UNIVERSITÉ DU QUÉBEC À RIMOUSKI

La gestion des risques des projets en partenariat public-privé en Chine : une étude de cas

Le stade "nid d'oiseau" à Pékin

MÉMOIRE

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RÉSUMÉ

Le partenariat public-privé (PPP) est une méthode de gestion de projet qui est de plus en plus utilisée dans les projets de construction d'infrastructures en Chine. La gestion des risques est d'une grande importance dans la réussite de ce type de projets. Par le biais d'une étude du projet du stade olympique, ce mémoire vise à explorer les facteurs de risque, la façon dont les risques sont attribués et partagés efficacement entre le secteur public et privé, ainsi que les problèmes rencontrés dans la gestion du risque au sein des projets PPP en Chine. D'une part, une enquête Delphi a été menée avec des responsables des secteurs publics et privés qui ont participé à la gestion de ce projet visant à identifier, classer et répartir les risques; d'autre part, une entrevue avec un expert sur la gestion des risques des projets de PPP en Chine a été développée pour discuter de la situation actuelle et des principaux problèmes de gestion des risques dans le cadre de projets PPP en Chine. Au sein du projet PPP auquel nous nous intéressons, 44 risques ont été identifiés, parmi lesquels 14 ont été attribués au secteur public et 18 pour le secteur privé, tandis que les 12 restants ont été identifiés comme équitablement partagés. Sept risques majeurs, y compris les risques de conception, de retard dans la construction, de dépassement des coûts de construction, les changements de la demande du marché, d'insuffisance de connaissance des risques, d'organisation et de coordination, d'échanges avec l'étranger et de convertibilité ont été identifiés et expliqués pour ce projet en particulier.

Il a également été constaté que, comparativement avec les résultats issus de recherches antérieures, dans le projet " Nid d'oiseau ", les risques étaient surtout attribués au secteur privé tandis que dans les pays occidentaux, le transfert des risques est effectué avec encore moins de succès. Les résultats de la recherche peuvent contribuer à des projets similaires de PPP, en particulier pour la construction des installations sportives.

Mots clés : le partenariat public-privé (PPP), la gestion des risques, Chine, Stade Nid d'oiseau

ABSTRACT

The Public-Private Partnership, otherwise known as PPP, is a method of management of project which is increasingly used in infrastructure construction projects in China. The risk management is of great importance in the success of such kind of projects. Through a case study of the Bird Nest Stadium Project for 2008 Beijing Olympic, this paperwork aims to explore the risks factors in the project, how the risks are allocated and shared effectively between public and private sectors, as well as the problems encountered in the risk management in China's PPP projects. On the one hand, a tow-round Delphi survey was conducted with the managers from both public and private sectors who participated in the management of this project to identify, rank and allocate the risks; On the other hand, an interview with an expert on the risk management of PPP projects in China was developed to discuss the present situation and the main problems of the risk management of PPP projects in China. In this typical PPP project, 44 risks were identified, among which 14 were allocated more to the public sector and18 to the private, while the rest 12 were considered to be equally shared. 7 top high risks including Design Risk, Construction Delay, Construction Cost Overrun, Market Demand Change, Inadequacy of Knowledge, Organization and Coordination Risk and Foreign Exchange and Convertibility were identified and explained for this particular project. It was also found that compared with the previous research results of the risk management of PPP projects in China, risks were more transferred to the private sector in the Bird Nest Project; while compared with that in western countries, the risk transferring is still less successful. The research findings may contribute to the similar PPP projects, especially for the facilities' construction for the further Olympic Games.

Keywords : Public-Private Partnership (PPP), risk management, China, Bird Nest

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INTRODUCTION

As the PPP is becoming more and more popular and important in China, a lot of research has been done on this subject. However, all the previous research had put its focus on the overall application and implementation of PPP, which only provided the general description of the situation of PPP projects in China. The research in this paperwork aims to focus on the risk management of one single PPP project in China- the Bird Nest Stadium of 2008 Beijing Olympic Games, of which the research results may be useful and meaning for a series of PPP projects for large sports or art events, for example, the upcoming 2012 London Olympic Games.

In this case study, both the quantitative and the qualitative research methods will be applied. Firstly, a questionnaire will be developed in order to find out all risk factors encountered in this PPP projects and will also be ranked according to their levels of influence in this project. Secondly, some particular risks in this project will be analyzed so that special attention would be paid and some precaution would be made for the future projects which have similarities with this one. Finally, an interview with an expert in the PPP research in China will be presented to give a more comprehensive understanding and explanation of the problems worthy of discussion in both this project, as well as all other PPP projects in China.

Chapter 1 serves to develop and to introduce the theme and the background of this study, as well as the specific reasons that draw our attentions to the PPP. A simple presentation of the worldwide history of PPP, as well as the development of PPP in China will be given in this chapter.

In chapter 2, a literature review regarding the risk management of PPP in China will be provided. Firstly, we will focus on a definition of PPP conception. Secondly, we will give a general introduction of the risk management in PPP projects, including the characteristics, content, as well as the current situation of the practice of risk management

used in PPP projects. Finally, we will continue to a deeper explanation of risk management in PPP, elaborating the risk identification and allocation, analyzing the risk factors of both public partners and private partners, and the methods of mitigating the risks of PPP projects.

Chapter 3 is the essence of this study. A case study of the Bird Nest Stadium Project for 2008 Beijing Olympic Games will be conducted in order to find out how the risks are managed in the PPP projects in China. Firstly, the background of the project will be introduced. Then a tow-round Delphi survey will be conducted with the managers from both public and private sectors, who participated in the management of this project to identify, rank and allocate the risks; an interview with an expert on the risk management of PPP projects in China will be developed to discuss the present situation and the main problems of the risk management of PPP projects in China. The transcript of the interview will be attached in the annex.

A discussion around the case study will be developed in chapter 4. The sharing and the allocation of the risks in this project will be analyzed. The specific risks and the highest risk factors in this particular project will be explained. The comparisons of risk management between this particular project and other PPP projects in China, as well as between that of China and other western countries will be conducted.

CHAPTER 1 GENERAL THEME OF RESEARCH

It is being reported that nowadays, in China, the traditional modes of financing can no longer meet the growing needs of the fast development of infrastructure construction. On the one hand, the government has been putting more emphasis on the construction of infrastructure projects with a large amount of funds injected, which accordingly increase the financial burden of Chinese government. While on the other hand, a large part of the domestic private capital has been keeping in an unused status. As a matter of fact, the bringing of PPP (public-private partnerships) financing mode is a perfect method of solving this dilemma. In the first chapter, a brief introduction of the application of PPP mode both in international projects and in China's domestic projects will be given before we proceed to our unique research objective – the management of risks in PPP projects.

1.1 Research Background

With the continuous injection of funds for the country's infrastructure construction, which is about up to four trillion Chinese dollars, the pace of development in China's infrastructure construction is developing with a rapid speed. The traditional mode of financing public infrastructure cannot meet the huge demand for funds. The government is facing a huge financial pressure, whereas the domestic private capital is comparatively in an idle status. However, the bringing up of PPP (Public Private Partnership) mode is almost a perfect solution for this dilemma.

The PPP model was first proposed by the United Kingdom, and has been widely used in countries all over the world. Up until now, there is no uniform definition for PPP, but people have reached some consensus about the PPP mode as follows:

• The PPP is a partnership developed between the public and the private sectors which takes full advantage of the respective advantages of both the government and private organizations.

• The PPP mode combines the government's coordinating ability, long-term planning capacity, social responsibility and the private parties' entrepreneurship, financial support, technology and management efficiency together as one. Under the government's guidance and supervision, as well as its financial support, the privatization is adopted in the management of project during the project's construction and operation periods.

• The nature of the PPP mode is the introduction of private capital in the field of public utilities. A bidding process will be used to select the best investors, builders and operators.

• Under the premise of ensuring the quality of public services, to share some of cost of the project's construction and operation with the government is the main purpose of the PPP mode.

In PPP projects, the government brings in the private investment. In the negotiating process, the cooperative relationship between the two sectors is faced with the problem of risk sharing. The Government intends to pass as many as possible the risks to the private sector; meanwhile the private sector is willing to bear the corresponding risks considering of profitability from the project. However, this transfer of risks is not unlimited. The private investors can only afford part of the risks to a certain extend. If the risk is beyond the private sector's control, it will eventually lead to the failure of the project. On the contrary, if private enterprises can only take a small part of the risks, its investment of the project cannot bring back a satisfactory return. This will force the private investors to finally give up the project, and to turn to investing the higher-yielding projects instead. Thus, the key factor of the success of PPP projects is to well manage the projects' risks and to share them in a reasonable way.

1.2 Situation in China

Based on the research report given by China Policy Institute, the PPP developed in China following the steps presented in the table below (Cheng & Wang, 2009):

Table 1 : Development of PPP in China

Year	Event
1980s	PPP mode was transplanted into China.
The mid-1980s (the first stage of PPP development)	The first successful PPP project B power project in Shenzhen, under cooperation with a Hong Kong company.
The mid-1990s (the first PPP boom)	Many PPP projects in the power and water sectors, such as the Laibin B power project in Guangxi, the water project in Chengdu, the power project in Changsha etc.
From 1995 to 2000	The establishment of the initial PPP leagal framework in China. A series of policies and statues were issued and carried out to regulate the boom in PPP projects.
The end of the 1990s (the first wave of PPP investments ended)	Public funds were invested in infrastructure under the positive financial policy of China; the central government started to demolish illegal PPP projects in local places.

The early 2000s (the second wave of PPP started)	The re-emergence of a bottleneck effect of infrastructure on economic development which provided a chance for the use of PPP in the infrastructure area again. Two prominent policies directing PPP development: 1. The Method of Managing Urban Public Utility Concessions (2004), which lays down specific legal directions for urban infrastructure; 2. The Decision on reforming investment scheme (2004), which relaxed the approval procedure for private investment and opened more sectors to investment.
2005	The first central government policy called "Opinion of the State Council" was issued to allow the entry of the private sector into the area of power, communications, railway, airline, and petroleum.

1.3 New Problems raised in Research

As the PPP is becoming more and more popular and important in China, a lot of research has been done on this subject. However, all the previous research had put its focus on the overall application and implementation of PPP, which only provided the general description of the situation of PPP projects in China. This comparatively large research range may result in the ignoring of some details and a lack of the particularity of projects with their unique characteristics. Nevertheless, my research aims to focus on the risk management of one single PPP project in China- the Bird Nest Stadium of 2008 Beijing Olympic Games, of which the research results may be useful and meaning for a series of PPP projects for large sports or art events, for example, the upcoming 2012 London Olympic Games.

This is a large-scale PPP project with a worldwide awareness and influence, which is also a very typical case of PPP project in China. Because of its large scale and worldwide significance, this project has drawn a high attention of Chinese government. A Large amount of funds has been invested into the project and a team of elites with abundant experience and knowledge of PPP projects has been chosen to accomplish this task. Thus, we can conclude that this project is a very representative one of PPP projects in China. Consequently, a deep study and detailed analysis of risk management of this project can indicate the present situation of risk management of PPP projects in China. Meanwhile, the study of the case will also help find out the shortage and problems in the risk management of PPP projects in China.

In this case study, both the quantitative and the qualitative research methods will be applied. Firstly, a questionnaire will be developed in order to find out all risk factors encountered in this PPP projects and will also be ranked according to their levels of influence in this project. Secondly, some particular risks in this project will be analyzed so that special attention would be paid and some precaution would be made for the future projects which have similarities with this one. Finally, an interview with an expert in the PPP research in China will be presented to give a more comprehensive understanding and explanation of the problems worthy of discussion in both this project, as well as all other PPP projects in China.

CHAPTER 2 LITERATURE REVIEW

As is mentioned above, this thesis aims to provide a description of the use of PPP projects in China and to give a research of the application of risk management of PPP projects in China.

In fact, the Public-Private Partnership mode has been applied in China since many years ago and there are hundreds of successful cases in China using this PPP mode. Moreover, this new mode is becoming more and more popular and is being used more often in the projects carried out in China, which offered us a large date-base of this research. We will now highlight the topics already explored as well as the underlying issues through a review of the literature on this topic.

Firstly, we will focus on a definition of PPP conception. Secondly, we will give a general introduction of the risk management in PPP projects, including the characteristics, content, as well as the current situation of the practice of risk management used in PPP projects. Finally, we will continue to a deeper explanation of risk management in PPP, elaborating the risk identification and allocation, analyzing the risk factors of both public partners and private partners, and the methods of mitigating the risks of PPP projects.

2.1 Define PPP

2.1.1 DEFINITION OF PPP

The terminology PPP is the abbreviation of Public-Private Partnership, which describes the involvement of the private sector's participation in any or all phases of a public service. In this mode of partnership, the public sector provides public goods and services through the collaborating with the private sector. In the eyes of the public opinion,

the public-private partnership represents a very vague notion. Because of the differences in ideology and culture, countries around the world can hardly reach a consensus on the definition of PPP. The term PPP has become complicated over the last 20 years, which has been gradually turned into a phenomenon encompassing several types of collaborations.

Since the contents and objectives of PPP vary in accordance with the country's unique feature and specific culture, different country has its own definition of the PPP term. For example, according to the Canadian Council for Public-Private Partnership, the definition of PPP is marked as:

> " public-private partnership carries a specific meaning in the Canadian context. First, it relates to the provision of public services or public infrastructure. Second, it necessitates the transfer of risk between partners."(Cheng & Wang, 2009)

The definition embraced by The Canadian Council for Public-Private Partnerships is as follows:

> "A cooperative venture between the public and private sectors, built on the expertise of each partner that best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards."

Another example, the official definition of PPP by the "Federal Report on PPP in Public Real Estate, Part I: Guideline", commissioned by the German Federal Department of Transportation, Construction and Real Estate (BMVBW) in 2003, is as follows:

> "The term PPP refers to a long-term, contractually regulated cooperation between the public and private sector for the efficient fulfillment of public tasks in combining the necessary resources (knowhow, operational funds, capital, personnel) of the partners and distributing existing project risks appropriately according to the risk management competence of the project partners." (Alfen et al., 2009)

Besides, a summary of some recent definitions for PPP are given as follows:

1) "PPPs are aimed at increasing the efficiency of infrastructure projects by means of a long-term collaboration between the public sector and private business. A holistic approach which extends over the entire lifecycle is important here." (Alfen & Barckhahn, 2012)

2) "The term public-private partnership ("PPP") is not defined at Community level. In general, the term refers to forms of cooperation between public authorities and the world of business which aim to ensure the funding, construction, renovation, management and maintenance of an infrastructure of the provision of a service." (Hodge & Greve, 2007)

3) "Standard & Poor's definition of a PPP is any medium-to-long term relationship between the public and private sectors, involving the sharing of risks and rewards of multisector skills, expertise and finance to deliver desired policy outcomes." (Caselli, Buscaino, Corielli, & Gatti, 2010)

4) "PPPs are long-term partnerships to deliver assets and services underpinning public services and community outcomes. Optimal structuring links private sector profitability to sustained performance over the long-term, yielding robust and attractive cash-flows for investors in return for delivering better value for money to the taxpayer." (Boussabaine, 2006)

5) "'Public-Private Partnership' is a generic term for the relationships formed between the private sector and public bodies often with the aim of introducing private sector resources and/or expertise in order to help provide and deliver public sector assets and services. The term PPP is, thus, used to describe a wide variety of working arrangements from loose, informal and strategic partnerships, to design build finance and operate (DBFO) type service contracts and formal joint venture companies." (Delmon, 2011)

2.1.2 CHARACTERISTICS OF PPP

PPP mode has now been widely used in all over the world. Generally speaking, in industrialized countries such as England, Germany etc., PPP is applied in the field of public service provision, for example, education, health service, waste management etc.; whereas in developing countries in large demand for basic infrastructure, for example, in China, PPPs are often used in large-scale projects, including the power, express ways, water supply instruction projects, in order to stimulate the rapid development and growth of the countries' economic.

However, different types of PPPs tend to share some common characteristics (G. Hodge, 2009). As it is indicated in the PPP handbook published by European Investment Bank, the PPP mode has four main characteristics as follows: (Uppenberg, Strauss, & Wagenvoort, 2011)

- Risks and responsibilities are shared between the public and the private sectors in order to gain efficiency, cost reliability and financial security;
- Public service and ultimate regulatory responsibility remain in public sector while the private sector undertakes that for implementation; transfer tasks and responsibility for the provision of infrastructure to the private sector;
- Relatively long term contractual relationship between the public and the private parties on different aspects of a planned project;
- Involve the private sector in the provision of public services; innovation in particular through output specification, service levels and payment mechanisms for public sector services to be supplied.

More briefly, in an evaluation report on projects financed by the EIB (Crescenzi & Rodriguez-Pose, 2008), a set of PPP characteristics were agreed by the evaluators as below, namely a PPP should meet the requests:

- Involve a clearly defined project.
- Involve the sharing of risks with the private sector.
- Be based on a contractual relationship which is limited in time.
- Have a clear separation between the public sector and the borrower, i.e. there should be a private-sector party raising project-finance based debt.

2.1.3 Advantages and Disadvantages of PPP

First of all, as Julie O'Neil, the Secretary General of the Irish Department of Transport at the PPP Transport Summit in 2005, "PPPs make additional projects affordable. By attracting private sector finance for schemes suited to the PPP model, limited public sector funds can be directed to deliver other non-PPP projects." (Baindur & Kamath, 2009). One of the most important benefits brought by the partnership with the public sector is that with the private sector's financial support, PPPs make projects affordable when the public sector cannot finance the project by itself or cannot increase its direct levels of borrowing.

Secondly, using the PPP mode can maximize the use of private skills and technologies. According to the report of PPP projects in Europe made by Paul Davies and Kathryn Eustice in 2005, under the PPP procurement, the private sector is not only required to deliver assets on time and budget on the service levels required by the public sector, but the private sector should also ensure that the individual assets and other elements of the project that have been procured work together to successfully deliver services. Meanwhile, the private sector should maintain and refurbish assets on an effective basis, in order that services are delivered continuously at satisfactory levels over the long-term. Therefore, PPP mode offer significant opportunities to benefit from private sector resulted from these specific requirements under the mode.

Thirdly, the PPP mode can transfer part of risks to the private sector. Under PPPs, the private sector takes life cycle cost risk and all the risks are allocated to the party best able to manage or absorb each particular risk (Baindur & Kamath, 2009). Since under the PPP, one of the public sector's aims is to seek the best value over the life of the asset and the project, the private sector is required to focus on the design and the implementation of the project with a view to their long-term cost to the taxpayer instead of the immediate capital spend. Therefore, the private sector has been devoted to the increasing of skills of analyzing and providing for life cycle costs accordingly, so that the life cycle risks are absorbed by the private sector. Furthermore, PPPs are designed so that risks are allocated to the party which is best able to manage them (Baindur & Kamath, 2009). Because of the participation of the private sector with the necessary long-term project skills, the risks associated with project delivery will automatically be transferred to the private sector who can manage them better. Thus, the public sector would accordingly achieved best value as the private sector brings in the expertise to manage or absorb the risks, and makes the pricing more economically and minimizing the costs of the project.

Last but not the least, as is concluded in the Case Studies of PPPs in Infrastructure Development from Asia and Europe by EU-Asia PPP Network, the PPPs not only remove the responsibility of funding the investment from the government's balance sheet and adopt managerial practices and experience of the private sector, but also introduce helpful competitions and enhance the project's efficiency as well. According to the EU-Asia report, it was estimated that, in the UK, the adoption of PPP mode had produce average savings of 17% to 25% over all sectors during the past ten years (Alfen et al., 2009).

On the other side, PPPs do have their limitations and restrictions in their implementations in the meantime. According to the report in the European Transport Conference in 2002, the most import disadvantage of the PPP mode is the increased transaction costs, which is a result of the complexity of the relations between the diverse actors and because of the long duration of these relations. And other important disadvantages are the higher capital costs, the insecurity of being granted the concession,

the culture gap between the two sectors and the holdup problem (Bank & Facility, 2003). Moreover, as it was mentioned in the presentation of PPIAF (Public-Private Infrastructure Advisory Facility) in 2005, the disadvantages of the PPP mode were concluded as below (Bank & Facility, 2003):

- Possible conflict between planning and environmental considerations;
- May increase operational risk, cost of re-entering the business if operator proves unsatisfactory;
- Commissioning stage is critical; contracts are more complex and tendering process can take longer; contract management and performance monitoring systems required;
- Limited incentive for whole life costing approach to design
- Does not attract private finance and commits public sector to providing long term finance.

2.2 Risk Management of PPP

Risk, as per Webster's dictionary, is defined as the possibility of loss, injury, disadvantage, or destruction. It is told by both theory and experience that risk management is critical for PPP efficiency. First of all, the appropriate risk allocation is essential for PPP efficiency; the risk allocation clauses are critical during procurement and the risks must be properly managed during the whole life of the PPP project's contract. Besides, risk allocation should be carefully addressed from the outset of the contract; the risks should be managed by the project leader during procurement and even after the contract is closed, the contract manager should address the risk management as the risk management is still critical. Therefore, in general terms, risk management is at the core of PPP procurement (Monteiro, 2005).

Risk management is an ongoing process throughout the lifecycle of the entire project. The process of risk management can be broken down into the following activities (Kraman & Hamm, 1999):

- Risk Identification: It is the process of identifying all the risks relevant to the project.
- Risk Assessment: It refers to determination of the degree of likelihood of the risks and the possible consequence if the risk occurs.
- Risk Allocation: Assigning the responsibility of the consequence of the risk to one or more of the parties to the contract.
- Risk Mitigation: The process of controlling the likelihood of occurrence of risk and/or the extent of the consequence of the risk.

As is indicated by the EU-Asia PPP network in their study of PPP projects in infrastructure development, it is agreed that from a PPP project perspective, the realization of different risks over the lifecycle of the project can create different scenarios where project benefits and costs can differ greatly from the projected base conditions. Thus, the identification, assessment and management of the risks associated with the project that can threaten the project capability to provide sufficient revenues to service the debt obligations and earn return on equity investments have been of paramount importance in procuring infrastructure projects through PPP route (Alfen et al., 2009).

2.2.1 Risk Classification and Identification in PPP Projects

The techniques of risk identification in PPP projects should be based on the specialized knowledge of experts and related experience in the projects with similar uniqueness as PPPs. It is hard to summarize the certain risks shared by all PPP projects due to a number of factors affecting the PPP projects, such as the location and environment of

the project, the type of the project's outcome, the culture and society surrounding the project, etc.

Above all, the risks which are typical of PPP projects can be broadly classified into two main categories (De Jong, Mu, Stead, Ma, & Xi, 2010). The first group is General or country specific risks, which are the risks mostly associated with the political, social, economic, and environmental situations in the host countries; the promoter of the project have no control over risks in this category. The second group includes the project specific risks. These risks are more related to the project itself and the project sponsors can control and manage them to certain extend.

Besides, the first group, general or country specific risks can be further divided into three major levels, including country political level risks, country commercial risks and country legal risks; while the second group, project specific risks can be divided into three phases in accordance with the three stages along the project's lifecycle, including the development phase, construction phase and operating phase (Alfen et al., 2009). Each risk categorized in both the two groups is also defined in the report as listed in the table below:

Table 2 : Risk Classification in PPP

Group Name	Risk Name	Risk Definition
The general or country specific risks	Political risks	Risks associated with political support, state's taxation, nationalization, expropriation, import/export restrictions etc.
	Country commercial risks	Risks concerned with convertibility of exchanging rate, inflation, foreign interest etc.
	Country legal risks	Risks related to changes in laws and regulation, the enforceability of contracts,

		compensation etc.
Project specific risks	Development phase	- Bidding risk which refers to the loss of the expenditures resulted from losing the tender to other bidders. - Delay in planning risk - Approval risk.
	Construction phase	- Construction cost overrun risk; - Construction time delay; - Failure to achieve completion.
	Operating phase	- Technical risk; - Demand risk; - Force majeure risk; - Revenue risk.

2.2.2 CHARACTERISTICS OF RISKS IN PPP PROJECTS

Risk refers to the uncertainty of future behavior of the decision-making and objective conditions which led to a variety of deviation from the possible results related to people's interests, as well as differences from the original anticipation. Risk exists in all human social and economic activities. PPP project financing operations, of course, is no exception. The risks of the PPP model are the risks, under the PPP mode, which may occur within the life cycle of the project and generate the uncertain impact of interference towards the

project's financing, construction and operations; or may lead to the loss or damage to the project, or even resulting in the event of project's failure.

Under the PPP mode, in addition of having the characteristics of the general risks of the project, such as objectivity, universality, diversity etc., risks in PPP projects also show the following characteristics:

1. Risks have long life cycle

Normally PPP projects are Large-scale projects with a large amount of investment. The required payback period for PPP Project Company to recover the costs, such as the repayment of bank loans of financial institutions is assumed to be longer. Therefore, the project risk' life cycle will be longer.

2. Risks with remarkable periodic feature

Along the development of the construction of the project, the risk of PPP financing presents obvious periodic features, which mainly referred to the following two aspects:

1) PPP financing model at different stages, the size of the project risk showing obvious stages. For example, in the project construction process, a lot of money for the purchase of engineering equipment, building materials, payment of construction costs, interest on loans from banks are calculated in the project's capital cost as the project has not yet generate any income. Thus, with the continued investment of funds, the risk related to the ability to repay all the debts is also growing. When the project operation period starts, this repayment risk will become smaller and smaller since stable cash income is generated and the repay of bank loans can be executed.

2) The main types of risk faced by the different stages of the PPP financing are also changing in accordance with the project's development. Some of the risks exist in a particular phase of the project, whereas some risks

stay throughout the project. During the construction phase, the main risks is the completion risk, while during the operational phase of the project, the main risks includes risks such as competitive risk, market risk etc. Throughout the operation of the PPP mode, risks such as policy risk, legal risk will exist along the whole life cycle of the project.

3. Each party involved in the project has its own characterized risks.

In PPP projects, since each party involved has different and its proper interest, the risk that each party will face in the project will also not be the same. For the government, as they do not need a direct investment or require little capital investment, in the construction of infrastructure projects, the main risks they should bear include: choose the wrong or non-qualified private partners which results in delay or failure in project financing process; the economic loss and social loss due to the non-standardization or time delay of the completion of the project; the loss caused by poor project management or improper maintenance after the project's outcome is transferred. For private investors, the purpose of their investment in the project is to get an adequate return. They, therefore, assume more risks within longer period. The main risks the private partners should undertake in the project include: national policy and regulatory changes lead to increase the cost of the project life cycles; not get a satisfactory return on investment after the completion of the project etc. For banks and other financial institutions, their target is to recover the full loan and earn interest. Therefore, the uncertainties in the project construction and operation processes may all lead to project delay or failure, and will also have impacts on lenders.

4. More complicated risks involved.

Although different types of PPP projects have different organizational structure, however a basic PPP financial project involves at least parties such as government and relevant departments, the PPP project company, shareholders, creditors, the design side, the construction side, the supply side, operators, insurance companies, and the users of the product or service. In this way, as for the entire project, including the financing, design,

construction and operation processes, as well as the process of transferring to the Government, each of the above process is completed by the participant who is responsible for that. Some participants may play several roles at the same time. And all participants must have co-ordination and mutual understanding among each other throughout the whole concession period in order to achieve the successful completion of the project. Compared with the general project, the embodiment of government participation and government interests makes the allocation of risk of PPP financing mode more complex. Indirect risks, such as inflation, changes in interest rates, political instability, policy discontinuity, the differences of local government departments, the inconsistence of local and central government views, the corruption of government departments, may all affect the construction and operation of the project, and may even lead to the full or partial nationalization of the investments from the investors.

2.2.3 Risk Sharing and Allocation in PPP

What makes the PPP mode different from the traditional financing mode is that, under PPP, some of the risks are transferred to and shared by the private sector. The principle of risk allocation in PPP mode is that risks should be borne by the party who best can manage them or bear them with the lowest cost. However, it is much more complicated to well allocate the risks between parties in practice regardless this simple principle. Based on the Annual Basic Plan for Private Participation in infrastructure report, another several principles and rules of how to well share the risks in PPP projects were concluded as below (ILORI, 2004):

- Risks belonged to PPP project implementation shall be classified based on the cause as attributable 1) to the government, 2) to the concessionaire, and 3) to force majeure.

- The competent enterprise or company, at the time of announcing the request for proposal or proposal content for unsolicited PPP projects, should include information on risk types, risk classifications etc. This measure will allow the concessionaire to make forecasts of the risks involved in the PPP project implementation.

- The risks which are foreseeable as well as the risk which can be insured should be handled by insurance as much as possible. Besides, the losses or added expenses that cannot be covered by insurance shall be allocated through negotiation by and within the negotiating parties.

- The party who is responsible for the risk must be clearly outlined in order to conclude the concession agreement.

    - Risks attributable to the government shall be borne by the government, while risks attributable to the private investors should be borne by the private sector.

    - For risks related to the force majeure, the allocation ratio should be mutually agreed and decided upon in the light of their specific characteristics.

    - Neither government nor the private investors may request additional user fee adjustment or compensation for loss on the grounds of the party's own risk allocation.

2.2.4 MITIGATION STRATEGIES OF RISKS IN PPP

Based on a report of Risk Management in PPP Projects (Grimsey & Lewis, 2002), the main risks types, the reason of the risks occurrence in the projects and how to mitigate the risks are conclude in the following table:

Table 3 : Mitigation of Risks in PPP

What risk?	Why has it?	How to mitigate?
Time and cost overruns or shortfall in performance	High capital intensity and a relatively long construction period	- Engineering, procurement, and construction contracts to an experienced and reputed firm; - Provisions for liquidated damages in the contracts.
Technical problems during the project's operational phase	Technology is untried or is changing rapidly or inability of the operator to manage such big and complex project.	- Entrusting operation to experienced operations and maintenance contractors; - Provisions for liquidated damages in the contracts; - Insurance against force majeure risks.
Market conditions assumed in determining the viability of the project not realized	Uncertainty in the forecast of the demand projections	Investors enter into a contract with the monopoly purchaser to guarantee a minimum level of purchase.
Interest rate changes	High capital intensity with large impact and long payback periods with which risks spread over a long time.	- Pass it on to consumers, for example, in arrangements in which the impact of interest rate variations on unit costs are treated as a pass-through into

		the tariff; - Using hedging instruments
Risk of not being paid for services delivered	Financial condition of public sector utilities in developing countries is often weak. And these utilities are often the monopoly and large buyers of the project's outcomes.	- Long term solution is to improve the financial condition of the utilities by improvement in efficiencies or privatization; - Short term, guarantee and counter guarantee by state and central government; - Set up an escrow arrangement.
Disruption in construction or operation of the project due to regulatory changes.	Infrastructure projects have to interface with various regulatory authorities throughout the life of the project, making them especially vulnerable to regulatory action.	Establishing strong and independent regulatory authorities which can operate with maximum transparency of procedures within a legal framework that provides investors with credible resources against arbitrary action.
Disruption in construction or operation of a project due to political decisions.	Infrastructure projects have high visibility with a strong element of public interest, which makes it vulnerable to political action that can interrupt or upset settled	Partially mitigated through political risk insurance offered by multilateral organizations, such as the multilateral investment guarantee agency, or bilateral investment protection agreements.

	commercial terms or even lead to cancellation of licenses or nationalization.	

2.3 Risk Management of PPP in China

From the 1980s to the mid-1990s, the initial legal and policy framework of the Public-Private Partnership has been formed in China (Ke, Wang, Chan, & Lam, 2010). However, due to China's specific national conditions as a developing country, the application and implementation of PPP in China has been facing a lot of challenges. For example, the state dominance which lead to the private parties' power and right being impaired; the legal and administrative frameworks which result it a complex regulatory regime; the state monopoly which limits the public participation etc. Although because of the continually growing economy in China, the role of PPP will be keeping expanding in the near future, there's still a long way for the PPP mode to develop into a mature form of governance and a new relationship between the government, the private investors, as well as the public. A more comprehensive institutional improvement, not only in terms of government capacity and national legislation, but also in public accountability is required for the further development of PPP in China.

First of all, PPP has good prospects in the field of infrastructure in China. International business monitoring report notes that the fast-growing construction market which is known as the world's third largest market, is rapidly growing at a rate of 9 to 10%. Moreover, the PPP mode was also adopted in the Olympics projects. All these have accumulated good practical experience for future PPP projects. At the same time, PPP has many benefits for the public sector in China's infrastructure, the private sector as well as the third-party. Nevertheless, so far, many of the PPP projects implemented in China have turned out to be unsuccessful. It was estimated by the PPP experts in China that a main

reason for the failures of these PPP projects rested on the underestimation of risk in the projects and a lack of experience in risk management in PPP projects.

It is noted that there are several specific risks in China's PPP projects in the area of infrastructure construction, mainly including:

- Lack of financing options;
- Social welfare and political risks due to poor contract making and uncontrollable pricing setting;
- Long-term contracts which lead to the failure in risk transferring;
- Overrun of time-consuming and high cost the procurement process;
- Much more higher funding costs for private sector;
- Losing of control power for public sector;
- The probability of errors in the concession agreement due to the lack of in-depth knowledge in PPP field;
- A lack of experienced and independent consultants in the legal, technical, financial, and operational processes of the project;
- Operational, market and rescue risks.

Secondly, the PPP mode can help to conserve the total cost of the project throughout the project's life cycle. It is very important for the government to do more research and to be willingly to take risks. The flexible project finance is beneficial for projects in PPP mode and the increase of the project supervision is also essential. Moreover, a transparent and fair allocation of risks in the PPP project is the key factor. Meanwhile we must focus on the risks associated with contractual and legal obligations to manage and mitigate the residual risk. For mitigation of the potential risk for PPP, several recommendations were made as follows:

- To establish a reliable risk management framework, and to identify, understand, reduce and monitor risks in various stages of the PPP cycle;
- To establish the commercial viability of the project;
- To negotiate with the preferred bidder in the tendering process;
- To adjust to the appropriate methods of management during the construction period;
- To enable service level agreements.

However, some PPP projects which has been applied in China, such as Beijing Metro Line 4 project, Shenzhen Metro Line 4 project etc. have already accumulated some experience in the PPP field. In addition of learning the successful international PPP examples, to strengthen risk management and to establish a qualified consulting service is essential. Furthermore, because of the long life cycle of PPP project, the assessment and management against the entire life cycle of the project is also necessary.

Last but not the least, it is important for China to build a PPP mode with Chinese specific characteristics. China's infrastructure construction and development has its own characteristics, and China is in a specific period of development. Thus all the specific Chinese characteristics should be taken into account in China's infrastructure development and investment. Based on the international experience of PPP, the sum up of China's own successful experience is also important. Wang Hao, the general manager of Infrastructure Investment Company of Beijing, claimed that the accurate positioning, quantitatively separating, the introduction of mechanisms, and the strengthening of the supervision in PPP projects, can improve the efficiency, achieve a win-win situation, as well as establish a new government-enterprise relations mechanism between the public and the private sectors. Meanwhile, different cultures, customs, background, legal environment, as well as transitions in economic and social environment in China, it is obligated to establish a PPP mode with Chinese own characteristics.

2.4 Method of the research

Our research aims to present a general and overall situation of the implementation and the application of PPP mode in projects in China, especially how the risks are managed and what the problems and obstacles in the risk management of PPP projects in China.

Generally speaking, this paper is based on a case study of a typical and presentable large-scale PPP project that have taken place in China – the national stadium construction project for 2008 Olympic Games in Beijing. In our case study, not only the quantitative research method will be applied by developing a questionnaire, but also the qualitative method will be used by interviewing an expert of PPP projects in China as well.

Firstly, a general introduction of the project will be given in order to present the background and relevant information of the Bird Nest project. Secondly, a questionnaire which aims to explore all the risk factors in the Bird Nest Project and how the risk factors are allocated in this project will be developed, using the two-round Delphi survey method which is very popular among all methods of developing a research. And a detailed and profound analysis of the risk factors' identification and allocation will be presented accordingly, as well as several specific risk factors in this particular project. Thirdly, the transcript of the interview with the expert will be provided as per attached in the annex to give a better and more comprehensive understanding and describing of the Bird Nest project as well as the PPPs in China. Plus the questionnaire and the result of the Delphi survey will also be provided in the annex.

CHAPTER 3

CASE STUDY - PPP Project of Bird Nest Stadium

The exploratory research of my thesis is based on a case study of a well-known large-scaled PPP project in China, the project of the national stadium for the Olympic Games of year 2008 in Beijing. As a large amount of funds were invested and a team of elites with abundant experience and knowledge of the management of various sorts of PPP projects had participated in the operation process, we can say that this project is a very typical and representative one among all PPP projects in China for so far. Consequently, through a deep and detailed study of the risk management of this project, we can indicate the present situation of risk management of PPP projects in China. Meanwhile, this case study can help us find out the problems and shortages in the risk management of this kind of projects.

In this chapter, I will firstly develop a questionnaire which aims to explore all the risk factors in the Bird Nest Project and how the risk factors are allocated in this project. A detailed and profound analysis of the risk factors' identification and allocation will be presented. The questionnaire will be distributed among the projects managers of each phase of the whole project from both the public and private partners. Secondly, I will focus on the analysis of the application of risk management of this project through an interview with a professor in Beijing University, who had contributed a lot in the research of PPP projects in China and had already published a book with this subject in China, in order to give a more objective and comprehensive discussion for the object of my research.

3.1 Project Introduction

The National Stadium of China, dubbed as the "Bird Nest", which is located in the Olympic Green in the northeast of Beijing, is the main stadium for the 29th Olympic

Games. This project was approved by Beijing Municipal Government early in 2003, aiming to meet the obligations signed in the contract with the International Olympic Committee (IOC) as the Host City for the 29th Olympic Games in 2008.

The Bird Nest Stadium covered a floor area of 258,000 square meters, will be able to accommodate a maximum of 91,000 spectators with a permanent capacity of 80,000 and a temporary of 11,000. During the 2008 Olympics, the stadium will be used to host the opening and closing ceremonies, track and field competition events and football final. The aim of this project is to build an international-standard multi-functional stadium for the 29th Olympic Games - the biggest event for China in year 2008, to show a bright new spot of infrastructure in Beijing to the whole world, and to make the stadium a remarkable legacy of China.

The project is decided to be developed in the form of Public-Private-Partnership (PPP), in which Beijing Municipal Government (BMG) undertakes 58% of the total investment as the public sector while the remaining 42% is financed by the private sector which is the China International Trust and investment Corporation (CITIC) consortium.(Sun, Fang, Wang, Dai, & Ly, 2008)

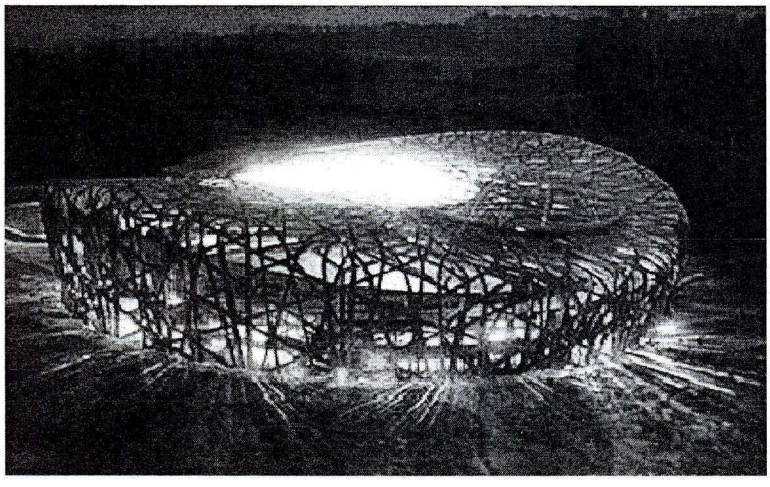

Figure 1 Bird Nest Stadium

CHAPTER 3

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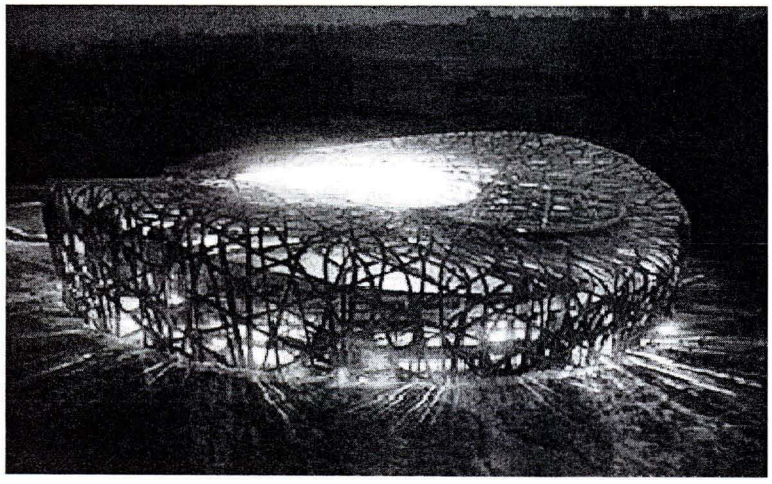

Figure 1 Bird Nest Stadium

3.1.1 PROJECT BACKGROUND

According to historical patterns, the Olympic Games have not only been a grand celebration of sports, but more importantly, the Olympic Games can bring tremendous public influence and numerous business activities to the host city and country. As for Asia, we all know that the 1964 Tokyo Olympics and 1988 Seoul Olympics successfully propelled Japan and South Korea onto the global stage. Following their footsteps, the winning of the bid to host the Olympic Games is 2001 made the 2008 Beijing Olympic Games a "coming out" party for China – an event that showcased China's maturation into a great economic and, to a lesser extent, political power.

Since July 13, 2001, the day when International Olympic Committee (IOC) announced that Beijing, the capital city of People's Republic of China was elected as the host city for the 29th Olympic Games in 2008, Chinese government and its masses of people have been well aware of the broad publicity of this big event as well as its great significance as a mark of China's emergence as a major global player to the world. On April 24 of 2002, Chinese Premier Wen Jiabao noted that the Beijing Olympics present an opportunity for China, to show the world how "democratic, open, civilized, friendly. And harmonious" it is.

After the winning of the bid of the host authority, Beijing's People's Municipal Government (BMG) decided to build the National Stadium as the main stadium for the 29th Olympics, which would be used for the opening and closing ceremonies, track and field events and the football finals. BGM has then, set three terms - "Green Olympics", "Hi-tech Olympics" and "People's Olympics" as the three main themes for 2008 Beijing Olympics Games. It was claimed that the building of the main stadium for this Olympics should reflect the above three themes along with the concept of sustainable development. Furthermore, in order to make the stadium as a model of environment protection and present the world China's hi-tech achievements and innovative strength, advanced,

practical and world-class cut-edge technologies in the field of ecology and environmental protections as well as advanced, reliable and high-new technologies will be adopted in the design, construction and utilization of the National Stadium throughout and even after the Olympics. This project aims to promote to the world a brand new image of a prosperous and civilized Beijing and the high spirits of its citizens. Our goal is to make the stadium an everlasting building meet various high functional requirements within, at least, the next 50 years.

3.1.2 PROJECT DESCRIPTION

The Municipal Government of Beijing (BMG) had drawn up a so-called "Olympic Action Plan" as soon as China won the host right. The PPP mode was decided to be adopted for the project, which means that all activities regarding the project, including the building, operating, maintaining, and financing will be accomplished thorough a collaboration of both the public and the private sectors. In the project, the Beijing State-owned Assets Management Corporation authorized by the BMG as one of the shareholders undertakes 58% of the total investment whereas the CITIC Consortium as the private sector finances the remaining 42%. After 30 years which is called a period of concession, all responsibilities will be transferred to the government.

3.1.2.1 BASIC REQUIREMENTS OF PROJECT

Among the build of all the sports facilities, the construction of the main stadium, which was given a nick name as "Bird Nest" because of its bird's nest looked-like shape, was the most important project of the Olympic infrastructure constructions. And this project, doubtlessly, became the focus of attentions from all over the world. At the very

beginning of its implementation, the project was required by BMG, to meet the demands as follows:

1) As the project requested an investment with a total amount of 3 billion yuan, according to the government's current financial statement, it was certain that funding support from some private departments was desperately needed to accomplish the project.

2) The most advanced technologies should be used through the application of the project in order to guarantee the quality of the architecture and the speed of the process.

3) Make sure that the stadium has its unique characteristics and will become a landmark building of the city and the country.

4) The future operation of the Bird Nest Stadium should not be over commercialized. The price of the entering tickets should be reasonable enough and be accepted by most of our citizens.

3.1.2.2 OVERALL FRAME OF PROJECT

In view of the Bird Nest main stadium project's background and its construction requirements, the project was decided to be developed in the form of Public-Private-Partnership (PPP). The Beijing State-owned Assets Management Corporation authorized by the BMG as the public sector undertakes the main part of the total investment while the remaining is financed by the private sector which will be assigned by the government through a tendering process.

Through two rounds of biding in an international tendering process, a consortium consisted by three entities, which were China International Trust and Investment

Corporation (CITIC), Beijing Urban Construction Group Corporation (BUCGC), and Golden State Holding Group Corporation (GSHGC), has eventually won the authority of the participation in the project. (Sun, Fang, Wang, Dai, & Lv, 2008). Their sharing of responsibilities of the project is as follows:

- The public sector BMG invested 20.3 billion yuan, which undertakes 58% of the total investment; BMG won't assume any loss or subsidies during the operation of the project; BMG cannot obtain its investment return until 30 years later, which is considered the cooperation period.
- The remaining 42% is financed by the private sector – the consortium made of CITIC, BUCGC and GSHGC. The consortium will, not only invest 14.7 billion in the project, but also undertake the construction, operation and maintenance of the project. It can only get its investment return within the first 30 years.
- As soon as the cooperation period (30 years) is over, all rights of the bird nest stadium will be return to the government.
- All standards of the project should be set and be confirmed by both the public and the private sectors. Every step of the project will be supervised by the public sector.

3.1.3 PROJECT OBJECTIVES

As for the host city and country, the huge inflows of investment to support the Olympics will bring us unpredictable economic and social benefits. The spending on the Olympics will propel the government's overall income growth while the recruitment of partners, sponsors and suppliers for the project will help boost advertising spending sharply. The project will also bring a breakthrough in terms of economic development, urban construction, social civilization and the citizens' living quality. Furthermore, the number of foreign tourists in Beijing will rise rapidly as a result of the increased visibility

that the Olympic architectures bring to the host country. The Olympic spirits' fast spread and extensively popularizing among Chinese people will enhance the reputation of both the city and the country.

As for the project itself, besides its goal of meeting all demands of holding the Olympic Games, the main objective of the project is of course, to obtain the maximum profit. And this notion should be insisted during each phase of the project, for example, the design, construction, operation, financing, maintenance and transfer. During the Olympic period, the stadium will be used for various sorts of competitions. Well organized games and excellent services should be provided to every athletes and all spectators; after the Olympics, the stadium can still make profits by holding special competitions events such International Track and Field Championships, World Cup Football Games etc.), various regular sports games (such as National Football Matches, Asian Track and Field Competitions etc.), and different sorts of non-competitive events (such as art performances, concerts, and commercial exhibitions etc.)

3.2 Project Structure

The Project is developed in the form of Public-Private-Partnership (PPP), or more exactly Build-Operate-Transfer (BOT) which is one of the different forms of PPP mode. Before presenting the companies and organizations that participated in the project and explaining how the whole project is operated phase by phase, we will first give a brief introduction of what exactly the BOT model is.

3.2.1 DEFINITION OF THE MODE OF PROJECT

3.2.1.1 WHY USE THE PPP MODE?

In the case of our project, a total of 250 billion yuan (Chinese Dollars) was planned to be invested for the construction of all the infrastructures regarding this Olympic events. The BMG was expected to undertake 180 billion of this entire investment among which an estimation of 20 billion was planned for the construction of all Olympic venues, including the Bird Nest stadium, the Water Cube, the Olympic Park and all other 35 stadiums and venues. As a matter of fact, the amount of current income of BMG was about 40 billion yuan, of which the available funds for this project were only over 12 billion. Under these circumstances, even a predicable annual increase of the BGM's income was taken into account, there still existed a long way for our government to fill in the gap of the finance requirement needed by this huge-scaled project by itself. Obviously, the government is facing with the problem of a lack of a certain amount of funds. As a result, a new mode – Public-Private-Partnership was brought in for the following reasons:

- Considering the significance and importance of Olympic Games, the revenues generated by the project is estimated to be able to cover its cost and provide sufficient return on investment. Therefore, the project is financially viable for the private entities.

- The viability of the project for the government depends on its efficiency in comparison with the economics of financing the project with public funds. The private sector is expected to bring qualified expertise and high efficiency to the project. Thus, even if the government could borrow money on better conditions compared to that of the private sector, the above factors could offset this particular advantage.

- A substantial part of the risk of the project will be partly transferred to the private sector, including political risk, technical risk, financing risk etc. In this way, the burden on the government can be reduced.

3.2.1.2 COMPARISON BETWEEN BOT AND PPP

Although the term "PPP" is broadly used to describe a range of relationships among public and private entities in the context of infrastructure and other services, it is also a general name used to conclude a group of various types of PPP mode, for example, BOT (Build-Operate-Transfer), DBFO (Design-Build-Finance-Operate), BOO (Build-Own-Operate) etc. (ZHAO & WANG, 2007) In our case, the government has chosen the BOT form as the final mode for the project, which is a form that finds extensive application in the infrastructure projects and in public private partnerships.

In addition of the related notion introduced in the previous literature review, I will make a further comparison these two terms BOT and PPP in the table as follows, to give a better research of the project.

Table 4 : Comparison of BOT and PPP

Notion / Characteristic		PPP	BOT
Similarities		i. involvement of participants including financier, investor and guarantor ii. combine the public and the private sectors in a same way, by the signing of concession agreement iii. the profits of the project is used in debt repayment and investment return iv. assets belong to the project are the mortgage for all activities and risks of the project	
Differences	Organizational	Government and private entity has common interest and they aim to achieve a win-win situation.	Each participant has their own interest and they all aim to maximize their own interest.
	Operational	✓ choosing project partners ✓ confirming project ✓ establishing project company ✓ tendering→financing →constructing→operating→transferring	✓ confirming project ✓ tendering ✓ establishing project company ✓ financing→constructing→ operating→transferring

Furthermore, I conclude respectively the advantages and disadvantages of PPP and BOT as below:

For PPP:

- Advantages:
  - Help the government transfer part of the risks of project.
  - Improve the relationship between government and private enterprises by sharing some sort of common interests.
  - The participation of private entity can bring high-new technologies and management experience into the project.
  - The collaboration between public and private sectors can accelerate the project progress, reducing extra cost for delay.
- Disadvantages:
  - The government takes some risks in choosing the proper private partners.
  - The complexity of the organizational form makes the management of project more difficult and requires a good coordination among different departments.
  - How to reasonably share the investment's financial return may cause some disputes.

For BOT:

- Advantages:
  - All responsibilities regarding the project will be transferred to private partners and a lot of risks that the government is supposed to take are avoided.
  - The financial debt of the government is partly reduced.
  - The organizational structure is less complicated and the coordination between public and private sectors is easier.
  - The share of project's profits is determined before starting the project and the disputes between public and private sectors will be much less.
- Disadvantages:
  - The pre-project process, including the understanding, negotiation and consulting between the public and private sectors may last too long to prolong the delay and to cause extra cost in the tendering process.
  - The increasing risk shared by the private sector gives more concerns to the private enterprises and makes it more difficult for the investors to make decisions.
  - Some conflicts regarding the sharing of profits may be generated in the financing process and slow down the speed of the project's development.

In this BOT framework, the BMG which plays a role as a third party, delegates to the private sector entities to design and build the stadium and to operate and maintain this sport

facility for 30 years, which is called the concession period. During this period, the CITIC consortium as the private party, has the responsibility to raise the finance for the project and is entitled to retain all revenues generated by the project and is the owner of regarded facilities. At the end of the concession period, all rights and responsibilities regarding the stadium will be transferred to BMG without any remuneration of the private entity involved.

3.2.2 PARTNERS' PARTICIPATION AND THEIR RESPONSIBILITIES

A project company is set up for the project, which comprises mainly of two parts: the public partners and the private partners. In addition, some projects management advisors are also recruited. We will then proceed to the introduction to each of the project's partners.

According to the figure as below, all the partners that had participated in the project are listed. And the figure also illustrates the project's basic structure. We'll then continue to explain how the project is developed and the function of public sector and private partners in the process.

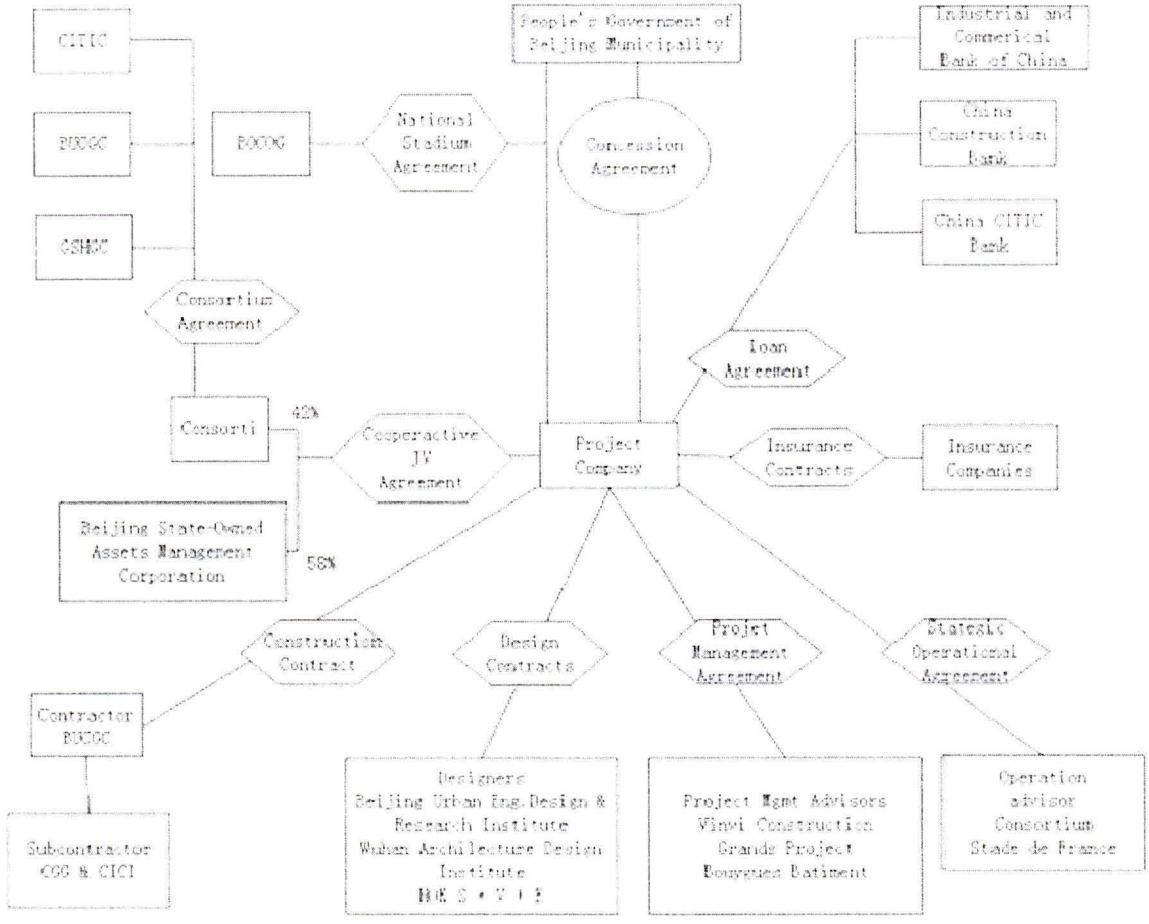

Figure 2 Structure of the National Stadium Project

Note: BDPC—Beijing Development Planning Commission; CITIC— China International Trust and Investment Corporation; BUCGC—Beijing Urban Construction Group Corporation; GSHGC— Golden State Holding Group Corporation; BSAMC—Beijing State-owned Assets Management Corporation; BOCOG—Beijing Organizing Committee for the Games of XXIX Olympiad; BCEG—Beijing Construction Engineering Group; CSCEC—China State Construction Engineering Corporation

3.2.2.1 THE PUBLIC PARTNER: BSAMC

3.2.2.1.a Company profile

The Beijing State-owned Assets Management Corporation (BSAMC) is nominated, mainly by the BMG, as the representative of the public, contributing 58% of the total investment. The BSAMC is a large-sized State-owned investment company authorized by Beijing municipal government to especially engage in capital operations. Its predecessor was Beijing State-Owned Assets Operation Company, which was founded in 1992, merged with the former Beijing Overseas Financing and Investment Management Center in April 2001. The merged company was subsequently transformed by the Beijing municipal government into a State wholly-owned company in accordance with the modern enterprise system and entrusted to operate and manage important State-owned assets in Beijing.

As of the end of 2010, BSAMC possessed RMB46.8 billion of total assets and RMB13.3 billion of net assets. BSAMC as the implementer and operator of major projects in Beijing focuses its business operations in four major fields: financial services, hi-etch and modern manufacturing, culture and creativity, urban functionality area development, environmental protection and new energies. Ten years of tremendous work has given rise to a great company. In its first 5 years, BSAMC consolidated its foundations, carried out reforms and adjustment, restructures itself from a utility unit into a modern enterprise, and changed from an asset management company purely undertaking government tasks to a large-sized State-owned investment holdings company with market functions. In its second five years, BSAMC achieved fast growth in both size and efficiency. The third five years, which coincide with China's Twelfth Five-Year Plan period, will see BSAMC embarking on a new journey of frog-leap development.

3.2.2.1.b Business Performance

Over the past 10 years, BSAM has achieved an impressive track record of business performance: (Figure 3)

Total assets:

As of the end of 2010, BSAM's assets totaled RMB46.8 billion, up by 8.6 times over RMB4.875 billion in 2001.

Net assets:

As of the end of 2010, BSAM's net assets reached RMB13.3 billion, up by 1.8 times over RMB4.721 in 2001.

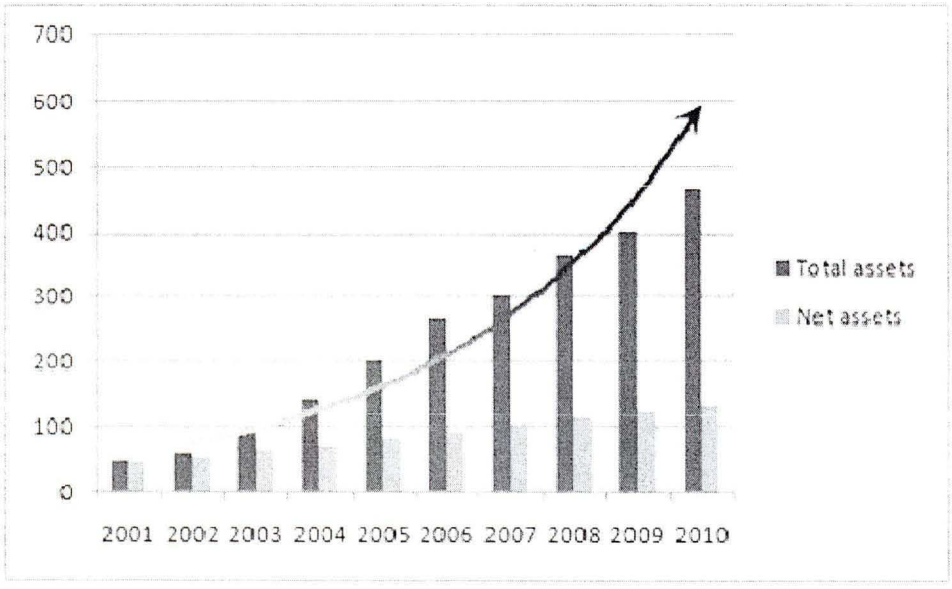

Figure 3 Business Performance of BSAM

Total profits:

BSAM increased its thin profits at the time of its founding to almost RMB1.4 billion in 2010.

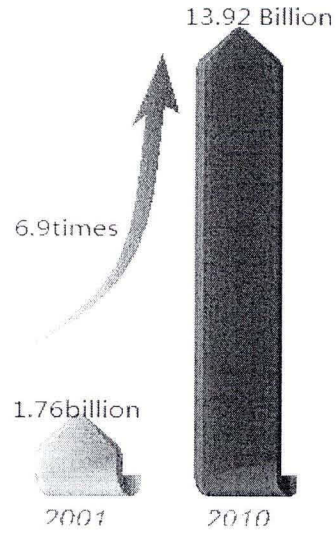

Figure 4 Total Profits of BSAM

3.2.2.1.c Responsibilities and Obligation in the project

In this project, the government BMG, acting as the public part, has mainly two important obligations.

Firstly, BMG is the original owner of all rights concerning the project. In order to let the private parts in, certain rights have to be granted through a process of signing the Concession Agreement. During the concession period, private partners are authorized to invest, finance, design and construct the national stadium, and afterwards, to operate, maintain and repair the stadium. All activities should obey the terms and conditions set in the Concession Agreement.

Secondly, the building of such a large-scaled sport facility needs a certain area of land. Due to the present emergent situation of land acquisition in China, to obtain the use of such a piece of land was supposed to cost the project company a considerable sum of money. As to show government's supports and incentives to the project, the Land Administrative Authority of BMG gratuitously offers the Project Company the allocated land use rights of the project facilities site for free, that is so say, the Project Company is

not required to pay the land premium or supporting infrastructure construction fee, provided that the Project Company shall cover the first level land development expenses (1,040 yuan per square meter).

3.2.2.2 The private partners: CITIC, BUCGC, GSHGC & Advisors (VCGP, BYB)

As indicated in the figure as below, the private sector is a consortium composed by three companies – China International Trust and Investment Corporation (CITIC), Beijing Urban Construction Group Corporation (BUCEC) and Golden State Holding Group Cooperation (GSHGC), with equity proportion in the total investment of 65%, 30% and 5% respectively. Each of the three companies has good business performance and rich experience in large-scaled construction projects.

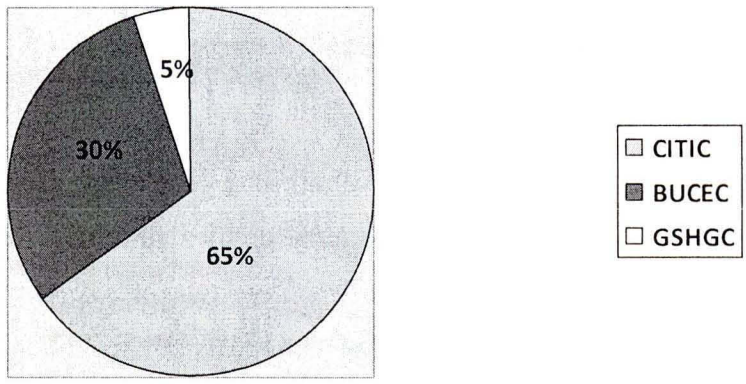

Figure 5 Ratio of Private Partners Investment

3.2.2.2.a.Company introduction

❖ CITIC:

This company has a long and rich history as it was established in 1979 by our former vice president of People's Republic of China and was approved and supported by Deng

Xiaoping, a very famous leader in China's liberation history. Along all these years, the company had been regarded as the widow of China's opening to the outside world and as a pilot of China's economic reform. With the endeavor of almost 30 years, CITIC has now become a large trans-national conglomerate, which owns 44 subsidiaries over the world, including Hong Kong, the United States, Canada, Australia etc. Besides, the company has also a few representative offices in Tokyo, New York and Frankfurt. The core business of the company ranges from financial industry, industrial investment to service industries.

❖ BUCGC:

Beijing Urban Construction Group Corporation (BUCGC) is a state-owned enterprise of China consisting of 120 corporate enterprises and over 20 overseas branches. It is one of the Top 500 Chinese Enterprises and one of the Top 225 International Enterprises. BUCGC has a total assets value of 5.3 billion U.S. dollars with over 28000 employees, and its annual turnover reaches 5.7 billion U.S. dollars. BUCGC is a comprehensive construction enterprise. Its business specializes in the management of construction project, real estate development, design & consulting, production and capital operation. BUCGC is specializing in the design and construction of industrial and civil works, municipal works, metro, expressway, deep foundation, airport and long distance pipeline works and the real estate development and capital operation. It also deals with the business such as industrial production, property management, hotel operation, foreign trade, etc. It is one of the Top 10 Construction Enterprises in China. From the establishment of the group in the year of 1983, BUCGC has become the leader of the construction market of China after 27 years' development. It has constructed many national and provincial key projects, foreign-invested projects and many overseas projects in Asia, Europe, Africa and America.

❖ GSHGC:

Formerly known as Golden State Import & Export Ltd., the company was established in the United States in 1986 and entered Chinese market in 1988. As a project consultant in China for over 50 international companies, GSHGC has actively promoted economic and technological cooperation between Chinese enterprises and their international counterparts on environment protection and infrastructure by successively participated in over 200 governmental loan projects, including approximately 100 water projects in China, major metropolitan transportation and solid wasted projects, various wind power generation projects, and equipment import projects for hospitals, institutes, radio broadcasting and TV stations, and factories. In the past 20 years, Golden State has turned from a consultant for government loan projects to a group corporation with over 1600 employees, nearly 30 specialized service companies, more than 10 plants on water supply, waste water treatment, and solid waste treatment in China. Golden State has successfully applied the investment modes of BOT, PPP, and TOT on projects, and invested in construction or purchase of 4 water plants, 6 waste water treatment plants, and 4 waste incineration plants.

❖ Project Management Advisors (VCGP & BYB)

Vinci Construction Grand Projects (VCGP) and Bouygues Batiment (BYB) are the two project management advisors hired by the Project Company. VCGP is a member of the French Vinci Group of Companies, which is among the largest group for construction and associated services in the world. It has its own representative office in Beijing, which offers services in civil and building constructions and relates services, for example, toll roads, airports, car parking lots etc.; while BYB is a member of the Bouygues Group of Companies, which is also a French company. This company is large French conglomerate with abundant experience in all sorts of projects in the fields of construction, services, telecomm and media.

3.2.2.2.b Duties and responsibilities in the Project

First of all, CITIC was elected by the private partners as the leader and representative of the private consortium, also names as CITIC Consortium. The company is in charge of the coordination of the bid preparation, as well as of submitting jointly the bidding document and material with the other two companies – BUCGC and SGHGC. Meanwhile, CITIC is also appointed as the role of legal person of the Project's Consortium, which represents all the private partners;

Secondly, BUCGC and GSHGC, both of which are large companies with rich experience in similar projects, will provide the best team of experts with specialized skills in various fields and professional person with abundant knowledge in management of projects.

Last but not the least, the two advisors of the project will provide professional advises in the process of project management and project operation. As both of these two advisors, VCGP and BYB are also shareholders of the consortium of Stadium of France, which is the first PPP project in the field of sports facilities, their advices will be persuasive and useful. Furthermore, the expertise and know- how of VCGP and BYB in the design, financing, construction of a sport venue and that of management and operation of such a sport facility can bring value and competitiveness to the Project Company.

3.3 Risk management of Project

In this part, we'll proceed to a detailed and profound analysis of the risk management for this specific project. We will develop our research in the ways as follows:

Firstly, all risk factors encountered in the studied project will be listed and sorted through a literature review and a telephone interview with Professor Wang who already had collect useful data regarding this project.

Secondly, a two-round Delphi Survey will be applied to rank the risk factors and to show how each risk factor is allocated between the private and public sectors by analyzing the results of questionnaire.

Last but not the least, compared with the previous research of the risk management of PPP projects in China, we will give a further description of several new risk factors which have never appeared in the former PPP projects in China and make a profound explanation of the difference in the risks of this case with the risks encountered by the other PPP projects in China.

3.3.1 Risk Identification

According to a large amount of literature review and previous research results of telephone interviews (Ke, Wang, & Chan, 2010) for the data collecting carried out by Professor Wang, who is an expert in China's PPP research, with the help of his colleagues, 41 risk factors regarding the Bird Nest Stadium Project were identified, as shown in Table 5, which include: (1) the principle risks for the past PPP projects in China; (2) the risk factors approved by experts and respondents with hands-on working experience in the Bird Nest PPP project in China; (3) risks that have been listed out and been studied in PPP projects in foreign countries that have similarities with our case. In addition, the definition of each risk factor was also given as shown in Table 6, which would be later attached to the questionnaire distributed to the people who participated in the management of the Bird Nest Project.

Based on a form of categorization of projects risks developed by Li (Bing, Akintoye, Edwards, & Hardcastle, 2005), we classify all the risk factors into three levels: macro level; meso level; and micro level. Li also defined each of the three levels risks as follows:

- The macro level risks mainly comprise the risks resulted from reasons external to the project itself, for example, political and legal conditions, economic conditions,

social conditions and natural environment conditions etc. In another word, these risks arise from the events outside the project itself, but can, to a certain extent, have influence on the project itself and the outcomes of the project.

- The micro level risks represents the risks arise from within the project itself, including the project's implementation, construction, operation, as well as the involving issues such as design problems, choose of location, market demand, project's products' usage etc.

- The micro level risks are the risks generated from the conflicts in the relationship between the private sector and the public sector, or among the partners in the private sector itself, due to the inherent differences in contract management. The key reason of this level risks it the fact that the public sector puts its emphasis on social responsibility, whereas the private sector is mainly profit driven.

The three levels of risks are all listed separately in the tables as below. For each level of risks, several groups are divided according to their different natures. For example, risks belonged to the macro level are divided into 5 groups according to different natures of the risk itself, such as political, legal, macro-economic, social and natural, while meso level risks are also classified by 5 different groups in the light of different phases along the entire process of the project, including the preparation and start-up, construction, operation, and supervision, plus the risks arise in the project finance problems. Besides, two groups, named as public-private relationship and third party, are set up for the micro level risks. Detailed catalogues for risks of each level are listed in the tables as below, while the definitions of every risk factor are given in table X followed by the risk list in order to help the readers and the respondents of the later questionnaire survey have a better understanding of what each risk means exactly and also to ensure the respondents have the same understanding of these risks.

Table 5 : Three Level Risks

- Macro Level Risks:

Group ID	Risk Factor	Category Group	RF ID	Risk Factor (RF)
1	G	Political	F1	Government's Intervention
			F2	Expropriation and Nationalization
			F3	Government's Reliability
			F4	Corruption
			F5	Political Opposition
			F6	Poor Political Decision Making
2	G	Legal	F7	Immature Juristic System
			F8	Change in Law
			F9	Change in Tax Regulation
3	G	Macro economic	F10	Tarif Change
			F11	Interest Rate
			F12	Foreign Exchange and Convertibility
			F13	Inflation
4	G	Social	F14	Public Opposition
			F15	Market Demand Change

5	G	Natural	F16	Geotechnical Conditions
			F17	Force Majeure
			F18	Environmental Protection

- Meso Level Risks:

Group ID	Risk Factor	Category Group	RF ID	Risk Factor (RF)
6	G	Preparation and Star-up	F19	Land Acquisition
			F20	Competition for Exclusive Right
			F21	Uncompetitive Tender
			F22	Subjective Evaluation
7	G	Construction	F23	Construction Changes
			F24	Contracts with Excessive Variation
			F25	Construction Cost Overrun
			F26	Construction Delay
			F27	Design Risk
8	G	Operation	F28	Supporting Utilities Risk
			F29	Technology Risk

9	G	Supervision	F30	Operation Changes
			F31	Operation Cost Overrun
			F32	Consortium Inability
			F33	Maintenance Risk
10	G	Project Finance	F34	Financial Risk
			F35	Payment Risk
			F36	Insufficient Financial Audit

- Micro Level Risks:

Group ID	Risk Factor	Category Group	RF ID	Risk Factor (RF)
11	G	Public Sector/Private Sector Relationship	F37	Organization/Coordination Risk
			F38	Inadequacy of Knowledge
			F39	Private Investor Change
12	G	Third Party	F40	Third Party Reliability
			F41	Staff Crises

Table 6 : Definition of Risks

D	Risk Factor	Definition
1	Government's Intervention	Public sector interferes unreasonably in privatized facilities/services.
2	Expropriation and Nationalization	Due to political, social or economic pressures, local government takes over the facility run by private firm without giving reasonable compensation.
3	Government's Reliability	The reliability and creditworthiness of the government to be able and willing to honor their obligations in future.
4	Corruption	Corrupt local government official demand bribes or unjust rewards.
5	Political Opposition	Delay or refusal of project approval and permit by local government.
6	Poor Political Decision Making	Government officials considers more their career achievement or short-term goals or personal interests, or with little PPP experience etc., resulting in a poor political decision-making process.
7	Immature Juristic System	The lack of national PPP law leads to different ways of PPP implementation in different places in China.
	Change in Law	Local government's inconsistent application of

8		new regulations and laws.
9	Change in Tax Regulation	Central or local government's inconsistent application of tax regulation.
10	Tariff Change	Improper tariff design or inflexible adjustment framework leading to the insufficient income.
11	Interest Rate	Unanticipated local interest rate due to immature local economic and banking systems.
12	Foreign Exchange and Convertibility	Fluctuation in currency exchange rate and/ or difficulty of convertibility.
13	Inflation	Unanticipated local inflation rate due to immature local economic and banking systems.
14	Public Opposition	Prejudice from public due to different local living standards, values, culture, social system, etc.
15	Market Demand Change	Demand change from factors as social, economic, environment, etc.
16	Geotechnical Conditions and Weather	Poor or unexpected ground/weather conditions.
17	Force Majeure	The circumstances that are out of the control of both foreign and local partners, such as flood, fires, storms, epidemic diseases, war hostilities and embargo.
18	Environmental Protection	Stringent regulation which will have an impact on construction firms' poor attention to

		environmental issues.
19	Land Acquisition	The project land is unavailable, or unable to be occupied at the required time.
20	Competition for exclusive-right	The government does not offer the exclusive right, or does not honor to its commitment and build another competitive project.
21	Uncompetitive Tender	The tendering process and documents vary from project to project and from province to province in China without transparent or standardized models.
22	Subjective Evaluation	Subjective evaluation and design of the concession period, tariff structure, market demand, etc.
23	Construction Changes	Unanticipated changes and errors in the construction resulting from the improper design.
24	Contracts with Excessive Variation	Improper arrangements in the contracts including inappropriate risk allocation among stakeholders, commitment from public/private partners.
25	Construction Cost Overrun	Construction cost more than predicted or poor construction quality.
26	Construction Delay	Longer construction time than predicted or Subcontractors and suppliers not being able to supply labor or material on time.

27	Design Risk	Delay in project approvals and permits due to design deficiency.
28	Supporting Utilities Risk	Supporting utilities, such as electricity, water, necessary for the construction, operation and management would not be available in a timely manner or at fair rates.
29	Technology Risk	The technology adopted not being mature or able to meet the requirements.
30	Operation Changes	Unanticipated changes and errors in the operation resulting from poor investigation.
31	Operation Cost Overrun	Operation cost overrun resulting from improper measurement, ill planned schedule or low operation efficiency.
32	Consortium Inability	The consortium not being able to perform its obligations as a PPP project company.
33	Maintenance Risk	Maintenance costs higher than expected or more frequent than expected.
34	Financial Risk	Poor financial market or unavailability or financial instrument resulting difficulty of financing.
35	Payment Risk	The consumer/government not being able or willing to pay, due to social or other reasons.
	Insufficient Financial	The government or lenders would not perform

36	Audit	a careful audit to the financial status of the project company.
37	Organization and Coordination Risk	An increase of transaction cost or a dispute may occur because of the improper organization and coordination between private and public sectors.
38	Inadequacy of Knowledge	Inadequate experience in PPP/ Inadequate distribution of responsibilities and authority in partnership.
39	Private Investor Change	The government or lenders would not perform a careful audit to the financial status of the project company.
40	Third Party Reliability	The reliability and creditworthiness of a third party to be able and willing to honor their obligations in future.
41	Staff Crises	Conflicts or discordance among staff in or between departments.

3.3.2 RISK ALLOCATION

3.3.2.1 Two-round Delphi Survey

The appropriate allocation of risks between the public and private sectors is a key requirement for the achievement of value for money in PPP projects. (Shen, Platten, &

Deng, 2006) To which sector the risk factors should be allocated depends on the type of the risk and the ability of which sector could better control and manage the risk. In the study of risk allocation for the Bird Nest Project, a two-round Delphi survey research method will be adopted. From November 2011 to January 2012, a Delphi questionnaire regarding the risk factors' allocation and ranking of the Beijing Bird Nest Stadium Project was distributed to 22 practitioners/academics who had participated in the management of the project.

As the questionnaire is against this particular case, all respondents chosen are the ones who had taken place in the crucial decision-making and the management of different part of the project, coming from both public and private sectors, (All their contacts provided by Professor Wang). Among all the 22 chosen respondents, 10 people are from public sector BSAMC, 10 from private sector comprised by three companies CITIC, BUCEC and GSHGC, with 2 others from two design companies VCGP and BYB as project advisors. Besides, as they had play important roles in such a big scaled PPP project with a worldwide significance, all of them are selected from the elite with in-depth knowledge and sound experience of domestic or international projects' management. According to their working background, each of the respondents can satisfy the following criteria (De Jong, Mu, Stead, Ma, & Xi, 2010), which makes their answers and opinions persuasive and believable:

1) Having extensive working experience in PPP projects in China.
2) Having current/recent and direct involvement in risk management of PPP projects in China.
3) Having a sound knowledge and understating of the concepts of PPP risks.

The related information of chosen respondents is given in Table 7 as below:

Table 7 : Information of Respondents

Item	Category	Freq.	%
Types of organization	Government	2	11.11%
	State-owned enterprises	5	27.78%
	Private companies	11	61.11%
Average turnover (per year) of the company they working for (RMB dollars)	Less than 50 million	0	0%
	50 million - 1 billion	2	11.11%
	More than 1 billion	16	88.89%
Years of working experiences in management of project	Less than 5 years	0	0%
	5-10 years	3	16.67%
	More than 10 years	15	83.33%
Numbers of participated PPP projects	Less than 4	3	16.67%
	4-8 projects	11	61.11%
	More than 8 projects	4	22.22%

In the first round of the Delphi survey, a questionnaire which includes a list of all 41 risk factors as in Table 6, the definition of each risk factor as in Table 6, along with an invitation letter attached, were sent to the selected experts by email. The purpose of the invitation letter, as attached in the annex, was to explain the purpose of the research and all respondents were informed that there would be two rounds of questionnaire. In the first round, the respondents were required to give two scores to each risk factor:

The first score is to determine the allocation of the listed 41 risk factors, to either private or the public sector according to a five-point Likert scale. Each score, with a range from 1 to 5, is defined as below:

- "1" – Government takes sole responsibility;
- "2" – Government takes the majority responsibility;
- "3" – Both public and private sectors share equal responsibility;
- "4" – Private sector takes the majority responsibility;
- "5" – Private sector takes sole responsibility.

The second score is to describe the degree of each risk's influence on the Bird Nest Project, in order to rank all the risk factors according to their importance in this project, so that we could know which risk should be paid more attention to in such kind of PPP project. The evaluation of a five-point Likert scale is also used. The definition of score ranged from 1 to 5 is as below:

- "1" – super low
- "2" – low
- "3" – medium

- "4" – high
- "5" – very high

In the first round Delphi questionnaire, the respondents were not only asked to score the 41 risk factors already listed, but also to advise if there existed new and specific risk factors as for this particular national stadium building project. As a result, a total of 18 completed questionnaires were returned in the first round Delphi survey, representing a respond rate of 81.82%. Among the 18 returned questionnaires, 7 from public sector, 9 from private sector (separately 4 from CITIC, 3 from BUCEC, and 2 from GSHGC), and the rest 2 from design advisors. Furthermore, three new risk factors were suggested by the respondents, which were "Competitions with existing stadiums", "Dispute among the private partners themselves", and "Change or Termination of Concession". These three risks were numbered accordingly as F42 Competitions with existing stadiums, F43 Dispute among the private partners themselves, F44 Change or Termination of Concession, and added to the original 41 risk list. Therefore, the revised Risk Factor List with a total of 44 risks was offered to the respondents in the second round survey. Furthermore, respondents were also provided with feedback of the results obtained in the first round. The averages of the scores of each risk factor, the frequency of each option in the five-point scale, as well as the respondent's own score in the first round were shown. In the second round, all respondents were requested to re-assess their scores in the light of the provided first-round results, and to give score to the three new added risk factors. A total of 17 completed questionnaires were sent back in the second round, which represent a highly successive rate of 100%. The mean score of each risk was calculated to determine their allocation between public and private sectors and to rank the risks. We will then continue to analyze the results of risk allocation according the survey results. As the risk ranking aims to reveal the severest risks in this project, the risk factor with the highest mean score regarding the risk ranking will be listed and explained in chapter 4, where some specific risks that the Bird Nest Project had encountered will be well discussed.

According to the "half-adjusting" principle (Yongjian Ke and Albert Chan, 2009), which was also adopted by Professor Wang in his research of "Preferred risk allocation in China's PPP Project" in 2009, the preferred risk allocation options are presented as mean values calculated from results given by all respondents in the way as below:

a) Risk with "Mean score of RF <1.5" is to be solely allocated to the public sector.

b) Risk with "1.5≤ Mean score of RF <2.5" is to be mostly allocated to the public sector.

c) Risk with "2.5≤ Mean score of RF <3.5" is to be equally shared by both the public and private sectors.

d) Risk with "3.5≤ Mean score of RF <4.5" is to be mostly allocated to the private sector.

e) Risk with "Mean score of RF≥4.5" is to be solely allocated to the private sector.

3.3.2.2 Results Analysis

In the following analysis of the risk allocation of the studied case, we will firstly, in Part 1, discuss how the identified 12 groups of risks are allocated according to the different group they have been categorized (as for the new added three risk factors which was added in the second round of Delphi survey, we will discuss them later in the next chapter called the discussion around the case study, as they are very special and specific ones in this PPP project); then in Part 2, we will proceed to make a summary of all the risk factors by dividing them into 5 categories as follows: i.) Risks to be solely allocated to the public sector ; ii.) Risks to be mostly allocated to the public sector ; iii.) Risks to be equally shared by the public and private sectors ; iv.) Risks to be mostly allocated to the private sector ; v.) Risks to be solely allocated to the private sector. And possible ways of risk mitigation will be suggested and advised accordingly.

- Part 1:

The appropriate allocation of risks between the public and private sectors is a key requirement for the achievement of value for money in PPP projects. (Li-Yin Shen, 2006) Whether the risks should be allocated to the public sector or the private sector depends on the type of risk and the ability of either sector could control and manage them. The general principle in PPP risk allocation is that each individual risk is identified and then allocated to the party that is best to be able to manage the risk. This principle has been adopted in the management of risk in implementing the Bird Nest Project in China. The identified risks by group are allocated as follows and a summary of the allocation is presented in Table 8. The principle of preferred risk allocation by group is based on the level of majority opinion (>50%). If over half of the risks in a single group are allocated to the public sector according to the respondents' results, we will consider this group of risks as allocated to the public sector.

- G1 & G2: These two groups of risks regarding the political and legal aspects are obviously closely related to the government and government officers and their decisions or actions. For example, a high tariff for the users, huge profits for the investors or a wrong decision by the government on the project may result in great political and social pressures, for which the private partners can hardly do anything to deal with these consequences under such circumstances (Shouqiprn Wang, 2009). Among these risks, risks as "Change in Law", "Immature juristic system" are considered as risks at a country level relevant to the legal system in China. If any change happens to the present law or juristic system, it may cause serious consequences which, for example, may prevent the project company from fulfilling its obligations due to some additional costs or inability to supply service. For another, risks as "Government's intervention", "Government's reliability", "Poor political decision-making" and "Corruption" are also at a country level but mostly related to some specific government officers. In this PPP project case, some high officers in the local government

BMG may make some wrong decisions, for instance, providing too much guarantees to investors or lacking accurate predictions of demand for the projects, which may lead to high cost in the contract-making process or incur complaints from the publics. All these risks may result from some limited experience and knowledge in PPP or some short-term goals for personal interest in the public sector. In summary, the public sector are mostly responsible for all risks regarding the politics and laws, especially for PPPs in China, where government is most powerful for the making of policies and regulations for which the private partners can hardly do anything to make a change.

- G3: As for group 3 which includes risks at a market level, such as "Inflation" and "Foreign exchange and convertibility", both public and private parties preferable share that equally, since either of the public sector or private investors can handle it well alone.

- G4: This group is mainly comprised of two risks, the public opposition and the change of market demand. The market demand is related to the market conditions concerning social factors such as the provision of facilities, population from labor market, and demanded technologies etc. which are comparatively dynamic, and their changes can significantly affect the profits return of the stadium that can be later collected for the private investors after the 2008 Olympics; whereas the public opposition may occur due to reasons mostly regarding the government policies, changes of taxation, environmental effects etc., which would depend more on the government's decision. In conclusion, the private sector and the public sector share the risks in this group.

- G5: The natural risks that may be encountered during the project include factors such as underground conditions, weather conditions, environmental protection and force majeure. Although these risks are generally recognized as being severe, they have a low probability of occurrence. And according to their nature, either public sector or private sector may not be able to deal with them alone

once such risks occur, for example, a rainstorm or an earthquake. Besides, the risk of the pollution to the land and surrounding, which associates with the operation and the overall planning of the project, is also shared between the government and the private partners. In conclusion, although the private partner is in better position to undertake site survey particularly on the underground conditions, such as any existing piles, the earth conditions, etc., this group of natural risks should be almost equally shared between both the public sector and the private sector.

- G6: The preparation of the project includes mainly two processes – the tendering process and the land acquisition. On the one hand, the tendering process of many PPP projects in China and the documents vary from project to project and from province to province without transparent or standardized models (Ke, Wang, Chan, & Lam, 2010). This makes it most related to the local rules and regulations as well as the legal affairs. Besides, the government has to assume the risk of choosing inexperienced and unqualified private investors who may not be suitable or competent for the projects, or even has financial difficulties. On the other hand, Beijing Municipal Government has the responsibility to take measures for ensuring the acquisition of an appropriate site for the Bird Nest National Stadium and for protecting the site from visual intrusion and incompatible land uses in surrounding areas. In this group of risks, the private partner is only responsible for the protection or demolition of existing buildings or facilities on the land. Thus, the public sector is mostly responsible for this group of risks.

- G7 & G8: These two groups of risks, which may occur during the construction and operation processes of the project, will mainly rest on the shoulders of the private partners, including the technology risks, cost overrun, time delay, construction/operation changes, etc. The private partner is responsible for the completion and construction of land reclamation with associated infrastructure

and facilities. And in the development of the project, there may be risks concerning the loss in the construction and operations stages, for example, cost overrun made by the waste of resources or time delay because of poor quality performance. The private partners are mostly responsible for such kind of risks.

- G9: The risks of this group may occur in the supervision process of the project. The risks in the maintenance are normally borne by the business that is responsible for the day to day maintenance and operation of the project, which will affect the profitability of running the projects. Therefore, the maintenance risks should be allocated mostly to the private partners as it is for the operation risks. Besides, the consortium inability is also suggested to be taken by the private sector as it is relative to the project consortium which is comprised of private investors. Thus, this group of risks is allocated mostly to the private sector.

- G10: This group of risks mainly concerns the project's financial problems. The implementation of the Bird Nest Stadium involves huge amount of financial resources contributed by both the private partners and the Beijing Municipal People's Government. The project is financed by a mixture of debt and equity where the non-equity financing of the project is mainly loan from banks. There are a lot of uncertainties about the returns from these financial commitments due to the possible reasons such as changes in interest rates, exchange rates, ownership and other factors. Both the private partners and the government will take the responsibility and the risk as the borrower of loan. It is agreed that this group of risks are shared between the two sectors.

- G11 & G12 : Both of the two groups include the risks belong to the Micro risks which mainly refer to the risks that may happen with sectors or among individuals. The public-private relationship risks may occur due to reasons such as inappropriate co-ordination or organization between parties, inadequate working experience or required knowledge. As in our case, the project company

is consisted of three large private enterprises with different culture and specialties. The relation among them would be much more complicated and more difficult to manage. Thus, there may be more probabilities of the occurrence of such risks for the private sector. And it is their responsibility to solve the problem and achieve an agreement. The other group "Third party reliability" risk would normally occur at the construction or operation stage of a PPP project, which is regarded as being out of the control of both parties, after the government and the project company reach an agreement on risk allocation and define them in the concession contract (Ke, Wang, Chan, & Lam, 2010). As most of the risks during the construction and operation stages of the project, the private sector will also take most of the responsibilities of these risks.

Table 8 : Allocation of Risks in Group

	Group ID	Group Name	Public Sector	Private Sector
Macro-level	G1	Political	Mostly Responsible	
	G2	Legal	Mostly Responsible	
	G3	Macro economical	Equally Shared	Equally Shared
	G4	Social	Equally Shared	Equally Shared
	G5	Natural	Equally Shared	Equally Shared
Meso-level	G6	Preparation and Star-up	Mostly Responsible	
	G7	Construction		Mostly Responsible

	G8	Operation		Mostly Responsible
	G9	Supervision		Mostly Responsible
	G10	Project Finance	Equally Shared	Equally Shared
Micro-level	G11	Public Sector – Private Sector Relationship		Mostly Responsible
	G12	Third Party		Mostly Responsible

- Part 2:

In this part, we will make a conclusion by sorting out all the risks according to their allocated categories. Meanwhile, a few advices and suggestions will be given in order to avoid the occurrence of risks and to reduce their influence or damage that may be caused to the project if the risks existed during the project.

i. Risks to be solely allocated to the public sector

According to the result of the questionnaire, the only risk factor which obtained a score less than 1.5 is the risk F2 "Expropriation and Nationalization". This result is turned out to be the same as in the research done by Yongjian Ke and ShouQing Wang (2009), which was a study of preferred risk allocation in the general PPP projects in China. As it is known to all that China is a developing socialism country. Government has the political power and responsibility to guarantee the maximized benefits of people and make sure the balanced development of the society. Therefore, if any high tariff for the consumers, huge profits for the investors, or a wrong decision by the government on this national stadium PPP project result in great political or social pressures, our government would be forced to terminate the concession and take over the facility run by the private project company without giving reasonable compensation (Ke, Wang, Chan, & Lam, 2010). Under this

situation, the private partners can do nothing to deal with the loss and the consequences caused by the government's reactions. It is thus recommended that the concession agreement should provide for warranties, indemnities, liabilities and a compensation mechanism for early termination of contract (Ke, Wang, Chan, & Lam, 2010). But as for our case, there is little chance that this risk may occur by taking into account the great significance and worldwide impact that the 2008 Olympics bring. And that is also a reason why this project attracted a large amount of private investors and competitors in the tendering process. And in this project, the expropriation risk is treated as political force majeure, which has already been mitigated.

ii. Risks to be mostly allocated to the public sector

There are thirteen risks to be mostly allocated to the public sector, including F1"Government's Intervention", F3"Government's Reliability", F4"Corruption", F5"Political Opposition", F6"Poor Political Decision Making", F7"Immature Juristic System", F8"Change in Law", F9"Change in Tax Regulation", F10"Tariff Change", F19"Land Acquisition", F20"Competition for Exclusive Right", F21"Uncompetitive Tender", and F22"Subjective Evaluation". It is obvious that all these risks have shared a common characteristic, which is they are all closely related to the country's policies and the government's legal systems or some relevant government's officers and their behaviors (Ke, Wang, Chan, & Lam, 2010). Up until now, except for some local governments' or ministries' regulations relevant to PPP, for example, the Beijing and Ministry of Housing and Urban-Rural Development's (formerly named Ministry of Construction) regulations, there are no national PPP laws in China (Ke, Wang, Chan, & Lam, 2010). In order to decrease the probability of these risks, it is very important and necessary for private investors, especially the foreign ones who have little recognition of Chinese rules and regulations, to study the local laws and adapt to China's typical politics. It is suggested by professor Wang that, for those how are planning to set steps in the PPP projects in China, the hiring of a professional legal consultant is highly essential for handling the legal affairs.

Furthermore, some special rules could be set in the concession agreement to cover such risks, for example, "the change in law provision applies to any change in law after Bid Submission Date" (Ke, Wang, Chan, & Lam, 2010). The special regulations set for the Bird Nest Project will be presented in the next discussion chapter.

For the risks related to the government officers as well as their decisions, the private investors need to assess the liability of the government officials' decisions, especially their verbal promises, for the reason that "the wrong decisions made by the local governments would incur public complaints or even result in the key officials' stepping down (Ke, Wang, Chan, & Lam, 2010). Another risk needs to be explained is the "Corruption". In order to gain the government's cooperation and assistance as much as they can, the private investors may spend not only a lot of time but also a large amount of money on some key officer which may lead to scandals as corruption. This will not only cause bas social and public influences and also a delay on the efficiency of the operation of the project. In the Bird Nest Project, the risk corruption is addressed in the contract between the government and the project company in the form of warranties. However, as corruptions never take place out in the open, it is difficult to be precluded or be really legislated. The Bird Nest project has gained a lot of government's support and incentives. Therefore, the private parties still bears a certain part of the corruption risk.

The other three risk factors of which the public sector should be mostly responsible are the risks regarding the tendering process. As it is mentioned before, the tendering documents depend largely on local laws and regulations so that the government's policies are well worthy to be taken into account by the private partners.

iii. Risks to be equally shared by the public and private sectors

According to the survey results, there are twelve risk factors to be equally shared by both the public and private parties. They are F11"Interest Rate", F12"Foreign Exchange and Convertibility", F13"Inflation", F14"Public Opposition", F15"Market Demand

Change", F16"Geotechnical Conditions and Weather", F17"Force Majeure", F18"Environmental Protection", F22"Subjective Evaluation", F34"Financial Risk", F35"Payment Risk", F36"Insufficient Financial Audit". All the above risks sharing a same nature which makes them to be equally shared between the two sectors; that is neither the public sector nor the private sector would be able to deal with the risk on its own.

For the risks regarding the nature disasters, an appropriate extension of the construction period or the concession period is suggested as a way of compensation. In the Bird Nest Project, comfort is derived from the comprehensive and well-structured Force Majeure provisions in the project contract, as well as the appropriate insurance program which ensure the benefits o the sponsors and lenders.

For other risks relevant to the interest rates and the economical market, they may be dealt with directly through guaranteeing minimum purchase of project output, or indirectly through adjusting tariff with demand, or a combination of them (Ke, Wang, Chan, & Lam, 2010). In the Bird Nest Project, as the project company is made not only the nation-owned enterprise, but also international companies with foreign investors, there existed a problem of the fluctuating of the exchanging rate of foreign currencies. To solve this problem, some special measures have been made, which will be explained later in the next chapter. Since the private partners, especially those with foreign investors may not be so familiar with the government's policies and capabilities, even the business environment in China, they would easily reach agreements with the government's promises, especially when the government needed funding while the private investors needed projects (Ke, Wang, Chan, & Lam, 2010). Some risk like "Tariff change", "Payment risk" and "Subjective evaluation" may eventually occur. Some feasibility studies and contract negation, in which both parties are involved, will be needed in order to handle these risks. Thus the responsibility is equally shared.

iv. Risks to be mostly allocated to the private sector

The results of the survey indicate that fifteen risks out of the total 41 should be mostly allocated to the private sectors, which are F23"Construction Changes", F24"Contracts with Excessive Variation", F25"Construction Cost Overrun", F26"Construction Delay", F28"Supporting Utilities Risk", F29 "Technology Risk", F30"Operation Changes", F31"Operation Cost Overrun", F32"Consortium Inability", F33"Maintenance Risk", F37 "Organization and Coordination Risk", F38"Inadequacy of Knowledge", F39 "Private Investor Change", F40"Third Party Reliability", and F41"Staff Crises".

All the risks that belong to this category have one thing in common, that is they are all related to the management ability and technical skills provided by the private sector. Thus it is reasonable that the private sector should take more responsibility of these risks.

As defined in the term "PPP" by the Efficiency Unit (2008), the public and private sectors both bring their complementary skills to a PPP project for the sake of providing public services more efficiently. Consequently, only the private partners who are comparatively more efficient in the construction or operation than the public sector are considered as a qualified investor for a PPP project. Furthermore, as one of the big reasons for the public sector to promote PPP implementation is the shortage of funding, the private partner should guarantee their capabilities and availabilities of financial resources or their ability of finding lenders in the financial market.

It is agreed in the allocation schemes for most of PPP projects in the world that the risks related to the project's construction and operation should be assigned to the private partner, such as "Technology risk", "Cost overrun" etc. Besides, the risks for the relationships between parties are usually associated with the day-to-day requirements of the project (Ke, Wang, & Chan, 2010), it is appropriate that risks concerned this aspect rest more with the private sector. According to the q of the Bird Nest Project, the results turned out to be in accordance with the findings in the previous research for PPPs. However, there still exists some difference between the Bird Nest Project and the other PPPs due to its own

particularities. In the next chapter, the differences will be elaborated in the comparison of the PPP projects within and between countries.

v. Risks to be solely allocated to the private sector

In our survey, the risk F27 Design Risk is the risk with the highest score 4.87, which is over 4.5 and thus this risk is considered the only risk which is to be solely allocated to the private sector. According to the previous research of the risk allocation of PPP in China by Professor Wang, no risk was solely allocated to the private sector, which indicated that government's objective of risk transfer from public sector to private sector is not completed and not as well as other countries. But in this Bird Nest Project, according to our survey results, this transfer is better done than the other cases in China, which showed us a progress made in the PPP system in China. Why the private party undertook more of the risk in design and how they reacted to share the risk will be explained in the next chapter.

CHAPTER 4 DISCUSSION AROUND THE CASE STUDY

In this chapter, the discussion will be divided into two parts. In the first part, a further explanation will be given to the three new added risks arising in the Bird Nest Project as well as some top high risks in this project. Some measures and reactions taken by the government will be presented in order to explain how these risks were mitigated and balanced between the public and private sectors. While in the second part, comparisons of the risk management of PPP projects in different countries will be made. We will firstly compare the risk management of the Bird Nest Project with that of other carried out PPP projects in China, so that we can see the improvement for PPP risk management in China. Then, status of risk management of PPP in western countries will be compared with the situation in China, so that we can find out the gap of PPP system between developed countries and developing countries and where we can put our effort on to catch up with the fast development of skills and technologies in the field of management of project.

4.1 Individual risk factor analysis

4.1.1 Particular risks in the project

- F42 Competitions with existing stadiums.

Once the Bird Nest National Stadium is completed, it has to face a competition with the other existing stadiums in Beijing, as well as the other sports facilities all around our capital Beijing. This risk was brought out in the second round of the Delphi survey by the respondents from the private companies. The final average score of this risk factor is 3.98, which means that it is mostly the private consortium's responsibility to handle this risk. The

private investors have been worried about the possible competitions with other stadiums which may have a bad effect on their future income of the project. Another reason that may generate this risk is that the government may invest in the buildings of other new stadiums in the city during the concession period, which will also reduce the private investors' income from the project.

In order to assure the benefits of the private partners to attract their investment, government has made some explanations taken some special measures as follows:

1) According to a pre-survey of the existing stadiums, there are about 142 existing stadiums in Beijing, both urban areas and suburbs counted in. However, none of the existing ones could be compared to the Bird National Stadium in aspects such as scales, equipment, and popularity. What's more, some of them are not only small but also obsolete due to their long existing period. Therefore the competition among stadiums would be little during the concession period. So the private investors should not have too many worries about the occurrence of the competitions' bad effects.

2) The Beijing Municipal Government has made a special regulation in the project's contract, which is "During the concession period, BMG will not permit to develop new competitive stadium or expand any existing competitive stadium in northern area of Beijing". Thus, this risk allocated mostly to the private sector is mitigated.

- F43 Dispute among the private partners themselves

Due to the large scale of this Bird Nest PPP project, the Project Consortium is made of three large and well-known enterprises (CITIC, BUCGC, GSHGC) with a long business history and abundant investment experience. Among them, CITIC is a large trans-national conglomerate with 44 subsidiaries all over the world; BUCGC is one of the largest and

most excellent State-owned construction enterprise; and GSHGC is an international group company specialized in infrastructure construction of which the head office is in the United States. Since all of the three companies are very competitive, the disputes among them for how to share the interests and profits are accordingly frequent and strong.

First of all, the total profit of the project's construction is divided into three parts with the same proportion of each investor's equity in the Project Consortium. As a result, the share of the profit dispersed the Project Consortium's control over the project's construction and caused divergences on decision-making. Secondly, the BUCGC, as the general contractor for the project, who undertakes the most responsibility of design work and the construction, had put its emphasis more on its own profits, time and safety more than that for the overall project. This leads to the construction cost overrun and time delay risk. And government can hardly do anything to prevent this which makes this risk to become another risk which is considered to be solely allocated to the private sector.

Actually, this risk is considered to be among the highest ones in the Bird Nest Project. As a serious of problems concerning the stadium's design have occurred during the project's construction, the disputes are constant and government has to make some compensation for the loss in order to have the stadium completed in time for the 2008 Olympics.

- F44 Change and Termination of concession

According to the PPP Guide Book, the concession period refers to the duration for which the agreement has been signed. During this period, the private partner is permitted to levy fee and is liable for maintaining the facility; once the concession period is over, the property of the project will be completely handed over to the government. In the Bird Nest Project, the private sector obtained a concession period of up to 30 years, which mean that in the first 30 years after the stadium is finished, the private consortium will run, finance and maintain the stadium, and all rights would be transferred to government after 30 years.

However, there is a risk of either extending this period or terminating the period before its expiry. As a matter of fact, in order to avoid falling into the same tragedy as of "Montreal Trap", the private consortium ceded the concession agreement in 2009, only one year after its independent operation. The "Montreal Trap" is a story happened in 1976, right after the 21th Olympic Games held in Montreal. The income of the Olympic Stadium in Montreal turned out to be far less than the government had expected, which eventually caused a big loss of 10 million US dollars. The local government was obliged to collect a special tax to pay off this large amount of debt which took more than twenty years. This became a big nightmare for not only Montreal but also all other investors for Olympic stadiums as well. Unfortunately, the Bird Nest Stadium turned out to be facing the same problem.

It was claimed by the Beijing Investment Company that, since the Bird Nest Stadium's opening to public from October 2008 to May 2009, the total profit was about 260 million yuan. The sources of the income included three parts: entrance tickets from tourists, concerts and art performances, and the selling of licensed merchandise. However, taking into account the annual maintenance cost of up to 60 million yuan and the interest paid on loans from banks, the annual running cost of the stadium reached almost 100 million yuan. Furthermore, in accordance with the present national accounting standards in China, the depreciation of the stadium as a fixed asset should also be taken into account. During the 30 years' concession period, the stadium was estimated to cost a depreciation fee of about 2,000 million yuan. This means that the private investor could hardly gain any profits but only to pay for the stadium's depreciation cost for the government.

What's worse, the prospect for the operation of the Bird Nest Stadium is not as optimistic as it was expected. The Bird Nest Stadium takes a construction area of 258,000 square meters, with a business area of 7,740 square meters which takes the 35% of the total area. There are hotels, restaurants, supermarkets, clubs and boutiques running in the business area of the Bird Nest Stadium, which makes profits for the private investors. According to the interview to Zhang hengli, the vice president of National Stadium

Company in February 2009, the main sources of the Bird Nest Stadium, in the future, will still make profits from the advertising, venue rentals, naming rights sold to the activities such as art performances and sports competitions. In fact, even the Super Football Games, China's currently largest sports game, can only sale 50,000 tickets per match. The club investors were discouraged by the high additional costs of the alterations and operations for the Bird Nest Stadium. After one year of independent operation, the business transformation of the stadium still needed improvements, and the bid for the exclusive naming rights was not succeeded. Consequently, the tourism business which was originally considered as a sideline business has become the biggest source of income of the Bird Nest.

Taken all the present situations and predictions into consideration, the private consortium's original estimation of collecting the initial investment for the project of 450 billion yuan within the 30 years of concession period seems to be impossible. There is a danger of putting on the same tragic scene of the "Montreal Trap" again.

To avoid the big loss, on August 20th, 2009, an agreement was signed by Beijing Municipal Government and the Private Consortium to share this risk. The agreement consisted two parts: 1. the operation of the Bird Nest Stadium was changed into the share-holding system, in which BMG held 58% equity while the remaining 42% was held by the Private Consortium; 2. the former management system of the private sector's independent operation of the stadium was adjusted. A National Stadium Company owned by the government took over the responsibilities of the running, operating and maintaining of the Bird Nest Stadium, with the support and supervision of the local government. It was later exposed by the medium that in the shareholding system reform, Beijing Municipal Government had actually changed its held shares into equity. The government will lead the operation of the stadium and bear all the losses and profits of the project. This means, same as the results of the questionnaire in which this risk gained a score of 1.71, the government finally would mostly undertake the possible loss caused by this risk.

4.1.2 TOP HIGH RISKS IN THE PROJECT

According to risk factor's mean values for ranking, there are seven risk factor obtaining a score higher than 4. They are F27 Design Risk, F26 Construction Delay, F25 Construction Cost Overrun, F15 Market Demand Change, F38 Inadequacy of Knowledge, F37 Organization and Coordination Risk and F12 Foreign Exchange and Convertibility. These risks are considered high risks in the Bird Nest Project and thus worthy to be discussed and analyzed so that more attention can be paid to them in the risk management of other PPP projects. We will then start from the highest one F27 Design Risk.

- F27 Design Risk

As is shown in the results of the two-round Delphi Survey, the risk factor with the highest mean value in the ranking is F27 "Design Risk." By collecting information from newspapers and internet and interviewing the professor who had participated in the research against the Bird Nest Project, this risk is elaborated as below.

First of all, there exist a contradiction regarding the design problem between the government and the Private Consortium. Since the stadium is built for the big sport event in China's capital city Beijing, Beijing Municipal Government played a key role in deciding the blue print of the architecture. BMG required the Private Consortium to follow their opinions without the occupation of the copyright for the Bird Nest Stadium's design. This not only caused a problem for the Private Consortium in its negotiation with the design consultants companies, but also prevented the Private Consortium from maximizing the commercial using of the stadium which might lead to a loss of profits.

Another big problem substantially enhanced this risk is the cancellation of the retractable roof of the stadium. This decision was finally made by the government in August 2004, several months after the project actually started. And the construction was continued in the end of the year with the revised design plan without the retractable roof.

This change in the design brought out both positive and negative impacts on the project of its own. The most important thing is this caused a lot of troubles to the private investors which made them undertook almost all the bad effects of this risk. The reasons of the cancellation of the retractable roof and the loss caused to the private sector have been given in the interview with Professor Wu, one of the assistants of Professor Wang shouqin's study of the PPP projects in China. The conclusion is made as follows.

Firstly, why the government decided to cancel the retractable roof?

- To reduce the consuming of raw material;

According to a report made by the chief designer of the Bird Nest Stadium at the 93th China's Science and Technology Conference, it was estimated that the cancellation of the roof can save at least 3700 tons of steel material which was supposed to be used in the supporting structure and the retractable roof, since the re-designed stadium reduced the load of the steel structure and saved many other parts.

- To simplify the installation of the steel structure;

The structure of the unique wide span retractable roof is extremely complicated and difficult to be installed. The retractable roof, measured by 80m x 80m x 8m (length, width, height), has a steel space truss rigid unit composed of two parts which covers the entire open space of the stadium. The steel structure moves along the fixed rail on the permanent roof to get opened and closed. The fixed slide rail is underpinned by the rigid member at the front edge of the permanent roof with a distance of 85 meters. Due to this complex structure, the high cost and safety of the installation of the retractable roof still remained an unsolved problem, regardless the research of finding proper ways installing the roof. Thus, the canceling of the retractable will doubtlessly make the construction of the stadium a lot easier.

- To save money for the construction of the stadium

In the report of the chief designer, it was indicated that about 400 million yuan can be saved in the stadium's construction by canceling the retractable roof. As marked in the tendering document, the maximum cost for the construction of the Bird Nest Stadium is set to be 4,000 million yuan, whereas the winner of the design competition offered a plan with a cost of 3,890 million yuan. However, in the Feasibility Study Report submitted later by the National Stadium Company, the estimation of the total cost of installing was reduced to 2,670 million yuan. Thus, our National Development and Reform Commission approved a final amount of 3,130 million yuan in the investment for the Bird Nest program. With the help of optimization work by the Private Consortium's design consultants, the installation cost of the Bird Nest was cut down to 2,630 million yuan in the design phase. The ultimate evaluation of the total construction cost after the decision of the canceling the retractable roof had been made reached to an amount less than 2,267 billion yuan, which well satisfied the nation's and the government's original concept of " Host the Olympic Games Frugally".

- To reduce probability of malfunctions in using the stadium.

The Bird Nest Stadium is regarded as the most fashionable design of the fourth era architecture of the world. And no stadium of this kind has actually been completed so far. The retractable roof has a size almost as large as an international standardized football field, with a total weight of 1,700 tons. With such huge volume and heavy weight, the opening and closing movement of the retractable roof may encounter some malfunctioned problems and may threaten the stadium's and the audience's safety. Consequently, the cancelation of the retractable roof will successfully avoid such safety risks.

Secondly, what's the private sector's loss in canceling the retractable roof?

- Cause the claim from Design Consortium

The re-design of the stadium without the retractable roof led to a large amount of workloads in modifying and changing in the steel structure's design. As a result, the Design Consortium as part of the Private Consortium, which is consisted of the designers from Beijing Urban Architecture Company and consultants from Project Management Advisors, claimed a total of 40 million yuan for the renewing of the design, which was almost one third of the initial overall design cost 120 million yuan.

- Cause the cost overrun and time delay

Due to the numerous disputes against the cancellation of the retractable roof, the government had invited groups of experts to discuss and evaluate the feasibility of the cancellation. After several rounds of discussion and negotiation, the government finally achieved a consensus with the Private Consortium on the canceling proposal. Anyway, the redesign took time and the current construction of the stadium had to be terminated for a while. After all, it caused a time delay of half a year for the construction schedule for the project. However, as there exisanted a limit date for the construction of the stadium because of its special use for the Olympic event, the main structure of the stadium has to be finished by the end of 2006. Many advanced techniques were adopted to accelerate the construction process, which obviously demanded an extra amount of cost overrun paid mainly by the main contractor in the Private Consortium BUCGC. Thus BUCGC claimed that these additional technical costs should be shared by all members in the Private Consortium. But the Private Consortium refused to pay for that as they insisted that the Beijing Municipal Government was mostly responsible for the change in design and should accordingly bear all the overrun costs. As the disputes under this problem are still under negotiation now, the private partner BUCGC has unfortunately undertook the cost overrun loss.

- Influence on the stadium's operation after Olympics

Although the cancellation of the retractable roof can reduce part of the operation fee as it saved the cost in opening and closing process for the roof as well as the maintenance cost for the roof. However the Private Consortium claimed this would not count much as

every year there will be no more than 10 times of the total movement of the retractable roof. What's worse, without the retractable roof, the stadium was turned into a completely open air stadium. The weather condition may become a restriction to the various activities held in the stadium. For example, the unexpected rain may cancel or cause bad effects on the shows' quality. Hence the stadium may lose a lot of chances in the renting business which led to a reduction in the stadium's revenue. Besides, the retractable roof was supposed to be the unique characteristic of the Bird Nest Stadium which endowed the stadium an outstanding brand value. The cancellation of the retractable roof led to the sold of the name right of the Bird Nest Stadium still in vain. This aroused a lot of worries of the private investors in the consortium.

In conclusion, as it is analyzed above, in this project, the private sector undertook most of the bad consequences caused by the design risk, which makes it reasonable that, in the survey result, the respondents gave the design risk a quite low score and have it allocated solely to the private sector. Meanwhile, since the change of the design led to so many disputes and economical loss, especially big troubles to the private sector, it was agreed to be the highest risk in the Bird Nest Project, which can be a good warning to the similar projects in the design process in order to avoid such kind of loss.

- F26 Construction Delay

Due to the high complexity and technology standard for the construction of the Bird Nest Stadium, the construction planning took a very long period. In the time when Beijing Municipal Government signed the Concession Agreement with the Private Consortium on August 9, 2003, it was requested that the construction of the stadium should be finished by December 31, 2006, which allowed a three-year period for the construction process. Apparently, this construction schedule was not very feasible and reasonable, not taking into account any probable changes of the design. This gave the Private Consortium a great

pressure in the construction, especially with the change of the design plan by canceling the retractable roof. Thus the delay in the construction is unavoidable. The private sector had to mostly undertake this risk.

- F25 Construction Cost Overrun

The Bird Nest Stadium is the first stadium with a 3D steel frame in China, and the installation is very complex with a lot of parts being incised and weld for two or three times. The special inflated ETFE cushions' installation need quite innovative technical skills and abundant experience. Furthermore, the nest-like steel structure of the stadium brought out a lot of problems to be solved in its fabrication, installation and maintenance. All these increased complexity led to a huge cost overrun that completely destroyed the original balance sheet of the project's financial budget. As a matter of fact, the private sector had to pay most of the extra bill caused by this risk.

- F15 Market Demand Change

Since the Bird Nest Stadium is the most pre-eminent and the largest sport and performance facility with the most international-advanced high technical and environmental-friendly features among all the present sports venues in China, the Private Consortium gave a comparatively high expectation for the stadium's demand in the market. An estimation was made that there would be 16 large-scale activities held in the stadium, including non-commercial government-run big events, private enterprises large-scale performance, and all sorts of sports competitions. In addition, due to its high popularity brought by the 2008 Olympics, the stadium could also absorb a considerable sum of profits in the tourism industry. Unfortunately, the real situation is far less optimistic than it had been expected.

In the light of market survey during the first year of the stadium's operation after the Olympic Games, only 4 large-scale shows had taken place in the Bird Nest Stadium, including one drama performance and three concerts, with the rental fee of 4.5 million yuan per day which is much higher than the average rental fee required by other stadiums in

Beijing. Due to the high rental cost, some organizers of the sports and art events had to make another chose instead of the Bird Nest Stadium. As for the development of the tourism, in the first one year after the Olympic, the Bird Nest had attracted 3.08 million tourists from all over the world. The price of the entrance ticket was set at 50 yuan per person. The total income from the sold of the entrance tickets was up to 154 million yuan. Although this amount presently achieved the private investors' initial desire, the touristic income will gradually decrease with the fading of the Olympics' heat. No one can guarantee the profits in tourism would still even exist after a few years.

Although in the public sector had shown its support by setting special rules in the concession agreement to reduce the potential competitors in the market, the Private Consortium had already a large budget deficits due to the small market demand. In order to mitigate this risk, the Private Consortium had made some improvements in the previous mode of operation, aiming to change the stadium into a multi-functional industry product. The commercial performances will be divided into day-show and night-show. During daytime, the performance mainly includes small-scale shows and extreme sports show; whereas during the night, large-scale and high qualified performances will be provides. The revised operation plan can not only expand the range of various kinds of performance held in the stadium, but also attract those clients who do not have too much budgets in their shows. However, due to the existed budget deficits for the Private Consortium, this risk is still considered a high risk according to the average ranking score it gained in the survey results.

- F38 Inadequacy of Knowledge

Due to the unique characteristics of the Bird Nest National Stadium, the potential and future clients could be from all sorts of companies and different scales of enterprises both domestic and abroad. It is very important for the Private Consortium to build a friendly cooperative relationship with all relevant organizations, for example, regional and national sports federations, State Ministry of Culture, State Ministry of Communications, foreign affaire agencies, State Sports Administration etc.

Since it is the first time for the Private Consortium to run such a big sport facility, they lack the experience and know-how of operating the stadium, as well as skills in developing good relationship with all other domestic and foreign enterprises. However the Private Consortium signed a strategic operational agreement with Stade de France, a consultant company which can provide efficient operational technology and transfer know-how smoothly to the Private Consortium, this plan was eventually terminated due the large budget deficits for the Private Consortium. The Private Consortium had to finally face this risk on its own. Some countermeasures have been taken to alleviate the burden on the Private Consortium in the operational working. For instance, the Private Consortium had the parking lot outside of the Bird Nest Stadium sublet to an advertisement company. In this way, not only the advertisement company can earn profits from putting advertisements in the parking lot around the stadium, but this also help the Private Consortium run part of the stadium.

- F37 Organization and Coordination Risk

A few problems have emerged in the coordination due to some disputes between the public sector and the private sector. First, there are argues about how many parking spaces should be set in stadium's parking lot. The government required the Private Consortium to cut off 1000 parking spaces for the stadium in order to save mores spaces for the Olympic areas. This caused inconvenient of parking around the stadium and aroused the private investors' dissatisfaction. Moreover, the cancellation of the retractable roof and the government's restriction on the commercial use of the stadium also caused a lot of disputes. However, due to the government's political power and the stadium's main use of 2008 Olympics, the Private Consortium had to follow the government's instructions and satisfy the public demands regardless the probable loss of profits. However the government has set some special rules for the private sector's interest as compensation, this risk still remains high and is allocated most to the private sector.

- F12 Foreign Exchange and Convertibility

As the finance of the Bird Nest Project involved the loan from foreign banks and foreign investors, the floating of the foreign exchange rate is a high risk to both the public and the private sectors. In order to equally share this risk between two sectors, a threshold for the exchange rate was set to share the higher or lower revenues caused by this risk. The US dollars' portion of the operating tariff would be adjusted from time to time in accordance with the variations in the US$ to RMB$ exchange rate. The threshold was set at 6%, which means the Beijing Municipal Government would bore the consequences caused by this risk when the exchange rate was below 6%, while the Private Consortium took the risk when the rate is over 6%. In this way, this risk is fairly shared.

4.2 COMPARISONS FOR THE STUDY

4.2.1 Bird Nest Project VS PPP Projects in China

Compared to the research of risk allocation in China's PPP projects accomplished by Professor Wang and his assistants, no big difference appeared in the Bird Nest Stadium Project. The risk factor "Expropriation and Nationalization" is the only risk that to be solely allocated to the public sector in both of the two studies. All the risks that related to politics and government policies and rules are all agreed to be mostly allocated to the public sector. The risks concerned the project itself, especially those in the project's construction and operation processes, are mostly allocated to the private sector, while all other risks are considered to be equally shared between the public and the private sectors as both sectors are equally involved in the risk events and have same responsibilities to deal with the risks.

The unique thing that makes the Bird Nest Project different from the general situation of risk management of PPPs in China is that: in Professor Wang's research, no risk fell into the category that should be solely allocated to the private sector, while in the Bird Nest Project, the risk factor "Design Risk" was considered solely allocated to the private sector

according to the respondents of the two-round Delphi Survey. This risk has become a specific in this case for the reason that a big change of the design has to be executed due to the Olympics special social and public influence and importance. Although the Private Consortium was doomed to bear some loss because of this change in design, they could hardly do anything do be against this decision. Consequently, the private sector took most of the responsibility of the risk. However, this is not always the case in other PPP projects in China, but this survey result is meaningful and valuable to other PPP projects of which the outcome with same characteristics as this large national sports stadium. For example, for other countries who are about to hold the Olympic Games in the future, they should pay special attention to the design problems in order to avoid such loss, especially for the private sector.

Moreover, if we take a closer look at the risks to be mostly allocated to the private sector, we can easily find out that, in the Bird Nest Project, 15 risks out of 41 are considered to be mostly allocated to the private sector, which represents 36.59% of all risks items listed in Table 6, whereas in Professor Wang's research, only 27.03% of all the catalogued risk items are to be mostly allocated to the private sector. This is persuasive evidence that the Bird Nest Project has successfully made a better transfer of the risks from public sector to the private sector, which is the main objective of the PPP mode. This represents a significant improvement in China's practice in PPP projects and helps us to build confidence in the future development in PPPs in China. With more and more experience in PPPs as well as the research findings of PPP, China can do better and better in the management of PPP projects.

4.2.2 PPP IN CHINA VS PPP IN WESTERN COUNTRIES

In Li's research of the allocation of risk in PPP construction projects in the UK, which also classify the risk factors into macro, meso and micro levels, he found out that most of the macro and micro level risks are either to be retained within the public sector or

to be shared between both the public sector and the private sector; The majority of the risks concerned with the PPP project itself, especially those in the meso level, should be mostly allocated to the private sector (Ke, Wang, & Chan, 2010).

However, in our research, as it is shown in the table 8 , the result of risk allocation, we can easily conclude that the common point shared by both China and UK is that risks belonged to the meso level are mostly allocated to the public sector and risks of marco leve are considered to be mostly allocated to the public sector; the difference is that the risks in the micro level are more allocated to the private sector in the Bird Nest PPP project in China than that in UK's PPP projects. Interestingly, in the UK construction projects, 32 out of the total 46 risks, which represents 69.57% of all the catalogued risk items were allocated to the private sector (Ke, Wang, & Chan, 2010), while in the Bird Nest Project, 36.59 of all the listed risks are allocated to the private sector. This may suggest that PPP procurement for construction projects in China has not achieved the objective of risk transfer from the public sector to the private sector such as in UK (Ke, Wang, & Chan, 2010). Nevertheless, some risks' allocation should strongly depend on the specific characteristics of the project itself.

CONCLUSION

The purpose of this study was to gain a better understanding of the risk management of PPP projects in China. The PPP mode is widely adopted in the infrastructure projects in China in order to achieve multiple project objectives and to mitigate project risks. By using the PPP approach, not only the financial burden is shared with the injection of funds from the private investors, but they also bring in their skills in the management of projects and improve the effectiveness in risk management in running the projects.

By referring to the Bird Nest Stadium Project for 2008 Beijing Olympic Games, this paper examines the major risks in the implementation of this PPP project, as well as how the risks were shared between the public and the private sectors. The risks were identified and divided into 12 groups in accordance with their different nature. A two-round Delphi survey was conducted to find out how the risks were allocated and what the major risks were in this project. It is found that risks regarding the political, legal aspects are considered more allocated to the public sector, while those regarding the project itself, such as construction, operation risks were more allocated to the private sector as they can better manage them with their specialized experience and skills. Besides the design risk is proved to be the highest risk in this stadium construction project which warned us that special attention should be paid in the design process in the similar projects to avoid trouble and loss.

An interview with an expert on the PPP research in China was developed to give a better description of the status-quo of the application of PPP in China and the main problems in managing the PPP projects. It was indicated that although the risks were better transferred to the private sector in this Bird Nest project compared with the previous PPP

projects in China, risks were more allocated to the public sector than those in the PPP projects in western counties. The management skills of PPP in China should be improved and regulations for PPP should be standardized for the future development of PPP projects in China.

CONCLUSION GÉNÉRALE

Le but de cette étude était d'acquérir une meilleure compréhension de la gestion des risques des projets PPP en Chine. Le mode PPP est largement adopté dans les projets d'infrastructure en Chine afin d'atténuer les risques du projet. En effet, grâce à l'approche PPP, le fardeau financier se partage entre les partenaires. De la même façon, le capital de compétences (techniques ou de gestion) des firmes privées permettent également de s'assurer d'une saine gestion des projets.

En se référant au projet du stade olympique de Pékin, cette recherche nous a permis d'examiner les principaux risques dans la mise en œuvre du PPP. Elle nous a ainsi permis de comprendre comment les risques ont été partagés entre le secteur public et le secteur privé. Suite à une enquête de type Delphi, les risques ont été identifiés et répartis en fonction de leur nature en 12 groupes. Il a été constaté que les risques concernant les aspects politiques, juridiques ont été alloués au secteur public, tandis que ceux concernant le projet lui-même comme la construction ou les risques d'exploitation ont été fréquemment affectés au secteur privé. Nous avons aussi découvert que la conception du stade a été l'étape la plus risquée. De fait, les coûts additionnels engendrés par cette étape auraient pu être évités si une meilleure gestion des risques avait été faite. Toute chose égale par ailleurs, on peut en déduire qu'une attention toute particulière devrait être accordée dans le processus de conception de projets similaires, afin d'éviter les complications et les pertes qui en découlent.

Une entrevue avec un expert chinois en PPP a aussi été effectuée pour valider les principaux problèmes et risques identifiés lors de notre enquête Delphi. Ce dernier nous a confirmé que la liste des risques était valide. Il nous a également fait remarquer que dans ce projet Nid d'oiseau, par rapport aux projets de PPP antérieurs en Chine, les risques ont été mieux transférés vers le secteur privé. Il nous a également rappelé que les risques affectés

au secteur public ont été plus nombreux que ceux que l'on retrouve généralement dans les projets PPP en Occident.

Finalement, suite à cette étude, et afin d'optimiser le développement futur de projets PPP en Chine, il serait souhaitable que les compétences en gestion de projet devraient être améliorées et que la réglementation touchant les PPP devrait être plus normalisée.

ANNEXES

Annex 1: Questionnaire

Dear Sir/Madame,

Hello!

I am honored that I could have this chance to communicate with you on my research and hope that we could receive your precious support. This research aims to find out, rank, and allocate all the risk factors encountered in the Bird Nest Project for 2008 Beijing Olympic Games. All the results will be contributed to the future similar PPP projects and will be used in my graduate thesis for the master degree in Gestion de Projet of the Université du Québec à Rimouski.

A. Respondents' Information

1. Types of organization
    - State-owned enterprises
    - Private companies
    - Government
2. Average turnover (per year) of the company they working for(RMB dollars)
    - Less than 50 million
    - 50 million - 1 billion
    - More than 1 billion
3. Years of working experiences in management of project

- Less than 5 years
- 5-10 years
- More than 10 years

4. Numbers of participated PPP projects
   - Less than 4
   - 4-8 projects
   - More than 8 projects

B. Risk Factor Survey

Through literature reading and information collection on the Bird Nest Project, a total of 41 risk factors are listed in the table as per attached. Based on your management experience in the Bird Nest Project, please score each risk factor in the following two columns according to the criteria as below:

❖ Column 1 Allocation:

- "1" – Government takes sole responsibility;
- "2" – Government takes the majority responsibility;
- "3" – Both public and private sectors share equal responsibility;
- "4" – Private sector takes the majority responsibility;
- "5" – Private sector takes sole responsibility.

❖ Column 2 Ranking:

- "1" – super low
- "2" – low

- "3" – medium
- "4" – high
- "5" – very high

The definition of each risk factor is also attached with the questionnaire in order to ensure that all respondents have the same understanding of each risk and score them in the background at an even level.

Group ID	Risk Factor Category Group	FID	Risk Factor (RF)	Mean Value1 (Allocation)	Mean Value2 (Ranking)
G1	Political	1	Government's Intervention		
		2	Expropriation and Nationalization		
		3	Government's Reliability		
		4	Corruption		
		5	Political Opposition		

		6	Poor Political Decision Making		
G 2	Legal	7	Immature Juristic System		
		8	Change in Law		
		9	Change in Tax Regulation		
		10	Tariff Change		
G 3	Macro economical	11	Interest Rate		
		12	Foreign Exchange and Convertibility		
		13	Inflation		
G 4	Social	14	Public Opposition		
		15	Market Demand Change		
G 5	Natura l	16	Geotechnical Conditions and Weather		
			Force Majeure		

		17			
		18	Environmental Protection		
G 6	Preparation and Star-up	19	Land Acquisition		
		20	Competition for Exclusive Right		
		21	Uncompetitive Tender		
		22	Subjective Evaluation		
G 7	Construction	23	Construction Changes		
		24	Contracts with Excessive Variation		
		25	Construction Cost Overrun		
		26	Construction Delay		
		27	Design Risk		
G	Operat		Supporting Utilities Risk		

8	ion	28			
		29	Technology Risk		
		30	Operation Changes		
		31	Operation Cost Overrun		
G 9	Super vision	32	Consortium Inability		
		33	Maintenance Risk		
G 10	Projec t Finance	34	Financial Risk		
		35	Payment Risk		
		36	Insufficient Financial Audit		
G 11	Public Sector – Private Sector Relationship	37	Organization and Coordination Risk		
		38	Inadequacy of Knowledge		
		39	Private Investor Change		

G 12	Third Party	40	Third Party Reliability		
		41	Staff Crises		

D	Risk Factor	Definition
1	Government's Intervention	Public sector interferes unreasonably in privatized facilities/services.
2	Expropriation and Nationalization	Due to political, social or economic pressures, local government takes over the facility run by private firm without giving reasonable compensation.
3	Government's Reliability	The reliability and creditworthiness of the government to be able and willing to honor their obligations in future.
4	Corruption	Corrupt local government official demand bribes or unjust rewards.
5	Political Opposition	Delay or refusal of project approval and permit by local government.
6	Poor Political Decision Making	Government officials considers more their career achievement or short-term goals or personal interests, or with little PPP experience etc., resulting in a poor political decision-making process.

7	Immature Juristic System	The lack of national PPP law leads to different ways of PPP implementation in different places in China.
8	Change in Law	Local government's inconsistent application of new regulations and laws.
9	Change in Tax Regulation	Central or local government's inconsistent application of tax regulation.
10	Tariff Change	Improper tariff design or inflexible adjustment framework leading to the insufficient income.
11	Interest Rate	Unanticipated local interest rate due to immature local economic and banking systems.
12	Foreign Exchange and Convertibility	Fluctuation in currency exchange rate and/ or difficulty of convertibility.
13	Inflation	Unanticipated local inflation rate due to immature local economic and banking systems.
14	Public Opposition	Prejudice from public due to different local living standards, values, culture, social system, etc.
15	Market Demand Change	Demand change from factors as social, economic, environment, etc.
16	Geotechnical Conditions and Weather	Poor or unexpected ground/weather conditions.
17	Force Majeure	The circumstances that are out of the control of both foreign and local partners, such as flood, fires, storms, epidemic diseases, war hostilities and

		embargo.
18	Environmental Protection	Stringent regulation which will have an impact on construction firms' poor attention to environmental issues.
19	Land Acquisition	The project land is unavailable, or unable to be occupied at the required time.
20	Competition for exclusive-right	The government does not offer the exclusive right, or does not honor to its commitment and build another competitive project.
21	Uncompetitive Tender	The tendering process and documents vary from project to project and from province to province in China without transparent or standardized models.
22	Subjective Evaluation	Subjective evaluation and design of the concession period, tariff structure, market demand, etc.
23	Construction Changes	Unanticipated changes and errors in the construction resulting from the improper design.
24	Contracts with Excessive Variation	Improper arrangements in the contracts including inappropriate risk allocation among stakeholders, commitment from public/private partners.
25	Construction Cost Overrun	Construction cost more than predicted or poor construction quality.

26	Construction Delay	Longer construction time than predicted or Subcontractors and suppliers not being able to supply labor or material on time.
27	Design Risk	Delay in project approvals and permits due to design deficiency.
28	Supporting Utilities Risk	Supporting utilities, such as electricity, water, necessary for the construction, operation and management would not be available in a timely manner or at fair rates.
29	Technology Risk	The technology adopted not being mature or able to meet the requirements.
30	Operation Changes	Unanticipated changes and errors in the operation resulting from poor investigation.
31	Operation Cost Overrun	Operation cost overrun resulting from improper measurement, ill planned schedule or low operation efficiency.
32	Consortium Inability	The consortium not being able to perform its obligations as a PPP project company.
33	Maintenance Risk	Maintenance costs higher than expected or more frequent than expected.
34	Financial Risk	Poor financial market or unavailability or financial instrument resulting difficulty of financing.

35	Payment Risk	The consumer/government not being able or willing to pay, due to social or other reasons.
36	Insufficient Financial Audit	The government or lenders would not perform a careful audit to the financial status of the project company.
37	Organization and Coordination Risk	An increase of transaction cost or a dispute may occur because of the improper organization and coordination between private and public sectors.
38	Inadequacy of Knowledge	Inadequate experience in PPP/ Inadequate distribution of responsibilities and authority in partnership.
39	Private Investor Change	The government or lenders would not perform a careful audit to the financial status of the project company.
40	Third Party Reliability	The reliability and creditworthiness of a third party to be able and willing to honor their obligations in future.
41	Staff Crises	Conflicts or discordance among staff in or between departments.

C. Any new risk added in the Bird Nest Projects, as well as any other advices for the risk management in this project?

End

Annex 2: Results of the questionnaire

Group ID	Risk Factor Category Group	FID	Risk Factor (RF)	Mean Value1 (Allocation)	Allocation	Mean Value2 (Ranking)
G1	Political	1	Government's Intervention	1.56	MPB	1.89
		2	Expropriation and Nationalization	1.14	SPB	0.73
		3	Government's Reliability	1.61	MPB	2.24
		4	Corruption	2.38	MPB	3.23
		5	Political Opposition Poor Political Decision Making	2.49	MPB	0.88
		6		1.73	MPB	1.85
G2	Legal	7	Immature Juristic System	1.71	MPB	2.87
		8	Change in Law Change in Tax	1.83	MPB	2.24

		9 10	Regulation Tariff Change	2.23 2.34	MPB MPB	2.52 3.02
G3	Macro economical	11 12 13	Interest Rate Foreign Exchange and Convertibility Inflation	2.98 3.13 2.76	ESH ESH ESH	3.82 4.51 3.63
G4	Social	14 15	Public Opposition Market Demand Change	2.64 2.53	ESH ESH	3.20 4.68
G5	Natural	16 17 18	Geotechnical Conditions and Weather Force Majeure Environmental Protection	3.01 3.03 3.22	ESH ESH ESH	2.01 3.07 3.10
G6	Preparation and Star-up	19	Land Acquisition Competition for Exclusive Right	1.57 2.	MPB M	0.98 3

		20 21 22	Uncompetitive Tender Subjective Evaluation	01 1.53 1.89	PB M PB E SH	.22 2 .98 3 .34
G7	Construction	23 24 25 26 27	Construction Changes Contracts with Excessive Variation Construction Cost Overrun Construction Delay Design Risk	4.23 3.77 4.12 4.17 4.87	M PR M PR M PR M PR S PR	3.99 3 .08 4 .77 4 .79 4 .93
G8	Operation	28 29 30 31	Supporting Utilities Risk Technology Risk Operation Changes Operation Cost Overrun	3.97 4.12 4.33 4.28	M PR M PR M PR M PR	2 .21 3 .77 3 .38 3 .65

G 9	Super vision	32 33	Consortium Inability Maintenance Risk	4. 35 3. 82	M PR M PR	3 .87 3 .76
G 10	Projec t Finance	34 35 36	Financial Risk Payment Risk Insufficient Financial Audit	2. 76 3. 21 3. 00	E SH E SH E SH	3 .79 3 .46 2 .66
G 11	Public Sector – Private Sector Relationship	37 38 39	Organization and Coordination Risk Inadequacy of Knowledge Private Investor Change	3. 63 4. 18 4. 44	M PR M PR M PR	4 .49 4 .52
G 12	Third Party	40 41	Third Party Reliability Staff Crises	4. 06 4. 23	M PR M PR	2 .34 1 .68
Newly Added Risks		42	Competitions with existing stadiums Dispute among the	3. 98 4.	M PR S	4 .03 4

	43 44	private partners themselves Change or Termination of Concession	83 1. 72	PR M PB	.21 4 .18

Note: SPB=solely to public; MPB=mostly to public; ESH= equally shared; MPR= mostly to private; SPR= solely to private.

Annex 3: Transcript of the interview with Professor Wu (assistant of Professor Wang shouqin), participated in Wang's research in PPP projects in China, as well as in the writing and translating of the book named "Case Studies of PPP projects in Asia and Europe", which published in China in 2010. (Interview produced on Monday July 11, 2011)

- *Question 1*: Hello, Professor Wu, it is well known that your group of research led by Professor Wang shouqin has contributed a lot in the study of PPP projects, both in China and foreign countries. Can you please introduce us your main research achievements in the field of Public-Private Partnership?

Professor Wang has been devoting himself into the PPP projects research since he was a Post-Doctoral Fello in Singapore Nanyang Technological University. He was not only involved in the research entitled "Risk Management of PPP projects in Developing Countries", but also contributed in several PFI/PPP papers' publishing on the world's top construction journals. He is now working as the vice dean of the Department of Construction Management and Institute of International Engineering Project Management in Tsinghua University, continuing his research in the field such as, Principal Investor in "Developing an Equitable Risk Sharing Mechanism for Public-Private Partnership (PPP) Projects in the People's Republic of China (RPC)" jointed funded by the National Natural Science Foundation of China and the Research Grant Committee of Hong Kong, Principal Investor of "Improved Financial/Economic Evaluation Method Incorporating Risk Analysis for PPP/BOT Projects" funded by the National Natural Science Foundation of China, Project Coordinator (China) of the Europe Union funded Asia-Link Project "EU-Asia Network of Competence Enhancement on Public-Private Partnership (PPPs) in Infrastructure Development" in which five universities (Germany-Weimar, UK-UMIST, China-Tsinghua, India-IIT, Thailand-AIT) are involved and led by Germany-Weimar's Prof. Dr. Hans Wilhelm Alfen, and also collaborator of "Risk Management for Construction of Beijing 2008 Olympic Sport Venues" funded by BOCOG (Beijing Organization Committee for Olympic Games) etc. Besides he had tens and hundreds of

papers and reports published in various international journals. And actually I used to be a doctoral student of his and now I am working for him as one of his assistant professor and I have participated in his working of "Risk Management for Construction of Beijing 2008 Olympic Sport Venues" funded by BOCOG (Beijing Organization Committee for Olympic Games).

- *Question 2*: Well, actually I am writing a thesis on the subject of risk management of PPP project in China as my graduate paper for the master degree in University of Quebec, and I am focusing on a case study of the risk management of the project "Bird Nest Stadium for 2008 Beijing Olympic Games". Since you have assisted Professor Wang in the research of "Risk Management for Construction of Beijing 2008 Olympic Sport Venues" funded by BOCOG (Beijing Organization Committee for Olympic Games), I'm sure you must be well informed about the details of the Bird Nest Project. As Professor Wang is a very busy person, I am very appreciate that he gave me your contact and thank you very much for saving some time for my interview. So can you please help me solve a few questions that I encountered in my case study of the Bird Nest Project?

Yes, of course, I'll be very glad to help you. As for the Bird Nest Project, we have already collected some of data from the managers who participated in the management of this project, both from the public and private sectors. Based on the data, we have been analyzing the main problems in the management of the project and trying to sort out some solutions so that we can improve our management of such kind of PPP projects in China in the future. And I was informed by Professor Wang about your questionnaire distributed to some of the managers in this project concerning the risk management, how was that going? We can perhaps exchange our research result than.

- *Question 3*: Thank you very much of being so kind. My questionnaire survey is about the risk factors' identification and allocation of the Bird Nest Project. Before that, I may need some more detailed information about the project itself in order to prepare for the questions in my questionnaire. I've been trying to collecting as much as I can on the Internet and newspapers, but still seems not enough so far. Firstly, can you please talk about the sources of finance for the Bird Nest Project and how it was financed between the two sectors, the public and the private?

A functional authority Beijing Development Planning Commission (BSAMC) authorized by Beijing Municipal Government (BMG), on behalf of the public sector, signed the Agreement with the Private Consortium, which is formed by three companies CITIC, BUCGC, and GSHGC after the Consortium won the tender of the Bird Nest Project; and then they set up a Project Company jointly with Beijing State Owned Assets Management Corporation who acted as the representative of the BMG. After a few rounds of negotiations, the Private Consortium agreed to invest more and hold about 8% more proportion in the Project Company. The final proportions of the shareholder are: BSAMC, the public sector undertook 58% of the proportions of the project, while the rest 42% was shared by three private companies in the Private Consortium. The total fund of the Bird Nest Project is coming from: the government contribution of 1815.40 million yuan (58%), equity capital from the Private Consortium of 394.38 million yuan (12.6%), and loan from bank of 920.22 million yuan (29.4%). The Project Company was confident in raising the required 920.22 million yuan from the domestic commercial banks because the domestic commercial banks with good capacity in both domestic and foreign currencies had shown strong interest in the Bird Nest Project.

- *Question 4*: With such a large amount of bank loans, even more than the funds from the Private Consortium? Did the Project Company finally get the loan from the domestic commercial banks? Were there any difficulties in requiring the loan from the domestic commercial banks?

Actually, as I mentioned in the previous question, the Private Consortium was only willingly to share a small part of funds needed in the total investment since this is a large-scale project and the risk in finance is comparatively high. The private Consortium had worries about whether they can get their investment back and even make some profits through this project during the 30 years' concession period. Meanwhile, due to the same reason of a shortage of funds, the government was badly in need of the private partner's financial support. In the bidding process, the government had had a hard time in choosing a proper private partner which could provide the best financial support. The most two competitive bidders are the CITIC Consortium and the BCEG Consortium. Originally, the government was about to choose the BCEG as they offered a higher sharing of proportions than the CITIC. But due to some disputes and argues among the shareholders in the BCEG Consortium itself, the government had to negotiate with the CITIC Consortium to see if they could share a bit more. Finally, the CITIC agreed to undertake a 1.24% of the proportions and the rest funds should come from loan from banks; and the Private Consortium was required to be the main borrower of the loan. The bank loan is senior debt with tenor of 16 years with, 6 years of grace period, 5.184% as the interest rate, and drawdown period of 4 years. The principal of the repayment should be repaid in equal installments on quarterly basis from 2010, while interests should be paid on quarterly basis from first drawdown. Before the tendering process, the Project Company had got the letter of commitment from three domestic commercial banks, including the Industrial and Commercial Bank of China, China Construction Bank and CITIC Industrial Bank of China. The problem that occurred in the loaning process was that, when the three domestic commercial banks noticed the cancellation of the retractable roof event and the Project Company might be cost overrun, they were hesitating over the Project Company's payback ability. This was the reason why the government and the banks required the CITIC consortium, composed of three large companies (CITIC, BUCGC and GSHGC) as shareholders, to replace the Project Company as the borrower of the loan.

- *Question 5*: How the government showed their special support for this project to attract the private investors and finally persuaded the Private Consortium to take more responsibly in the project?

To ensure the success of the big event 2008 Beijing Olympics with a worldwide influence, our central government, as well as the Beijing Municipal Government (BMG) had shown their great supports and incentives by enacting a set of preferential policies in taxation and special regulations in the form of contracts and agreements. Firstly, as there is no BOT/PPP law in China, a series of government policies are enacted by Chinese central government and the BMG so as to meet its obligations for or provide incentives to the National Stadium. For example, the Ministry of Finance, the State Administration of Taxation and the General Administration of Customs jointly issued on Jan 23, 2003 the "Notices on Taxation relevant to the 29th Olympic Games" in which a lot of tax incentives are provided including that all imported equipment for the Stadium are free of custom and value added tax, and most of sales relevant to the Stadium are waived, etc. Besides, the BMG also enacts some other policies and requires coordination of its departments for the project. For example, the "Tendering Regulations for Concession of Urban Infrastructure Projects in Beijing" and the "Concession Regulations for Urban Infrastructure Projects in Beijing" implemented by BMG on Sept 1, 2006 and March 1, 2006 (trail version on Oct 1, 2003) respectively; the "Some Suggestions (36 clauses) on Developing Private Economy" issued by the State Council on Feb 24, 2005 encouraging private investment in infrastructure using project finance. Secondly, some special regulations and rules were set in the agreements with the Private Consortium to facilitate the implementation of the Stadium in PPP mode, which were:

1) BMG provides land at very low cost (1040 yuan per square meter for gross land development). This is really a quite low price compared to the 10,000 yuan per square meter for other land nearby.

2) BMG contributes 1.8154 billion RMB, 58% of total investment (3.13 billion yuan) but will not get any dividend.

3) BMG provides necessary infrastructure (water, electric and road etc) connection to the site and all other help and convenience for the construction and operation of the Stadium. For example, for easy shipping on road large steel structure components for the Stadium, the BMG has issued a special passport to the Project Company.

4) During the Test Competitions/Events and the Olympic Games, Beijing Organizing Committee for the Games of XXIX Olympiad (BOCOG) will pay fees to the Project Company. BMG will also undertake all expense of special equipment used for the opening and closing ceremonies as the equipment cannot be used for daily operation after the Game.

5) During the concession period, BMG will not permit to develop new competitive stadium or to expand any existing competitive stadium in northern area of Beijing.

- *Question 6*: How the Project Company functioned in the management of the Bird Nest Project and where its revenues mainly came from?

The Project Company undertook the responsibility of the Bird Nest National Stadium's finance, design work, as well as the construction, operation and maintenance of the project during the concession period. During the Olympics' period, the only source of the Project Company's income was the stadium's renting fees coming from the Beijing Organizing Committee for the Games of XXIX Olympiad (BOCOG) for the use of holding all test competitions, test events and the Olympic Games. In the design plan of the stadium, 80,000 square meters of building area was designed for the commercial use with 1,000 parking places, 110 corporate boxes, 2 Chinese restaurants and 2 Western restaurants, a membership hotel with 70 rooms, and another 40,000 square meters for the construction of a large super-market. During the concession period, counted from December 31, 2006 to December 31, 2038 (the Olympic period August 8, 2008 to August 24, 2008 excluded), the

Project Company can make profits from various business activities, including advertisement, sponsorship, franchise, renting spaces such as parking lots, restaurants, hotels in and around the stadium, entrance tickets sale, sport competitions, art performance and concerts, the selling of the naming right, as well as revenues from various media such as television, radio and Internet.

- *Question 7*: Were there any disputed and disagreements among the private partners in the Private Consortium? How they shared their profits and risks encountered in the project and how they achieved a balance among themselves, as well as with the government as the public sector?

Yes, the disputes were unavoidable in such a large-scale project, not only among the private partners themselves, but also between the private and the public sectors. Firstly, the total profit of the project's construction is divided into three parts which made the share of the profit dispersed the Project Consortium's control over the project's construction and caused divergences on decision-making. Secondly, the BUCGC, as the general contractor for the project, who undertakes the most responsibility of design work and the construction, had put its emphasis more on its own profits, time and safety more than that for the overall project. This led to the cost overrun and time delay for the stadium's construction. Thirdly, the Private Consortium had also a few disagreements with the government as well. The government concerned more for the successfully holding of the Olympic Games and a good public influence whereas the Private Consortium put more emphasis on their own commercial interests. Take the canceling of the retractable roof for example, the BMG agreed with the cancellation because it was not only economical but also built a good public reputation with a symbol of "Host the Olympic Games Frugally". But obviously, the Private Consortium was not happy with this decision since this not only led to a construction cost overrun and time delay, but also reduced the Bird Nest Stadium's brand value since the unique and symbolic retractable roof was cut off which would definitely made the stadium far less attractive to various business activities and investments. All these

problems and disputes caused the risks occur in the project which made the proper risk management very much critical for the well-operating of the project. However, both the government and the Private Consortium had tried hard to balance the sharing of the risk and put the project's own efficiency their top priority. In order to solve the disputed and disagreements, negotiations and re-negotiations made among the private partners and with the government were a good method. With all these coordination and cooperation between the public and the private sectors, solutions were finally found and the stadium was finished in time for the Olympics.

- *Question 8*: Speaking of the risks, what do you think are the main risk factors in China's PPP projects? And how should the risks be assessed and are there any measures to mitigate the risks encountered in the PPP projects?

As far as I am concerned, above all is the legislation risk. The investors should firstly well learn the regulations, policies, and related rule of the country or the region where the projects take place; than the reliability of the local government is another risk to be considered. Normally the government with higher level and more powers is more reliable. Before starting the project, the investors should make sure that the project comply with all related regulations and policies in the country; besides there may be risks regarding the market demand, interest rate, exchange rate, projects' finance risk, inflation risk, majeure force etc.

In order to mitigate the risks such as inflation, floating of prices, some protection measures could be set in the contracts and agreements. For example, the price adjustment could be adopted to avoid the inflation risk; the total price could be fixed in the contract so that the risk of changes of the raw material price could be transferred to the design and construction companies. Besides, some compensation rules could be set in the contracts in order to balance the risk allocation between all parties. For example, a threshold of the total profit could be fixed with a buffering account for the project, if the actual profits from the

project is higher than the threshold, the extra profits could be added to the buffering account; on the contrary, when the profits cannot meet the threshold, the funds in the buffering account could be used to make a compensation.

- *Question 9*: For the developing countries as China, should the government take more responsibilities of the risks in the PPP projects?

Well this largely depends on the project itself and the characteristics of the project. In developing countries, take China for example, some risks, such as Expropriation and Nationalization, are the risks that the Private Consortium could hardly do anything to control them. The government should take all responsibilities of this kind of risks. For other risks like market risk, design risk, construction and operation risk, the Private Consortium are more capable of controlling them so that those risk should be more allocated to the private sector. There are also some risks should be shared between the public and the private sectors, such as force majeure, natural risks etc. The sharing of risks should be arranged through a negotiation between the partners instead of simply leave all responsibilities to the government. In fact, in China's existed PPP projects, the risks such as the local government's reliability, quotation risk aroused due to the unfair regulations in the initial contract. Thus, the signing of a fair and reasonable PPP contract and strictly follow the rule set in the contract is very important. Plus a reasonable method of risk allocation and some adjusting and compensating measures should also be included in the contract.

- *Question 10*: And in order to get involved in PPP projects in China, do you think there existed some unfair competitions between the state-owned enterprises and the private enterprises?

To be honest, the market-oriented state-owned enterprises are still the main force in the field of the infrastructure construction projects, in which the PPP mode is often

adopted. According to the recent PPP projects, most of the bidders who won the tendering for a PPP project are state-owned enterprises, especially for the project with a long life cycle and that requires more funds invested. However the only criterion for the government to choose the private partner is "efficiency", there indeed existed some unfairness in the tendering process due to an asymmetric financing environment and market conditions which are typical of China. We could only depend on the government to voluntarily take some measures against such kind of unfairness. For example, improve and perfect the relevant laws and regulations make the tendering process open, fair and equitable, accelerating the restructuring of state-owned enterprises etc. Actually, our government has already made some amendments in the related laws and regulation. In 2005, a new rule has been added in China's economic laws, which marked: "private capital is legally allowed to enter the monopoly industries in China, such as electricity, telecommunications, railways, civil aviation, petroleum as well as other fields."

- *Question 11*: And what do you think are the advantages for the state-owned enterprises for the China's PPP projects which make them more competitive than private enterprises? There is some saying assumed that for the state-owned enterprises in the PPP project, they are just using the state's money to finance the project, and even they got budget deficits, they are only transferring their loss in the loan from banks. What's your opinion over this? Do you agree with that?

Well, first of all, the state-owned enterprises are much more capable in financing and have much more experience in the management of infrastructure projects. With the invisible support of government behind their backs, the state-owned enterprises are more powerful in negotiating and setting rules in the contract. In another word, they have more control over some certain risks; whereas the private enterprises are comparatively weak in financing and have fewer sources for financing; meanwhile they lack the experience in managing large-scale infrastructure projects and they have less power in the decision making.

For the state-owned enterprises' financing problem, I don't completely agree with the saying. Firstly, not all funds are coming from the state-owned banks. There are other sources for the PPP project's financing, such as capital markets, foreign aid loans, public funding agencies, international financial institutions etc.; secondly, for most of the PPP projects, whether the borrower is state-owned enterprise or not, once the project turned out to be a failure, the lender can only require the repayment with a limited range. Therefore, the lender focused more on the project itself, including the project's feasibility and profitability, rather than the whether the borrower is state-owned enterprise or private enterprise. Besides, the lender will also adopt the insurance method or third-party guarantee to transfer part of the financial risk.

- *Question 12*: The private enterprises normally participate in the tendering for a PPP project in the form of a private consortium which is consisted of several private enterprises. How should they choose proper partners in order to win the bidding?

According to the recent PPP projects in Beijing, the winners in the bidding have one thing in common, which is the consortiums are all made of three companies. This is actually resulted from the project's own feature. Take a PPP power project for example; the best combination of the consortium is made of: 1. a state-owned enterprise which takes control over the local power grid; 2. foreign partners which can provide funds and experience in operating and managing the power project; 3. private enterprise who can offer skills in design and equipment's supply chain. In a word, the principle for choosing the bidding partners is to choose the ones with complementary advantages. Besides, in order to avoid disputes after the bidding, some principles should be settled among the private partners before the tendering process.

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