may help reduce the risks of cost and schedule overruns. Project should not start until the entire requirements and approvals are ready.*
6. *In China, sometimes (such as the Citong bridge case) the government does not provide the private enterprises with favorable and fair environment where they could do business safely. Most of the time the government favors the state-owned enterprises at the expense of sacrificing the benefits of private enterprises. Moreover, the government offers discriminatory policy instruments to public and private enterprises in order to protect public enterprises. The state-owned banks also like to lend their loans to state-owned enterprises but not the private ones. Therefore, the business environment is sometimes unfair competition between public and private.*
7. *TOT is more favorable than BOT considering low trust levels, but it does not mean there are no problems. In some cases such as the He-Chao-Wu expressway, in TOT model, the strategic behavior that is most easily taken place would be the “loss of state capital”. During the transfers of expressway operating rights, non-standard procedures and nonobservance selection criterion on the operator have resulted in collusions between the government officers and the potential contractors.*

SECTION IV

In this final section we make a summary on conclusions and recommendations.

CHAPTER 7 CONCLUSIONS AND RECOMMENDATIONS

How to achieve successful public-private partnerships for expressway projects in China, that is to say, what is the favorable and pleasant environment for applying public-private partnerships in China's expressway sector and what are the improvements and recommendations?

This entire research was undertaken to provide answers to the above mentioned main research question. The basic underlying mechanism of the Chinese context in terms of the institutional circumstance and strategic behaviors accompanying each applied PPP option was studied. Since the theories of PPPs and principal-agent relation were understood, a 4-level framework was created to direct our empirical research. In addition, the research hinged around exploration problems in using PPPs in expressways and provision recommendations which could enable the Chinese policy makers on behalf of the central government to understand the pivotal issues in ensuring the success of the partnerships and to engage themselves to a more transparent institutional environment.

The conclusions combining the empirical research with case studies disclosed two orientations that act as obstacles in successfully using PPPs in China expressway sector, which accompanying with recommendations are divided into sub-sections to discuss each part individually:

➤ Institutional Preconditions

What are the gaps and limitations of China's existing institutional circumstance for favorably applying innovative PPP options? And what are the recommendations on improving such an institutional environment?

- The institutional gap is the "Transparency Law" which could combat against corruption and non-standard decision-making procedures of the officials.

In China, the lack of Transparency Law would foster and breed corruption both before tendering and during tendering. Before tendering when project is still at its conception, ex ante evaluation

and feasibility study stages, officials usually in provincial and local governments would put forward “political achievement” projects that stand for their political achievement and help them pursue position promotion but that do not necessarily consider the real project demands and public interests. During tendering, corruption primarily concentrates on collusions between officials and bidders. The collusions may take several forms, including breach of confidentiality, bribery and nepotism. Therefore, the recommendation is to build up the Transparency Law, which could combat against corruption through legislating transparent, open and clear decision-making procedures and thus providing opportunities for the public to scrutinize the public decisions.

- **The institutional limitations contain the lack of the “Concession Law”, the inherent inconsistency of the existing legislations and the lack of an independent judiciary.**

The existing legislations and regulations indeed offer some relevant provisions on which concession-type procurements can rely, but they are still incomplete to answer all the questions pertaining to applying for and granting concession. Therefore, a unified law, “Concession Law”, is recommended to be built up dealing special problems raised by concession procurement. Apart from the lack of the unified law, some existing legislations and regulations are inherently inconsistent. Some rules and provisions that can be found in one regulation or law can be still found in others with fundamental differences in their descriptions. As a consequence, both the public sector and the private sector would confuse with the laws to which they should accord in performing their work, and they would also do not know how to insure their own interests when disputes arouse. Thus recommendation is to adjust and tighten the existing laws and regulations in order to make them well articulate with each other. Furthermore, the current judicial system of China has the problems of dependence, which means that the judiciary could be influenced by government and thus provide breeding ground for corruption.

➤ **Predictions about success and failure of PPP models: Strategic Behaviors**

What are the predictions about success and failure of the PPP models in the context of China? And what strategic behaviors may emerge in each PPP option that would cause their failures and how to deal with those strategic behaviors?

- **The possible factors that could lead PPPs to be unfavorably applied consist of:**

- **Adverse selection**

During the ex ante contractual period, selecting a right contractor through tendering is the mission in a priority. The factors that might cause failure of this mission compose automatic selection in cases under DBB and sometimes DB and adverse selection in cases under BOT and TOT. The consequence of automatic selection is the lack of accountability and efficiency of state-owned enterprises. The possible reasons are that there is lack of incentives for workers in state-owned enterprises to promote their accountability and efficiency and that continuous governmental protection on state-owned enterprises in the way of providing easy access to supports and resources makes them loss their competition capacity under the market economy. In addition, such governmental protections on state-owned enterprises form an unfair competition and discouraging growth environment for private enterprises.

Except for corruption in tendering in forms of collusion between officials and bidders, adverse selection may be resulted from collusions among bidders in various types. They may collude with each other on raising the submitted bid prices together; some of the bidders may collude in order to exclude other bidders by submitting their bid prices substantially lower than the normal price; and they may collude with each other under agreements on winning the bid by turn.

➤ **Moral hazard in project implementation**

During the contractual period, ensuring the right way of implementing and performing the project is regarded as a priority, and additionally, providing adequate and right incentives and monitoring instruments are also important. The factors that may lead project implementation to fail consist of jerry-build in construction phase and strategically increasing profits by private enterprises during operation and maintenance phase. Jerry-builds may be taken place in cases using DB and BOT and strategic increase of private profits may happen in cases under BOT and TOT. Jerry-builds may be either technical or experience-dependent, which thus may lead to reduction on project quality and increase in maintenance costs on the rudimentary quality problems. Strategically increasing profits by private enterprises may be taken place in various forms including strategically increasing the charging period, the number of tolls, raising the charging price, and reducing maintenance with the consequence of harming public interests.

➤ **The predictions: combining PPP options with strategic behaviors**

➤ **DBB**

DBB has been rarely used at present in China. The failure points include that first, its “bid” process has been replaced by automatically selecting a state-owned enterprise by the Chinese regional or local government, which did not depend on competitive tendering with clear and standard selection procedures and criteria; second, the workers in state-owned enterprises are lack of accountability and efficiency. Thus, strategic behaviors under DBB consist of automatic selection and moral hazard problems in construction. Assuming that it was to be applied at present times, it needs a shift from automatic selection to competitive tendering and thus accords to the competition rules in the modern market economy, and it should design incentives in order to motivate workers’ accountability and efficiency.

➤ **DB**

DB is now widely used in northern China. It is predicted that DB would be conditionally successful if its accompanying strategic behaviors can be dealt with, including adverse selection and moral hazard in construction. Adverse selection may be caused by non-standard and non-transparent selecting procedures and bidder collusions, and the continuous protection on commercialized state-owned enterprises by government through providing easy access to supports and resources. Moral hazard in construction is largely due to constructors’ intentions of making excessive profits and thus jerry-builds.

➤ **BOT**

BOT is recently applied since late 20th century mainly in southern China. It is predicted with the result of high risk of failure. Strategic behaviors run through the entire process from project tendering to project maintenance, including adverse selection in tendering, moral hazard of jerry-builds in construction, and strategic increasing in profits, and moral hazard of reducing maintenance in operation. These strategic behaviors emerge because of the failure points including also the non-standard and non-transparent tendering procedures and

criteria; lack of incentives and monitoring on construction; and lack of incentives for good project operation.

➤ TOT

TOT is also recently applied in China, concentrating primarily on southern areas. It is predicted with the result of conditional success, taking into considerations of China's institutional context and the relatively low trust levels. Strategic behaviors within the scope of TOT contain adverse selection and moral hazard problems in the operating and maintenance stages for old expressways. If the expressway is newly constructed, then TOT has to be combined with some construction process such as DB. In such cases, strategic behaviors comprise those both in TOT and DB. The conditions for success, thus, contain the standard and transparent tendering and adequate incentives for operating for existent expressways; and extra efforts in monitoring project quality for new expressway projects.

➤ **The recommendations:**

➤ On adverse selection

The recommendation on lack of accountability and efficiency resulted from automatic selection is the "Dividend Policy" which could provide incentives for workers in state-owned enterprises through linking their income to their performance. When it turns to adverse selection, the fundamental tenet of recommendations is to increase collusion-costs of bidders and to deter strategic communication among bidders. Increasing collusion-costs by setting credible punishment mechanism could reduce the motivations of bidders to collude. And deterring strategic communication among bidders by enlarging the scope of bidders, using the semi-transparent policy and the two-dimensional evaluation method could prevent their strategic communication and discover their motivations to collusion. In addition, government should remove protections on commercialized state-owned enterprises in order to cultivate their competitiveness and thus efficiency and productivity.

➤ On moral hazard project implementation

Recommendations against strategic project construction include three aspects. First is to use the fixed-price contract with periodical payment from the government under DBB and DB in order to deal with cost overruns and unilateral termination of the contract. Second is to employ a construction monitoring group to supervise the project quality (construction material purchasing and using) and thus to prevent jerry-builds. Third is to implement the policy of "liable for projects during whole lives of project legal person and monitoring legal person" (usually they are the project manager and monitoring manager), which provides incentives for them to be accountable and be stricter with the project quality.

Recommendations against moral hazard problems in the operation and maintenance phase focus on adopting "Reputation Policy" that offers incentives for the operator to build up its reputation credits as business assets and Williamson's relational contracting that emphasizes on-going administrations on the contractual relations. In addition, public hearing is also recommended both as an independent solution and as a complementary method to reputation policy and Williamson's relational contracting because a public hearing system can provide direct response from the users about the road conditions and service quality. Additionally, as Francis Fukuyama indicated, a shift should be encouraged from long-term contracting to short-term contracting since the Chinese players are discouraged to be entrusted with long-term and extensive freedom of contractual tasks.

➤ Findings from case studies

What we have learnt from the case studies? And what are their extra values?

➤ Shen-Da Expressway

Automatic selection is a kind of “adverse” and may result more serious problems of lack of accountability and thus reduction on efficiency because the government has no alternatives. Automatic selection in Shen-Da case has led to ex post strategic behaviors of experience-dependent jerry-builds (222 locations) which were inspected after its 10-year operation. And bias optimism on estimating costs caused project cost overruns.

➤ Xiang-Jing Expressway

The Transparency Law is urgent for China since corruptive behaviors in some regional areas are prevailing. In Xiang-Jing case, it manifested in the way of issuing free toll cards by officials to their favorable persons. Governmental decision process and procedures are arbitrary and not based on standard criteria. And some regulations such as Administration on Toll Roads are still incomplete since they did not cover all aspects of administering toll roads such as regulations on issuing free toll cards.

➤ Le-Yi Expressway

Le-Yi case went well in its tendering process, but strategic behaviors of jerry-builds (9 locations) have been inspected, grouped as technological-dependent ones. The motivation of the contractor to be fully compliant to the contract terms is hardly to ensure. And land acquisition in China, even approved for the projects, is difficult since it is hard for the private contractor to persuade farmers to move without government supports and accompany.

➤ Citong Bridge

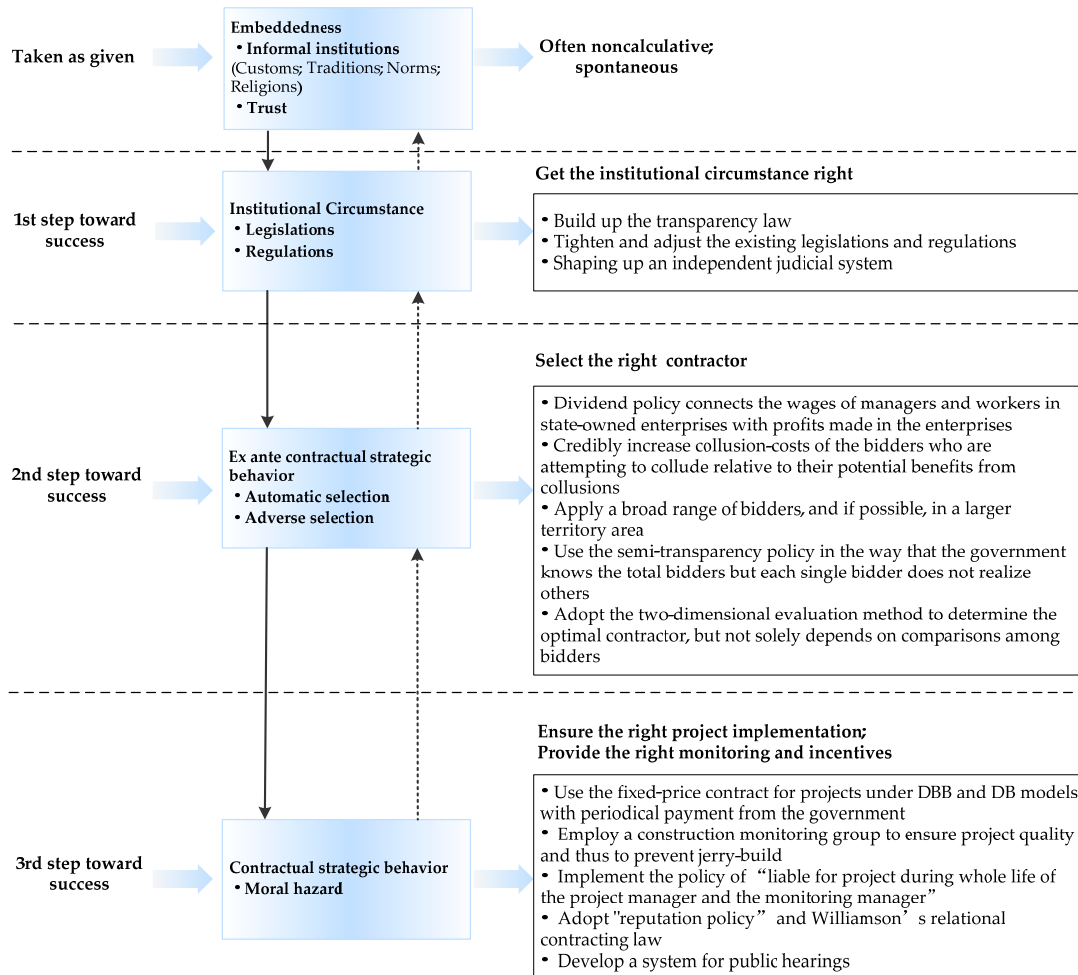
Citong case is typical in illustrating unfair competition between state-owned enterprises and private ones. In some regional areas, state-owned enterprises are protected by government through favorable policy instruments. Such a situation created an unfair competition environment for private enterprises. The Law against Unfair Competition has been legislated but it is not well enforced. The reason is that the judicial systems in some regional areas are dependent and thus may be influenced by government. Thus the Transparency Law is needed not only to combat corruption within the government but also in the judicial systems. Corruptive judiciary is even worse since it sends a wrong signal that corruption is a behavior that can be tolerate.

➤ He-Chao-Wu Expressway

He-Chao-Wu case is also a classic case describing corruption during transferring expressway operating right. The Transparency Law is firstly needed to combat corruption such as accepting bribery in this case. And the inconsistency between the Tendering Law and the Procurement Law may act as an excuse for officials to transfer the open competitive tendering to close invited tendering. Such corruptive behaviors may be regarded as the result of China’s non-energetic and dependent judiciary which does not energetically do investigations and is

influence by government interference.

Therefore, we can enrich our 4-level framework as the following:



This study focused on getting China’s institutional circumstance right for PPPs; selecting the right contractor; and ensuring the right project implementation and providing the right monitoring and incentives aspired to answer the research question—How to successfully apply PPPs in China expressway sector. However, there are limitations pertaining to gathering information. It is not always possible to get the entire information required for research because some information is not public and the interviewees sometimes reserve partial information that they do not like to disclose such as the corruptors. In addition, considering our research boundary formulated in chapter 1, we cannot go through the whole country but only Beijing, Shenyang and Dalian to obtain information on the national level (such as case studies) since China is large geographically and research schedule is limited. Extra costs have been paid for gathering unpublished documents in Ministries and Provincial Departments. Given the information obtained and the limited research schedule, probably, not all aspects of institutional deficiencies and types of strategic behaviors have been explored. Since the scope of the research is always limited, here several proposals can be made for the future continuation of the project:

- i) Further explore the remained institutional deficiencies and types of strategic behaviors;

- ii) Extend the research field of China expressway sector to other infrastructure sectors;
- iii) Compare the situations of PPP application in western countries with that of China.

Finally, the reflections on the methodology include both merits and limitations. Merits are that desk research is cheap, through which large amount of relevant papers and reports can be obtained from various international organizations. And case studies are really helpful in understanding the theory and providing supplementary findings. But one fatal limitation for desk research is its inaccuracy. So desk research must be accompanied by other research approaches such as surveys we have used. We did surveys through interviews, which has got satisfactory results. But one limitation of doing surveys, especially in China, that needs to speak out is the culture differences. We recommend that before doing surveys, such as interviews, researchers should know how to make communications with the people in another culture and thus how to obtain the information that is needed.

Bibliography

- Akintoye Akintola, Matthias Beck and Cliff Hardcastle (2003) Public-private partnerships: Managing risks and opportunities. ISBN-13: 978-0632064656. Wiley-Blackwell Publication. UK.
- Banister David and Nerechman Joseph (2000) Transport investment and economic development. ISBN:041925600. Routledge Publication. US.
- Bellver Ana and Kaufmann Daniel (2005) Transparenting transparency: Initial empirics and policy applications. The World Bank. Working Paper Series. Washington DC. US.
- Button Kenneth J. (1993) Transport Economics. pp58-62. ISBN-10: 1852785233. Edward Elgar Publishing. UK.
- Burchell Andrew (2000) Privatization and deregulation of transport. Chapter 2. Regulation of transport: An overview. ISBN-13: 978-0312232733. Palgrave Macmillan Publication. Europe.
- Caers Ralf, Boi Cindy, Jegers Marc, et al (2006) Principal-agent relationships on the stewardship-agency axis. Journal of non-profit management and leadership. Vol.17, No.1. Wiley Periodicals Inc. Published online in Wiley InterScience.
- Chang Mike, Frankel Brad, Reyes Caridad, et al (2005) PPP Centrum of the Czech Republic: PPPs-lessons learnt. Published online in PPP Centrum. Crech.
- China Audit Office (2008) Audit report on Chinese toll roads. Published online in China Audit Office. China. Beijing.
- Cohen Susan I. and Loeb Martin P. (1989) The demand for cost allocation: The case of incentive contracts versus fixed-price contracts. Journal of accounting and public policy. 8 165-180 (1989). Elsevier Ltd. Publication. Available online at www.sciencedirect.com.
- Dai Kewu (2001) Enhancement of expressway construction: practicing the anti-corruption contract for expressway projects. The Department of Communication of Jiangsu Province. 1000-0952(2001)02-13-01.
- Dang Shengli and Zu Yaqin (2006) Qualification of the bidders during the tendering process. Journal of Coastal Enterprises and Science and Technology. Vol.74, No.4.
- Djankov Simeon (2007) Measuring the ease of enterprise. The World Bank Enterprise Surveys. Published online by the World Bank at <http://blog.doingbusiness.org/2008/01/measuring-the-e.html>. Washington DC.
- Domberger Simon and Jensen Paul H. (1997) Contracting Out by the Public Sector: Theory, Evidence, Prospects. Oxford Review of Economic Policy. Vol.13 No.4. Oxford University Press Publication. UK.
- EIB (2005) Transaction costs in public-private partnerships: A first look at the evidence. Economic and Financial Report 2005. European Investment Bank. Economic and Financial Report 2005/03. Published by EIB at www.eib.org/efs/.
- Estache Antonio, Juan Ellis and Trujillo Lourdes (2007) Public-private partnerships in transport. Policy research working paper No.4436. Sustainable department. Published online by the World Bank.
- European Commission (2003) Guidelines for successful public-private partnerships. Published at http://ec.europa.eu/regional_policy/sources/docgener/guides/pppresourcebook.pdf. by European Commission. Brussels.
- European Commission (2004) Resource book on PPP case studies. Published by European Commission at http://ec.europa.eu/regional_policy/sources/docgener/guides/pppresourcebook.pdf. Brussels.

European International Contractors (2003) EIC white book on BOT/PPP. ISBN3-980825-4-4. Published by European International Contractors at http://www.eicontractors.de/seiten/bookshop/eic_white_book.pdf

Feng Peirong (2005) A preliminary research into bad behavior of construction project bid and countermeasure of preventing and curing. Journal of Zhejiang Wanli University. Vol.18, No.4.

Flyvbjerg Bent (2003) Megaproject and risk: An anatomy of ambition. ISBN-13: 978-0521009461. Cambridge University Press Publication. Europe.

Flyvbjerg Bent (2004) Procedures for dealing with optimism bias in transport planning. Guidance Document Report No. 58924. Published by British Department for Transport. British.

Flyvbjerg Bent (2005) Policy and planning for large infrastructure projects: Problems, causes and cures. World Bank Policy Research Working Paper No. 3781. Published by World Bank. Available at SSRN: <http://ssrn.com/abstract=873657>.

Flyvbjerg Bent et al (2005) How (in)accurate are demand forecasts in public works projects? Journal of the American planning association. Vol.71, No.2. Published by American Planning Association. Chicago.

Fumagalli Elena, Garrone Paola and Grilli Luca (2007) Service quality in the electricity industry: The role of privatization and managerial behavior. Journal of energy policy. 35(2007) 6212-6224. Elsevier Publication. London.

Gezhouba Corporation (2005) Xiang-Jing expressway project cost estimation report. Unpublished Document.

Grimsey Darrin and Lewis Mervyn K. (2005) Are public-private partnerships value for money? Evaluating alternative approaches and comparing academic and practitioner views. Accounting forum. 29(2005)345-378. Elsevier B.V Publication. Available at www.ScienceDirect.com.

Grossman Sanford Jay and Hart Oliver D. (1986) The costs and benefits of ownership: A theory of vertical and lateral integration. Journal of Political Economy. 94(4)691-719. University of Chicago Press Publication. Chicago.

Guasch J, Luis (2007) Granting and renegotiating infrastructure concessions: Doing it right. Published by World Bank. Washington DC.

Haezendonck Elvira (2007) Transport project evaluation: extending the social cost-benefit approach. pp176-177. Edward Elgar Publishing Ltd Publication. UK.

Hart Oliver D. (1996) An economist's perspective on the theory of the firm. Firms, organizations and contracts. ISBN 0 19 877435 4. pp202-204. Columbia Law Review Association, Inc. Publication. Columbia.

He Chengping (2002) Implementing construction monitoring is the essence of ensuring project quality. The journal of highway and transport. Vol.9, No.3.

HM Treasury (1991) CUP Guidance No. 58. HM Treasury Publication, London.

HM Treasury (2003) Public services: meeting the productivity challenge. HM Treasury Publication. London.

HM Treasury (2005) Managing risks with delivering partners. A guide for those working together to deliver better public service.

Hodge Graeme (2007) Public-private partnerships: an international performance review. Public administration review. pp5454-553. Paper presented at the annual meeting of the The Midwest Political Science Association, Palmer House Hilton, Chicago, Illinois.

Hope, K. R. (2001) The New Public Management: Context and Practice in Africa. International Public

Management Journal. Vol. 4, No. 2. Elsevier Publication. London.

Huang Yunfeng (2007) Problems in and countermeasures for tendering and bidding management of construction engineering project in China. Journal of Building Construction. Vol.29, No.5.

Ian Alexander and Irwin Timothy (1996) Price caps, rate-of-return regulation, and the cost of capital. Private Sector Development Department. The World Bank. Note No.87.

Indonesia Public Expenditure Review (2007) Spending for development: Making the most of Indonesia's new opportunities. Chapter 5.

Jamali Dima (2004) Success and failure mechanisms of public private partnerships in developing countries. International journal of public sector management. Vol.17, No.5. Emerald Group Publishing Limited. UK.

Jensen Michael C. (2003) A theory of the firm. Governance, Residual Claims, and Organizational Forms. ISBN 0-674-01229-1. pp137-138. Harvard University Press Publication. US.

Kessides Ioannis N. (2004) Reforming Infrastructure: Privatization, Regulation and Competition. A World Bank Policy Report. ISBN-13: 978-0821350706. World Bank Publication. Washington DC.

Klein Daniel B. (1997) Reputation: Studies in the voluntary elicitation of good conduct. ISBN-10: 047209596X. Michigan University Press. Michigan. US

Laffont Jean-Jacques and Tirole Jean (1998) A theory of incentives in procurement and regulation. ISBN0-262-12174-3. pp3-4. The MIT Press Publication. US.

Lane Cristel (1997) The social regulation of inter-firm relations in Britain and Germany: Market rules, legal norms and technical standards. Cambridge Journal of Economics. 21(2). Pp197-215. Cambridge University Press Publication. UK.

Lane Jan-Erik (2000) New Public Management. Chapter 7: From long-term contracting to short-term contracting. ISBN0415231876. Routledge Publication. UK.

Leigland James (2006) Is the public sector comparator right for developing countries? Public private infrastructure advisory faculty. No.4, April 2006. Published by World Bank at http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2006/09/28/000310607_20060928115633/Rendered/PDF/375400Gridlines0401PUBLIC1.pdf.

Li Changyong (2000) Research on sustainable development of road traffic in China. Journal of Xi'an Highway University. Vol. 20. No. 3. Xi'an Highway University Publication. Xi'an.

Li, Jianfeng, Li Wei and Xiong Qingyuan (2007) Journal of Sichuan Building Science. Vol.33, No.2.

Li S. and Zhang W. (2000) The road to capitalism: Competition and institutional change in China. Journal of Comparative Economics. 28 pp269-292. Elsevier Publication. UK.

Li Shaomin and Xia Jun (2008) The roles and performance of state firms and non-state firms in China's economic transition. Journal of World Development. Vol.36, No.1. pp39-54.

Li Tang (2002) Discussion on principal-agent problem of state-owned enterprises. Forum of Administration.

Li Wengui (2005) Research on service contract for expressways. Journal of Guangdong Expressway Communication. Vol.90, No.3.

Li Wei, Xi Guangheng and et al (2001) New concepts for project reconstruction and extension: Shen-Da expressway as an example. Liaoning Road Plan and Design Institute. Shenyang. Unpublished Document.

- Li Xiaoyu (2007) Problems which need attentions during the tendering process. Guangdong Construction Materials. Vol. 6, pp179-180.
- Liaoning Department of Communication (2000) Post-evaluation report of the old Shen-Da expressway. Liaoning Department of Communication. Unpublished Document.
- Liaoning Road Plan and Design Institute (2000a) Introduction on planning Shen-Da expressway reconstruction and extension. Unpublished Document.
- Liaoning Road Plan and Design Institute (2000b) Traffic demand forecasting on Shen-Da expressway reconstruction and extension project. Unpublished Document.
- Liaoning Road Plan and Design Institute (2000c) Shen-Da expressway reconstruction and extension project geographic conditions and choices of technical solutions. Unpublished Document.
- Liaoning Road Plan and Design Institute (2000d) Reasons for the poor road conditions of the old Shen-Da expressway. Unpublished Document.
- Liaoning Road Plan and Design Institute (2000e) Shen-Da expressway reconstruction and extension project cost estimation and financing sources. Unpublished Document.
- Liaoning Road Plan and Design Institute (2000f) Shen-Da expressway reconstruction and extension project organization and technical solutions. Unpublished Document.
- Liu Lijuan (2007) Problems in the Tendering Process of Highway Construction. TransportWorld. 2007-2-3.
- Liu Jun (2000) Discussion on “jerry-build” problems in project construction. Journal of Southern China Highways. Vol.25, No.4.
- Liu Zhongmei, (2006) Highway construction and sustainable development. Sci-tech information development and economy. Vol.16. No. 22.
- Lorenzen, C.C., and Barrientos, M.E. (2001) Tollroad concessions: The Chilean experience. PFG discussion paper series, No.124. Published by World Bank at <http://siteresources.worldbank.org/INTINFNETWORK/Resources/PeterRoberts+NatalyaStankevich.pdf>.
- Maskin Eric S. and Tirole Jean (2007) Public-private partnerships and government spending limits. International journal of industrial organization. 26 (2008) 412–420. Elsevier Ltd. Publication. UK.
- Medda Francesca (2007) A game theory approach for the allocation of risks in transport public private partnership. International Journal of Project Management. 25 (2007) 213–218. Elsevier B.V Publication. Available at www.ScienceDirect.com.
- Meredith Jack R. and Samuel J. (2006) Project management: a managerial approach. ISBN-13: 978-0471715375 Wiley Publication. Sixth edition.
- Miller John B. (2000) Principles of public and private infrastructure delivery. pp50-60. ISBN-10: 0792372018. Springer Publication. US.
- Miller Roger and Lessard Donald R. (2008) Evolving strategy: risk management and the shaping of mega-projects
- Minassian Teresa (2004) Public-private partnerships. International monetary fund. Published by World Bank. Washington DC.
- National People’s Congress (1993) Law of against Unfair Competition of People’s Republic of China.
- National People’s Congress (1994) The company law of People’s Republic of China.

- National People's Congress (1998) The Law of Highways of People's Republic of China.
- National People's Congress (1999) The tendering law of People's Republic of China.
- National People's Congress (2000) The contract law of People's Republic of China.
- National People's Congress (2002) Government Procurement Law.
- National People's Congress (2004) Administration ordinance of toll roads.
- National People's Congress (2007) The property law of People's Republic of China.
- Nora M, Hesham Osman, and Tamer E (2006) Stakeholder management for public private partnerships. *International Journal of Project Management*. 24 (2006) 595–604. Elsevier Ltd and IPMA Publication. UK.
- North D. and Thomas R. P. (1973) *The rise of the western world*. Cambridge University Press Publication. UK.
- Obermann Gabriel (2007) The role of the state as guarantor of public services: Transaction cost issues and empirical evidence. *Journal of Compilation CIRIEC* 2007. pp475-500. Available at SSRN: <http://ssrn.com/abstract=1010784> or DOI:10.2139/ssrn.10.1111/j.1467-8292.2007.00343.x.
- OECD (2001) Private initiatives for corporate responsibility: An analysis. Directorate for Financing, Fiscal and Enterprise Affairs. Working Paper on International Investment. OECD Publication.
- OECD (2002) Competition and efficiency in publicly funded services. *OECD Economic Studies* No.35. OECD Publication.
- OECD (2003) Public sector transparency and international investment policy. OECD directorate for financial, fiscal and enterprise affairs. OECD Publication.
- OECD (2007) Development centre studies: Informal institutions-How social norms help or hinder development. OECD Publication.
- OECD and International Transport Forum (2008) *Transport Infrastructure Investment*.
- Ouyang Xiaotao (2007) Enhancement on quality management during project construction. *Journal of Coastal Enterprises and Science and Technology*. Vol.88, No.9.
- Pakkala Pekka (2002) Innovative project delivery methods for infrastructure-An international perspective. Finnish road enterprise. pp32. ISBN952-5408-05-1.
- Pakkala P. and de Jong Martin et al (2007) International overview of innovative contracting practices for roads. Next generation infrastructure foundation. TU Delft.
- Parker David and Hartley Keith (2002) Transaction costs, relational contracting and public private partnerships: a case study of UK defence. *Journal of purchasing and supply management*. OECD Publication.
- Paul Amos (2004) Public and Private Sector Roles in the Supply of Transport Infrastructure and Services. *Transport Papers*. World Bank Group. TP-1. May 2004. Published by World Bank at http://www-wds.worldbank.org/servlet/main?menuPK=64187510&pagePK=64193027&piPK=64187937&theSitePK=523679&entityID=000160016_20051021100611
- Perez Benjamin G. (2004) Achieving public-private partnership in the transport sector. pp163-240. ISBN-10: 0595312055. iUniverse, Inc. Publication. US.
- Powell W. W. (1990) Neither market or hierarchy: network forms of organization. *Research in organizational behavior*. No.12, pp260-335. The Free Press Publication. New York.
- Qiao Lixin (2008) Influence of asymmetric information on tendering for construction projects. *Journal of*

Liaoning Administration College. Vol.10, No.2.

Qian Suwei (2006) How many state assets were sold at a loss? The newspaper of economic consulting. 2006-07-31.

Raiser Martin (1997) Informal institutions, social capital and economic transition: reflections on a neglected dimension. Working paper No.25. Published by European Bank for Reconstruction and Development available at <http://www.ebrd.com/pubs/econo/wp0025.pdf>.

Ranjay Gulati (1998) Alliance and networks. Journal of Strategic Management. No.19. pp292-316. John Wiley & Sons Publication. England.

Rondinelli Dennis and Nellis John (1983) Decentralization and Development: Policy Implementation in Developing Countries, Sage Publications, Beverley Hills, CA.

Schauvelberger John E. (2003) Alternate financing strategies for build-operate-transfer projects. Journal of construction engineering and management. Vol. 129, No. 2. pp. 205-213. SACE Publication. US.

Schjelderup Guttorm (1990) Reforming state enterprises in socialist economies. Policy, research and external affairs. Working paper of public economics. WPS368. Published by World Bank. Washington DC.

Shan Anwar (2005) Tailoring the fight against corruption to country circumstances.

Shandong Expressway Corporation Limited (2007) Le-Yi expressway project periodical evaluation report in 2007. Shandong.

Sichuan Department of Communication (2003a) BOT solution for Le-Yi expressway project financing. <http://www.scjt.gov.cn>.

Sichuan Department of Communication (2003b) Requirements of potential bidders, tendering criteria and procedures notice. <http://www.scjt.gov.cn>.

Sichuan Department of Communication (2005) Affiche of tendering for Sichuan Le-Yi expressway BOT project.

Sichuan Department of Communication (2007) <http://www.scjt.gov.cn/structure/index/scjtt>

Sichuan Infrastructure Project Inspection Group (2008) Inspection report on Le-Yi expressway construction quality. Shandong.

Smyth Hedley and Edkins Andrew (2007) Relationship management in the management of PFI/PPP projects in the UK. International Journal of Project Management. 25(2007)232-240. Elsevier B.V. Publication UK.

Song Yuanyuan (2005) Analysis of surround-bidding and accompanying-bidding in construction project bidding. Journal of construction management modernization. Vol.85, No.6.

Song Zhiguo (2007) The development path of China's reform on state-owned enterprises and corporate governance. Huxiang Forum. 2007 No.6.

Su Dongwei (2005) Corporate finance and state enterprise reform in China. China Economic Review. 16(2005)118-148.

Sun Haiping (2007) Strategic behaviors and countermeasures in project tendering. Journal of China Municipal Engineering. Vol.128, No.4.

Tam C M (1999) Build-operate-transfer model for infrastructure developments in Asia: reasons for successes and failures. International journal of project management. Vol.17, No.6, pp377-382.

ten Heuvelhof Ernst et al(2007) Why project management fails in complex decision making process. ISBN1402073313. Springer London Limited Publication. London.

- The Ministry of Communication of China (1996) Administration on compensable transferring expressway operating right. The Ministry of Communications of China. No.9.
- The Ministry of Communication of China (2004) Measurements of administration on road construction market. The Ministry of Communication of China.
- Transparency International (2005) Global corruption report. ISBN 0745325084. Pluto Press Publication. UK.
- Transparency International and Cambridge University (2007) Global corruption report 2007. Transparency international. ISBN 978-0-521-70070-2. Pluto Press Publication. UK.
- UNCITRAL (2001) Legislative guide on privately financed infrastructure projects. The United Nations Commission on International Trade Law. ISBN92-1-133632-5. Published by United Nations. New York.
- US Department of Transportation (2007) Case studies of transportation: PPP around the world. Federal highway administration. Final report work order 05-002.
- van Ham Hans and Joop Koppenjan (2000) Building Public-Private Partnerships: Assessing and Managing Risks in Port Development. Public Management (an international journal of research and theory), ISSN:1461-667X.
- von Hirschhausen Christian, Beckers Thorsten, and Brenck Andreas (2004) Infrastructure Regulation and Investment for the long term: An Introduction. Utilities Policy. 12(2004)203-210. Elsevier Ltd. Publication. Available online at www.sciencedirect.com.
- Walsh Kieron (1995) Public services and market mechanisms: Competition, contracting and the New public management. ISBN0-333-58806-1. pp48-49. Palgrave Macmillan Publication. New York.
- Wang Weiping, (1999) Reforming China's Institutional Environment for Urban Infrastructure Provision. Urban Studies. Vol.36.No.13,2263-2282.
- Wang Yunquan (2003) Problems and recommendations of expressway operation. Shandong Economy. Vol.116, No.3
- Waterman Richard W. and Meier Kenneth J. (1998) Principal-agent models: An expansion? Journal of public administration research and theory 2:173-202. Published by: Oxford University Press on behalf of the Public Management Research Association. UK.
- Wei Xiuben (2001) "Bean curd" projects and their quality examination. Journal of Archetecture. Vol.11, No.1.
- Williamson Oliver E. (1996a) The mechanisms of the governance. ISBN 9780195132601. pp56-57.
- Williamson Oliver E. (1996b) Transaction-cost economics: The governance of contractual relations. Firms, organizations and contracts. ISBN 0 19 877435 4. pp168-198.
- Williamson Oliver E. (1998) Transaction cost economics: How it works; Where it is headed. De Economist. 146, No.1, 23-58.
- Williamson Oliver E. (1999) Public and private bureaucracies: A transaction cost economics perspective. The journal of law, economics and organization. Vol.5, No.1.
- Williamson Oliver E. (2008) Outsourcing: Transaction cost economics and supply chain management. Journal of supply chain management. April, 2008, Vol.44, No.2.
- World Bank (1994) China: Highway Development and Management Issues, Options and Strategies. Transport Operations Division. Report No. 13555-CHA. Published by World Bank. Washington DC.
- World Bank and Economic Commission for Africa (2003) Public sector management reforms in Africa:

- Lessons learnt. ECA/DPMD/PSM/TP/03/1. Published by World Bank. Washington DC.
- World Bank (1996) Transaction costs in private infrastructure projects-Are they too high? Public policy for the private sector. Note No.95. Published by World Bank. Washington DC.
- World Bank (1998) Why performance contracts for state-owned enterprises haven't worked? Series Study on Private Sector. The World Bank. Note No.150. Published by World Bank. Washington DC.
- World Bank (2003) A review of canceled private projects. Private sector and infrastructure network. The World Bank Group. Published by World Bank. Washington DC.
- World Bank (2005) The role of the public and private sector in transport infrastructure: PPP options. Seminar: PPP in transport sector in Russia. March 3-4, 2005. Published by World Bank. Washington DC.
- World Bank (2006) Private participation in infrastructure: lessons learnt. OECD Global Forum for International Investment. Published by World Bank. Washington DC.
- World Bank (2007) An Overview of China's Transport Sector. Eastern Working Paper No.15. Published by World Bank. Washington DC.
- World Bank and Japanese Ministry of Construction (1999) Asian toll road development in an Era of financial crisis. Tokyo International Forum: March 9 – 11, 1999. Published by World Bank. Washington DC.
- World Bank Seminar (2007) Definition of PPP and options available. Powerpoint. Published by World Bank. Washington DC.
- Wu Longgang (2002) Chinese BOT approach and its first application in Xiang-Jing expressway. Journals of Highways. Feb.2002, NO.2.
- Xiao Zuzuo (2003) Discussion on strategic behaviors during tendering process. Journal of Shanxi Architecture. Vol.29, No.6.
- Xie Jinjin (2004) Water quality evaluation and protection research of the Jin River in Fujian province. Journal of Quanzhou Normal University (Natural Science). Vol.22, No.6.
- Yang Yanying (2003) Problems of Chinese Traditional Public Administration and Reforms. Central Library. 1671-6949(2003)02-0026-03.
- Yang Yusheng and Yuan Jianbo (2006) Surveys on costs of expressway construction monitoring. Journal of Chongqing Communication University. Vol.25. No.3.
- Yesilkagit Kutsal (2004) The design of public agencies: overcoming agency costs and commitment problems. Journal of public administration and development. Dec.24. pp119-127. John Wiley & Sons, Ltd.Publication. UK.
- Yves Jean (1994) Financing of major infrastructure and public service projects. Published by French Ministry of Public Works, Economic and International Affairs Division. France. Available at <http://www.worldbank.org/html/fpd/infrastructure/toolkits/Highways/Highways/pdf/69.pdf>.
- Zhao Dapeng (2003) Deepening Public Administration Reform in China Applying with Western's Experience. Administration and Law. 2003.12
- Zhao Xinlong (2003) The necessity of monitoring in construction projects. The journal of petroleum educational institute of Xinjiang. Vol.7, No.2.
- Zhang Changchun (2005) The administrative institutions for the government investment. A collection on
- Zhang Liqiang (2003) Problems of the intellectual property rights in China. Journal of Anhui University of Science and Technology. Vol.5, No.4. Anhui University of Science and Technology Press Publication.

Anhui.

Zheng Jurong, Roehrich Jens K and Lewis Michael A (2008) The dynamics of contractual and relational governance: Evidence from long-term public-private procurement arrangements. *Journal of purchasing and supply management*. 14(2008) pp43-54.

Zhu Yumo and Liu Xinxin (2004) The economic properties of the intellectual property right law in China. *Journal of social sciences review*. Vol.19, No.6.

Zitron Jeff (2006) Public-private partnership projects: towards a model of contractor bidding decision-making. *Journal of purchasing and supply management*. 12(2006)53-62. Elsevier B.V Publication. Available at www.ScienceDirect.com.

Zu Luming (2005) Problems in and countermeasures for the pre-qualification in tendering process. *Journal of Optimization of Capital Construction*. Vol.26, No.5.

Interviews

1) The Ministry of Communication, Beijing, China

Hua Li
Vice Head of Road Transportation Department

2) China's Research Institute of Road Transportation Development, Beijing

Xiaofeng Li
Engineer of Road Transportation Development
E-mail: xf.li@rioh.cn

3) Liaoning Department of Communication, Shenyang, Liaoning Province

Jian Shi
Head of Road Design Section
Tel: (0086) 13804998028

4) Liaoning Institute of Road Design and Plan, Shenyang, Liaoning Province

Yuwu Sun
Head of Feasibility Study Research Group
E-mail: slee7388@sina.com

Chao Wang
Associate Engineer of Road Design
Tel: 00 86 24 88110718

5) Expressway Project Tendering Committee, Shenyang, Liaoning Province

Hui Wang
Head of Tendering Department

6) Communication Bank of China, Liaoning Branch

Shuguang Tan
Head of the Lending Department

7) Agriculture Bank of China, Liaoning Branch

Wenqi Han

Head of the Lending Department
Mobile phone: (00 86) 13804995209

8) Liaoning Lijie Consultancy Firm, Dalian, Liaoning Province

Li Liu
Chairman Board
E-mail: liuli@cnpmi.com

Yushan Liu
Standing Director
E-mail: lyslndl@163.com

Appendix 1: Main Questions during Interviews

Domain 1: The application and development of public-private partnerships in China's expressway sector

- 1) What about the PPP history in China's expressway sector?
- 2) What are the driving factors of the application of PPP in expressway sector in China?
- 3) Among the Chinese expressways, which ones have applied PPPs? And what PPP options are they?
- 4) What about the performance of these expressways that have used PPPs?
- 5) What are the lessons learnt of the government during the process of applying PPP? And what are the obstacles and recommendations?
- 6) What are the lessons learnt of the private sector during the process of applying PPP, known by the government? And what are the obstacles and recommendations?
- 7) What are the roles of government and the private sector in applying PPP? What are their responsibilities? And how to allocate risks?

Domain 2: Tendering

- 8) What does the tendering process look like for expressway projects using PPP?
- 9) What are the selection criteria and procedures of the tendering process to choose the right contractor?
- 10) During the tendering process, what are the non-standard and corruptive behaviors of government officials?
- 11) During the tendering process, what are the strategic behaviors from the private sectors?
- 12) At present, what are the countermeasures against these strategic behaviors?

Domain 3: Project lifecycle (design-construction-operation-maintenance)

- 13) During the whole project lifecycle, how does government ensure the public interests?
- 14) During the whole project lifecycle, how does government ensure the rational return to the private sector?
- 15) What are the incentive schemes and monitoring methods available for government to ensure the right implementation of the project during project lifecycle? That is to say. How does government prevent ex post contracting strategic behaviors from the private sector?

Domain 4: Informal institution - "Guanxi"

- 16) What opinions do the interviewees have about the influence of China's informal institutions including the low trust levels and the dependence on "Guanxi" on effectively applying PPPs?

Domain 5: Expressway administration in China (institutional environment)

- 17) What does the institutional environment look like for expressway administration?
- 18) What about the performance of such an institutional circumstance? That is to say, what are the shortcomings and limitations and what are recommendations to improve it?

Domain 6: Expressway financing

- 19) What are the financing methods of the Chinese expressway?
- 20) What contributions do the Chinese domestic banks make for expressway financing? And what about the performance of such loans?

Domain 7: Private sector

- 21) What positive factors does the private sector bring for PPPs?
- 22) What market environment and opportunities do PPPs bring for the private sector?

