

Project Governance Framework for Mega Construction Projects (MCPs) in China: Lessons from SHITH and SHCBD projects

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Abstract

We analyse governance in two mega construction projects (MCPs): Shanghai Hongqiao Integrated Transportation Hub (SHITH) project and Shanghai Hongqiao central Business district (SHCBD). We suggest that the governance of mega construction projects in China needs the participation of construction headquarter and three coordination platforms, namely, design coordination platform, schedule platform and construction platform are necessary. This paper first analyses the current status and necessity of project governance in MCPs and review of project governance. Finally, we propose a theoretical project governance framework of MCPs in China. By understanding the importance of governance framework, it is hoped this will bring a signal for other MCPs in China to implement the similar method to ensure the efficiency and effective of construction.

Keywords: Mega construction projects; Project governance; Framework; SHITH project; SHCBD project.

1. Introduction

The rapid pace of modernization and the strong growth of the nation's economy have created a massive market for the construction industry in China over the last decades. With the introduction of a number of fiscal policies aimed at increasing investment in fixed assets and to accelerate the infrastructure development, an increasing number of high profile mega construction projects (MCPs), such as the Beijing National Stadium ('the Bird Nest') and the Beijing Olympics Project, and the Three Gorges Dam, have been undertaken or completed in the past ten years. These MCPs are characterized by large investment, great complexity, more stakeholders and extensive influence. Despite these achievements, the construction

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industry has been criticized for producing poor quality construction works, delay and cost overrun with low efficiency and effectiveness. Problems including evasion of the application of the procurement system, false contract transferal and illegal sub-letting are very common in the construction procurement in China, despite a series of government reform on the construction industry. While it is estimated that China's construction industry will account for nearly one-fifth of the global construction output within the decade, these problems would threaten the sustainable development of the nation's construction industry. With this in mind, it is important to probe a reasonable and effective tool to improve the project management and governance of the MCPs in China.

We start our analysis with a review of literature that has elaborated the concepts of mega construction projects, project governance and program governance, and more specifically, we review project governance framework literature. In the case study of this paper, we discuss the project governance work of the SHITH project and the SHCBD project and discuss the performance of their governance approach. Finally, we propose a theoretical project governance framework for MCPs in China.

2. Literature Review

2.1 Mega construction projects: the current status in China

MCPs are defined as a very large investment construction project, or aggregate of projects, characterized by magnified cost, extreme complexity, increased risk, lofty ideals, and high visibility, in a combination that represents a significant challenge to the stakeholders, a significant impact to the community and pushes the limit of construction experience. Flyvbjerg, et al.(1995) argued that the classification of mega-project should focus on the size of the task involved in developing, planning and managing projects of the large magnitude, which is more than US \$22 million in term of investment. In the US, mega-project is defined as a major infrastructure projects that with a total contract sum more than USD \$500 million or a project of a significant cost that attract a high level of public attention or political interest because of substantial direct and indirect impacts on the community, environment and budgets. Inkeri Ruuskaa(2011) defines a large project as a significant undertaking characterized by multiple organizations seeking success with different objectives, changing priorities of project objectives, and finally, the project being subject to the impacts of a wider socio-political environment. In China, MCPs are usually public works which are mainly invested by the government. The MCPs are usually multifunctional, colossal in size and scope, with a long life time, high invested and considerably uncertain.

With the size and complexity of MCPs gradually increases, the management of mega-projects is becoming more challenging, and it has been reported that many mega-projects in China were resulted in cost overrun, with regional development effects and environmental impacts often turning out very differently from the original planning (Aalonen, K. ,2008). While the Chinese construction industry has undergone a significant development over the last two decades owing to its strong economic growth and unprecedented urbanization plan, there exist many problems in the management and governance of the MCPs. Problems like cost overrun, late delivery, delay of payment, low efficiency, overstaffed organizations and/or

corruption have been repeatedly reported and stated. Government intervention, government corruption and poor public decision-making processes were identified as three most important risk factors for PPP projects in China. Administrative intervention from government along with serious local protectionism, an immature legal system, and corruption practices limit the transparency of the construction market in China. For example, the allocation of design and construction task of many construction works does not totally depend on a fair tendering approach, but influenced by local government. In addition, many construction practitioners in China believe that it is important to develop and maintain good relationship with the relevant authorities for winning construction works/tasks and smoothing approval process than improving their competitiveness with advanced management techniques. For these reasons, it has been argued that sweeping reforms of governance practice in construction or infrastructure projects is urgently needed.

2.2 Program governance and project governance

A large amount of literature is discussing about the term of governance and corporate governance. The former is often related to mechanisms or processes that affect to how either a single transaction or recurrent transacting is organized ex ante and carried out ex post between two or more actors, either within the boundaries of a single organization or between two or more organizations. Literature on institutional economics literature focuses, in particular, on governance structures required for carrying out economic exchanges, such as purchases of raw materials or purchases of complex projects. Furthermore, literature on corporate governance emphasizes various agency problems resulting from the separation of ownership from control that characterizes modern corporations.

Project governance is defined as the process of project decision-making within a framework, to ensure coherence between the realizing of organizational objectives and the processes and resources used in a project, thus enhancing a smooth running organization and profitability. Bekker and Steynde (2009) pointed out that project governance contains a set of management system, regulation, relationship, structure, framework which to provide decision supporting in order to realize the expected goal. Good project governance can cultivate a good operational environment and provide a strong institutional guarantee for project success. While the program governance is the process of developing, communicating, implementing, monitoring, and assuring the policies, procedures, organizational structures and practices associated with a given program (PMI, 2008). Both project and program governance stress on organizational structure, institution arrangement and management approach. But program governance ensures decision-making and delivery management activities are focused on achieving program goals in a consistent manner, addressing appropriate risks and fulfilling stakeholder requirements, and pay more attention to organization structure and institutional mechanism. Governance for programs is different from governance for projects, because the goal, scope and impact of a program is typically complex, such as multi-year timelines, competition between projects for scarce resources, diverse stakeholder requirements, inter-project and enterprise-level risks and issues. According to PMI, program governance provides an appropriate organizational structure and the policies and procedures necessary to support program delivery through formal program reviews'. Program governance is an effective management idea for program management

especially in organization management which should be applied throughout the program management life cycle. So program governance is not a new management idea that stems from program management they have the same goal but different approach. Program governance must provide additional benefits which cannot be gained through single project governance, While project governance mostly thrives on certainty.

2.3 A review of the project governance framework in construction field

To understand how a 'good' project governance could be achieved, it is important to understand the main components of the construction project management success. Collins and Baccarini (1996) proposed a logical framework method (LFM) to provide a detailed framework for defining and understanding the project success. The framework argued that both project management success and product success are main components of measuring project success. To achieve a project management success, it is important to ensure the project to meet the time, cost and quality objectives, to obtain the quality of the project management success, and to satisfy project stakeholders' needs with respect to the project management process. Based on the project transaction governance, Winch (2001) developed a conceptual framework for understanding the governance of transactions through the construction project lifecycle that combines the diverse perspectives of construction law, economics and management. In general, the conceptual framework specifies the projects could be governed in the vertical and horizontal dimensions. Vertical transaction governance relates to the supply of design services, which is initially for conceptual design and later for more specific design services related to aspects of facility functionality. Horizontal transaction governance relates to the employment relationship, and always involves market transactions for the supply of specialist skills and services. Miller and Hobbs (2005) have presented a framework for understanding governance in large complex projects and emphasized the dynamic, even unexpected nature of governance in large complex projects. According to Turner(1999),a functional hierarchical line management is a communication mechanism, but lack of innovation, inflexibility of management approach and focus of customers. He also proposed a versatile project-based organization should adopt network governance structure. Based on literature review of projects governance, the complexity of construction management needs the compelling of government, but also the program governance network sets the strategic direction, monitors levels of performance, especially profitability.

3. Methodology

In the process of building the project governance framework, this paper follows the following research steps. Firstly, the authors have a rich experience of construction for MCPs in China, and have contributed many MCPs in China, such as Guangzhou's Baiyun International Airport, SHITH, Shanghai Pudong Airport expansion projects, SHCBD, etc. The authors find that there exist many problems of project governance of MCPs in China after years of engineering practice. Meanwhile, in recent 10 years, the Chinese scholars further proved the lack and short points of project governance. Secondly, based on the existing project governance guidelines and standards, combining the characteristics of MCPs and unique feature of the project governance organization in China, the framework is built.

4. Two Cases

4.1 Shanghai Hongqiao Integrated Transportation Hub Case

4.1.1 Background information

The SHITH project, a major urban infrastructure, is the key projects of the “Eleventh Five-Year” outline in Shanghai, covering an area of 26.26 square kilometre. The whole project involves Hongqiao airport expansion project, high speed and inter-city railway system project (Hongqiao railway station), west traffic centre project, east traffic centre project, municipal comprehensive affiliation project, etc. It is the portal of Shanghai to Yangtze River Delta, with more than 700 billion RMB investment. The SHITH project is an open and complex system, the large scale, big investment and so on which made it more uncertain than the single project. But the schedule of this complex infrastructure project is less than three years, which calls on the high standard of management performance and project governance.

4.1.2 The main program actors

(1)The SHITH construction headquarter (CH) is established by Shanghai government in May, 2006, whose responsibility is general construction management task, i.e. the schedule coordination of different project investors.(2)Shanghai Rainbow Investment Corporation (SRTC) is a government investment development company, which is also established by Shanghai government in July, 2006. SRTC is also as the office of SHITH construction headquarter to coordinate various investment companies and undertake detail construction affairs. SHITH is a mega construction which consists of a number of investment subjects, so Shanghai Airport Authority (SAA) and City Investment Company are two other investment companies. (3)The hub is commissioned to two project management companies: Shanghai Airport Construction Headquarters (SA) and Shanghai Construction Management Company (SCM). The SA Construction Headquarters is mainly responsible for the management of the Traffic Centre part of the project, while the SCM Company take charge of the management of the comprehensive affiliation part of the project. (4)General design management mode is employed to the design management of SHITH. Shanghai Municipal Engineering Design Institute (SME) undertakes the design management of the entire region, while the Hua Dong Design and Research Institute (HD) are responsible for the Traffic Centre. In order to meet with the SME, the SHITH construction headquarters specially set up the general engineer's office to undertake planning and design affairs.(5)There is no unified construction management subject for the construction management of the hub due to its complexity. For the Traffic Centre construction, general construction management mode is applied, and the Shanghai Construction Group Company (SGC) takes charge of the construction management of this part of the project.

4.1.3 Goals of the program and the objectives of project actors

The SHITH project is supposed to be finished before May, 2011 and provide service in the Shanghai world exposition. So the safety and schedule are at the top of all official priority lists.

4.1.4 Collaboration practices among actors

Complex multi-firm network embodies various roles and responsibilities. By Shanghai government delegates authority to the CH, CH is responsible for the general project governance task. It undertakes the missions, including formulating governance plan, preparing audit plan for the related municipal government department, establishing benefit realization plan for the investment company, making 'go' or 'no-go' decision for single project, providing authorization to main project management companies (i.e. SA Construction Headquarters and SCM Company). The investment companies are required to provide CH with the change request notification, milestone reports, project completion reports, including benefits realization reports. When the CH receives the reports and feedbacks from SRTC and other investment companies, the governance plan, audit plan, benefit realization plan will be updated and revised accordingly. The whole process is continuous from preparation stage to the final completion of the program and throughout the program life cycle. While SRTC is the office of CH, on one hand, the decision of CH can be carried out fast, but on the other hand, CH can't represent public welfare very well because of the benefit of SRTC in the traffic centre construction. Meantime, the authors' party' plays the role of schedule consultant and balance the schedule conflicts in order to guarantee SHITH finished in time. SME as the main design contractor is responsible for the CH to coordinate the conflicts among different design company in order to keep the goal alignment. Furthermore, the general construction contract confers SCG to control subcontractors and monitor that safety issues are properly dealt with.

4.2 Shanghai Hongqiao Central Business District (core the first phase) case

4.2.1 Background information

The SHCBD project is the key projects of the "Twelfth Five-Year" outline in Shanghai, covering an area of 86 square kilometres. The main functional area is 26 square kilometre. Besides, the first phase of development area is 1.4 square kilometre. And the first phase is in the development and construction process, and this paper will take the first phase as the example case. The whole project involves not only municipal infrastructure projects but also enterprise investment projects which makes it more complex. There exist conflicts between governmental will and enterprise behaviour which needs more coordination and balances.

4.2.2 The main program actors

(1)Shanghai Hongqiao Business District Management Committee (SHBDMC) is an agency of Shanghai government, undertaking the responsibility of the development of SHCBD. (2)Shanghai Rainbow Investment Corporation (SRTC) is still the main government investor, performing the governmental investment function. (3)Besides government investment company, there are many big real estate enterprise, such as, China Vanke limited corporation (Vanke), Longfor Properties (Longfor), Shui On land development corporation (Shui On), etc. (4)Meantime, there are many design companies and sub-contractor company in this project, but no main design management company and main construction contractor.

4.2.3 Goal of programs and objectives of the project actors

SHCBD is a new platform for international trade, the central business district of Yangtze River Delta and west centre of Shanghai, So the quality and schedule are the most important point. But, different investors have different purposes, for example real estate developers have business objectives, while the government has its public welfare.

4.2.4 Collaboration practices among actors

On July, 2010, Shanghai government delegate construction management committee (MC) established to coordinate and balance important construction problem in the CBD. Even if SHBDMC is also the agency of Shanghai government and SRTC is the governmental investment company. SHBDMC prioritizes quality and safety over the interests of STRC and other enterprise investors. Comparing with SHITH project, although they are both public sectors, there exists conflicts between them, i.e. MC pays more attention to serve the real estate developer while SRTC focus on infrastructure construction.

4.3 Progress of these two mega construction projects

The progress and outcomes in both projects are compared by the following issues: survey of budget, delays on schedule, quality control issues on concreting problems and quality control issues on other problems, collaboration among actors, and conflicts among actors. However, it should be noted that SHITH and SHCBD are proceeding in different phases. Although these two projects have some relativity, they have their own characteristics. The SHITH project appears to not only managerial challenge, but also technical, i.e. how to deal with the overlap joint of two different transportation infrastructures. Respectively speaking, the SHCBD does not face technical challenge, but how to deal the significant conflicts of interest between the public and private sector stakeholders are their crux.

4.3.1 Survey of budget

In SHITH project, the whole investment is 70 billion. And we can't get much information of investment from outside media source. But we learn about STRC and SAA have investment surplus. And the investment of projects managed by SCM is basic balanced. So the most surplus is from SA construction headquarters.

In SHCBD project, the first phase also has investment surplus without detail data.

4.3.2 Delays on schedule

In SHITH, two major components for ensuring project success are (i) quality achievement according to the original requirement, and (ii) on-time project completion. In the SHITH Project, the Hongqiao T2 airport terminal project was completed in 12 days prior to the project completion date despite the tight construction schedule. The schedule accomplished rate of the Project reaches as high as 92%, which brings high economic benefits and social benefits. Also there is no major mistake taken place during the test operation.

In SHCBD, Until now no one land can be completed until 2014 in current status. As for infrastructure construction, the energy trench project and road engineering project are all scheduled to finish in 2012, and it will delay to 2013. because the advance speed is slow and the coordination capacity of MC is not enough, Shanghai government establish Shanghai Hongqiao Business District Construction Headquarter which has more authority just like SHITH construction headquarter and MC is as its office to deal with detail affairs.

4.3.3 Quality control issues, concreting problems

Because quality and safety issues are both key concern of CH, the quality control is successful in SHITH. While In SHCBD, the participation of land developer makes the quality control task is heavier than SHITH. And until now, there is no severe quality issue appeared.

5. Discussion

5.1 The role of construction headquarter Mega Construction Projects (MCPs) in China

Since 1958, construction headquarter mode appeared in China. As a temporary agency of local government, it's mainly responsible for the management and coordination of the public project, especially public infrastructure. MCPs can be viewed as a dynamic network of organizations that combines the resources, capabilities and knowledge of the participating actors to fulfilling the needs of the owner. As these objectives and expectations may conflict, large projects face several challenges not evident in the contexts of projects carried out by individual firms (Morris and Hough, 1987) (Flyvbjerg et al., 1995). In the SHITH, it contains 12 investment companies not to mention hundreds of design companies, supply units and so on. Both in the SHITH and the SHCBD, the projects interacts with the stakeholders which indirectly influence projects, such as relocation household who need to be paid for moving house. So it is necessary to have a party to coordinate and balance benefits between all stakeholders in the relative fair position. In China, there is no party can replace the function of construction headquarter. Usually, when the government becomes the major investment subject of the MCP, a 'CH' is developed to take charge of the whole development process for the public-funded project. The CH is a temporary organization which is accredited and guided by the related government departments, and will act as the project owner on behalf of the government. The main investment company usually commissions professional project management company to implement construction management and it mainly assumes the responsibility of supervising. The project management companies are in charge of the total management of the MCPs and to some extent play the role of owner project management. Fig 1 shows the project governance organization of MCPs in China.

In this mode, there exist many government agencies. So it's important to understand the project context of public sector. According to Pillai (1995), transparency and accountability are important in the public sector because the sector has a profound and pervasive effect on the lives of citizens and on the activities of the private sector. Transparency and debate to improve the analysis need to be implemented. Unaccountable decision making could

increase the danger of corruption. This includes the diversion of public resources, risk of costly project and project rejection.

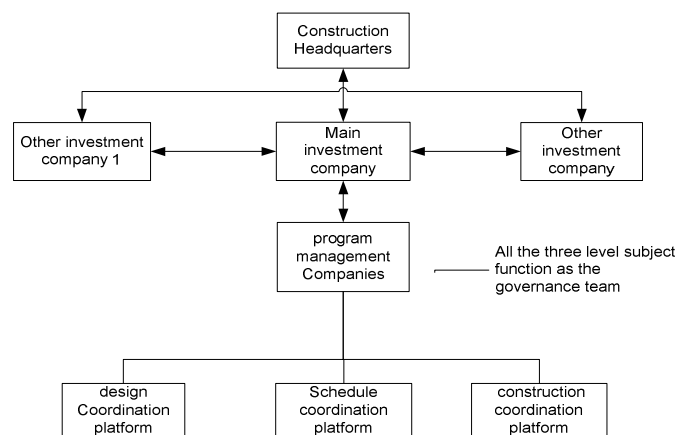


Fig. 1 The project governance organization for MCPs in China

Another potential impacts of public sector context is that no matter how strong professional advice may be for, or against, a project, and whatever the result of extensive use of rational methods, the final decision is a political one, such as SHITH and SHCBD. They have their political goals. It's important to recognize the importance of adapting project management method in the MCPs. The role of CH should be shift from a compelling coordinator to a decision maker with professional project advisor, ensuring effective service delivery. Meantime, by having effective and good project governance framework could assist transparency and accountability, trust and cooperation between top management.

5.2 The necessity of three coordination platforms

The governance in SHITH and SHCBD differed in the application of professional project management institute and three coordination platform, namely, design coordination platform, schedule platform, and construction platform.

Ineffective communication has been linked to poor performance (Inkeri Ruuskaa, 2011). In SHCBD, infrastructure projects and development land project have complex overlap relationships, i.e. the energy trench project needs to be finished before the first single building of development land of Shui On. And other nine developer's project schemes influence the stability of energy trench project. In order to avoid repeated construction and resource waste, the energy trench and underground pedestrian passage are supposed to be building at the same time. But these two projects are in the different phase. Because the lack of general design company, no one propose the rational and reasonable plan and arrangement of all single projects within the SHCBD. The project is unordered and inefficient and engineers are trapped in dealing with coordination affairs but not previewing problems.

The need to achieve goal alignment between the owner and the contractor, and to reduce the chance and benefit for opportunism by the client or contractor has been considered as the most significant issue when choosing a governance structure. Although CH can deal with

severe conflicts among different stakeholders, but there are also many detail construction conflicts which need to be coordinated. Therefore, the general design contractor and the general construction contractor will be selected through public bidding and tendering. The general design contractor will be responsible for the design management and also undertake the detailed project construction task. The general construction party is mainly responsible for managing and supervising the sub-contractors, monitoring the construction schedule and safety. The schedule coordination party is very often undertaken by professional advisor. A party “objectively” representing the interests of the mega construction project who could integrate and optimize schemes of all parties from initiation to handover is necessary.

5.3 The alignment between governance work and management work

Turner(1999) define the role of governance in a project is to set strategic direction, set and monitor levels of performance, especially profitability, provide finance, and control financial returns, provide technical expertise through centre of excellence, provide an audit function, and control risk exposure. However, governance work can deal with problems such as institutional arrangement, strategic direction and long-term goal of mega construction project. It is still necessary to achieve project success through project management approaches. How can the application of these two different approaches (management and strategic/ governance) work together to influence the performance of a project. Based on the research and the results of the case study analysis, it was discovered that there is a need to combine these two different approaches since the combination has the ability to enhance project's performance. Clearly in SHITH and SHCBD projects, there are many project team behind three platforms which to achieve the short- term success of single project. Their goals' alignment with mega construction is guaranteed by program management company and three coordination platforms.

6. Conclusion: towards a new project governance framework for mega construction projects (MCPs) in China

There are less studies on universal theoretical project governance framework of MCPs. W inch(1999) proposed a 3C abstract project governance framework elaborating the relationship of controlling, conception and the construction. On this basis, the 4C framework and (1+3C) framework are built to demonstrate the function of client. According to Garland, the project governance framework must clearly show the decision making path which does not include the stakeholders directly in the decision making. Abu Hassim(2011) pointed that by implementing a project governance framework, problems in organizational can be hindered as the line of accountability is clearly defined. According to Yin(2009), program governance framework is composed by organization management level, institution management level and integrated management level. The literature review provides the theoretical basic of the project governance framework, elaborating the organization and institution management part in governance.

Based on literature review and the practices of MCPs in China, the program construction is influenced by not only internal factors, but also external factors. It is not an independent system. The external factors includes policy, economy, market and law environment which

all checks and balances the MCPs' project governance structure. The project and its performance are affected by complex external factors. Meanwhile, the MCPs inherent characteristics such as multifunction, colossal size, long-term, uncertainty and its organizational culture comprise the internal factors. The changes and influences from external and internal factors determine the framework is not invariable. It adjusts the inner organization and institution mode. But the main structure would not change much because the mode of MCPs in China would not change much in the MCPs duration mostly and only a stable governance structure can promise the steady management and advance. Fig 2 shows the pervasive governance structure for MCPs in China.

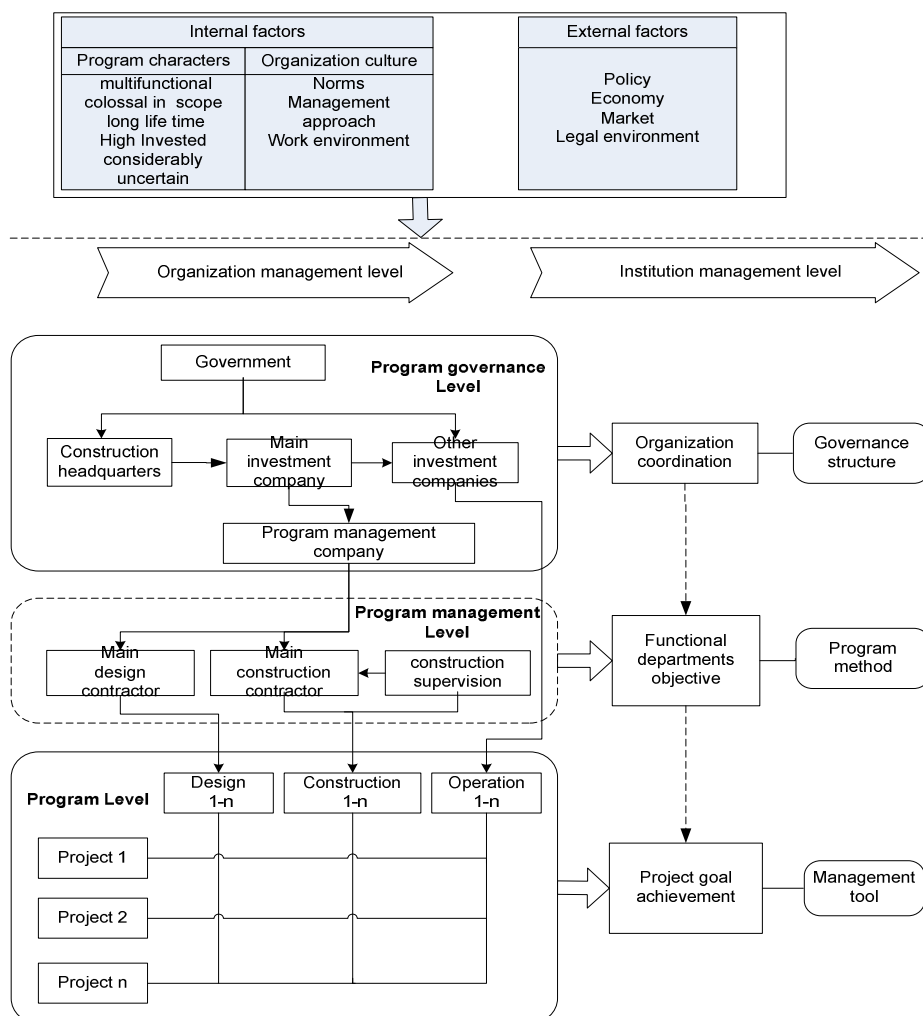


Fig. 2. Project governance framework for MCPs in China

As discussed above, the project governance team of the MCPs in China generally consists of three main subjects: (i) construction headquarter, (ii) investment companies, and (iii) program management company. The government first establishes a construction headquarter as a temporary organization of government which is responsible for MCPs' functional orientation and strategic scheme. And there is need to differ the function of CH from the main investment company. In this governance framework, on one hand, CH can gain more assistance from program management company, on the other hand, the supervision from the investment company should increase the responsibility and

accountability of public sector. And in this organization mode, it will realize the separation of the government function of investment, investment management and program management in order to avoid the occurrence of the government corruption.

CH and the main investment company are jointly take charge of the construction planning and management of the MCPs. The main investment company represents the government as an independent company for infrastructure investment. It assists construction headquarters to coordinate with other investment companies. The headquarter assists the main investment company to select professional program management agency to manage the MCPs through the public bidding and tendering, or by directly commissioning the main investment company as the program management subject. The program management subject will act as a link between the governance and program management. The program management company is responsible for the detailed management of the MCPs construction and in effect plays the role of owner's project management. The three level governance subjects select the general design contractor and the general construction contractor through public bidding and tendering. On the platform of design coordination platform, the design contractor is responsible for managing and conducting the design of the project. On the construction coordination platform, the general construction contractor is responsible for managing and supervising subcontractors, ensuring the safety of site, and monitoring the construction master schedule. And the schedule is often as the important focus of Chinese infrastructure construction. So a schedule platform is the progress consulting company will coordinate the progress issues among all construction and design firms and suppliers.

The project governance of MCPs in China includes the participation of government which makes its organizational structure different from other countries. On the way of the development and transition of construction industry, there are many program delivery failures caused by government corruption, government intervention and so on which can't be solved by traditional project management but project governance. By establishing a project governance framework involving the participation of government, investment companies, program management company, this could take the advantage of coercive power of government and monitoring power of investment companies. This is important as Chinese government needs to take the appropriate action to overcome numerous loopholes in the mega construction activities to ensure a more efficient and effective government investment.

7. Further Research

This paper focuses on project governance framework in the context of mega construction project with the participation of government which appears to be heading towards a new renaissance, in particular within the Chinese project area. This paper contributes to theoretical system in the governance of mega construction projects from organization management level and institutional environment level. We welcome further research that would further elaborate these novel findings of the governance in mega construction projects, with an emphasis on the complex supply network, various business approaches of the network actors, relationships, and the impacts of the complex institutional environments where the projects take place.

Further research on project governance in the context of mega construction projects is needed especially in four specific areas. First, this is a theoretical framework from a very small sample to draw conclusions, which limited the findings. Recent years, there have many mega construction projects in China. It's necessary to study their governance framework, governance organization and so on. Second, the literatures focus on qualitative research with less quantitative research. Further researches are also needed on the quantitative study of project performance implication of various governance frameworks.

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