THE HONG KONG POLYTECHNIC UNIVERSITY

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EFFECTIVE AND EFFICIENT BRIEFING IN PUBLIC PRIVATE PARTNERSHIP PROJECTS IN THE CONSTRUCTION INDUSTRY

TANG Liyaning

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

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CERTIFICATE OF ORIGINALITY

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it reproduces no material previously published or written, nor material that has been accepted for the award of any other degree or diploma, except where due acknowledgement has been made in the text.

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ABSTRACT

Public private partnership (PPP) is widely used in construction projects. Private companies involved in 'design, financing, construction, ownership and/or operation of a public sector utility or service' are called Public-Private Partnerships (PPP) in facilities development. However, the briefing process in PPP projects has been largely overlooked in terms of its importance, although decisions made at this process have a far-reaching influence throughout a project's life cycle. Briefing is the process by which a client informs others of his or her needs, aspirations and desires, either formally or informally, and a brief is a formal document which sets out a client's requirements in detail at the end of the briefing process.

This research reviews the literature regarding PPP used in the construction industry. Three gaps in the scope of the existing research on PPP in construction are identified. They are as follows: (1) A systematic research study of the briefing process of PPP projects and a comparative study of the briefing process between PPP projects and conventional projects has not yet been fully studied; (2) The factors affecting the success of briefing of PPP projects have not been addressed; and (3) An framework for guiding the briefing process of PPP projects needs to be developed.

According to addressing these gaps, the aim of this research therefore is: To develop a framework for improving the efficiency and effectiveness of the briefing process in PPP projects in the construction industry.

The following four objectives are designed to achieve the above aim: (1) To identify the critical success factors (CSFs) for the briefing process of PPP projects in the construction industry; (2) To assess the importance levels of the CSFs in the briefing process of PPP projects; (3) To conduct a comparative analysis on the CSFs in different locations; (4) To develop a framework for guiding the briefing process of PPP projects in construction.

These objectives have been achieved through a literature review, interviews, questionnaire surveys, and action research conducted in Hong Kong and Australia, all targeting construction projects. Findings from the research are categorised into four areas: (1) the identification of total 48 critical factors in 4 aspects (i.e. procurement-related factors, stakeholder-related factors, risk-related factors, and finance-related factors), which are important for the success of briefing process in PPP projects in construction projects. The identification process were based on literatures and the investigation of differences between PPP projects and conventional projects at the briefing processes and characteristics of PPP projects at briefing process; (2) the development of a systematic framework for guiding the briefing process of PPP projects, which consists 3 groups (i.e. the timeline of the briefing process and the process for writing a brief, and steps of briefing, and

deliverables in the briefing); (3) the validation of the systematic framework by conducting through examining two real cases (Hong Kong and Australia).

The research has contributed to new knowledge and improved understanding of the briefing process in PPP projects in construction in at two areas: (1) The collection of ranked and grouped CSFs and identification of characteristics of the briefing process of PPP projects can help both the public sector and the private sector become more aware of their responsibilities and the specific issues, which are important to the briefing process in a PPP project; (2) The systematic framework can be used as a reference for systematic consideration of doing briefing by PPP project management teams in construction and ensure that important procedures and issues will not be overlooked.

PUBLICATIONS

Refereed Journal Papers:

- Tang, L.Y.N., Shen, Q.P., and Cheng, E.W.L. (2010). A review of studies on Public-private partnership projects in the construction industry. *International Journal of Project Management*, 28(7), 683-694.

Refereed Journal Papers Under Review:

- Tang, L.Y.N., Shen, Q.P., and Cheng, E.W.L. (2011). Procurement-related critical factors for briefing in Public Private partnership projects. *International Journal of Project Management*, under review.

- Tang, L.Y.N., Shen, Q.P., and Cheng, E.W.L. (2011). Critical factors to briefing in the Queensland Public Private Partnership projects: a survey. *Journal of Management in Engineering*, under review.

Conference Papers:

- Tang, L.Y.N., Shen, Q.P., and Cheng, E.W.L. (2010) Procurement-Related Critical Factors for the Success of Briefing in Public Private Partnership, *International Conference on Construction and Real Estate Management 2010*, Australia, 56-59.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Research

The contractual relationships in which private companies involved in "design, financing, construction, ownership and/or operation of a public sector utility or service" are called Public-Private Partnerships (PPP) in facilities development (Akintoye et al., 2003a). There are many forms of PPP projects, such as the outright privatization of previously state-owned industries (Ng, 2000) and contracting out of services. The latter contains services such as refuse collection (Sindane, 2000) and cleaning by private firms and the use of private finance in the provision of social infrastructure (Tanninen-Ahonen, 2000; Li and Akintoye, 2003).

Traditionally, private sectors receive services and supports provided by the public sector. However, a trend of reversion seems to be developing in a number of countries, notably in the UK. With the development of market, the private sector is increasingly involved in providing goods and services to the public sector in each stage of construction such as designing, constructing, financing, operating and maintaining, while the public sector only pay for these services (Gerrard, 2001; Webb and Pulle, 2002).

There are various definitions about PPP projects. The idea of bringing in private firms to finance public sector infrastructure is the early format of PPP introduced by the World Bank (The World Bank and the International Finance Corporation, 1992).

In the UK, Public-Private Partnerships for Urban Environment (PPPUE) (UNDP, 2007) defines PPP broadly as including informal dialogue between government officials and local community-based organizations, and long-term concession arrangements with private businesses, but not privatization.

In the USA, the National Council for Public Private Partnership defines PPP as a "contractual arrangement between a public sector agency and a for-profit private sector, whereby resources and risks are shared for the purpose of delivery of a public service or development of public infrastructure" (Li and Akintoye, 2003).

In Canada, the Council for Public Private Partnerships (2004) defines a PPP as a "cooperative venture between the public and private sectors, built on the expertise of each partner, which best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards".

Whilst there is no unique definition for PPP, the essential element of the cooperation between private and public sectors over various project stages is echoed in different definitions.

It is considered particularly important to work out a cooperation mechanism in the project design stage by construction practitioners. It is widely appreciated that project design has most significant impacts on project performance from the perspective of project life cycle. The briefing process in PPP projects has been largely overlooked in terms of its importance, despite the fact that decisions made at this process have a far-reaching influence throughout a project's life cycle. Because of having multi-stakeholders in the briefing process of PPP projects, it is highly necessary to have an effective and efficient framework for guiding the briefing process and help both the public sector and the private sector.

1.2 Research Aim and Objectives

This research has conducted a comprehensive literature review on the subject of PPP and its application in referring to construction sector. Three typical gaps in the scope of the existing research are identified as follows:

Gap 1. A systematic research study of the briefing process of PPP projects and a comparative study of the briefing process between PPP projects and conventional projects has not yet been fully studied;

Gap 2. The factors affecting the success of briefing of PPP projects have not been addressed;

Gap 3. A framework for guiding the briefing process of PPP projects needs to be developed.

Based on the research background and the gaps identified, the aim of this research is: To develop a framework for improving the efficiency and effectiveness of the briefing process in PPP projects in the construction industry.

In management practice, effectiveness refers to getting the right thing done, while efficiency refers to the time or effort that is well used for the intended task or purpose (Drucker, 2006).

The following four objectives are designed to achieve the above aim:

Objective 1. To identify the critical success factors (CSFs) for the briefing process of PPP projects in the construction industry;

Objective 2. To assess the importance levels of the CSFs in the briefing process of PPP projects;

Objective 3. To conduct a comparative analysis on the CSFs in different locations;

Objective 4. To develop a framework for guiding the briefing process of PPP projects in construction.

The objective 1 focuses on find out the characteristics of the briefing process in PPP projects by comparing briefing process between PPP projects and conventional construction projects. After the characteristics are found out, CSFs for construction PPP projects' briefing process will be identified accordingly. The objective 1 is corresponding to Gap 1. The objectives 2 and 3 will solve Gap 2 by assessing the importance level of CSFs and conducting comparative analysis on CSFs in different

construction practices. Gap 3 will be solved in the objective 4 by developing a framework for guiding the briefing process of PPP projects.

1.3 Research Process

This research is designed to include a number of research phases and methods, as shown in Figure 1.1.

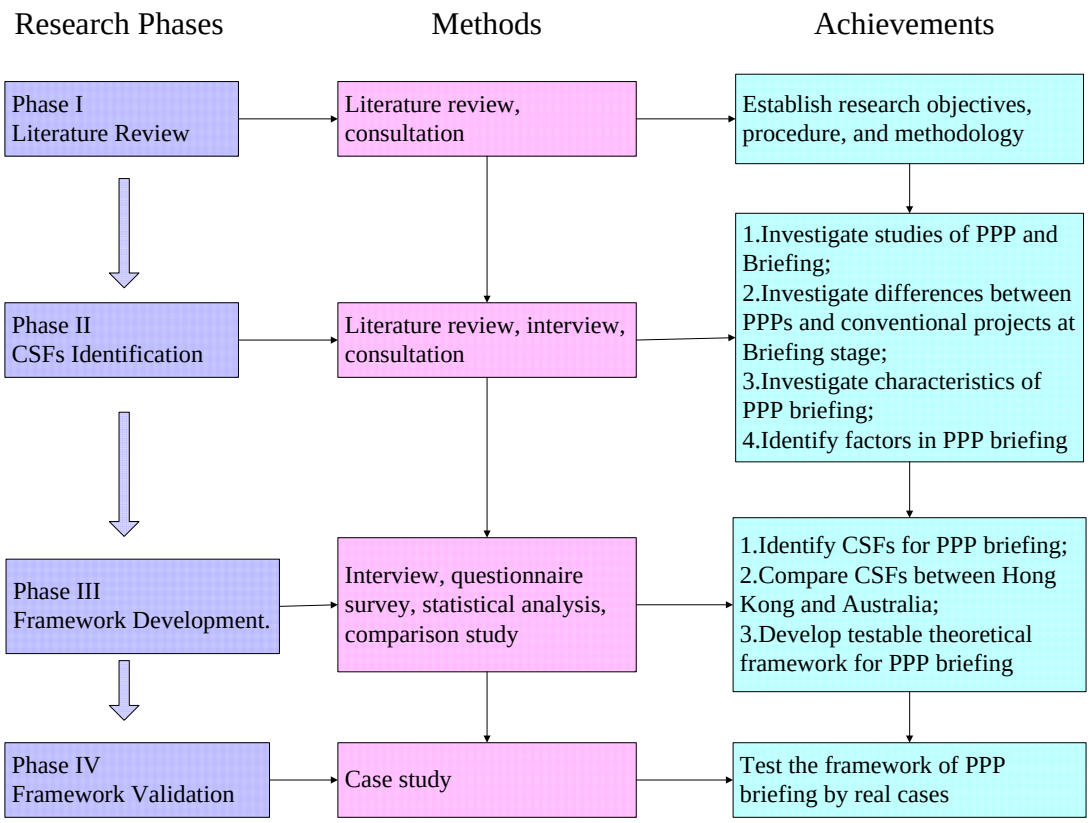

Figure 1.1 Research design

The research aims to achieve the four objectives outlined in Section 1.2 through four phases:

Phase 1: Literature review.

In the literature review phase, literature review and consultation methods are used. The objectives, procedure, and methodology of the research are formulated.

Phase 2: CSFs identification.

With more understanding of the theories and the literature about the topic of PPP in the construction sector, research is undertaken to examine the differences between conducting briefing for PPP projects and that for conventional projects. Reasons contributing to the differences are addressed in Chapter 2.

Phase 3: Framework development.

CSFs affecting the performance of project briefing for PPP projects are identified by using interviews and a questionnaire survey. The survey is conducted both in Hong Kong and Australia (Queensland) construction. It is important that different practices chosen for analysis are comparable. In this content, the construction practices in Hong Kong and Australia are both considered as advanced. The comparison will lead to effective results. Moreover, statistical analysis is conducted to test the rankings of these factors. By doing comparative study, rankings of CSFs in Hong Kong and Australia are compared. Australia was chosen as another location for interviews and questionnaire surveys in the research for two reasons. Firstly, few

construction projects in Hong Kong used the PPP method during the past 5-10 years. On the other hand, Australian federal and state governments encourage using PPP method in public projects (Duffield, 2006). So there are many PPP projects in Australia in these ten years. Secondly, from papers studied on Australian PPP projects, there are no significant differences in briefing practice between Hong Kong and Australia. It is important to note that the construction practices from the two locations were comparable, which avoid the impact of different levels of construction practices on the research results.

The identification of CSFs and the comparative analysis are needed for proposing a systematic framework for guiding briefing of PPP projects, and this framework is validated in the next phase of the research.

Phase 4: Framework validation.

In this research phase, the framework for PPP project briefing developed in Phase 3 is validated by using case studies. Data from two real projects (one in Hong Kong, and the other in Australia) are collected for undertaking the case studies (refer to Chapter 6).

1.4 Structure of the Dissertation

This dissertation consists of seven chapters. Chapter 1 provides an overview of the research. It addresses the background of the research, research aim and objectives, research process, and dissertation structure.

Chapter 2 presents a comprehensive literature reviews in the discipline of PPP and briefing in the construction field. This chapter starts reviewing the history of using the PPP approach, and then summarized the literature on PPP principles and application experience in different countries. A review of briefing is also done to highlight the research gaps from the perspective of implementing PPP projects.

Chapter 3 describes the research design developed to achieve the research objectives outlined in Chapter 1. The research procedures and methods are carefully defined in line with the research aim and objectives of this research. The method of this research is determined after a careful consideration of such research related aspects as purposes of the study, types of investigation, extent of researcher interference with the study, study setting, unit of analysis, time horizon, methodological strategy and research methods, measurement, data analysis, and ethical considerations. A detailed research process is then developed. A description of how the knowledge is gained from the use of the selected research methods is given.

Chapter 4 presents the identification of CSFs which affect the performance of project briefing for PPP type construction projects. In-depth analysis on practitioners' views on the relative importance between factors is conducted in Hong Kong and Australia, which are considered comparable. By using statistic analysis, four groups of CSFs are identified.

Chapter 5 presents the development and refinement process of a framework for guiding the implementation of project briefing for PPP projects. The findings from the empirical studies in Hong Kong and Australia are synthesized in the development of a systematic framework for guiding the briefing process for PPP projects in construction.

Chapter 6 is to validate the proposed systematic framework using two real projects in Hong Kong and Australia. The validated framework is recommended as guidance to help decision makers in conducting briefing for PPP type construction projects.

Chapter 7 summarizes the research findings in addressing the research aim and objectives, and highlights the contribution of this work concerning briefing for PPP projects. The chapter presents major conclusions drawn from the study. The chapter also outlines the limitations of this research and recommendations for further research.

1.5 Summary of the Chapter

This chapter provides an overall introduction to the dissertation. The main elements of the research are the identification of CSFs affecting the performance of project briefing for PPP projects and the establishment of a systematic framework to guide the briefing process. The study on these two elements can contribute to the management of PPP projects in the construction field. An effective and efficient

briefing process in PPP projects requires both the public sector and the private sector to follow a detailed framework with critical factors.

The research gaps outlined in this chapter are explored further in Chapter 2 through a comprehensive review of the literature, which lays the theoretical foundation for achieving the research objectives of this study.

CHAPTER 2
CRITICAL REVIEW OF PREVIOUS STUDIES

- *Introduction*

- *A Review of Public Private Partnership Projects*

  - Development of Public Private Partnership theory
  - Concepts of Public Private Partnership
  - Advantages and Disadvantages of Public Private Partnership
  - The selection of reviewed papers
  - Research topics in the reviewed papers

    Risks

    Financing

    Relationships

    Project success factors

    Concession periods

    Future studies of Public Private Partnership in construction

- Summary of the findings in the literature review

❖ *A Review of Briefing*

- Definitions of briefing
- Problems of briefing
- The briefing process in PPP projects

❖ *Summary of the Chapter*

CHAPTER 2

CRITICAL REVIEW OF PREVIOUS STUDIES

2.1 Introduction

This chapter presents a comprehensive literature review of PPP and briefing of PPP projects in the construction field. Principles and definitions of PPP and project briefing are examined from the existing literatures. The literature review leads to the identification of the gaps in the scope of the existing research on the subject of project briefing for PPP projects in construction.

2.2 A Review of Public Private Partnership Projects

2.2.1 Development of Public Private Partnership theory

The application of public private partnership (PPP) in the construction industry has caught researchers' attention. It is widely appreciated that the PPP principles can improve the effectiveness of operating particularly the public sector projects. Many researchers have attempted to improve the operation of PPP projects by identifying key aspects of these projects (e.g. Erridge and Greer, 2002; Grimsey and Lewis, 2002; Li et al., 2005b). Though it was not until the late 1990s that the PPP approach was widely implemented, private investment in public infrastructure can be traced back to the 18th century in European countries. One of the notable examples is the

concession contract that supplied drinking water to Paris. In the 19th century, more similar cases were added from not only the European community (e.g. the Suez Canal and Trans-Siberian Railway, as well as canals, turnpikes, and railroads in Europe) but also their American and Asian counterparts (e.g. United States, China, and Japan) (Kumaraswamy and Morris, 2002).

According to Winch (2000), the PPP approach has been widely utilized in England since 1997. Specifically, private companies have so far been involved in facility development, including designing, financing, construction, ownership, and/or operation of a public sector utility or service (Akintoye et al., 2003a). In developing countries such as China, there are more foreign firms or international financial institutions than domestic institutions that are involved in implementing PPP projects (Luo et al., 2001). For example, the Laibin B power station in Guangxi, which is a successful PPP projects in China, involves the participation of Electricite de France International and GEC Alstom.

The forms of PPP can be broadly classified into outright privatization of previously state-owned industries (Ng, 2000) and contracting out of services (Efficiency Unit, 2005a). The latter includes services performed by private firms, such as refuse collection and cleaning and the use of private finance in provision of social infrastructure (Li and Akintoye, 2003; Sindane, 2000; Tanninen-Ahonen, 2000). Experiences and advantages from operating PPP projects were examined in previous

studies. In addition to lessons learned from case studies (James et al., 2005), researchers have suggested the following advantages of implementing PPP projects:

- Enhanced partnership between the public sector and the private sector (e.g. Erridge and Greer, 2002;Ysa, 2007; Zhang and Kunaraswamy, 2001a; Zhang et al., 2002; Zhang, 2004a; Zhang, 2004b),
- Better risk management (e.g. Grimsey and Lewis, 2002; Li et al., 2005a; Shen et al., 2006),
- Effective government policies (e.g. Ball and Maginn, 2005; Hart, 2003),
- Clearer understanding on critical success factors (e.g. Li et al., 2005b),
- Improved maturation of contract (e.g. Ho, 2006; Tranfield et al., 2005), and
- More appropriate financial analysis (e.g. Akintoye et al., 2003b; Norwood and Mansfield, 1999; Huang and Chou, 2006; Saunders, 1998).

Studies of PPP in construction have been increasing, to date there appears little research given for summarizing what has already been presented in the literature. It is considered important to examine the existing literature, which can improve our understanding of the PPP‘s advantages and disadvantages. As Li et al. (2000) suggested, “rather than arguing for a particular viewpoint, it would be more beneficial to investigate systematically what we do know and how we can proceed to learn more”. Therefore, a systematic review of relevant PPP studies is given in this chapter, which aims to:

(1) Compare and contrast the findings of the existing studies via a structure set for this research.

(2) Provide insights into further PPP research, which will lead to improvement on existing PPP projects.

2.2.2 Concepts of Public Private Partnership

Sagalyn (2007) contended that Public-Private (PP) projects have spanned three generations. In the first generation, mistakes easily emerged due to lack of experience by public and private partners and their consultants. In the second generation, large development companies developed specialized PP urban development projects, often by employing planners who managed PP projects for public entities or led PP corporations. As a result of social development, the third generation of PP projects has emerged, which are initiated by developers seeking private-sector involvement. The number of PP projects is increasing in the third generation and it is anticipated that they will be used more widely in public service, city reconstruction, and so forth.

The idea of allowing private firms to finance projects of public sector infrastructure results in the emergence of PPP projects (Li and Akintoye, 2003; The World Bank, 1992). However, due to many forms of PPP projects and situations in different countries, there are various definitions of PPP. According to the United Nations Development Programme (2007), the definition of PPP should be broad so that even the informal dialogue between government officials and local community-based organizations, which is perceived to be essential to successful PPP projects, should

be included. In the US, the National Council for Public Private Partnership defines a PPP as a "contractual arrangement between a public sector agency and a for-profit private sector developer, whereby resources and risks are shared for the purpose of delivery of a public service or development of public infrastructure" (Li and Akintoye, 2003). In Canada, the Council for Public Private Partnerships (2007) defines PPP as a "cooperative venture between the public and private sectors, built on the expertise of each partner, which best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards".

In Hong Kong, the Efficiency Unit (EU) has another definition of PPP. The EU was set up as a unit of the Office of the Chief Secretary for Administration in 1992. The mission of the unit is to provide bureaus and departments with high quality management consultancy services and to advance the delivery of world-class public services to the people of Hong Kong (EU, 2005b). The EU (2005a) created a new focus on Private Sector Involvement (PSI) to "assist the government in meeting its priorities, building on the clear recognition that public funds are limited". As shown in Figure 2.1, PSI has two forms: Outsourcing and Public private partnerships. It introduced the practice of PPP to the maintenance of infrastructure facilities in Hong Kong, and defines PPP as "arrangements where the public and private sectors both bring their complementary skills to a project, with varying levels of involvement and responsibility, for the purpose of providing public services or projects". The unit describes six forms of PPP as shown below:

- *Creating wider markets:* The assets in terms of skills and finance from both the public and private sectors are better utilized.

- *Private Finance Initiatives (PFIs):* The public sector purchases quality services while the private sector maintains or constructs the necessary infrastructure. The private sector supplies designs, builds, finances, and covers the costs through charges on the users of the asset.
- *Joint ventures:* The public and private sectors pool their assets, finance and expertise under joint management. Under this type of PPP, the private sector participates more in management for project operation.
- *Partnerships companies:* Private sector ownership is introduced to state-owned businesses through legislation, regulation, partnership agreements, or retention of a special government share.
- *Partnership investments:* The public sector shares in the return generated by investments made by private sector parties.
- *Franchises:* The private sector pays a fee during the concession period awarded by the government for the revenue (or a share of the revenue) that the service generates.

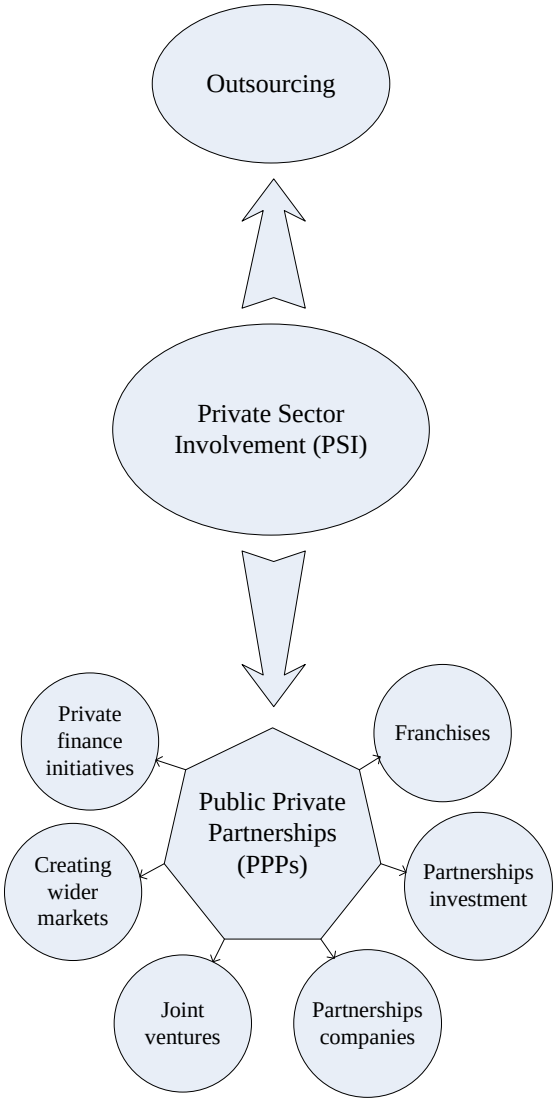

Figure 2.1 Types of private sector involvement (PSI)

Other than the above forms, Build-Operate-Transfer (BOT) is another form of PPP. In a BOT project, the private sector "builds" the project, "operates" it over a concession period, and, at the end of the concession period, "transfers" it to the client (usually, a public sector) without consideration.

2.2.3 Advantages and disadvantages of Public Private Partnership

One of the main advantages of the PPP approach is that it can save resources in many ways. As opined by Cumming (2007), the government can concentrate on its core competencies, and does not need to rely on its own resources for unfamiliar projects. Edkins and Smyth (2006) suggested that because of the participation of the private sector in operating public projects, government assets, data and intellectual property can also be utilized more productively, which leads to substantial improvement in the quality of public facilities and services. On the other hand, by proper use of the private sector‘s skills, experience, technology and innovation, public services can be delivered more satisfactorily. Another advantage is that the public and private sectors can share risks at different stages (Shen et al., 2006). In operating a PPP project, as the private sector brings commercial disciplines to public projects, the risk of cost overruns and project delays can be drastically reduced (Li and Akintoye, 2003; Ho, 2006). To finish the design, build, and operation stages in PPP, the private sector can help the public sector make a leaner civil service structure with a more efficient hierarchy of responsibility for services delivery (EU, 2005a).

Other than the advantages of saving resources and efficient use of resources, economic benefits can also be gained by using the PPP approach. For example, PPP leads to reduction of lifecycle costs (Li and Akintoye, 2003), since government capital investment is spread over the life cycle of a project, which guarantees the expected rate of return for governmental investment.

Although PPP is perceived as a way of creating public infrastructure at little or even no cost to the public purse, the "no free lunch" notion still prevails (Kumaraswamy and Zhang, 2001). Kumaraswamy and Zhang (2001) presented several cases of BOT ventures that had run into problems due to cost overruns, improper price and income projections, and legal disputes between private operators and the government. In most cases, the government and the general public, but not the private operators, have ultimately shouldered the cost of failure. Their research led us to focus on about the failure of PPP performance from the public sector perspective.

Practitioners indicate that political obstacles stand in the way of using PPP (Algarni et al., 2007), since PPP projects always need special legislation. In most circumstances, the municipal or state legislature has to discuss special terms at length before legislation is enacted to regulate the use of PPP. Also, some government agencies may exhibit resistance to change in the context of adopting a new delivery/financing approach. The PPP method of project development may not be well understood and sometimes may not be welcomed by the government agencies that handle PPP.

2.2.4 The selection of reviewed papers

The research papers on PPP published in the following six leading construction management journals were used: *Construction Management and Economics (CME),*

the ASCE *Journal of Construction Engineering and Management (JCEM)*, *Engineering Construction and Architectural Management (ECAM)*, *Journal of Management in Engineering (JME)*, *International Journal of Project Management (IJPM)* and *Building Research & Information (BRI)*.

The selection of these journals was based on Chau's (1997) ranking of journals related to the construction industry. Although Chau's paper is a decade old, there appears no updated ranking of construction management journals. The six journals are regarded as top-tier in the field. The PPP-related papers published in these journals from 1998 to 2007 were reviewed. The rationale behind this is that most of the mainstream PPP studies are post-1998 products. The 6 journals were chosen because these top journals were well-received of having more PPP papers than other journals. Reviewing papers from these journals helps the researcher reveal what has been known in the existing research regarding PPP and establish the scope of the research. Related papers in other well-known journals such as Safety Science, Housing Studies, Construction Innovation, Finance and Development, Journal of the American Planning Association, Journal of Knowledge Management, etc. have also been studied as references in the research. So the research did not omit important papers in PPP-related areas.

The method introduced by Al-Sharif and Kaka (2004) was adopted to employ a systematic search to identify papers with the following phrases in subjects, titles,

keywords, or abstracts: Public Private Partnership, Private Finance Initiative, Build-Operate-Transfer, Build-Operate-Own, and Joint Ventures.

The search procedure for papers related to PPP research involves the following three steps:

1. Titles, keywords, and abstracts were scanned with the related keywords. The search was scaled down by focusing on the papers published from 1998 to 2007.
2. A brief review of the abstract of papers was conducted to filter out remotely related or unrelated papers.
3. After filtering, 107 articles with relevant contents regarding PPP in construction were selected for further analysis, as shown in Table 2.1.

Table 2.1 Number of articles which are related to PPP studies in the selected journals from 1998-2007

Journal title	Number of papers
Journal of Construction Engineering and Management	35
International Journal of Project Management	25
Construction Management and Economics	23
Engineering, Construction and Architectural Management	14
Journal of Management in Engineering	6
Building Research and Information	4

Table 2.1 exhibits the number of papers published in the target journals from 1998 to 2007. Over this period, *JCEM* published the largest number of PPP papers (35), followed by *IJPM* (25), *CME* (23), *ECAM* (14), *JME* (6), and *BRI* (4). These sample figures indicate that the subject of PPP in construction has already drawn researchers' attention.

Figure 2.2 shows the number of PPP papers published in the selected journals from 1998 to 2007, indicating the growing research interest in PPP in construction. In line with this development, it is considered the appropriate time to find out what major issues addressed in the existing literature.

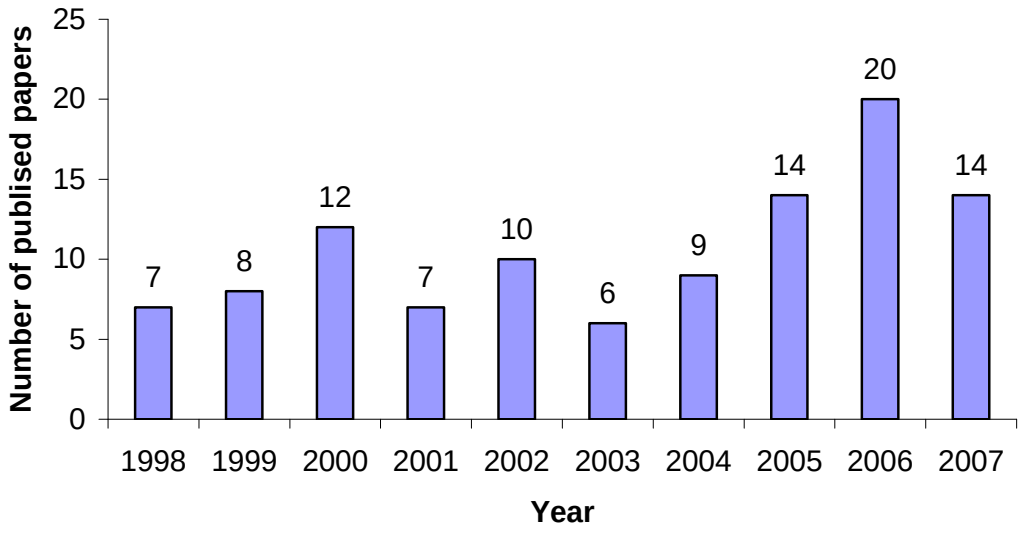

Figure 2.2 Number of relevant papers published yearly in the selected journals from 1998 to 2007

Furthermore, the research papers listed in Table 2.1 can be further classified by the methodologies they used, such as case studies, surveys, etc. accordingly, the classification is demonstrated in Figure 2.3, indicating that case study has been mostly used (57). This is probably because it is easier for scholars to draw some implications from real cases than from other research methods. Additionally, research methods of surveys and literature reviews ranked second and third with 43 and 34 papers respectively, followed by interviews (19). There are also two papers concerning getting opinions from academic scholars and industry practitioners via workshops.

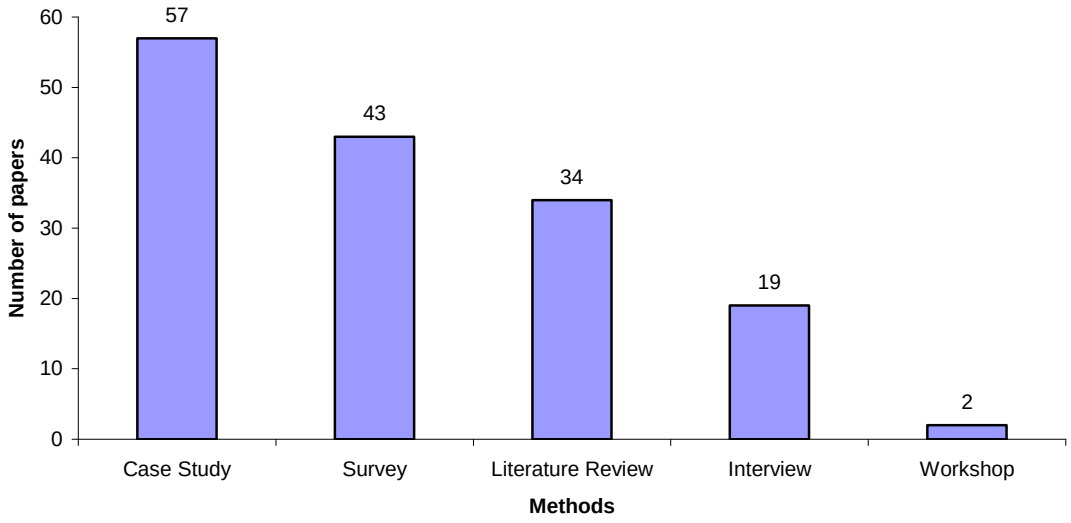

Figure 2.3 Methods used in selected journal papers

To set the structure for classifying the existing studies, some existing classification systems were referred. For example, in a case study by Molenaar and Songer (1998), the PPP project characteristics were categorized as project, owner, market, and relationship. The variables having statistically significant correlations with project success were further grouped into: project scope, schedule, budget definition, project complexity, agency experience/staffing, owner design input, design-build market, design-builder prequalification, and method of selection. By referring to these existing systems, the relevant literatures were classified according to the topics of "risks", "relationships", and "financing", "project success factors", and "concession periods". Of the 107 retrieved papers on PPP, 85 studies were identified as most relevant to this study, and were critically reviewed. Those papers that were not reviewed are given in the bibliography.

2.2.5 Research topics in the reviewed papers

2.2.5.1 Risks

Research into risks involved both empirical studies and non-empirical studies. Empirical studies involved the collection of primary data. Papers researched on risks are as follows:

- Risks research in empirical studies (e.g., Li et al., 2005a; Shen et al., 2006; Akintoye et al., 1998; Li and Tiong, 1999; Li et al., 1999; Schaufelberger and Wipadapisut, 2003; Yeo and Tiong, 2000; Zayed and Chang, 2002; Lam and Chow, 1999; Abednego and Ogunlana, 2006), and

- Risks research in non-empirical studies (e.g., Thomas et al., 2006; Zhang and Zou, 2007; Eaton et al., 2006; Singh and Kalidindi, 2006).

Research on risks can help explore the appropriate ways of managing important risks associated with PPP projects. Risks of PPP can be clustered according to the conventional risk management process: identification of risk areas, risk analysis, and risk strategies. To improve risk strategies, risk areas need to be identified and analyzed properly. Research has been carried out to identify key risk areas and attributes, and to study how contractors and financial institutions perceive risks. For example, previous studies used questionnaires to collect data for identifying key risk areas in BOT projects, such as political risks, financial risks, revenue risks, market risks, promoting risks, procurement risks, development risks, construction completion risks, and operating risks (Akintoye et al., 1998; Zayed and Chang, 2002). Schaufelberger and Wipadapisut (2003), through a study of 13 cases, found that project risks, project conditions, and availability of financing were the major considerations in selecting a financing strategy. The project risks that were arguably the most significant in financing strategy selection were political, financial, and market risks.

Shen et al. (2006), on the other hand, used the case study of the Hong Kong Disneyland theme park to analyze the risks affecting project performance. The important risks were grouped into the following 13 categories: site acquisition, unexpected underground conditions, pollution to the land/surroundings, land

reclamation, development, design/construction, changes in market conditions, inexperienced private partner, financial, operational, industrial action, legal and policy, and force majeure. These risk categories were further divided into three main groups: internal, project-specific, and external. There are still other studies on PPP risk management and also case studies about effective risk management measures of international construction joint ventures (e.g., Li and Tiong, 1999; Li et al., 1999; Yeo and Tiong, 2000). The findings of these studies showed that the most critical risk factors are associated with the financial aspects of joint ventures, government policies, economic conditions, and project relationship.

Apart from risks that were studied in general terms, risks that affected individual project stages were also studied by researchers. For example, the effect of financial risks in BOT projects on different phases of procurement was investigated in a survey by Lam and Chow (1999). The results suggested that "interest rate fluctuation" was the most significant financial risk in the pre-investment phase, while "currency exchange restrictions" was moderately significant in the operational phase.

The above key risk areas provide valuable reference for practitioners when implementing a PPP project, and thus adequate contingency strategies can be developed to instigate risk impacts on a PPP project.

Researchers also investigated risk strategies adopted by the public and private sectors. For example, Li et al. (2005a) conducted a questionnaire survey about risk allocation preferences in PPP construction projects in the UK. They found that risks could be distinguished by whether they should be retained by the public sector or shared with the private sector. They suggested that in PPP construction projects, site availability and political risks should be retained by the public sector partner, while relationship risks, force majeure risks and risks of legislation changes should be shared by both parties.

Risks are one of the popular research topics for studying PPP projects. Thomas et al. (2006) proposed a risk probability and impact assessment framework based on the fuzzy-fault tree and the Delphi method. The framework included extensive scenario modeling of critical risks in projects and systematic processing of professional judgement of experts.

Zhang and Zou (2007), on the other hand, developed a fuzzy analytical hierarchy process model for the appraisal of the risk environment pertaining to joint venture projects. Eaton et al. (2006) developed a theoretical model for the construction industry, which specifies potential stimulants and impediments to creative behavior in PPP projects.

2.2.5.2 Financing

- Financing research in empirical studies (e.g., Akintoye et al., 2003b; Norwood and Mansfield, 1999; Huang and Chou, 2006; Saunders, 1998).
- Financing research in non-empirical studies (e.g., Ho, 2006; Wibowo, 2004; Bakatjan et al., 2003; Ho and Liu, 2002; Chang and Chen, 2001; Subprasom and Chen, 2007; Zhang, 2006a; Zhang, 2006b; Zhang, 2005d; Zhang, 2005e),

Using data collected from a questionnaire, Norwood and Mansfield (1999) found that financial sources continued to be scarce despite a pressing need by contractors. As they argued, some developing countries were gradually more able to provide a higher grade of local technical expertise at competitive prices. This would result in a greater chance for local contractors to compete in overseas markets, which is increasingly the case in Asia. This presents difficulties to contractors to participate in overseas PPP projects if they are not properly financed. As stated earlier, Schaufelberger and Wipadapisut (2003) found that the availability of finance greatly influences selection of a favorable financing strategy which can support participation from the private sector.

Akintoye et al. (2003) reviewed the literature and used qualitative analysis to examine factors that could continue to deter the achievement of best values. They found that among other factors, the high cost of the PFI procurement process is a main burden on PPP projects, and leads to the willingness of the private sector to participate.

Financing plays an important role in PPP. Studies that focused on model development addressed different financing issues when researchers have attempted to study the financial viability of PPP projects. For example, Ho and Liu (2002) used an option pricing-based model to evaluate the financial viability of a privatized infrastructure project. To estimate when the project is at risk of bankruptcy, this quantitative model takes into account the views of both the project promoter and the government. Wibowo (2004) formulated a cash flow model to calculate operating revenues generated by a PPP project. The financial impact of guarantees was studied from the perspectives of both the government and the project sponsor. The simulation results revealed that guarantees could reduce the financial viability risk but could not avoid cost.

Researchers also studied the return and value of PPP projects. For example, Bakatjan et al. (2003) used a simplified model to determine the optimum equity level for decision-makers at the evaluation stage of a BOT project. This model combines a financial model and a linear programming model to maximize the return of a project from the equity holder's point of view. Zhang (2006a; 2006b) argued that there is a need for establishing the best-value objective dimensions for innovative project delivery models. These models could offer the best value to the public sector and support the partnership of public and private sectors by continuously enhancing the best value through long-term contractual arrangements. Then, a methodology was developed for capital structure optimization and financial viability analysis that

reflected the characteristics of project financing, incorporated simulation and financial engineering techniques, and aimed for win-win results for both public and private sectors (Zhang, 2005d; Zhang, 2005e).

Other research, such as rescuing plans and capacity choice, was also conducted. For example, Ho (2006) developed a game-theory based model, which determines when and how the government will rescue a distressed project and what impacts the government's rescue behavior on project procurement and management. Through an effective rescue model, the government would be able to map out a blueprint for the public, develop policies, and negotiate with the concessionaire (Chang and Chan, 2001). Subprasom and Chen (2007) provided modeling and analysis of highway pricing and capacity choice of a BOT scheme. It was found that the combination of toll charge and roadway capacity regulation performed best in terms of social welfare increment. Yet, in PPP highway projects, the regulation may cause financial pressure on private investors to operate a project. The government, therefore, may need to subsidize private investors in order to make their participation financially viable.

2.2.5.3 Relationships

- Relationships research in empirical studies (e.g., Erridge and Greer, 2002; Ysa, 2007; Zhang and Kumaraswamy, 2001a; Zhang and Kumaraswamy, 2001b; Zhang et al., 2002; Zhang, 2004a; Zhang, 2004b; Abdual-Aziz, 2001; Chan et al., 2003; Consoli, 2006; Palaneeswaran and Kumaraswamy, 2000a;

Palaneeswaran and Kumaraswamy, 2000b; Smyth and Edkins, 2007; Wang et al., 1998; Wang et al., 1999; Wang and Tiong, 1999; Wang et al., 2000a; Wang et al., 2000b; Wang et al., 2000c; Wang and Tiong, 2000; Zhang et al., 1998; Ling, 2004; Zhang, 2005a; Zhang, 2005b; Zhang, 2005c; Ranasingre, 1999; Vazquez and Allen, 2004; Henisz, 2006; El-Gohary et al., 2006).

The relationship between organizations within the framework of partnership between public and private sectors is perceived crucial to the success of PPP projects, and thus hinders the operation of PPP projects. A poor relationship would easily lead to misunderstanding and conflict. Therefore, the review on the existing literature focuses on examining what factors facilitate or inhibit the relationship.

Chan et al. (2003), when conducting an industry-wide survey, found that "improved relationship amongst project participants" and "improved communication amongst project participants" were the most significant benefits obtained from the use of PPP. Through interviews, Consoli (2006) found that various demands of stakeholders, contractual arrangements, and different philosophical standpoints are the major factors causing friction between the involved parties. Apparently, friction is the major cause for a poor relationship.

Furthermore, researchers found that sector relationships in PPP projects were determined by the nature of relational contracting and relationship management (e.g., Erridge and Greer, 2002; Ysa, 2007; Smyth and Edkins, 2007). Through a Malaysian

case study, Abdul-Aziz (2001) observed that once privatization has taken place, re-involvement of the public sector, particularly through the injection of new funds, should be refrained as much as possible because of the public sector's lack of expertise.

A fair deal is what project parties pursue, and researchers have studied the success factors of how to achieve win-win relations by comparing various kinds of BOT-typed infrastructure developments in the USA, the UK, and China (e.g., Wang et al., 1999; Wang and Tiong, 1999; Wang et al., 2000; Wang et al., 2000a; Wang and Tiong, 2000; Wang et al., 2000b; Zhang et al., 1998; Zhang and Kumaraswamy, 2001b). Their studies were intended to identify the strengths of successful approaches and learn lessons from less successful or abortive PPP projects. Their studies suggested that proper maintenance of relations be achieved through effective management of political risks, foreign exchange, and revenue risks.

Zhang (2004a; 2004b; 2005a; 2005c) carried out a knowledge-mining process to draw experience and learn lessons from international PPP practices and to refine experiential and expert knowledge underlying the subconscious decision-making process in the field of project financing. He identified five critical success factors (CSFs) (favorable investment environment, economic viability, reliable concessionaire consortium with strong technical strength, sound financial package, and appropriate risk allocation via reliable contractual arrangements) for a win-win relationship, each of which includes a number of sub-factors.

Researchers also related the relationship issue to contractor selection. For choosing suitable contractors, researchers not only suggested benchmarking as the best selection practices, but also emphasized “innovative” contractor selection to be used by large public clients, in which a relationship is regarded as a key criterion (e.g., Zhang, 2004a; Zhang, 2004b; Palaneeswaran and Kumaraswamy, 2000a; Palaneeswaran and Kumaraswamy, 2000b). Palaneeswaran and Kumaraswamy (2000a; 2000b) made a comparative overview to formulate a “cooperative” and “non-competitive” conceptual benchmarking model to identify the core aspects of selecting a suitable bidder in order to achieve the best “value for money” results.

2.2.5.4 Project success factors

- Project success factors in non-empirical studies (e.g., Kumaraswamy et al., 2007; Salman et al., 2007; Jefferies et al., 2002; Thomas, et al., 2003).

Researchers studied what influences the success of PPP projects. For example, Kumaraswamy et al. (2007) developed a force field model to visualize the importance of relational forces. A framework was conceptualized to link relational contracting approaches through sustainable relationships. Salman et al. (2007) introduced a decomposed evaluation model to assess the most significant decision factors that strongly affected the feasibility of BOT projects.

2.2.5.5 Concession periods

- Concession periods in non-empirical studies (e.g., Ng et al., 2007; Ye and Tiong, 2000; Ye and Tiong, 2003; Shen et al., 2002; Shen and Wu, 2005; Shen et al., 2007).

Capital investment of the private partner is recovered through the operational revenue over the concession period. Research has been conducted on how to determine the length of a concession period. For example, Ng et al. (2007) proposed a simulation model to assist the public partner to determine an optimal concession period. The simulation output showed that risks and uncertainties, such as changes in inflation rate, traffic flow, and operation cost, could influence the decision on the concession period. Through the Monte Carlo simulation, Ye and Tiong (2000; 2003) provided a method for evaluating the mean net present value (NPV), variance, and NPV-at-risk of different concession period structures. The risk-return trade-off was studied to ensure a sufficiently long concession period for generating financial returns that can compensate for the risks.

Other studies focused on developing a model for determining a concession period for BOT projects (e.g., Shen et al., 2002; Shen and Wu, 2005). The model was used to identify a specific concession period, which took into account the bargaining behavior of the two parties engaged into a BOT contract (Shen et al., 2007).

2.2.5.6 Future studies of Public Private Partnership in construction

This review summarized research on PPP projects in existing papers. A review of such study provides insights into future research agendas. The following discussion thus recommends some possible research areas.

Risks

Previous studies attempted to identify the risks in PPP by using a small sample or a small number of cases. To make risk identification results more meaningful, a larger sample size is recommended and should include practicing professionals (Shen et al., 2007). Moreover, future research should focus on exploring more risk assessment models. As noted by Medda (2007) and Xenidis and Angelides (2005), it is crucial to create risk assessment models to incorporate different types of risks (such as technical and legal risks) which should not only be accurate, but also be easier to use. Models resisted by practitioners are of no use to the real world.

Financing

Existing studies show that too much or too little governmental guarantee or support can not atrike a suitable balance between private benefits and public interests. Especially when the government provides too much guarantee, it will be easy for the concessionaire to get the benefits from the contract at the expense of the public interests. This leads to the commonly asked question of how to pursue a win-win scenario between the public sector, the private sector, and the ultimate general public

users (e.g. Zhang, 2005a; Zhang, 2005b). Future research should therefore be designed to find such an answer.

Since prior research highlighted the importance of collaborative arrangements in public procurement that transfers from a "controlling regime" to a "facilitative stage", the conditions that help speed up the transfer process need to be identified. This is consistent with Erridge and Greer's (2002) contention that the social capital underscoring the productive bonding between parties and the role of the government in facilitating positive outcomes resulting from the social capital should be developed. Furthermore, the cultural and political issues in PPP should also be addressed under new agendas. PPP experience cannot be simply copied from one country to another since different countries have different practices in terms of culture and policy. Research should be undertaken to address the relationship issue by evaluating the effect of cultural mismatching and other relational variables on project success (e.g. Sillars and Kangari, 2004).

Contractual agreements

This study points out the importance of improving the contractual agreements. In fact, partners in a project should make sure that the contractual language is effective and that the contractual clauses conform to international practices. However, conflict and argument about contractual terms are not uncommon. One of the possible areas for improvement is the provision of clear definitions of financial indicators for foreign sponsors and lenders to avoid unnecessary misunderstanding.

Since negative behavioral relations and tendencies may lead to adversarial or litigious relations in contract implementation, more research is needed to explore which factors affect behaviors. For example, contract terms may be a key factor as they are generally perceived to generally have greater impact upon relationship performance (Edkins and Smyth, 2006).

Development of Public Private Partnership models

Appropriate political, legal, and economic environments are essential to the implementation of PPP projects. For PPP projects to work smoothly, the impact level of these environmental issues should be identified, especially when relating to different PPP types (e.g. Kumaraswamy and Zhang, 2001; Zhang and Kumaraswamy, 2001). Both empirical and operational studies are useful to establish PPP decision models. Empirically, conceptual models can be developed based on case studies, and can be tested by use of representative samples. Moreover, an appropriate decision-making technique should be employed to establish a decision model for estimating a specific impact level of environmental issues for PPP projects.

Concession periods

As the concession period is important for generating returns for the private partner, future concession models should not only take into account the government‘s interests but also those of the private investor. Generally, simulation models can be

used to identify the most appropriate concession period. In addition to qualitative variables, quantitative variables should be incorporated in order to propose a robust model for simulation testing (Ng et al., 2007).

Strategies in choosing the right type of Public Private Partnership

The types of PPP need be carefully selected to adapt to real project situations with consideration of project backgrounds such as social, political, cultural, and economical conditions.

Since the failure rate of joint ventures in PPP projects has been high, partners are recommended to monitor both internal and external conditions in the host country. By knowing the key factors, joint ventures can be enacted and sustained properly. Among others, internal factors include partner fit, partner relations, and structural characteristics, while external factors include host country conditions and project risks. As suggested by Ozorhon et al. (2007a, 2007b), both direct and indirect effects should be evaluated simultaneously.

Previous research found that non-privately funded PPP was more cost-effective in the delivery of maintenance services compared to traditional term contracts (Devapriya, 2006; Ng and Wong, 2006). However, in a country or region practicing of the “big market, small government” policy like Hong Kong, privately funded PPP projects are expected to be dominant. Thus, it is important to examine whether

privately funded PPP projects are also more cost-effective. If not, research needs to be undertaken to explore improvement.

2.2.6 Summary of the literature review

The literature review undertaken in previous sections in this chapter covers popular PPP topics. Three specific characteristics of PPP – risks, relationships, and financing – have been addressed in details. Research was carried out to identify risk categories, analyze risk factors and formulate risk strategies. Factors affecting relationships between the public sector and the private sector have also been identified based on win-win situations. Financial sources and the way to achieve best value-for-money results are important for the private sector.

Models and simulation methods are used to value factors for success in research on financing, project success, risks, and concession periods. Moreover, insights have been provided to offer further research directions for PPP in construction. These insights will help formulate research gaps that support the construction of research objectives in this study.

Future studies summarized in literature review would also help solve research gaps. For example, risks and financing are to topics in future studies suggested in existing research. Later in the study of this research, factors in these two topics will be identified. Research on strategies in choosing the right type of PPP will also be considered in critical factors in later research. Research on development of PPP

models will be examples to build the framework for guiding the briefing process in PPP projects.

2.3 A Review of Briefing

2.3.1 Definitions of briefing

In literatures, there are many definitions from different views to understand the meaning of briefing. Usually in the UK and Hong Kong, the phase "construction briefing" is used while "architectural programming (AP)" is used commonly in the US (Luo, 2010). Newman et al. (1981) defined briefing as "*the communication between the client and architect for the purpose of exchanging information and making decisions usually with the purpose of enabling the architect to design a building required by the client*". White (1991) said briefing likes "*the process of producing a statement of what the client's needs. It is both an expression of project requirements and a learning process*". In 1997, CIB gave the definition of briefing as "*the process by which a client informs others of his or her needs, aspirations and desires, either formally or informally, and a brief is a formal document which sets out a client's requirements in detail*". In research by Blyth and Worthington (2001), they claimed briefing is "*a creative process. Design is briefing, and briefing relies on design. Briefing is an evolutionary process of understanding an organization's needs and resources, and matching these to its objectives and its mission*". At the same time by Hyams (2001), briefing seemed as the process on "*defining the question to which the design is an answer, the one answer chosen from among the*

many possible". Later, Kelly and Duerk (2002) gave the definition of briefing like "*the process of gathering, analyzing, and synthesizing information needed in the building process in order to inform decision-making and decision implementation*".

Architectural programming is commonly used in USA and many definitions were also given (Luo, 2010). For example, Pena et al. (1977, 1987, and 2001) claimed AP was "*a process leading to the statement of an architectural problem and the requirements to be met in offering a solution*". Duerk (1993) told AP was "*the process of managing information so that the right kind of information is available at the right stage of the design process and the best possible decisions can be made in shaping the outcome of the building design*". In research of Cherry (1999), AP was "*the research and decision-making process that defines the problem to be solved by design*". And Hershberger (1999) defined AP likes "*the first stage of the architectural design process in which the relevant values of the client, user, architect, and society are identified; important project goals are articulated; facts about the project are uncovered; and facility needs are made explicit*".

2.3.2 Problems of briefing

Many researchers have identified problems during the briefing process (Luo, 2010). In the survey conducted by Newman et al. (1981), six main problem areas were summarized based on the UK's briefing practice:

1) Client problems. The client is short of experience in briefing, has preconceived ideas, or does not understand drawings in proper ways;

2) Client/architect relationship problems. The client and the architect do not understand what each other does;

3) Cost problems. The client wants more places than he can afford;

4) Client organizational problems. In the client organization, there are arguments about decisions made. At the same time, the client organization is not good for communication with building users.

5) Regulations/bureaucracy problems. The client does not understand delays by building regulations, planning procedures, or other bureaucratic requirements;

6) Site/time problems. Because of wrong or unobtainable site information, there is a lack of time for the architect to complete the work and for the client to examine proposals.

Kelly and Male (1993) identified almost the same five problem areas in the briefing process: 1) Client's experience with the building industry; 2) Representation of client interest groups; 3) Identification of client's needs; 4) Interpretation of the client's needs in building terms; 5) Provision of sufficient time for briefing.

Barrett and Stanley (1999) examined the solutions to the above problems and gave reasons why certain solutions are not effective. First, good practice recommendations are, in practice, may not produce a successful outcome because other external factors are not considered. Second, they are oral agreements and only partially implemented.

Further examinations of the reasons for briefing failure showed that human nature is often an important reason. The human behavior is captious and the repercussion of people's thinking on the briefing process needs to be systematically considered (Barrett and Stanley, 1999). Lack of knowledge of the practitioners during briefing and complex aims among the stakeholders could simply cause failures of briefing. Client reeducation, management of project dynamics, achievement of appropriate user involvement, usage of understandable visualization techniques, and appropriate team building are five major solutions proposed to significantly improve the efficiency of the briefing process.

Blyth and Worthington (2001) argued that effective processes of decision making are the main part of an effective briefing process. Timely information to meet the needs of the business, the needs of design development and the needs of the construction contract are key characteristics of a good briefing process. Six aspects concerned to achieve successful briefing were identified: definition of the process,

making of timely decision, understanding underlying agendas, planning for future change, clear and comprehensive communication, and feedback of experience.

Yu (2006) also identified five problems during briefing:

1) Lack of a comprehensive framework: Although numerous briefing guides have been developed for briefing, many researchers suggested that the general framework for briefing was still inadequate. The limitations in the existing framework for briefing can shift the focus away from the requirements of the client, and can result in problems in briefing practice (Kamara and Anumba, 2001; Yu et al., 2005);

2) Lack of identification of client requirements: Successful briefing relies on the thorough analysis of needs and rigorous evaluation of available potions (Atkin et al., 1995). Latham (1994) and Kamara and Anumba (2001) revealed that commercial pressure from clients may require detailed designs to be prepared as soon as possible. This reduces the time spent on understanding the real needs and requirements of the clients and may affect the performance and success of the project (Yu, 2006);

3) Inadequate involvement of all the relevant parties of a project: Previous research revealed that the briefs may not be comprehensive because they are usually prepared by only a small group of representatives from the client organization or by the consultants in the industry. Most public clients reported that involvement of other stakeholders would prolong the duration of briefing because of the difficulties

associated with identifying them and researching a general consensus in meeting (Chung and Shen, 2003; Yu, 2005);

4) Inadequate communication between those involved in briefing: The use of sketches and drawings to re-state and record changes to client requirements can make it difficult for requirements to be traced to the original needs of the client. Moreover, records of decisions at project meetings can be quite vague, and do not provide any explanation of why those decisions were taken (Kamara and Anumba, 2001; Yu, 2005);

5) Insufficient time allocated for briefing: Previous research projects show that poor definition of client requirements is due to inadequate time and thought being given at an early enough stage (Kamara et al., 2002). This often occurs because there is urgency to obtain an immediate solution. Time pressure and a refusal to commit finances have caused the briefing to be limited mainly to financial considerations (Barrett and Stanley, 1999; Yu, 2005).

2.3.3 The briefing stage in PPP projects

PPP for procurement of construction facilities and service delivery provides real opportunities to address the issues and process involved in client briefing by the PFI client group (including client's advisers) and Special Purpose Vehicle (SPV) in a holistic way. The client group must specify, in unambiguous terms, the output specifications that the facilities must achieve in a manner that be interpreted by SPV

who bring in innovation and expertise to ensure that these are met over the whole concessionary period otherwise payment due to the SPV will be affected.

Client briefing for construction development typically consists of project and strategic requirements. Project requirements consist of a number of requirements including client, user, site, environmental, regulatory, design, construction, and life-cycle requirements (Kamara and Anumba, 2000) while the strategic sets out the broad scope and purpose of the project and its key parameters including overall budget and programme.

In the PPP project the Business Case (outline and full) defines the scope of the project and its relationship with the institutions' other activities. It provides an appraisal of other alternative methods of procurement that can be used to meet the requirements of public sector services other than the PPP route. It deals with affordability issues and financial matters; and for these reasons, PPP business case is hardly used wholly as a client brief. It is accepted that the disclosure of such confidential financial information contained within a PPP project business case could be prejudicial to the tendering process.

However, there are elements of the business case that are included in a PPP brief document. For a PPP project to be signed off there must be included in a business case be some details of risk allocation proposals and also of the output specification. In addition, details on the project background are included in the business case.

These sections of the business case are easily transferred to a brief document for the PPP project.

Unlike the brief for conventional procurement, the brief for a PPP project must supply information not only on the project requirements but also on the project programme, risk management, output specification and payment mechanism. The question is therefore whether or not the details on these elements of the brief are sufficiently well developed to reduce the protracted period of negotiation that invariably arises in PPP projects. It raised the research gap that a systematic framework which can guide the process of briefing in PPP projects is needed in the research. Although a flowchart for establishing PPP projects was developed in the guide which was published by EU in 2008, it was still short of detailed steps and important factors particularly for the briefing process in PPP projects.

2.4 Summary of the Chapter

This chapter reviews previous research on PPP and briefing in construction, which is the first phase of this research. This chapter commences with a description of PPP concepts, development of PPP theory, and advantages and disadvantages of PPP. Following this, an overview of existing PPP literature in construction is conducted, followed by a review of briefing to examine the problems within the briefing process.

PPP is an arrangement where both the public and private sectors bring their complementary skills to a project, with varying levels of involvement and

responsibility, for the purpose of providing public services or projects (EU, 2008). From the above review of briefing literature, briefing is critical to the client's organization whether the client is an owner occupier or developer because the client's requirements for the envisaged facilities are elicited, clarified, represented in a brief/program, and used in the whole life cycle of a building (e.g., design orientation, construction direction and post-occupation evaluation). The examination of PPP development and briefing processes formulates a theoretical foundation of this research.

There is a growing academic interest in using PPP in construction. An overview of the current studies leads to the conclusions that a comprehensive list of CSFs at the briefing process can contribute to a body of knowledge about PPP in construction. A systematic framework for guiding the briefing process of PPP projects can improve the perception of briefing success.

The next chapter describes the research methods used in the identification processes of CSFs and establishment of the framework.

CHAPTER 3

RESEARCH DESIGN

- *Introduction*
- *The Selection of Research Methods*
  - Interview
  - Questionnaire survey
  - Case study
  - Ethical considerations
- *The Research Process*
  - Phase 1 – Literature review
  - Phase 2 – CSFs identification
  - Phase 3 – Framework development
    - Critical success factors
    - A framework for Public Private Partnership projects at the briefing process

- Phase 4 – Framework validation

❖ *Summary of the Chapter*

CHAPTER 3

RESEARCH DESIGN

3.1 Introduction

Proper research design is the key to the success of a research study. Emory and Cooper (1991) pointed out that the choice of research methodology should depend on the features and scope of the research. Research design is the plan which explains the overall scheme or programme of the research. This chapter introduces the main research methods adopted in this study, including literature review, professional interviews, questionnaire survey, and case studies. “What are these methods?”, “Why choose these methods?”, and “How are they conducted?”. These questions are addressed in Section 3.2. Detailed research process and the methods used to gain PPP projects knowledge in this study are outlined in Section 3.3.

3.2 The Selection of Research Methods

In Fellows and Liu (1997), research is never a fixed process. A true state of affairs, precision and confidence, objectivity, ability to generalize, and parsimony defined in terms of simplicity and economy are reflected by the features of purpose, rigor, testability and repeatability (Sekaran, 1999). The way the knowledge is gained, how theories are generated and tested, and the relationship between theoretical perspectives and research problems are called methodology (Blaikie, 1993).

In the research of project/construction management, there are four typical research methods: literature review, case study, interview, and questionnaire survey. Fellows and Liu (1997) explain that the scope and depth required by the research would take the choice of suitable research methods.

Literature review is a common research method to help researchers establish proper understanding about the development and research gaps in the disciplines concerned. Thus it is also a major method used in this study. In addition, the following methods were also adopted.

3.2.1 Interview

Interview is a popular research method to collect first-hand empirical research data. There are various interpretations of what an interview is. According to Corbetta (2003), qualitative interview can be defined as a conversation that has the following characteristics: the interviewer elicits it; interviewees are selected on the basis of a data-gathering plan; a considerable number of subjects are interviewed; a cognitive objective which is guided by the interviewer is included, and is based on a flexible, non-standardized pattern of questioning. It is emphasized that an interview does not simply involve recording information; it is a process of social interaction between two individuals.

In the research done by Corbetta (2003), three types of interviews were classified, namely, structured interviews, semi-structured interviews, and unstructured interviews. The same questions with the same wording and in the same sequence (the questions are predetermined both in content and in form, as in a questionnaire with open questions) are delivered to all interviewees in structured interviews. In semi-structured interviews, pre-written questions are not asked by the interviewer, but an "outline" of the conversation (only the content is predetermined but not the exact questions to be asked) is referred to. In unstructured interviews, to make sure that predetermined topics that are dealt with are most adequate in the particular interviewing situation is the interviewer's only task. Structured interviews were adopted in this study to examine views for CSFs and the framework from experts.

3.2.2 Questionnaire survey

In a questionnaire survey, all the respondents are asked the same questions in similar circumstances. A methodical technique that requires the systematic collection of data from subjects or participants, and involves the researchers targeting a sample of persons who have been exposed to or experienced an event or process to question participants in relation to these is called a questionnaire survey (Denzin and Lincoln, 1998). To produce effective questionnaires, careful piloting is necessary to ensure that a questionnaire has to be clear and unambiguous. Means of self-completion questionnaires could be used to gather information. The aim of a questionnaire survey is to obtain answers from a large number of individuals to enable the researcher to not only describe but also to compare, to relate one characteristic to

another and to demonstrate certain features that exist in certain categories (Bell, 2005). The questionnaire survey used in this study was to collect values of factors and opinions about the framework for guiding the briefing process of PPP projects.

3.2.3 Case study

A case study approach provides an opportunity for one aspect of a problem to be studied in some depth (Bell, 2005). To identify the common and unique features, to identify or attempt to identify the various interactive processes at work, and to show how they affect the implementation of systems are objectives of using case studies. A large-scale survey may include these processes hidden in depth but these processes could be crucial to the success or failure of systems. Yin (1994) also suggested that the more a study contains specific propositions, the more it will stay within reasonable limits. In this research, 2 case studies will be used to test and validate the framework for the briefing process in PPP projects.

3.2.4 Ethical considerations

Ethics is an important consideration in conducting research. Research ethics points to “a code of conduct or expected societal norm of behavior while conducting research” (Sekaran, 2003). By Bourne (2005), the importance of three aspects of ethics must be recognized in a research study: (1) avoidance of harm in the fieldwork, (2) informed consent in recruitment of participants, and (3)

confidentiality in reporting the findings, and the subsequent provision of assurances of privacy, confidentiality and anonymity (Miles and Huberman, 1984).

In this research, all the subjects and respondents participating in the questionnaire and case studies were sent an official letter from The Hong Kong Polytechnic University stating clearly the research topic and the participants' rights during the data collection process (e.g. confidentiality of the data consent seeking). This was to make sure that the nature of the research and participated in this research voluntarily were made clearly to the participants. They should withdraw from interviews, surveys and/or case studies at any time throughout the study. The use of a recording device for interviews asked for permission at the first place. The organization, projects, and respondents in the research were all considered to be anonymous and with assurance of confidentiality (Sekaran, 2003).

3.3 The Research Process

As stated in sections 1.2 and 1.3, this research was conducted in four phases to address different objectives: Phase 1 was about formulating the research objectives, procedure, and methodology of the research; Phase 2 was to conduct a literature review and identify CSFs of the briefing process in PPP projects in the construction industry; Phase 3 was framework development phase as an interactive development and refinement process; Phase 4 used case study to validate the systematic framework in real-life projects.

3.3.1 Phase 1 – Literature review

In the Phase 1, the research efforts are largely devoted to literature review. The literature, related to PPP, is reviewed in Phase 1. This phase commenced with an exploration of PPP concepts. In this research, PPP is defined as "arrangements where the public and private sectors both bring their complementary skills to a project, with varying levels of involvement and responsibility, for the purpose of providing public services or projects" (EU, 2008). Following this, the development of using PPP and the existing research were then analyzed. The existing research studies of PPP in general formulate the theoretical foundation of this study.

An overview of the existing literature related to briefing in PPP projects in construction was conducted at the final stage of this phase. Three gaps in the scope of existing research concerning briefing in PPP projects were identified (as shown in Section 1.2).

These gaps led to the conclusion that a systematic framework, which comprises a detailed briefing process and critical success factors for briefing, can facilitate understanding of the establishment of PPP projects in the construction field. The perception of briefing success requires identification of critical success factors in certain aspects of PPP. Also, it is necessary to develop a framework as a systematic and generic reference for the practice of PPP in the construction industry.

In order to achieve the research aim and address the research gaps, four objectives (as described in Section 1.2) need to be achieved in the following phases:

(1) To identify the critical success factors (CSFs) for the briefing process of PPP projects in the construction industry (addressing Gap 1 outlined in Section 1.2); (2) To assess the importance levels of the CSFs in the briefing process of PPP projects (for Gap 2); (3) To conduct a comparative analysis on the CSFs in different locations (for Gaps 1 and 2); (4) To develop a framework for guiding the briefing process of PPP projects in construction (for Gap 3).

3.3.2 Phase 2 – CSFs identification

Two research methods were applied in this phase: (1) a literature review and (2) professional interviews. The available literature on PPP in construction was first reviewed in this phase. The selection of studies to be reviewed was based on Chau's (1997) ranking of journals related to the construction industry. Although Chau's paper was published a decade ago, there appears no updated ranking of construction management journals. The six journals used are regarded as the top-tier journals in the field. These are: *Construction Management and Economics (CME),* the ASCE *Journal of Construction Engineering and Management (JCEM), Engineering Construction and Architectural Management (ECAM), Journal of Management in Engineering (JME), International Journal of Project Management (IJPM)* and *Building Research & Information (BRI)* (presented in Chapter 2).

Differences between PPP projects and conventional projects at the briefing process and characteristics of PPP projects at the briefing process were investigated. The data from professional interviews are important for supporting this study. The interviewees were carefully identified and selected. Results were tested by three separate interviews with a government officer, a consultant and a contractor (presented in Chapter 4). Based on these, four categories of factors for further testing were identified as described in Chapter 4.

3.3.3 Phase 3 – Framework development

Presented in Phase 3 was an interactive process for CSFs and framework development and refinement using two research methods: (1) interviews and (2) a questionnaire survey.

3.3.3.1 Critical success factors

Regarding the second objective, focus in Section 4.2 is to identify of CSFs from the current studies. Four categories of totally 48 initial CSFs were identified from the existing studies, as addressed in Section 4.3. Interviews and a pilot study were then used to confirm the final list of candidate CSFs. The relative significance between these candidate factors was then assessed by collecting professionals views through a questionnaire survey conducted in Hong Kong and Australia. The details of the questionnaire survey are given in Sections 4.4 and 4.5. Samples of invitation letter for questionnaire and the questionnaire survey are attached in Appendix A and B.

The following questions are answered, based on the questionnaire survey and data analysis in Section 4.6-4.9,

- What is the ranking of the CSFs of each category in different background information?
- Is there a general consensus on the rankings of the CSFs across respondent groups?
- Is there any correlation between the score values of CSFs and respondent group types?
- What are the true differences in the perceptions of the relative importance of CSFs across respondent groups?

3.3.3.2 A framework for Public Private Partnership projects at the briefing process

A framework that aims at being a systematic and generic reference to the practice of project managers in briefing of PPP projects in construction is presented in Chapter 5. The approaches taken are as follows:

- Based on existing structures and the results in Chapter 4, an initial framework for successful briefing of PPP projects in construction is proposed. The framework consists of three components: (1) steps of briefing, (2) deliverables for the whole process, and (3) the timeline of the briefing process and the process for writing a brief (Section 5.2);

- Interviews were then conducted in Hong Kong based on the literature review to collect empirical information from practitioners in construction for developing a framework, and the outcome is an initial framework for the briefing process of PPP projects (Section 5.3);

- The framework developed based on empirical studies in Hong Kong were validated and revised by nineteen interviewees in Australia, and a systematic framework for briefing of PPP projects in the construction industry was formulated and discussed (Section 5.4). The reason for choosing Australia for validation of the findings obtained in Hong Kong is that Australia has mature management in construction, which is similar to Hong Kong though the cultural environment is different. The culture of Hong Kong is oriental, whereas the dominate culture in Australia is western. This makes the proposed framework more meaningful to be used as a general reference for project managers from different cultural backgrounds.

3.3.4 Phase 4 – Framework validation

The validation of the systematic framework was carried out in Phase 4. The main research method used in this phase is case study.

Two cases were studied in this research, one was from Hong Kong and the other was from Australia, which produced findings which confirmed the applicability of the proposed framework. It was concluded that the framework provided a practical

reference for management teams, in terms of the provision of a useful management leading and checking mechanism, which enables the surety of covering all steps and important factors, when stakeholders are involved in the briefing process of PPP projects.

In addition, the case study shows that the proposed framework can be a useful reference for the project management team. The findings in Phase 4 clearly confirmed the context-specific attribute of the briefing process of PPP projects and the applicability of the proposed framework. The framework was finalized at the end of this phase.

3.4 Summary of the Chapter

This chapter describes and justifies the research design used in achieving the research aim and objectives described in Chapter 1. The design and structure selected for this study was logical and deductive reasoning. The research methods used in this study were literature review, interviews, questionnaire survey, and case studies.

The research was conducted in four phases with four objectives: Phase 1 is the literature review to confirm the objectives, procedure, and methodology of the research; Phase 2 is CSFs identification to review the literature on the briefing process in PPP projects in the construction industry and identify CSFs of briefing; Phase 3 is framework development as an interactive development and refinement

process to value the CSFs and develop the framework; Phase 4 was about validating the systematic framework in real-life projects through case studies.

CHAPTER 4

CRITICAL SUCCESS FACTORS OF PPP PROJECTS IN THE BRIEFING PROCESS

- *Introduction*
- *Differences Between PPP projects and Conventional Projects at the Briefing Process*
- *Identification of Critical Success Factors*
  - Procurement-related factors
  - Stakeholder-related factors
  - Risk-related factors
  - Finance-related factors
- *Development of the Critical Success Factors List*
- *The Questionnaire Survey*
  - Survey design and administration
  - Sample characteristics

- *Methodology for Data Analysis*
- *Findings from the Questionnaire survey in Hong Kong*
  - Procurement-related factors
  - Stakeholder-related factors
  - Risk-related factors
  - Finance-related factors
- *Findings from the Questionnaire survey in Australia*
  - Procurement-related factors
  - Stakeholder-related factors
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- *Comparison of Findings between Hong Kong and Australia*
- *Validation of the Critical Success Factors*
  - Testing for reliability of a scale
  - Testing for content validity
- *Summary of the Chapter*

CHAPTER 4

CRITICAL SUCCESS FACTORS FOR THE BRIEFING PROCESS OF PPP PROJECTS

4.1 Introduction

Conclusions from the literature review (Chapter 2) reveal the necessity for identifying the factors contributing to an effective and efficient briefing process in PPP projects. This task will be achieved in this chapter. Of these factors, the critical ones can be found through analyzing individual factors' relative importance. The focus in Section 4.2 is on the identification of CSFs from examining the current studies on briefing in PPP projects in construction and accordingly, forty eight factors are identified. The implications of the CSFs are discussed in Section 4.3. Interviews and a pilot study with three construction practitioners in Hong Kong were used to validate the CSFs, which are presented in Section 4.4. Based on the validated candidate CSFs, a questionnaire was designed to collect opinions about the relative importance among individual CSFs from a broad range of the public sector in some departments of the Hong Kong Government. The survey design, administration, and the sample characteristics are explained in Section 4.5. The collected data were analyzed using SPSS and a mathematical model. The results of the analysis are explained in Sections 4.6-4.8. A comparative study between Hong Kong and

Australia is presented in Section 4.9. It is important that different practices chosen for analysis are comparable. In this content, the construction practices in Hong Kong and Australia are considered as advanced. The comparison will lead to effective results. The reliability and validity of the results are shown in Section 4.10.

4.2 Differences between PPP projects and conventional projects at the briefing process

In this research, CSFs are viewed as activities and practices that should be addressed in order to ensure the effectiveness and efficiency of the briefing process in PPP projects. Previous studies addressed the CSFs affecting the effectiveness and efficiency of briefing in PPP projects, but these factors were presented in fragmentation. Furthermore, some studies addressed the factors by referring to general construction projects, rather than considering the differences or special features of PPP projects. The differences between PPP projects and conventional projects at the briefing process are discussed in this chapter.

The differences between the two types of projects were examined from their implementation processes. After reviewing the existing literature (e.g. EU, 2008; Shen et al., 2006; Kelly and Duerk, 2002), differences between the briefing process of PPP and conventional projects are shown in Table 4.1.

Table 4.1 Differences between PPP projects and conventional projects at the briefing process.

PPP projects	Conventional Projects
Conduct market testing to assess whether the private sector is willing and able to perform the tasks.	Obtain professional advice; Confirm the business case.
Conduct a PPP feasibility study to assess the feasibility of adopting PPP and ensure no overriding legal/statutory obstacles; pay more attention to the financial return.	Conduct a feasibility study in a normal way and pay attention to the global influence.
The fundamental approach to procure a facility via PPP is to define the facility in terms of the service which it is to provide.	The client department seeks the assistance of one of the works departments in designing the facility or in the case of design and build contracts, to prepare performance specifications for the facility.
Prepare Public Sector Comparator (PSC): raw PSC; competitive neutrality adjustment; the value of transferable risks, and seek policy endorsement.	Options appraisal.
Conduct appropriate technical assessments.	Technology to be incorporated or accommodated, including equipment, services, and IT in strategic brief
Initiate an Expression of Interest (EOI) exercise.	EOI rarely needed, unless the project needs special technology.
The department consults and seeks approval of *Public Works Subcommittee* and *Finance Committee* for the capital works funding involved.	Same steps on program but conventional projects must have approval while PPP projects may or may not need to apply for funding from the government.

Seek draft land grant conditions, containing more legal conditions because there will be a concessionary period.	Seek draft land grant conditions normally.
Instruct the *Department of Justice* on drafting of procurement documents/contract.	Not required.
Finalize procurement documents and seek approval from the *Central Tender Board*; There are more considerations on social benefits. Getting approval may need communication with more departments because there are more stakeholders in the project.	*Central Tender Board* will pay more attention to cost of construction than the return of the project when CTB evaluates the approval.
Establish bid evaluation committee with experts of PPP establishment.	Establish normal bid evaluation committee.

From Table 4.1, a number of key points can be identified:

- Certain procurement-related steps that do not exist in conventional projects are needed in briefing of PPP projects. For example, preparing a Public Sector Comparator (PSC) is one of these steps. A PSC is an estimated and risk-adjusted cost for delivering the PPP project output by the government. The PSC is expressed in terms of the net present cost to the government assuming the government is to implement the public project, using a discounted cashflow analysis that adjusts the future value of the expected cashflow to a common reference date. This enables comparison with bids and makes allowance for the imputed cost of government borrowing (EU, 2008);

- The private sector holds the opinion that given its market orientation, the feasibility study should be more focused on the possibility of using PPP projects than on the public in conventional projects (Shen et al., 2006); and

- Special financial and risk-related issues in PPP projects are considered in more detail in the briefing process than those in conventional projects (Kelly and Duerk, 2002). For example, the department which implements PPP projects seeks approval of the Public Works Subcommittee and the Finance Committee for the capital involved (EU, 2008); the department seeks draft land grant conditions, involving more legal conditions because, for example, there will be a concessionary period later; and

- The overall picture from this table shows that some special characteristics could be found in the briefing of PPP projects. This is the first step where we can find differences between PPP projects and conventional projects at briefing.

4.3 Identification of CSFs

There are a variety of studies addressing various success factors affecting PPP project or conventional projects. However, the presentation of these factors is fragmental, and the factors do not particularly refer to the briefing process nor incorporate the special characteristics of PPP projects. Nevertheless, these studies provide valuable references to identify CSFs in briefing in this study. Based on a comprehensive review of relevant literatures, four initial categories of CSFs were

compiled and synthesized, including: procurement-related factors, stakeholder-related factors, risk-related factors, and finance-related factors.

4.3.1 Procurement-related factors

15 procurement-related factors are identified (Table 4.2) based on the existing literature (e.g., Blyth and Worthington, 2001; Yu et al., 2008). For example, Leung et al. (2008) suggested that "formal briefing sessions" and "regular formal meetings" influence project success and participant satisfaction in construction projects. Yu et al. (2008), through a questionnaire survey conducted in Hong Kong, found significant implications for industry practitioners in producing guidelines for the briefing process and for writers in drafting a how-to briefing guide for construction projects. The Construction Industry Board (1997) suggested that "clear and agreed objectives", "carefully thought-out requirements" and other factors be critical to the success of the briefing process. Blyth and Worthington (2001) also identified that "defining the process", "timely decision taking" and other key areas as essential to briefing success.

Table 4.2 Procurement-related factors of the briefing process in PPP projects

Procurement-related factors	Remarks
Clear goals and objectives	Briefing is a process which should have a clear goal and/or objectives.
Experience of the brief writer	An experienced person is needed to develop a brief.
Clear end user requirements	A brief needs to make clear what the end

	user requirements are.
Development of a framework agreed by the key parties	During briefing, the process of brief formulation needs to be agreed by the key parties.
Control of process	The public sector should lead throughout the briefing process.
Adequate time for briefing	Briefing should be allocated with adequate time.
Consensus building	A consensus of the brief amongst various stakeholders needs to be developed during the briefing process.
Proper priority setting	Priority of decisions to be made should be agreed by the key parties in briefing.
Time for freezing of brief documents	A schedule should be set for completion of the brief.
Flexibility of briefs to cater for changes	Flexibility in briefs should be provided to cater for possible changes.
Good record of decisions made	Decisions made should be recorded in detail.
Identification of client requirements	Identification of client requirements should be done during briefing.
Thorough understanding of client requirements	Client requirements should be thoroughly understood.
Feedback from completed projects	Feedback from completed projects is needed to improve briefing.
Clear and precise briefing documents	A clear and precise brief should be available at the end of the briefing.

4.3.2 Stakeholder-related factors

Aspects of stakeholders in PPP projects have been widely studied by researchers. For example, when conducting an industry-wide survey study, Chan et al. (2003) found that the most significant benefits obtained from the use of partnering in PPP projects were ‘improved relationship amongst project participants’ and ‘improved communication amongst project participants’. Various demands of stakeholders, contractual arrangements, and different philosophical standpoints were found by Consoli (2006) through interviews that created friction between the involved parties. Apparently, friction is the major cause for poor relationships.

Through a Malaysian case study, Abdul-Aziz (2001) claimed that once privatization has taken place, re-involvement of the public sector, particularly through the injection of new funds, should be refrained from because of its lack of expert experience and possible social impact on the project. Researchers have also related the relationship issue to contractor selection. For choosing suitable contractors, researchers have not only suggested benchmarking as the ‘best’ selection practice, but also emphasized the ‘innovative’ contractor selection approaches to be used by large public clients, in which a relationship is always regarded as a key criterion. For example, Palaneeswaran and Kumaraswamy (2000a, 2000b) made a comparative overview to formulate a ‘cooperative’ and ‘non-competitive’ conceptual benchmarking model to identify the core aspects for selecting a suitable bidder in order to achieve the best ‘value for money’ results.

The success factors of how to create win–win relations were studied since a fair deal is what project parties should achieve. The strengths of successful approaches and the lessons from less successful or abortive projects were identified. For example, Zhang (2004a, 2004b) carried out a knowledge-mining process to draw experience and learn lessons from international PPP practices and to refine experiential and expert knowledge underlying the subconscious decision-making process in project financing. He developed five main critical success factors (CSFs) (favorable investment environment, economic viability, reliable concessionaire consortium with strong technical strength, sound financial package, and appropriate risk allocation via reliable contractual arrangements) for a win–win relationship, each of which includes a number of sub-factors.

18 factors which may affect stakeholder relationships were identified based on the literature review. For example, the Construction Industry Board (CIB) (1997) summarized that trusting relationships among stakeholders were important to the briefing process. Blyth and Worthington (2001) argued that a clear and comprehensive communication was a key aspect of briefing. This study examines whether these factors are equally important in the briefing process of PPP projects.

Table 4.3 Stakeholder-related factors of the briefing process in PPP projects

Factors	Explanations
Experience of the client	The client should have related experience of briefing.

Clear management structure	The client needs a clear management organization structure for briefing.
Knowledge of client's responsibility	Knowledge of the client's responsibility is needed.
Skillful guidance and advice from project manager	Project managers should give appropriate guidance and advice during briefing.
Holding workshops for stakeholders	Workshops for stakeholders should be held regularly.
Good facilitation	Good facilitation of briefing should be given to stakeholders.
Selection of briefing team	Briefing teams need proper participant selection.
Clarity of roles of stakeholders	Roles of stakeholders should be clarified clearly.
Sufficient consultation with stakeholders	Briefing needs sufficient consultation with stakeholders.
Experience of stakeholder group	Stakeholders' experience of attending briefing should be considered.
Balance of the needs/requirements of different stakeholders	Needs/requirements of different stakeholders need to be balanced.
Knowledge of consultants	Knowledge of consultants should be considered.
Knowledge of statutory and lease control of the project	Knowledge of statutory and concession period control of the project are needed in briefing.
Team commitment	Team commitment should be clear.
Honesty	Honesty among stakeholders is critical to briefing.
Openness and trust	Openness and trust should be built among stakeholders.

Open and effective communication	Briefing needs open and effective communication.
Agreement of brief by all relevant parties	Agreement on the brief should be obtained among all relevant parties.

4.3.3 Risk-related factors

In Australia, PPP is seen as a way for state governments to avoid most of risks by purchasing outputs. The initial allocation of risks must be considered in briefing of PPP projects. How well the private sector manages risks transferred and how the public sector manages the contract over PPP projects' long concession periods influence long term value-for-money results of PPP projects (Australian Department of Finance and Administration, 2005). The briefing process should identify the key risks of a PPP project and set out initial thinking on risk allocation. From the above discussion, nine factors about risk issues in PPP briefing process are identified as shown in Table 3.

Table 4.4 Risk-related factors of the briefing process in PPP projects

Risk-related factors	Remarks
Commencement of risk register	Risk issues needs to be identified in the briefing process.
Special risk assessment	Special risk assessment should be set for the brief.
Quantification consequences of risks	Consequences of quantitative project risks

	should be considered.
Estimation probabilities of risk	Probability of project risks should be estimated.
Calculation value of risks	Cost of project risks should be calculated in briefing.
Identification desired risk allocation	Desired project risk allocation should be determined during briefing.
Possible allocation of responsibilities and risks between the Government and the private sector	Possible allocation of responsibilities and risks of the project between the government and the private sector should be set in the brief.
Well measurement of risk management/mitigation	Risk mitigation management of the project need to be well measured.
Calculation transferable risks and retained risks	Project-related transferable risks and retained risks should be calculated in the brief.

4.3.4 Finance-related factors

6 finance-related factors are presented in Table 4 were found. For example, Akintoye et al. (2003) found that the key factors include high cost of the PFI procurement process, lengthy and complex negotiations, difficulty in specifying the quality of service, pricing of facility management services, potential conflicts of interests among those involved in procurement, and the public sector clients' inability to manage consultants. These factors are critical to the financing issues of PPP projects. Funding and budgets during preparation should be allocated to consider PPP before the briefing process. Take Western Australia State as an example, there has been very limited us of PPP projects and they have not been

typically ascribed to the public sector's procurement portfolio like the other states. Sometimes the proposed approach does not allow for the consideration of PPP options. PPP method is ignored because PPP entails political and financial considerations and the decision is taken by the Department of Treasury (Love et al., 2010).

Table 4.5 Finance-related factors of the briefing process in PPP projects

Finance-related factors	Remarks
Practical budget and programme	Practical budget and programme of the project should be needed.
Prepared biding for funds through the RAE process	Bidding for funds from the government should be prepared via the policy bureau through the resource allocation exercise process.
Conduction socio economic studies	Socio-economic studies regarding the project need to be conducted.
Demonstration how PPP can achieve the best value for money	Whether and how PPP can achieve the best value-for-money results should be indicated.
Proposed commercial arrangement	Proposed commercial arrangement including contract duration, payment mechanisms, and other partnership/financial arrangements should be formulated in the brief.
Good financial standing of the private partner	Good financial standing of the private partner needs be considered in briefing.

4.4 Development of the Critical Success Factors List

The four categories of CSFs addressed in previous section were identified through a literature reviews. These factors are candidate CSFs, which were further confirmed in terms of their appropriateness and sufficiency through consulting professionals from the construction industry. The consultation was conducted with three industrial experts in face-to-face interviews (refer to Appendix C). These experts took part in more than two PPP projects experience by assuming different project management roles. Two further interviews were conducted with officers from some departments of the HKSAR Government who are in charge of PPP projects in the capacity as project client. An additional interview was conducted with a contractor from a private company. Each interview lasted for half to 1 hour, depending on the interviewees' availability and contributions.

All interviewees agreed that the proposed four categories were proper, critical and comprehensive. They also made valuable comments on the use of language and the way of presentation of factor statements. All comments were considered and acted upon the construction of the confirmed list of CSFs.

4.5 The Questionnaire Survey

A questionnaire survey was used to collect views from a wide perspective on the relative significance between individual factors.

4.5.1 Survey design and administration

By using the confirmed list of candidate CSFs presented in the last section, the questionnaire included a number of questions such as “please answer this section with reference to your previous experience in a PPP project that you have participated in Hong Kong”. It was planned to send the questionnaire to a comprehensive group of target respondents to seek their professional opinions on the relative significance between the factors. Prior to sending out the questionnaires, a pilot study was conducted to validate the readability and adequacy of the questionnaire. Two government officers who had taken part in PPP projects were required to answer the preliminary questionnaire. There were no diverse comments proposed, and hence the finalized questionnaire was the same as the first version.

The questionnaire consisted of two sections. In the first section, respondents’ background information includes four types of data: namely the type of the PPP project, the nature of the PPP project, the role played in the PPP project and the experience of the PPP project, was collected. In the second section, respondents were invited to rate the individual factors under the four categories on a scale of 1-5, where 1 represents ‘strongly disagree’ and 5 represents ‘strongly agree’. Respondents in Hong Kong and Australia answered the questionnaire based on a particular PPP project they had participated in.

The questionnaire survey in Hong Kong was carried out from March to May 2009 to collect opinions from the public sector. Those who had PPP experience in the

HKSAR government departments were chosen as participants in this study. 500 questionnaires were sent out and 122 effective responses were collected, yielding a response rate of 24.4% which was in the acceptable range in construction research (Akitoye, 2000; Zhang, 2004). Questionnaires were received from the respondents who worked in the Architectural Services Department, the Buildings Department, the Drainage Services Department, the Efficiency Unit, the Environmental Protection Department, the Highways Department, and the Transport Department.

The questionnaire survey in Australia was carried out from August to October 2010 to collect opinions from the public sector on the Queensland Government in Australia. Questionnaires were distributed to professionals in governmental departments, including the Department of Education and Training, the Department of Infrastructure and Planning, the Department of Transport and Main Roads, and the Department of Treasury. These departments all have had PPP work experience such as the Southbank Institute, the North-South By-pass Tunnel, and the Airport Link project. Consequently 78 effectively completed questionnaires were collected, giving a response rate of 26.4% which was in the acceptable range in construction research (Akitoye, 2000; Zhang, 2004).

4.5.2 Sample characteristics

The sample data collected in Hong Kong covered a wide range of PPP projects, about one third of the respondents have worked on road projects (33.6%), followed by drainage projects (29.5%), waste transfer stations (13.1%), theme parks (9%),

tunnels (6.6%), schools (4.9%) and rail projects (3.3%). Of the four different natures of PPP projects, slightly more than half of the projects involved refurbishment (52.5%), followed by new build (33.6%) and schemes comprising both new build and refurbishment (13.9%). In terms of roles played in PPP projects, 51 respondents were engineers (41.8%), followed by client representatives (22.95%), administrators (9.84%), contract managers (8.20%), surveyors (7.38%), financial managers (4.92%), architects (2.46%), and contractors/suppliers (2.46%). It should be noted that most of the respondents (77%) were not directly involved in briefing, leaving 23% of respondents directly involved in briefing. Despite this, their active involvement in projects should provide useful data for this survey. Especially when briefing is perceived to be part of the inception stage of a project, professionals who work at other stages should be able to provide opinions on how to improve the briefing process.

In the sample data collected in Australia, more than half of the respondents (56.4%) worked in infrastructure projects (including rails, tunnels, roads etc.), while 43.6% took part in PPP building projects such as hospitals and schools. For the nature of PPP projects, most of the projects were new build (98.7%) and only one respondent worked in refurbishment projects (including renovation, extension etc.). In terms of roles in PPP projects, 20 respondents (25.6%) were from professional groups including contractor/suppliers, engineers, and surveyors. The left 74.4% of respondents (n=58) are at management level such as administrators, client representatives, contract managers, financial managers, and legislative councilors.

For the briefing experience in PPP projects, 47 respondents were directly involved and 31 respondents did not directly join the briefing process.

4.6 Methodology for Data Analysis

The obtained raw data were inputted and analyzed with the aid of a mathematical model and the Statistical Package for Social Sciences (SPSS) computer software. The analysis and calculation were carried out to answer the following questions for achieving Objective 2:

- What is the ranking of the CSFs of each category with different background information?
- Is there a general consensus on the rankings of the CSFs across respondent groups?
- Is there any correlation between the score values of CSFs and respondent group types?
- What are the typical differences in perceptions on the relative importance of CSFs across respondent groups?

The answers and findings to the above questions are discussed in detail in Sections 4.7 to 4.9 respectively. Purposes and outcomes of different statistical analysis methods are summarized in Table 4.6 (adopted from Yang, 2010).

Table 4.6 Methods of statistical analysis (adopted from Yang, 2010)

Method	Purpose of the method	Outcomes
Kendall's Coefficient of Concordance	Measuring the agreement of respondents on their rankings of CSFs	The ranking of CSFs according to different types of projects and respondents
Correlation (T-test and ANOVA)	Describing the strength and direction of the correlation between two variables	a) The similarity to the rankings of CSFs across different groups; b) The correlation between CSFs and background variables
Nonparametric Test – 2-independent samples (Mann-Whitney Test)	Investigating the difference between two independent groups on the scores of the CSFs	The true differences in perceptions of the relative importance of CSFs across groups

These methods were used by similar survey studies carried out by Akintoye (2000), Wong and Aspinwall (2005), Aksorn and Hadikusumo (2008), and Yang (2010).

Linear discriminate analysis (LDA) has been shown to be very useful in statistics, pattern recognition, machine learning and data mining to find a linear combination of features which characterize or separate different classes of instances (e.g. Fisher, 1936; Lachenbruch, 1975; Klecka, 1980; Friedman, 1989; Duda et al., 2000; Martinez and Kak, 2001; McLachlan, 2004). The main goal of LDA is to predict group membership based on a linear combination of the random variables. The combined features preserve the maximal separable property of data, and thus are

useful to visualize categorized data in lower dimensional space. A sample visualization method is developed to estimate the weighted importance of the 48 factors in four categories. The method is described below.

Suppose there are N respondents, where N is 122 in this data set. Each respondent is denoted as $\mathbf{x}_i = (x_{i,1}, x_{i,2}, ..., x_{i,d}) \in R^d$, which is a dimensional vector. Each dimension is an item with values ranging from 1 to 5. The class labels used in pattern recognition (Duda et al., 2000; Bishop, 2006; Hastie et al., 2008) are defined based on the indicator of different variables, namely the options mentioned above. These variables are used to help distinguish different data samples. Suppose there are C classes, and the label of $\mathbf{x}_i$ is l_i. The linear discriminate analysis (LDA) finds a linear projection matrix $\mathbf{W} \in R^{d \times m}$ to project the original data to lower-dimensional data

$$\mathbf{y}_i = \mathbf{W}^T \mathbf{x}_i \tag{1}$$

where $\mathbf{y}_i \in R^m$ is an m dimensional vector.

To estimate $\mathbf{W}$, two scatter matrices are introduced, which are the within-class scatter matrix $\mathbf{S}_w$ and between-class scatter matrix $\mathbf{S}_b$:

$$\mathbf{S}_w = \sum_{i=1}^{C} \sum_{\mathbf{x}_j : l_j = i} (\mathbf{x}_j - \mathbf{m}_i)(\mathbf{x}_j - \mathbf{m}_i)^T \tag{2}$$

$$\mathbf{S}_b = \sum_{i=1}^{C} (\mathbf{m}_i - \mathbf{m})(\mathbf{m}_i - \mathbf{m})^T \tag{3}$$

where $\mathbf{m}_i$ is the mean of class i, and $\mathbf{m}$ is the mean of all data samples. $\mathbf{S}_w$ measures the intra-class variances and $\mathbf{S}_b$ measures the inter-class variances. The optimization of the projection matrix $\mathbf{W}$ is to find a lower-dimensional space to simultaneously maximize the between-class scatter and minimize the within-class scatter. Compared with the principal component analysis, which is based on the total variances ($\mathbf{S}_w + \mathbf{S}_b$), the LDA projects the data sample with most discriminative directions (Bishop, 2006). This means that the projected data have the property where the samples are with the same label will show a clustering property in the projected space. The visualization will help find classes with similar levels of importance but different working experiences. The optimization criterion is formulated as:

$$\mathbf{W}^* = \arg\max_{\mathbf{W}\in R^{d\times m}} tr\left(\left(\mathbf{W}^T\mathbf{S}_w\mathbf{W}\right)^{-1}\left(\mathbf{W}^T\mathbf{S}_b\mathbf{W}\right)\right) \quad (4)$$

Here *tr* represents the trace of a matrix. The solution to this criterion is proven to be the m largest eigenvectors of the matrix $\mathbf{S}_w^{-1}\mathbf{S}_b$ and the optimizal value of the criterion is the sum of the corresponding largest eigenvalues (Duda et al., 2000; Bishop, 2006; Hastie et al., 2008).

Since each vector $\mathbf{x}_i$ is used to represent a sample, the similarity between samples $\mathbf{x}_i$ and $\mathbf{x}_j$ can be represented by a function of Euclidean distance. The shorter the Euclidean distance between the two samples, the more similar they are. Therefore, the Euclidean distance between two projected vectors $\mathbf{y}_i$ and $\mathbf{y}_j$ was used to

approximately represent the similarity. Although some information may be lost, this does not affect the use of the 2D plane to visualize the clustering property.

Based on the observation in the 2D visualization of samples, most of the samples are located approximately on a Gaussian distribution near the zero point. However, some samples are distant from the center. To reduce the influence of faraway clustered data samples, a class-mean-based ranking method is developed to sort the factors. A function of the class mean and the total data mean is used to weight the factor agreement values. In particular, the weighting for data $\mathbf{x}_i$ in background variable k is calculated as:

$$\begin{aligned} w_{l_i}^k &= \exp\left(-\frac{1}{2}\left(\mathbf{m}_{l_i}^k - \mathbf{m}^k\right)^T \boldsymbol{\Sigma}^{-1} \left(\mathbf{m}_{l_i}^k - \mathbf{m}^k\right) \right) \\ &= \exp\left(-\frac{1}{2}\left(\mathbf{m}_{l_i}^k - \mathbf{m}\right)^T \boldsymbol{\Sigma}^{-1} \left(\mathbf{m}_{l_i}^k - \mathbf{m}\right) \right) \end{aligned} \tag{5}$$

where k is the indicator of different background variables, ranging from 1 to 4 to represent four background variables respectively. l_i is the class label for $\mathbf{x}_i$. $\mathbf{m}_{l_i}^k$ is the mean of class l_i in background variable k. $\mathbf{m}^k = \mathbf{m}$ is the total data mean. $\boldsymbol{\Sigma}$ is the total data covariance matrix which is calculated based on all the data samples, so that:

$$\boldsymbol{\Sigma} = \frac{1}{N-1}\sum_{i=1}^{N}(\mathbf{x}_i - \mathbf{m})(\mathbf{x}_i - \mathbf{m})^T \tag{6}$$

It can be seen that the weighting coefficient is just the exponential term of a multivariate Gaussian distribution:

$$\frac{1}{(2\pi)^{d/2}}\frac{1}{|\mathbf{\Sigma}|^{1/2}}\exp\left(-\frac{1}{2}\left(\mathbf{m}_{l_i}^k-\mathbf{m}\right)^T\mathbf{\Sigma}^{-1}\left(\mathbf{m}_{l_i}^k-\mathbf{m}\right)\right) \tag{7}$$

which ignores the constant term. The weighting has the property ranging from 0 to 1. If the class mean $\mathbf{m}_{l_i}^k$ in background variable k is distant from the total data mean $\mathbf{m}$, a small weighting is given to the samples with that background variable option. Contrarily, if the experience class $\mathbf{m}_{l_i}^k$ in experience type k is near the total data mean $\mathbf{m}$, a large weight is given, since the samples in options of that background variable represent the majority of the collected data. Similar weighting schemes have been widely used in non-parametric kernel methods (Schölkopf and Smola, 2001), neural network-based machine learning (Bishop, 1995) and manifold approximation (Belkin and Niyogi, 2005).

Based on the weighting in each background variable option, the weighting for each data sample $\mathbf{x}_i$ is defined as:

$$w_{\mathbf{x}_i}=\frac{1}{4}\sum_{k=1}^{4}w_{l_i}^k=\frac{1}{4}\left(w_{l_i}^1+w_{l_i}^2+w_{l_i}^3+w_{l_i}^4\right) \tag{8}$$

where $w_{l_i}^k$ is the weight for $\mathbf{x}_i$ with class label l_i in background variable k. This means that if a data sample is in the majority of all of the four background variables, it adds a large weighting to compute the final ranking.

With the weighting value for each data sample, the final ranking score for item j is calculated as:

$$r_j = \sum_{i=1}^{N} w_{\mathbf{x}_i} x_{i,j} = w_{\mathbf{x}_1} x_{1,j} + w_{\mathbf{x}_2} x_{2,j} + \ldots + w_{\mathbf{x}_N} x_{N,j} \quad (9)$$

4.7 Findings from the questionnaire survey in Hong Kong

4.7.1 Procurement-related factors

The visualization results of procurement-related factors are shown in Figure 4.1. The horizontal and vertical axes represent the scale value of the projected coordinate system. The scale value is a weighted combination of original factor values. The weighting scheme is determined by the projection matrix $\mathbf{W}$. In Figure 4.1, most of the samples show their clustering properties, which means the samples of the same class label are projected onto nearby places. Since all the original rating values are normalized as zero mean and uniform variance, most of the samples cluster around the zero point. There are some clusters very close to the zero point, but there are also clusters distant from the zero point.

In Figure 4.1 shows that the background “the type of the PPP project”, results from respondents who took part in waste transfer projects are more centralized than those who took part in theme park projects. It was found that respondents who attended waste transfer shared the same opinions on questions raised in the questionnaire survey and respondents who attended theme park projects had different views

among themselves. The figure only gives a direct sight about data distribution in different background information variables. Detailed ranking results generated by the mathematic model are presented in Table 4.7.

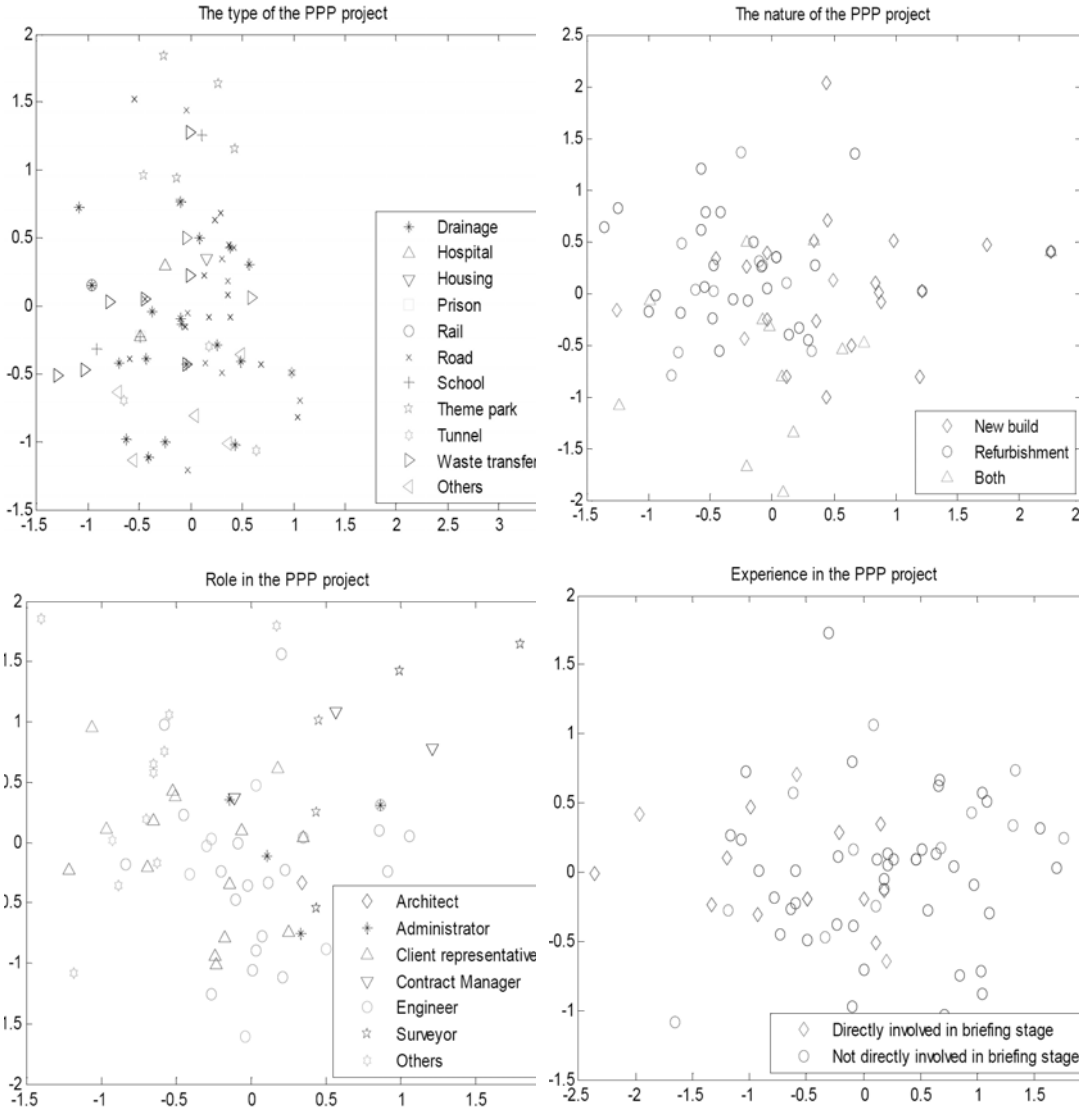

Figure 4.1 Projection results of background variables for procurement-related factors

Table 4.7 lists the ranking order of factors related to procurement in the briefing process from public sector opinions.

Table 4.7 Ranking scores of procurement-related factors

Factors	Weighted Scores
Clear goals and objectives	3.193
Clear end user requirements	3.191
Experience of the brief writer	3.187
Thorough understanding of client requirements	3.067
Good record of decisions made	2.956
Identification of client requirements	2.941
Adequate time for briefing	2.888
Flexibility of briefs to cater for changes	2.837
Time for freezing of brief documents	2.821
Clear and precise briefing documents	2.819
Feedback from completed projects	2.806
Development of a Framework agreed by the key parties	2.797
Proper priority setting	2.751
Consensus building	2.745
Control of process	2.561

As shown in Table 4.7, “clear goals and objectives” ranked first (=3.1932), followed by “clear end users requirements” (=3.1914). In order to maximize the benefit from a project, clear goals and objectives of briefing should be based on clear instructions from the client (CIB, 1997; Abdel-Aziz, 2001). End users of the project may have specific requirements which, unfortunately, may not be made known in the briefing

process. Thus, the client has the responsibility to make sure that all user groups' requirements are heard (Blyth and Worthington, 2001).

In the third and fourth places were "experience of the brief writer" (=3.1869) and "thorough understanding of client requirements" (=3.0674). Brief documents specify all requirements demanded by a project and therefore brief writers therefore play an important role as they need to capture all the requirements in a clear overall picture for project stakeholders, including clients and designers (Hyams, 2001). On the other hand, the needs and requirements of all stakeholders should be included in a comprehensive manner in the end product of building construction (Karama et al., 2002). For example, site, environmental, and regulatory requirements should be combined when producing design requirements

"Good record of decisions made" holds the fifth place in the rankings (=2.9563). The reasons for its importance are similar to those of "experience of the brief writer". Decisions should be well kept and recorded in brief documents by brief writers for later use. There are many techniques, such as computer-aided tools, that can help establish records of decisions (Tang et al., 2010).

The public sector seems not to agree that it should be responsible for the whole briefing process. It is assumed that each stakeholder needs to contribute to briefing and brief documents. Regarding "consensus building", many respondents think that

it is not only the key parties but all stakeholders who should have equal rights to express their opinions in a briefing.

4.7.2 Stakeholder-related factors

Figure 4.2 shows the projection results for stakeholder-related factors in different background information variables. Regarding the background “the nature of the PPP project”, the most centralized results are from the respondents who took part in new build of PPP projects. It maybe because respondents who attended new build might have to deal with more new requirements than those in refurbishment project. So respondents who attended new build projects shared the same opinions on questions raised in the questionnaire survey and respondents who attended refurbishment projects had different views among themselves. The figure shows the data distribution in different background information variables. Detailed ranking results generated by the mathematic model are presented in Table 4.8.

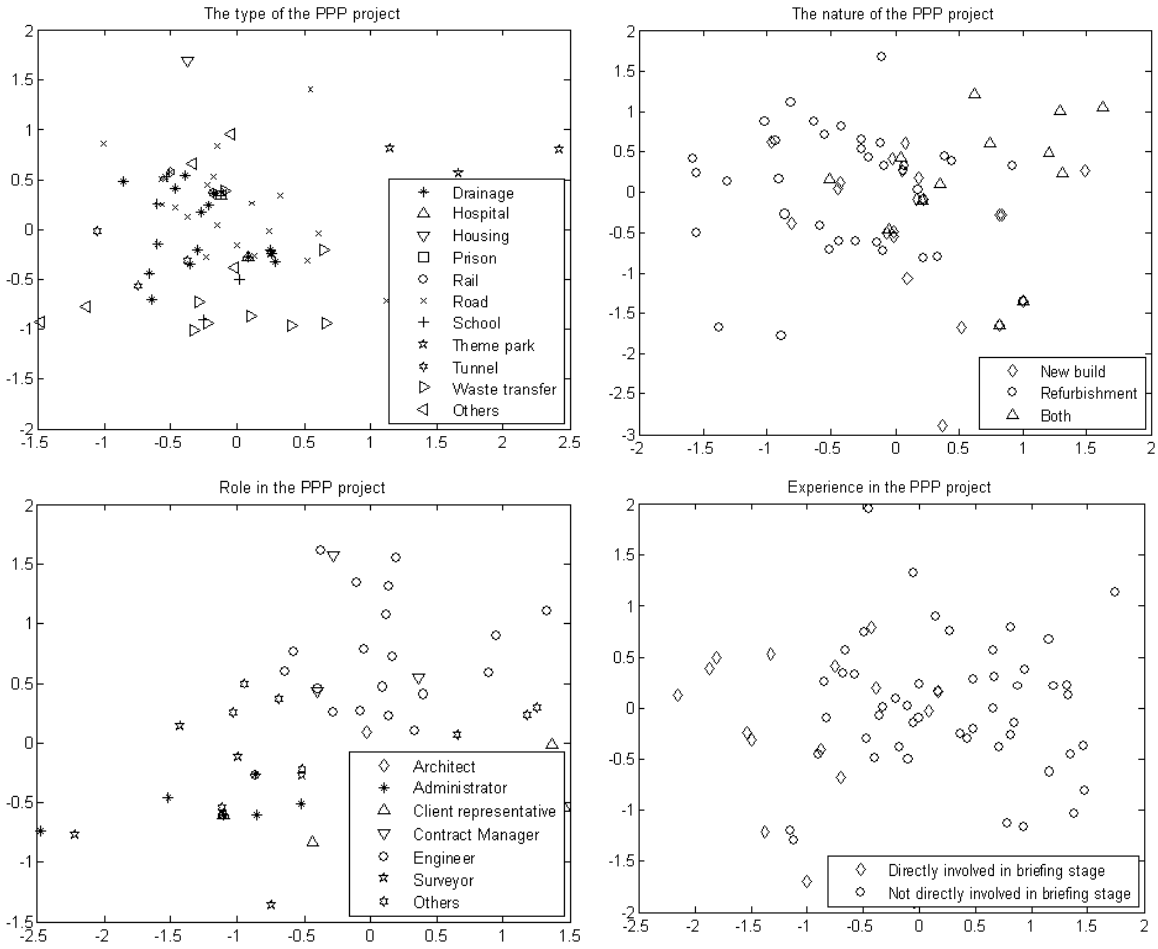

Figure 4.2 Projection results of background variables for stakeholder-related factors

Table 4.8 lists the ranking order of factors related to stakeholders in the briefing process from public-sector opinions.

Table 4.8 Ranking scores of stakeholder-related factors

Factors	Weighted Scores
Open and effective communication	2.735
Skillful guidance and advice from project manager	2.711
Knowledge of consultants	2.700
Openness and trust	2.677
Clarity of roles of stakeholders	2.657
Knowledge of clients business	2.650
Honesty	2.613

Knowledge of statutory and lease control of the project	2.596
Agreement of brief by all relevant parties	2.594
Selection of briefing team	2.590
Team commitment	2.583
Sufficient consultation with stakeholders	2.572
Clear management structure	2.490
Good facilitation	2.473
Balance of the needs/requirements of different stakeholders	2.468
Experience of the client	2.464
Holding workshops for stakeholders	2.386
Experience of stakeholder group	2.380

As shown in Table 4.8, “open and effective communication” ranked in first place (=2.735), followed by “skillful guidance and advice from project manager” (=2.711). The ethics of care offer an alternative underpinning that more adequately recognizes the interests and hears the voice of internal and external stakeholders (Smyth, 2008). From the views of the public sector, open and effective communication is the most important factor during the briefing process. Project managers have responsibility to give initial advice and undertake feasibility exercises to help the client appreciate the nature of their site or building (Salisbury, 1998). Project managers with skillful guidance and advice will lead to a smooth briefing.

“Knowledge of consultants” ranked third (=2.700). Consultants may manage teamwork, collaboration, face-to-face contact and effective communication structures during the briefing process. The public sector wants consultants to be well equipped to help the briefing process. “Openness and trust” listed in the fourth place (=2.677). As regards measures of closeness and collaboration in partnerships, two ways of trust were used: (1) self-interested trust, based upon seeking win-win

outcomes centering upon a minimal range needed for exchanges, managing transactions and working together and (2) socially orientated trust, based upon self-love (Smyth, 2008). The fifth place in the ranking was “clarity of roles of stakeholders” (=2.657). In order to understand the various interested parties in the project, all types of stakeholder should be identified and represented during the early stages of the project (Kelly et al. 2004).

The public sector seems not to care about the experience of attending briefing of stakeholder groups (=2.380). Because some of stakeholders in briefing are end users and/or other parties, so they do not force all stakeholders to attend the briefing process before. For “holding workshops for stakeholders” (=2.386), the public sector think workshops which train stakeholders how to do briefing are not that necessary because the purpose of the briefing process is to clarify all needs of clients. It is not possible to train stakeholders to do briefing as each project is unique to do a very standard way to the briefing process.

4.7.3 Risk-related factors

Figure 4.3 shows the projection results of risk-related factors in different background information variables. Regarding the background “role of the PPP project”, the most centralized results are from the respondents who were engineers in PPP projects. The results from the respondents who were client representatives or contract managers have more discrete distributions than engineers. The figure indicates

clearly data distribution in different background information variables. Detailed ranking results generated by the mathematic model are presented in Table 4.9.

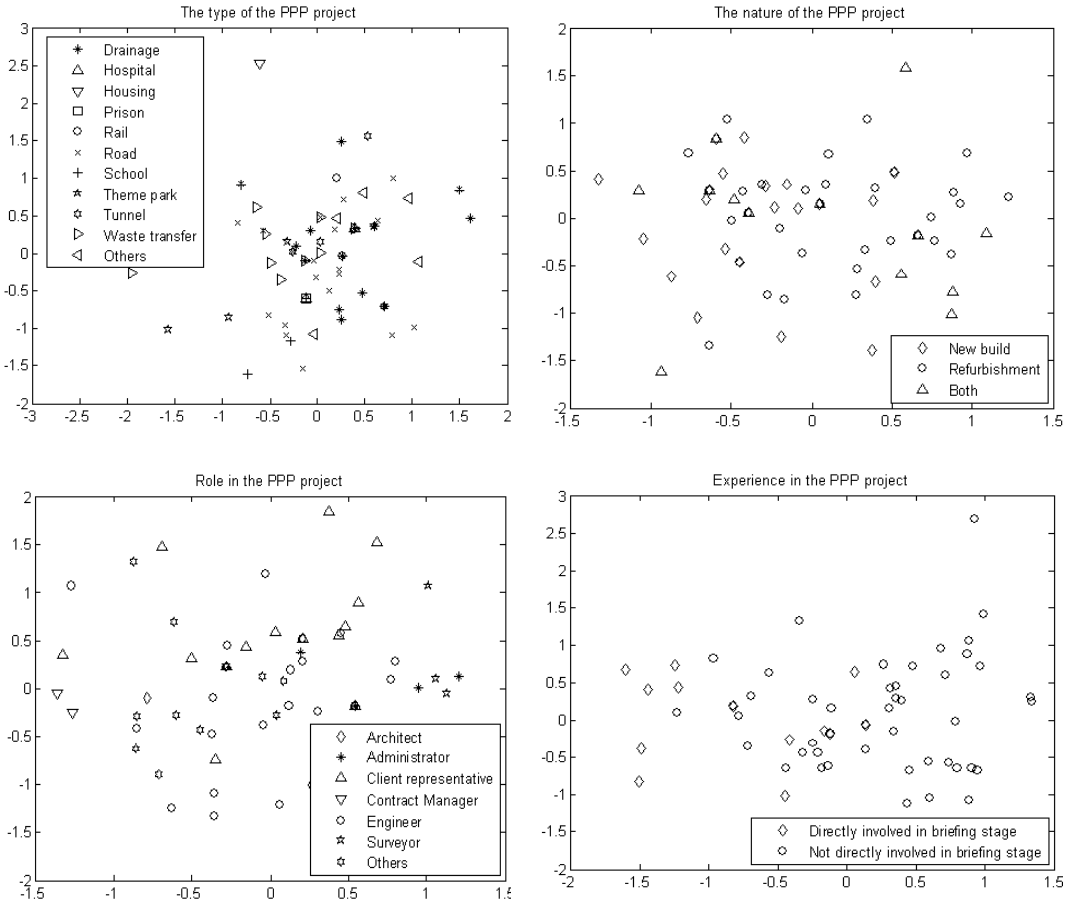

Figure 4.3 Projection results of background variables for risk-related factors

Table 4.9 Ranking scores of risk-related factors

Risk-related Factors	Weighted Scores
Possible allocation of responsibilities and risks between the government and the private sector	3.1061
Commencement of risk register	3.1052
Well measurement of risk management/mitigation	3.0651
Special risk assessment	2.9948

Quantitative consequences of risks	2.9298
Identification desired risk allocation	2.9150
Estimation probabilities of risk	2.8945
Calculation value of risks	2.8411
Calculation transferable risks and retained risks	2.8301

As shown in Table 4.9, “possible allocation of responsibilities and risks between the government and the private sector” ranked first (3.106), followed by “commencement of risk register” (3.105). It may because responsibilities are regarded as the most important issue in PPP projects with multi-stakeholders. If stakeholders are responsible for problem-solving, risks can be solved. Risk identification is also important as it determines the directions on risk avoidance and relocation. Risks cannot be managed until they are identified by the public sector.

The public sector seems to have ranked “calculation value of risks” (2.841) and “calculation transferable risks and retained risks” (2.830) in the last positions in the whole factors. It might because detail calculations do not need for the public sector, judgments of potential risks should be enough at the briefing process.

4.7.4 Finance-related factors

Figure 4.4 shows the projection results of finance-related factors in different background information variables. For example, the background “experience of the PPP project”, results from the respondents who were directly or indirectly involved in the briefing process are not centralized. Reasons for these might be that their opinions and answers were diverse and there were no format steps for the briefing

process. The figure indicates clearly about data distribution in different background information variables. Detailed ranking results generated by the mathematic model are presented in Table 4.10.

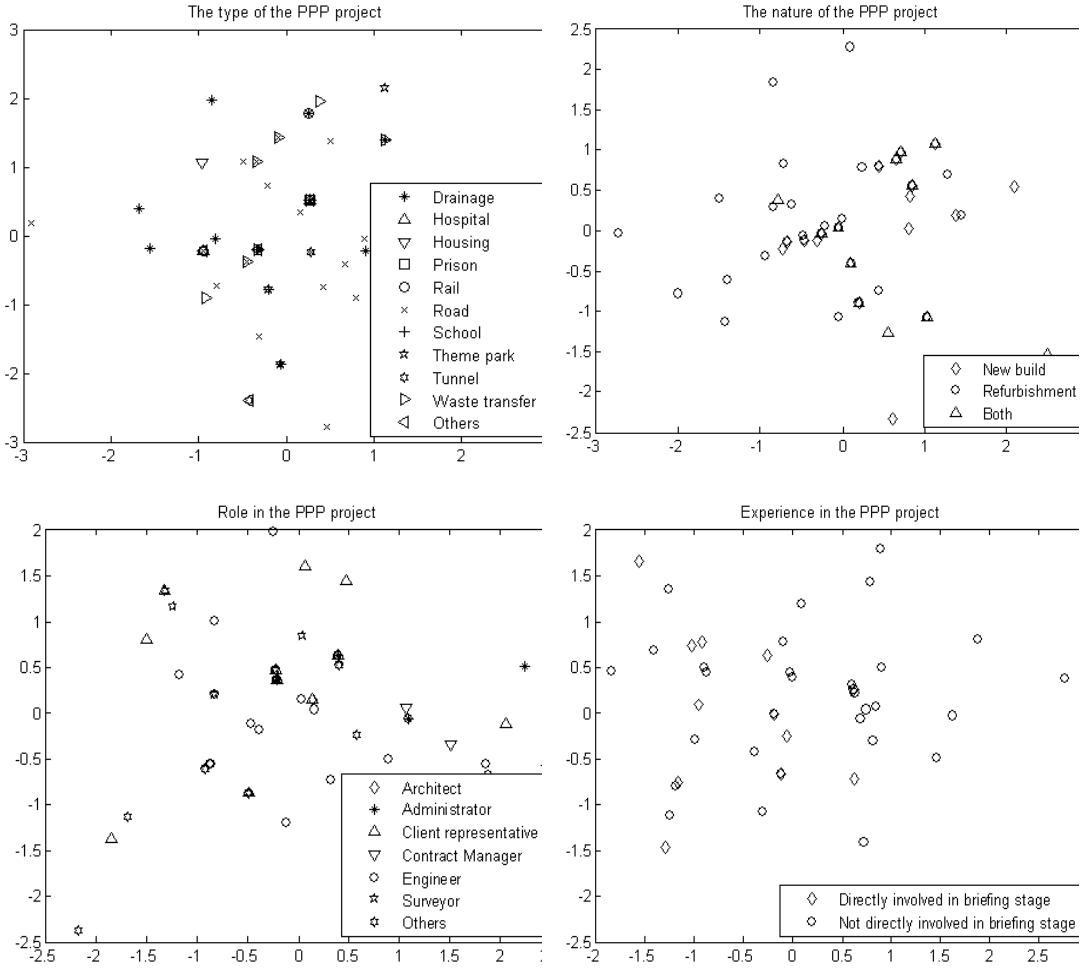

Figure 4.4 Projection results of background variables for finance-related factors

Table 4.10 Ranking scores of finance-related factors

Factors	Weighted Scores
Practical budget and programme	3.5335
Good financial standing of the private partner	3.4104
Prepared biding for funds through the RAE process	3.3437
Demonstration how PPP can achieve the best value for money	3.3131
Proposed commercial arrangement	3.2734
Conduction socio economic studies	3.1104

As shown in Table 4.10, “practical budget and programme” ranked first (3.534), followed by “good financial standing of the private partner” (3.410). Both of these two factors give confidence to the public factors from the potential private partner. Practical budget and programme could lead to a reasonable investment from the private sector. A good financial standing could assure the public sector that a potential private partner is capable of finishing projects.

“Proposed commercial arrangement” (3.273) and “conduction socio economic studies” (3.110) listed the last positions of ranking results. The reasons for these results might be that the public sector thought the commercial arrangements and socio-economic studies were not that necessary during the briefing process, comparing with other financial aspects.

4.8 Findings from the questionnaire survey in Australia

4.8.1 Procurement-related factors

Before calculating values for factor ranking, comparisons of different background variables were conducted to test influences of different backgrounds on the factors. For the types of PPP projects, T-test was used because there were two types of variables, infrastructure and building. Results in Tables respectively showed some factors had significantly different values from the two different types of PPP projects. Take procurement-related factors for example, in Table 4.9, there are 9 factors which have significantly different influence under two kind of PPP projects, which are: “clear goal and objectives” (0.000), “proper priority setting” (0.005), “time for freezing of brief documents” (0.000), “flexibility of briefs to cater for changes” (0.014), “good record of decisions made” (0.000), “identification of client requirements” (0.000), “thorough understanding of client requirements” (0.000), “feedback from completed projects” (0.000), “clear and precise briefing documents” (0.000). Further analysis of these 9 factors was taken to show which variables had more influence on factors in columns “mean of infrastructure projects” and “mean of building projects”. Values in “average mean” are average means of these factors in the background variable “types of PPP projects”, while values in “mean of infrastructure projects” and “mean of building projects” are average means of factors in different types of projects. Values in parentheses are the absolute differences of influenced factors between the average means and the means of different types of PPP projects. As shown in Table 4.9, 4.12, 4.15, and 4.18, within these factors

which have influences by different types of PPP projects, building projects seem to have more influence than infrastructure projects.

Table 4.11 Results of procurement-related factors (the type of PPP project)

	Sig. (2-tailed)	Mean	Mean of infrastructure projects	Mean of building projects
Clear goal and objectives	0.000	4.73	4.52 (0.21)	5.00 (0.27)
Proper priority setting	0.005	4.01	3.86 (0.15)	4.21 (0.20)
Time for freezing of brief documents	0.000	4.46	4.05 (0.41)	5.00 (0.54)
Flexibility of briefs to cater for changes	0.014	4.56	4.39 (0.17)	4.79 (0.23)
Good record of decisions made	0.000	4.59	4.27 (0.32)	5.00 (0.41)
Identification of client requirements	0.000	4.73	4.52 (0.21)	5.00 (0.27)
Thorough understanding of client requirements	0.000	4.60	4.30 (0.30)	5.00 (0.40)
Feedback from completed projects	0.000	4.67	4.41 (0.26)	5.00 (0.33)
Clear and precise briefing documents	0.000	4.73	4.52 (0.21)	5.00 (0.27)
Experience of the brief writer	0.104			
Clear end user requirements	0.068			
Development of a framework agreed by the key parties	0.674			
Control of process	0.073			
Adequate time for briefing	0.104			
Consensus building	0.481			

Since contractors and clients usually have different opinions in the briefing process, same analysis of background “roles in PPP projects” are also done in Table 9-12. The parentheses in the diagonal cells are the absolute differences of influenced factors between the average means and the means of different roles of PPP projects.

In Table 4.10, most of the procurement-related factors have significantly different values from contractors and clients. For example, “clear end user requirements” has the largest difference between differences of average mean and means of contractors and clients. For this factor, difference between average mean and mean of contractors is 0.41, while difference between average mean and mean of clients is 0.04.

Table 4.12 Results of procurement-related factors (the role of PPP project)

	Sig. (2-tailed)	Mean	Mean of contractors	Mean of clients
Clear goal and objectives	0.000	4.73	5.00 (0.27)	4.55 (0.18)
Clear end user requirements	0.000	4.59	5.00 (0.41)	4.55 (0.04)
Development of a framework agreed by the key parties	0.001	4.31	4.50 (0.19)	4.06 (0.25)
Control of process	0.002	4.90	4.60 (0.30)	5.00 (0.10)
Consensus building	0.000	4.51	4.20 (0.31)	4.77 (0.26)
Proper priority setting	0.001	4.01	3.65 (0.36)	4.17 (0.16)
Time for freezing of brief documents	0.000	4.46	4.50 (0.04)	4.32 (0.14)
Flexibility of briefs to cater for changes	0.016	4.56	4.75 (0.19)	4.38 (0.18)
Good record of decisions made	0.000	4.59	5.00 (0.41)	4.32 (0.27)
Identification of client requirements	0.000	4.73	5.00 (0.27)	4.55 (0.18)
Feedback from completed projects	0.011	4.67	4.75 (0.08)	4.55 (0.12)
Clear and precise briefing documents	0.000	4.73	5.00 (0.27)	4.55 (0.18)
Experience of the brief writer	0.104			
Thorough understanding of client requirements	0.061			
Adequate time for briefing	0.104			

Table 4.13 Ranking of procurement-related factors in PPP briefing process

Procurement-related factors	Ranking results
Experience of the brief writer	3.23
Adequate time for briefing	3.22
Control of process	3.18
Identification of client requirements	3.05
Clear goals and objectives	3.04
Clear and precise briefing documents	3.03
Feedback from completed projects	3.02
Thorough understanding of client requirements	2.99
Clear end user requirements	2.96
Consensus building	2.94
Good record of decisions made	2.93
Flexibility of briefs to cater for changes	2.92
Time for freezing of brief documents	2.87
Development of a framework agreed by the key parties	2.75
Proper priority setting	2.62

Table 4.13 shows that an experienced brief writer (=3.23) is the most important thing during the briefing process in the public sector's opinion. Experienced writers help finalize brief documents on structures, contents, and records for usage of briefing documents in the rest of project life cycle, especially for states of Australia with few PPP projects before such as the Western Australia State. "Adequate time for briefing" (=3.22) and "control of process" (=3.18) are in the second and third positions in the list. Too much or too little time put in briefing would lead to time-extension of the project life cycle which would raise the bidding price for the private sector or make the requirements of stakeholders not fully understood. It is the same to the control of briefing process, a controlled process is necessary for both the

public and private sectors to ensure the effectiveness and efficiency of the briefing process.

Factors of “Time for freezing of brief documents” (=2.87), “development of a framework agreed by the key parties” (=2.75) and “proper priority setting” (=2.62) ranked lst in the list. Some of the Australian respondents perceived that the briefing process was a dynamic process in which means decisions could be changed anytime if necessary and brief documents could never be fixed or improved with the improvement of PPP projects.

4.8.2 Stakeholder-related factors

Table 4.14 Results of stakeholder-related factors (the type of PPP project)

	Sig. (2-tailed)	Mean	Mean of infrastructure projects	Mean of building projects
Clear management structure	.000	4.58	4.41 (0.17)	4.79 (0.21)
Knowledge of clients business	.013	4.64	4.52 (0.12)	4.79 (0.15)
Skilful guidance and advice from project manager	.001	4.91	5.00 (0.09)	4.79 (0.12)
Holding workshops for stakeholders	.031	4.76	4.89 (0.13)	4.59 (0.17)
Good facilitation	.000	4.37	4.05 (0.32)	4.79 (0.42)
Clarity of roles of stakeholders	.001	4.86	4.75 (0.11)	5.00 (0.14)
Sufficient consultation with stakeholders	.000	4.53	4.16 (0.37)	5.00 (0.47)
Experience of stakeholder group	.000	4.46	4.73 (0.27)	4.12 (0.34)
Knowledge of statutory and lease control	.000	4.73	4.52 (0.21)	5.00

of the project				(0.27)
Honesty	.013	4.64	4.52 (0.12)	4.79 (0.15)
Open and effective communication	.043	4.94	4.89 (0.05)	5.00 (0.06)
Agreement of brief by all relevant parties	.000	4.12	4.43 (0.31)	3.71 (0.41)
Experience of the client	.334			
Selection of briefing team	.133			
Balance of the needs requirements of different stakeholders	.062			
Knowledge of consultants	.028			
Team commitment	.050			
Openness and trust	.269			

Table 4.15 Results of stakeholder-related factors (the role of PPP project)

	Sig. (2-tailed)	Mean	Mean of contractors	Mean of clients
Experience of the client	0.000	4.58	4.25 (0.33)	4.85 (0.27)
Clear management structure	0.000	4.58	4.75 (0.17)	4.40 (0.18)
Knowledge of clients business	0.000	4.64	5.00 (0.36)	4.40 (0.24)
Good facilitation	0.000	4.37	4.50 (0.13)	4.17 (0.20)
Selection of briefing team	0.037	4.71	4.75 (0.04)	4.62 (0.09)
Clarity of roles of stakeholders	0.014	4.86	5.00 (0.14)	4.77 (0.09)
Sufficient consultation with stakeholders	0.048	4.53	4.25 (0.28)	4.53 (0.00)
Experience of stakeholder group	0.000	4.46	3.80 (0.66)	4.85 (0.39)
Balance of the needs requirements of different stakeholders	0.000	4.36	5.00 (0.64)	3.94 (0.42)
Knowledge of consultants	0.000	4.63	5.00 (0.37)	4.38 (0.25)
Knowledge of statutory and lease control of the project	0.000	4.73	5.00 (0.27)	4.55 (0.18)
Team commitment	0.002	4.42	4.50 (0.08)	4.26 (0.16)

Honesty	0.000	4.64	5.00 (0.36)	4.40 (0.24)
Open and effective communication	0.000	4.94	4.75 (0.19)	5.00 (0.06)
Skilful guidance and advice from project manager	0.080			
Holding workshops for stakeholders	0.346			
Openness and trust	0.185			
Agreement of brief by all relevant parties	0.221			

Table 4.16 Ranking of stakeholder-related factors in PPP briefing process

Stakeholder-related factors	Ranking results
Open and effective communication	3.21
Skilful guidance and advice from project manager	3.17
Openness and trust	3.13
Clarity of roles of stakeholders	3.12
Holding workshops for stakeholders	3.07
Knowledge of statutory and lease control of the project	3.04
Selection of briefing team	3.03
Experience of the client	3.00
Knowledge of client's responsibility	2.99
Honesty	2.98
Knowledge of consultants	2.96
Clear management structure	2.95
Experience of stakeholder group	2.94
Sufficient consultation with stakeholders	2.93
Team commitment	2.86
Good facilitation	2.82
Balance of the needs/requirements of different stakeholders	2.78
Agreement of brief by all relevant parties	2.67

The respondents selected "open and effective communication" (=3.21) as the most important factor among stakeholder-related factors as shown in Table 4.16, followed

by “skilful guidance and advice from project manager” (=3.17) and “openness and trust” (=3.13). The three factors allowed stakeholders who attended the briefing process to have direct access to PPP projects with first-hand knowledge of plans and requirements. Related staffs would immediately answer questions and provide detailed advice in such culture and environment.

The last three factors are “good facilitation” (=2.82), “balance of the needs/requirements of different stakeholders” (=2.78), and “agreement of brief by all relevant parties” (=2.67). Some of the respondents expressed that only facilitations to stakeholders are not enough, knowledge about briefing from stakeholders, such as contents, organization, and team selection of briefing, is as important as good facilitation to stakeholders. Ten government officers who worked in PPP projects of new building all expressed that needs/requirements of different stakeholders are hard to balance but solutions to the problem remain necessary to be examined.

4.8.3 Risk-related factors

Table 4.17 Results of risk-related factors (the type of PPP project)

	Sig. (2-tailed)	Mean	Mean of infrastructure projects	Mean of building projects
Special risk assessment	.001	4.86	4.75 (0.11)	5.00 (0.14)
Quantification consequences of risks	.043	4.94	4.89 (0.05)	5.00 (0.06)
Identification desired risk allocation	.000	4.60	4.30 (0.30)	5.00 (0.40)
Well measurement of risk management	.000	4.37	4.05 (0.32)	4.79

mitigation				(0.42)
Calculation transferable risks and retained risks	.043	4.87	4.77 (0.10)	5.00 (0.13)
Commencement of risk register	.174			
Estimation probabilities of risk	.895			
Calculation value of risks	.310			
Possible allocation of responsibilities and risks	.668			

Table 4.18 Results of risk-related factors (the role of PPP project)

	Sig. (2-tailed)	Mean	Mean of contractors	Mean of clients
Special risk assessment	0.014	4.86	5.00 (0.14)	4.77 (0.09)
Quantification consequences of risks	0.000	4.94	4.75 (0.19)	5.00 (0.06)
Estimation probabilities of risk	0.000	4.86	4.45 (0.41)	5.00 (0.14)
Calculation value of risks	0.000	4.72	4.25 (0.47)	4.85 (0.13)
Possible allocation of responsibilities and risks	0.000	4.73	4.50 (0.23)	5.00 (0.27)
Well measurement of risk management mitigation	0.000	4.37	4.50 (0.13)	4.17 (0.20)
Calculation transferable risks and retained risks	0.000	4.87	4.50 (0.37)	5.00 (0.13)
Commencement of risk register	0.399			
Identification desired risk allocation	0.061			

Table 4.19 Ranking of risk-related factors in PPP briefing process

Risk-related factors	Ranking results
Commencement of risk register	3.27
Quantification consequences of risks	3.25
Calculation transferable risks and retained risks	3.22
Estimation probabilities of risk	3.21
Special risk assessment	3.17
Possible allocation of responsibilities and risks between the Government and the private sector	3.13

Calculation value of risks	3.12
Identification desired risk allocation	3.03
Well measurement of risk management/mitigation	2.86

The Table 4.19 shows that “commencement of risk register” (=3.27), “quantification consequences of risks” (=3.25), and “calculation transferable risks and retained risks” (=3.22) are the top three factors related risk in PPP briefing process. It is never too early to identify risks in PPP projects and hence allocated to the parties who are best capable of carrying while transferring risks requires equitable risk allocation between the public and private sectors.

Some of the Australian officers explained that reasons why the three factors were less important in the factor list. Risks like price of materials can change and hence be different from what was calculated in the briefing process, while risk allocation is considered an on-going and ever-changing task. The Australian public sector also reckoned that measurement of risk management/mitigation should be left to consultancies.

4.8.4 Finance-related factors

Table 4.20 Results of finance-related factors (the type of PPP project)

	Sig. (2-tailed)	Mean	Mean of infrastructure projects	Mean of building projects
Prepared biding for funds through the RAE process	.000	4.12	3.80 (0.32)	4.53 (0.41)

Conduction socio-economic studies	.000	4.60	4.30 (0.30)	5.00 (0.40)
Demonstration how PPP can achieve the best value for money	.000	4.46	4.05 (0.41)	5.00 (0.54)
Practical budget and programme	.360			
Proposed commercial arrangement	.269			
Good financial standing of the private partner	.652			

Table 4.21 Results of finance-related factors (the role of PPP project)

	Sig. (2-tailed)	Mean	Mean of contractors	Mean of clients
Prepared biding for funds through the RAE process	0.001	4.12	4.00 (0.12)	3.96 (0.16)
Demonstration how PPP can achieve the best value for money	0.000	4.46	5.00 (0.54)	4.11 (0.35)
Good financial standing of the private partner	0.000	4.77	5.00 (0.23)	4.62 (0.15)
Practical budget and programme	0.207			
Conduction socio-economic studies	0.061			
Proposed commercial arrangement	0.185			

Table 4.22 Ranking of finance-related factors in PPP briefing process

Finance-related factors	Ranking results
Practical budget and programme	3.41
Proposed commercial arrangement	3.31
Good financial standing of the private partner	3.23
Conduction socio economic studies	3.16
Demonstration how PPP can achieve the best value for money	3.01
Prepared biding for funds through the RAE process	2.80

Table 4.22 shows that the Australian public sector rated “practical budget and programme” (=3.41) and “proposed commercial arrangement” (=3.31) most highly. Relatively, the respondents rated factors of “demonstration how PPP can achieve the best value for money” (=3.01) and “prepared biding for funds through the resource

allocation exercise process" (=2.80) low. Generally speaking, the officers of Australian state governments paid more attention to reasonable budget and PPP procurement programme than value-for-money results during the briefing process. There might be an inherent conflict between the public sector's need to demonstrate the value-for-money results and the private sector's need for robust revenue streams to support the financing arrangement. 20 government respondents who had been directly involved in the briefing process reckoned that market soundings were worth more consideration than the financial standing of the private partner in the early stage of a PPP project.

4.9 Comparison of Findings between Hong Kong and Australia

As the questionnaire survey was conducted in both Hong Kong and Australia, a comparison of results from the two places might help obtain a deeper understanding of views from the public sector.

Of all procurement-related factors, "experience of the brief writer" occupies a top 3 place of both lists (No.3 in Hong Kong list and No.1 in Australia list). An experienced brief writer is considered highly important because decisions made at briefing have a far-reaching influence on the life cycle of a project. On the other hand, "proper priority setting" occupies a bottom 3 place of both lists (No.13 in Hong Kong list and No.15 in Australia list) since the topics discussed and the decisions made in the briefing process cover a wide variety of issues and the priority of decisions is therefore not that necessary for the public sector.

Of the stakeholder-related factors, “open and effective communication” and “skilful guidance and advice from project manager” are ranked first and second in both the Hong Kong and Australian lists as both factors give the opportunity for all stakeholders who attend the briefing process a direct access to PPP projects with first-hand knowledge of plans and requirements. Related staffs would immediately answer questions and provide detailed advice in such culture and environment.

Of the risk-related factors, the factor “commencement of risk register” took high places in the rankings (No.2 in Hong Kong list and No.1 in Australia list). It is never too early to identify risks in PPP projects and risks must be properly identified before they can be allocated to the parties who are best capable of carrying them. In contrast, the factor “calculation value of risks” took low places (No.8 in Hong Kong list and No.7 in Australia list) because detailed calculations are uncalled for at the briefing stage when judgments of potential risks will suffice.

Of the finance-related factors, the factor “practical budget and programme” took the first place in both the Hong Kong list and the Australian list. The public sector from both Hong Kong and Australia paid more attention to reasonable budget and PPP procurement process. It can be concluded that the financial ability of potential private sector is important for the private sector.

4.10 Validation of the Critical Success Factors

4.10.1 Testing for reliability of a scale

Cronbach's Coefficient Alpha was used to examine the internal consistency of scales under the headings of the CSFs. A Cronbach alpha value was computed for each dimension. The alpha coefficients ranged from 0.66 to 0.73 were greater than 0.6, which indicated that all factors had acceptable and good internal consistency and reliability (Hair et al., 1998; Zhang, 2006).

4.10.2 Testing for content validity

Ahire et al. (1996) believed that if the measurement items in the survey "adequately cover the content domains or aspects of the concept being measured", an instrument has content validity. Gotzamani and Tsiotras (2001) and Wong and Aspinwall (2005) have clarified that "it is not assessed numerically, but can only be subjectively judged by the researchers". As discussed in Sections 4.1 to 4.5, the CSFs listed in this survey were identified by a comprehensive review of relevant literature and validated by several i8nterviews and a pilot study with the help of professionals from the construction industry which ensured the content validity of the questionnaire.

4.11 Summary of the Chapter

With a focus on different aspects of the briefing process in PPP projects, various aspects of CSFs have been suggested by researchers and presented in the literature. It has been found crucial to develop a comprehensive list of factors and their relative importance to the success of an effective and efficient briefing process.

This chapter presents the results of interviews and questionnaire surveys conducted in Hong Kong and Australia with the aim of developing a comprehensive list of CSFs. The results from Hong Kong and Australia were studied and compared to check differences in the relative importance of the CSFs.

48 CSFs from 4 categories were identified through a literature review, face-to-face interviews and pilot studies. Based on a questionnaire survey, the rankings of the CSFs were obtained. The findings from the study show that most of the respondents thought that all CSFs were critical to the success of an effective and efficient briefing process of PPP projects in the construction industry. A framework based on these CSFs are further explored and validated by the empirical studies in Hong Kong and Australia in Chapter 5 and 6.

CHAPTER 5

DEVELOPMENT OF A SYSTEMATIC FRAMEWORK FOR GUIDING THE BRIEFING PROCESS OF PPP PROJECTS

- *Introduction*
- *An Initial Framework for guiding the Briefing Process in Public Private Partnership Projects*
- *Findings from Interviews in Hong Kong for the Framework Improvement*
- *Findings from Interviews in Australia for the Framework Improvement*
- *Details of the Improved Systematic Framework*
- *Summary of the Chapter*

CHAPTER 5

DEVELOPMENT OF A SYSTEMATIC FRAMEWORK FOR GUILDING THE BRIEFING PROCESS IN PPP PROJECTS

5.1 Introduction

One of the research objectives of this study is to develop a systematic framework for the briefing process of PPP projects. Research efforts in this chapter will achieve this objective. This chapter starts exploring models of briefing by literature and the results of interviews in Hong Kong and Australia. The main outcome in this chapter will be a systematic framework for the briefing process in construction PPP projects, presented in the form of flowcharts.

This chapter is structured as including follows:

- An initial framework for guiding the briefing process of PPP projects was proposed based on a literature review (Section 5.2);
- The initial framework was refined by incorporating the comments from professionals, which were collected through constructive interviews. Interviews were conducted in both Hong Kong and Australia to collect

empirical information from practitioners in construction and government departments (Sections 5.3 and 5.4);

- A systematic framework for guiding the briefing process of PPP projects was formulated (Section 5.5).

5.2 An initial Framework for Guiding the Briefing Process in Public Private Partnership Projects

According to the definitions of briefing introduced in Chapter 2, the briefing process is carried out at the early stage in a project development process. Architectural programming (AP) was formerly used in the US which has the same meaning as construction briefing used in the UK and Hong Kong. RIBA outline plan of work and the AIA Schedule of Designated Services describe the process of briefing, as shown in Figure 5.1 (Luo, 2010).

It is showed by the briefing/AP definitions in Figure 5.1 that briefing and designing are intertwined. Regarding the design process, briefing contains two primary stages (RIBA, 2000; Kelly, 2005): strategic briefing and project briefing, as shown in Figure 5.2. This separation is the same in the research done by Newman et al. (1981), CIB (1997), and Kelly and Duerk (2001), or similar as the results from the research done by Barrett and Stanley (1999), Blyth and Worthington (2001), and Kamara et al. (2002).

RIBA Outline Plan of Work 7th Edition, 2000

Preparation		Design			Pre-Construction			Construction		Use
A	B	C	D	E	F	G	H	J	K	L
Appraisal	Strategic Briefing	Outline Proposals	Detailed Proposals	Final Proposals	Production Information	Tender Documents	Tender Action	Mobilization	Construction to Practical Completion	After Practical Completion

Development of a Brief

AIA Schedule of Designated Services 13th Edition, 2001

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Pre-Design	Site Analysis	Schematic Design	Design Development	Construction Documents	Bidding	Contract Administration	Post-Contract

Development of an Architectural Program

Figure 5.1 Briefing/AP in a project development process

The broad scope purpose and key parameters such as the overall budget and program are set out in the strategic brief (CIB, 1997). An output specification which explains in clear term expected is provided in the strategic brief. Then, the strategic brief will be transferred into construction term in the project brief, providing initial sizes and quantities to the elements and an outline budget (Luo, 2010).

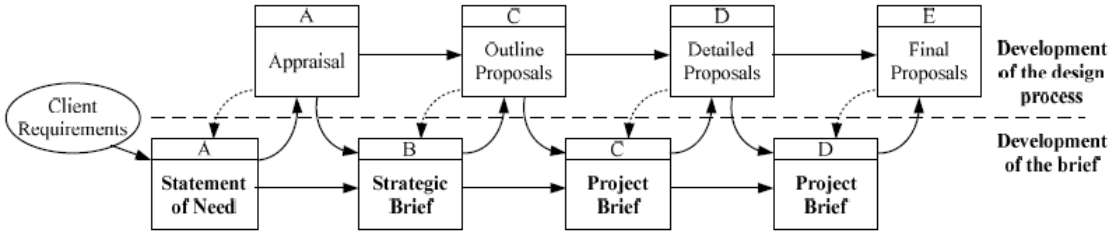

Figure 5.2 Process of brief and design development

(adapted from: RIBA, 2000)

Other studies such as Pena et al. (1987, 2001), Duerk (1993) and Cherry (1999) concluded that schematic programming and program development as two phases in architectural programming, as shown in Figure 5.3. Cherry (1999) stated that a matter of the information scale is the only difference between a schematic program and a design development program.

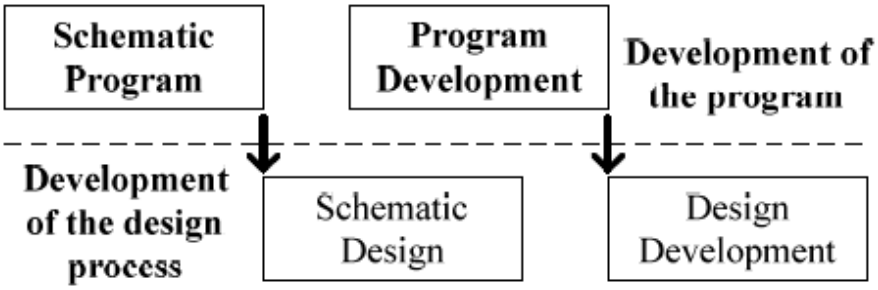

Figure 5.3 Two-phase process of program development

(adapted from: Pena and Parshall, 2001)

In more detail, four levels of the decision information in the project delivery process were summarized by Kelly and Male (1993). They were: (1) components, when the detailed design of elements is agreed; (2) concept, the point at which a decision to begin a project is taken and the formulation of the strategic brief and outline business case are undertaken; (3) elements, elements are identified, a cost plan configured, and a full business case completed when the building takes a geometric form; and (4) spaces, when the size, adjacency, servicing and finishing of spaces are defined in the project brief.

Kelly et al. (1992), in a comprehensive review of briefing studies for traditional construction projects, argued that the major weakness of the current briefing guide is that real assistance to clients and designers is too general and implicit. The briefing process in traditional construction projects (e.g., projects where design and build processes are handled by two different parties and projects which are only funded by governments), however there are very few studies focusing on the briefing process of PPP projects. Kamara and Anumba (2001) conducted case studies and an industrial survey to investigate the briefing process and to identify the limitations in

current practice. They suggested that the general framework for briefing is inadequate. Kelly and Duerk (2002) also note there are mandatory design guides that do not carefully consider the requirements of either the public sector or large corporate organizations. Outdated or irrelevant design guides may lead to inappropriate or even incorrect design decisions. Each project has a specific briefing process and briefing in one project can not be repeated for other projects.

However, there are appreciations that the existing project briefing models are not effective in application for PPP. The reasons why these existing models can not be directly used in the briefing process of PPP projects can be summarized: (1) these models are not specifically for PPP projects; (2) these models are too general and hard for project managers to follow for implementing the briefing process. An alternative model is therefore needed to guide the implementations of briefing. In this study, with reference to previous models, an initial framework for the briefing process of PPP projects is firstly proposed, as shown in Figure 5.4 (adopted from EU, 2008).

In this model, there are three components: deliverables, briefing activities, and briefing documentation. The central column of the model in Figure 5.4 consists of activities of briefing. The left column indicates various deliverables along the whole briefing process. Some deliverables may consist of more than one step. For example, the first deliverable is to mobilize and develop a business case, which consists of the first four steps. The right column represents the procedure or timeline of the briefing

process and the process for writing a brief. A briefing session in PPP projects is scheduled for approximately halfway through the bid preparation period. This allows the potential transaction advisors hired by the government to seek a financial bid for considering which elements of the project need clarification before completing their bids. Regular review of lessons learned from previous briefings and checking progress of ongoing briefings are important for producing an effective briefing process. Also, exposing hidden agendas through clear representation and recording of project goals is an important function of the brief writer.

Nevertheless, the adequacy of the model in Figure 5.4 needs to be checked. For this purpose, interviews were conducted both in Hong Kong and Australia to seek opinions from experts.

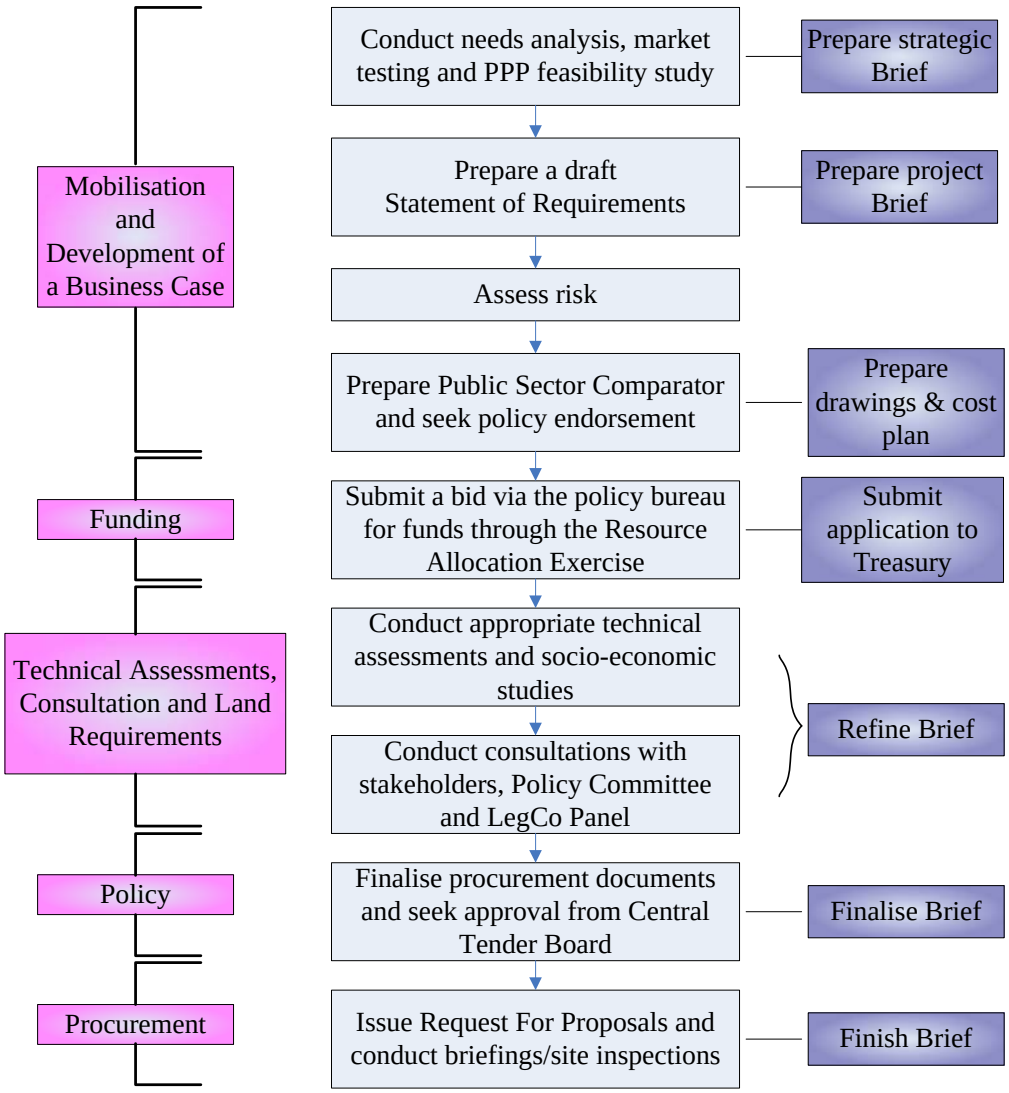

Figure 5.4 An initial framework for the briefing process of PPP projects

The interviews were designed to help explore the detailed activities in the briefing process for PPP projects. The results from the interviews were used to modify the initial framework. The process and analysis of the interviews in Hong Kong and Australia are reported in the following Sections 5.3 and 5.4.

5.3 Findings from Interviews in Hong Kong for the Framework Improvement

Three face-to-face interviews were conducted in Hong Kong to collect empirical information about the proper procedures and activities of the briefing process of PPP projects. One interviewee was a government officer from EU with 20-year working experience in construction and the other two interviewees were from construction companies, both of them have over 15-year working experience in the construction industry. The interview questions were related to the development of a briefing framework for PPP projects. They are as follows:

Q1. Would you please describe the briefing process for PPP-type construction projects you attended before?

Q2. Who are key parties in the briefing process of PPP projects in your understanding?

Q3. Do you think the initial framework is proper for the briefing process of PPP projects? What modifications should be made?

The responses of the interviewees are summarized as follows:

(1) Responses to Q1:

All of interviewees expressed that they do not have an established procedure for the briefing process in PPP projects. This is in line with Kelly (2005)'s findings that the briefing process did not have a fixed procedure. Nevertheless, the interviewees believed that an established procedure for the briefing process in PPP projects is

important. They also found that identifying all critical factors for the briefing process is the key to the effective and efficiency of the briefing process.

(2) Responses to Q2:

The interviewees listed a number of groups relating to construction projects. These groups include: clients, contractors, consultants, suppliers, end users, government, financiers/sponsor, communities, general public, competitors, and etc. One of the interviewees from a government department believed clients are the most important during briefing while the other two interviewees from industry suggested that end users and financier/sponsor should also be invited to attend the briefing process as they are also important stakeholders. Clients need to clearly explain their requirements which should be accepted by end users. Financier/sponsor should be invited to attend the briefing process of PPP projects because PPP projects need to be invested by the private sector. Interviewees said that financier/sponsor here does not only mean to the potential private partner but also financial officers from treasury-related departments from the government.

(3) Responses to Q3:

The interviewees basically agreed that the initial framework proposed expressed the real process of the briefing process of PPP projects. Nevertheless, they suggested that the framework provide more detailed activities which could guide both the public sector and the private sector through the briefing process. For example, the framework should cover more steps where stakeholders should be involved in and

the aspects which should be charged by cooperative stakeholders. Particularly, they suggested that the key factors affecting the effectiveness of each procedure be highlighted in this context. The concepts of CSFs were introduced to the interviewees at this point and the interviewees suggested including CSFs in the proposed framework.

5.4 Findings from Interviews in Australia for the Framework Improvement

Nineteen face-to-face interviews were conducted in Queensland, Australia. All of them have more than 10-year working experience in the construction industry. Seven interviewees were from four construction companies (PBAJV, Brisconnections, The Horizon Alliance, and Baulderstione), and twelve of them from various departments of the Queensland Government including Department of Education and Training, Department of Infrastructure and Planning, Department of Transport and Main Roads, and Department of Treasury.

The responses of the interviewees are summarized as follows:

(1) Responses to Q1:

On 2 May 2002, the Queensland Government released its Public Private Partnership (PPP) policy guidelines, Public Private Partnership Guidance Material: Achieving Value for Money in Delivering Infrastructure Services April 2002 (Qld Guidelines) as a draft for public comment. The Qld Guidelines reveal the process and principles

by which Queensland's PPP policy, released in September 2001, is likely to be implemented. i The policy applies to both "hard" and "soft" infrastructure and the full spectrum of PPP project delivery options, including: Design, Build and Operate; Design, Build, Finance and Operate, and equity sharing arrangements.

Detailed guidelines for PPP projects now exist in three Australian States: Victoria, New South Wales and Queensland. In Western Australia, it has been reported that a draft policy paper has been circulated among senior ministers, but is yet to be released. In South Australia, PPP Guidelines were on the political agenda but the process has been flagged for review by the current Labor government.

But same as Hong Kong, the interviewees all agreed that the briefing process of PPP projects do not have a fixed procedure and the process that they went through was different from each other. For example, sometimes "PPP business case development" came first, while sometimes it was "expression of interest". They all thought that it is necessary to formulate the briefing process of PPP projects as this method plays a very important role in the construction industry.

(2) Responses to Q2:

Among stakeholders involved in the briefing process (e.g. government departments, architects, quantity surveys, contractors, potential private sector, consultancy companies, and etc.), government departments (e.g. Department of Treasury) and potential private sector were selected by most interviewees as key parties in briefing.

They explained government departments such as Department of Treasury need to play a good leading role during briefing. PPP projects have big different aspects in the financial part compared with conventional projects. Potential private sector was selected as the key party because of the ability of finance and risk undertaking. All policies have a paramount objective of obtaining better “value for money” (arrived at with the aid of a Public Service Comparator). All policies seek an optimal allocation of risk, as opposed to a maximum transfer of risk to the private sector, and include a risk allocation matrix that represents a preferred risk allocation; all provide for measures intended to ensure probity and accountability throughout the life of a project; all have a service-oriented “output specification” focus, with “core” services remaining the purview of the government; and all policies require potential projects to be assessed against a public interest test.

(3) Responses to Q3:

The interviewees thought that government departments and private companies paid more attention to risk-sharing aspects. Some interviewees said based on Queensland’s PPP policy, a value for money framework was developed to provide a comprehensive set of procedures and identify the best value for money outcome for the government and the community. These procedures evaluate a range of project delivery options for infrastructure. Interviewees from government departments said the framework has been endorsed by the Queensland Government and applied to all infrastructure projects that have been identified as a potential PPP where the

expected whole-of-life project cost will exceed $100 million net present value during the term of the contractual relationship.

This value for money framework was found in Queensland Government's website as shown in Figure 5.5. The interviewees basically agreed that this framework is too general for the briefing process of PPP projects and the initial framework developed in this research is more detailed and more suitable to be guidance for the briefing process. In order to let the interviewees understand the initial framework, 48 critical factors were introduced to them. After being introduced the factors, to the interviewees found it important to incorporate the factors into the initial framework to make it more comprehensive.

Figure 5.5 The value for money framework from Queensland Government

5.5 Details of the Improved Systematic Framework

Through the empirical studies on the adequacy of the initial briefing model proposed by the researcher, a number of areas were identified for improvement in the initial framework, including the incorporation of CSFs in the framework. Accordingly, a modified systematic framework was developed, as shown in Figure 5.6. The systematic framework consists of five deliverables: “mobilization and development of a business case”, “funding”, “technical assessments, consultation and land requirements”, “policy”, and “procurement”. For each deliverable, a number of activities are defined in logical sequence. A detailed description of these individual activities and factors inside activities is provided. It should be noted that, while every construction project is likely to be unique as PPP projects, some of the identified activities or factors can be omitted depending on the characteristics of PPP projects, and the resources in the organization.

In the deliverable of “mobilization and development of a business case”, there are four activities included: “conduct needs analysis, market testing and PPP feasibility study”, “prepare a draft statement of requirements”, “assess risk”, and “prepare public sector comparator and seek policy endorsement”. Each activity contains several CSFs. For example, in the activity of “conduct needs analysis, market testing and PPP feasibility study”, three key factors are identified: “adequate time for briefing”, “feedback from completed projects”, and “good facilitation”. As the very beginning of the briefing process, “feedback from completed projects” will help practitioners learn lessons from completed projects for needs analysis and market

testing. “Adequate time for briefing” would ensure that practitioners begin the briefing process on time and “good facilitation” will let PPP feasibility studies under a structured guideline. The inclusion of these CSFs raises the awareness of the public sector towards important issues in each activity in the briefing process.

The deliverable of “funding” includes one activity of “submit a bid via the policy bureau for funds through the resource allocation exercise”. It contains five key factors: “possible allocation of responsibilities and risks between the government and the private sector”, “practical budget and programme”, “demonstration how PPP can achieve the best value for money”, “proposed commercial arrangement”, and “good financial standing of the private partner”. These CSFs would help the public sector make sure that the issues about funding during the briefing process of PPP projects are properly addressed.

The deliverable of “technical assessments, consultation and land requirements” is implemented through two activities: “conduct appropriate technical assessments and socio-economic studies” and “conduct consultation with stakeholders, Policy Committee and LegCo Panel”. In the second activity, nine key factors are identified. For example, the factor of “knowledge of client’s responsibility” highlights that the client could carry out their responsibility and would not deliver non-possible risks to the potential private sector.

The deliverable of “policy” involves the activity of “finalize procurement documents and seek approval from Central Tender Board”. Two factors of “skillful guidance and advice from project manager” and “knowledge of statutory and lease control of the project” are identified to affect this activity. Skillful guidance and advice from project manager would bring a smooth briefing process and time would not be wasted in a lot of meetings.

The deliverable of “procurement” involves the activity of “issue request for proposals and conduct briefing/site inspections”. Six factors are identified to affect this activity. For example, consensus building between parties involved in the briefing process about the brief documents would let all stakeholders understand the decisions made during the whole briefing process; agreement of the brief documents by all relevant parties would make all stakeholders know their responsibilities and workloads.

The systematic framework illustrated in Figure 5.6 shows the deliverables, operation activities, and the brief documentation process during the briefing process of PPP projects. It should be noted that, as every PPP project is likely to be unique, some of the identified activities or factors can be omitted depending on the characteristics of individual PPP projects, and the resources in the organization. The adequacy and applicability of the systematic framework are validated and tested in Chapter 6 by using two real projects.

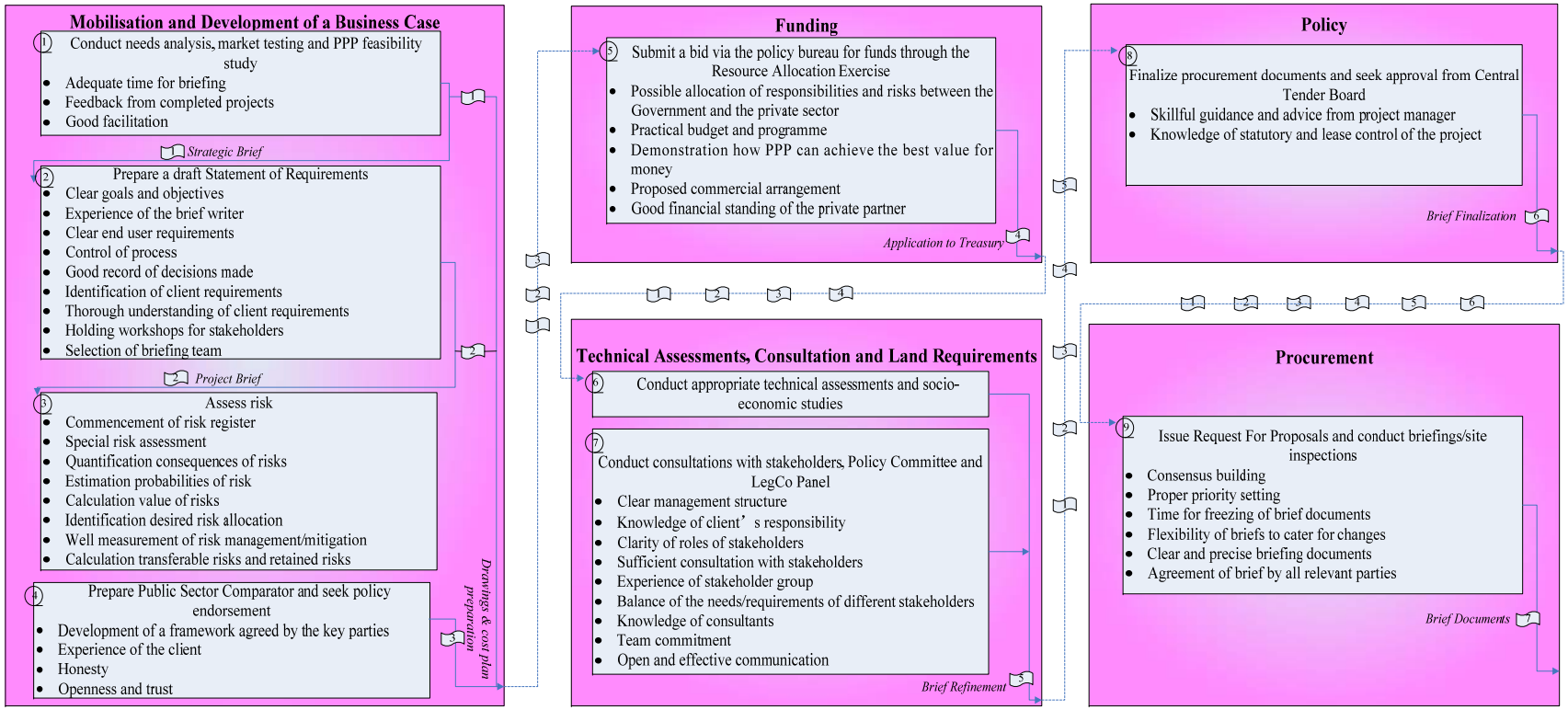

Figure 5.6 An improved framework for the briefing process of PPP project

5.6 Summary of the Chapter

The objective of the research in this chapter is to develop a systematic framework for guiding the briefing process of PPP projects in construction. To achieve this objective, empirical studies, comprising three interviews in Hong Kong, and nineteen interviews in Australia, were conducted in 2009 and 2010. The comments from the industry practitioners were synthesized with the outcomes from previous studies, and a systematic framework is proposed.

Experience from the empirical studies and interviews show that the activities in the framework should consider both the public sector and the potential private sector. It also needs to be noted that to ensure the effectiveness and efficiency of the briefing process, critical success factors are added in the framework to help two sectors understand and formulate the briefing process comprehensively and smoothly. The significance of the framework is that it serves as a reference for the systematic consideration of the briefing process of PPP projects in construction.

To validate this systematic framework, the case study approach was used to analyze two real projects in Hong Kong and Australia, and are described and evaluated in the following Chapter 6.

CHAPTER 6

VALIDATION OF THE SYSTEMATIC FRAMEWORK

- *Introduction*
- *The Detailed Case study*
  - Project 1 – the Berwick Community Hospital project
  - Project 2 – the Hong Kong Disneyland project
- *Discussion*
- *The Finalized Framework*
- *Summary of the Chapter*

CHAPTER 6

VALIDATION OF THE SYSTEMATIC FRAMEWORK

6.1 Introduction

A systematic framework was developed based on the results of interviews and questionnaire surveys conducted with a wide range of PPP practitioners (Chapter 5). In this chapter, this systematic framework is to be validated and tested from the perspectives of its adequacy and applicability.

Two case studies were used in the validation of the systematic framework, which are two real PPP projects. An overview of the two projects is given in Section 6.2 and details of how the case studies were carried out are outlined in Section 6.3. The outcomes from these two case studies, compared and summarized in Section 6.4, are used to determine the applicability of the systematic framework at the briefing process in PPP projects. The finalized framework is introduced in Section 6.5.

6.2 The Detailed Case Study

6.2.1 Project 1 – the Berwick Community Hospital project

As the first public hospital to be procured under the government's Partnerships Victoria policy, the Berwick Community Hospital is a good example for studying PPP practices in Australia. The private sector was represented by the Progress Health consortium, involving ABN-AMRO and Multiplex. It was responsible for the design, construction, financing and maintenance of the facility. After the hospital had been completed in 2004, it was leased to the private sector for 25 years. After that, the hospital will be transferred to the state (Partnerships Victoria, 2010).

A finance lease on the basis that the key risks associated with the project was to be borne by the state. The leasing arrangement was defined as this process. The net present cost of the building and facility services was calculated at $115 million at June 2002. Accordingly, the hospital was recorded as a state asset with a corresponding liability. Over the 25-year period, the government's obligations to finance the capital cost and maintenance of the facility estimated at $378 million (Department of Treasury and Finance, 2004-05). By calculations contained within the public sector comparator (PSC), it was 9 per cent higher than $378 million if the project had been undertaken in the public sector (Fitzgerald, 2004). The net present value of the hospital building at 30 June 2006 was $84 million (Hon. J Brumby, MP, Treasurer, response to the Committee's follow-up questions, Inquiry into the 2006-07 Budget Estimates, received 26 July 2006, p.5).

The government officer from Department of Treasury and Finance, who was involved in the briefing process of the project, had direct responsibility for deciding whether to use PPP method in this project or not. From experiences, risks borne by the government included extensive provisions if the private sector defaulted on risk management. The officer was then asked through phone and emails about the activities and CSFs in the framework based on his experience of this project.

In the case study, the officer said there are different kinds of risks observed from the project. All the key risks associated with this PPP project remained with the state defined in the contract. This appears to be against the key principles of using PPP mechanism, by which many risks particularly these technical risks are risks in the project operation process should be borne by the private sector. According to finance lease arrangement, it is expected that the state was going to incur an additional debt of $378 million over the 25 year concession period. Because of decisions made in the briefing process, the project was conducted on the basis that the public sector would cost 9 percent more when they undertake the projects. So the value of the lease payments of $378 million by a factor of 8.65 percent is the discount compared to the 9 percent. It is a leave of excess. Because some information was missing from the brief documents, an allowance for all the risks borne by the government was not included in net present value of the project. If the contractor defaulted on risk management, the government could stop the contract but have to pay the contractor

the market value of the project at the date of termination (Partnerships Victoria, 2010).

If the percentage of savings was not discussed and decided during the briefing process, the private sector would afford the different amounts of money. For the CSF of “identification desired risk allocation”, the majority of the risks associated with the project were borne by the government. The high degree of risk borne by the private sector was translated to higher borrowing costs for the developers. After the briefing process, although it was too late to amend the concession agreement, the government recognised this shortage and reduced the discount rate for hospital facilities in 2003. So the activities “assess risk” and “submit a bid via the policy bureau for funds through the resource allocation exercise” were considered very important for the briefing process.

Risk allocation was a big problem that the hospital project forced the government to recognise that the state was accepting a disproportionate share of the risks involved in PPP projects. The CSF of “possible allocation of responsibilities and risks between the government and the private sector” would help the public sector recognise that use of the public sector comparator needed to be more robust and include consistency of approach across projects. The CSF of “practical budget and programme” helps the government acknowledge that tenderers needed a more reasonable budget raised during the tendering process. Sometimes the low-cost proposals was submitted which included overly aggressive assumptions as to the

cost efficiencies that could be achieved by private sector operators. This had the potential to lead to financial difficulties in the project life cycle at a later stage.

The deliverable of "policy" is another part that should be paid attention, said the officer. Due to lessons learnt from previous partnership projects, the government has issued further policy documents and various advisory notes dealing with the policies. During the briefing process, determining inflation rates, managing interest rate risk, and managing of conflict of interest were topics should be discussed. Stakeholders in the project team indicated that some CSFs, for example "experience of the brief writer", "clear management structure", and "honesty" should not be limited to one activity but applied to the whole briefing process.

6.2.2 Project 2 – the Hong Kong Disneyland project

On 10 December 1999, the Hong Kong SAR Government, The Walt Disney Company (WD) and Hong Kong International Theme Parks Limited (HKITP) signed the project agreements on implementation of Hong Kong Disneyland (HKD). Work has commenced and HKD is scheduled to open in 2005 (Shen et al., 2006).

Overall, both the briefing process of the project and the whole HKD project progressed on schedule. The officers who attended the briefing process of the HKD in Tourism Commission of Hong Kong SAR Government were subjects of this case study. During the briefing process, many aspects mentioned in the systematic

framework were mentioned. For example, the activity of “conduct consultation with stakeholders, Policy Committee and Legislative Council” in this project was that the regulations of flight were tabled before the Legislative Council and decisions made have an influence on the opening of the HKD. For the activity of “conduct needs analysis, market testing and PPP feasibility study”, the project had consulted the previous Panel on the environmental impact assessment reports regarding reclamation and infrastructure works at North Lantau as well as construction and operation of the HKD. Because of this assessment, the director of Environmental Protection issued a series of Environmental Permits for the project. And these permits helped the operations of the HKD.

Workshops and meetings were held during the briefing process for discussions on reclamation and consultancy on design of infrastructure works at Penny’s Bay. The consultancy covers roads, irrigation network, stormwater drainage, utilities, and etc. A contract about environmental monitoring and audit consultancy was discussed to ensure that the reclamation work will be carried out in strict compliance with the requirements stipulated in the Environmental Permit and approved Environmental Monitoring and Audit Manuals.

The CSF of “clear management structure” also found out its usage in this project. In accordance with the project agreements, the Hong Kong SAR Government was entitled to appoint five Directors. They are the Financial Secretary, Secretary for Economic Services, Secretary for the Treasury, Secretary for Works and Director-

General of Investment Promotion. In addition, the Government and WD agreed that such appointments should be made at a later stage as necessary (EU, 2005a, b).

As a successful PPP project in Hong Kong, the HKD made big efforts on financial aspects during the briefing process. As the CSF of “demonstration how PPP can achieve the best value for money”, the information relating to the potential capital injection and shareholding structure of HKITP were asked to be provide. The expression of using CSF of “practical budget and programme” in this project was that HK$14.1 billion, comprising HK$8.4 billion of debt and HK$5.7 billion of equity, was estimated on top of the expenditure of HK$4 billion incurred on reclaiming the land for Phase I of the project.

On 30 June 2009, a notice that the Government and the Walt Disney Company had reached an agreement in principle on the expansion of Hong Kong Disneyland was announced by the Secretary for Commerce and Economic Development. During the briefing process of the proposed expansion of HKD, discussion focused on financial arrangements such as all the necessary new capital which was estimated to be about HK$3.49 billion for the construction of the new theme areas would be contributed by the Walt Disney Company. And the Company will take charge of sustaining the park's operation during the construction years (EU, 2005a, b).

Because of good usage of “proposed commercial arrangement”, the Government would not inject any new capital into the expansion plan. The outstanding balance of

the Government loan to the HKITP made conversion from loan to equity. This contributed to the deleveraging of the HKITP while maintaining the Government's majority shareholding in the joint venture.

The officers who attended the briefing process of this project said the Government could still earn interest from the remaining loan balance maintained with the HKITP. Such an arrangement should allow the Government to retain a loan balance.

All officers expressed that without a systematic framework during the briefing process, the CSFs of “special risk assessment” and “good financial standing of the private partner” had not been paid enough attention. For example, within the project expansion period, there were differences between the project cost and the Walt Disney Company's contribution.

Same as the project 1 in Australia, some officers in this project team suggested that some of the CSFs should not be limited in specific activities or deliverables. CSFs such as “open and effective communication”, “control of process”, “good facilitation”, and “openness and trust” were important during the whole briefing process.

6.3 Discussion

The results of the feedback in these two projects indicated that project teams were satisfied with the systematic framework in general.

The case studies also demonstrate clearly the role of the framework as a reference for the briefing process of PPP projects. Thus depending on the type of the project, the resources in the organization, and the role involving in the briefing process, some identified activities can be omitted.

The limitation of the case studies in this research could not be avoided. Owing to time limitation, it is hard to find out projects which on case are in the briefing process. Both of these two projects have gone through the briefing process. The use of the framework had to be supposed to use in these two cases, hence feedback from several aspects could not be obtained and therefore there was no basis on which to build improvement, either for the public and private sectors or to the framework itself.

6.4 The Finalized Framework

Based on the findings of the case studies, the systematic framework (Figure 5.6) was finalized with minor changes. The finalized framework is shown in Figure 6.1.

A comparison of the contents of Figure 5.6 and Figure 6.1 reveal the following changes: one group called “uninterrupted support” was added and seven CSFs were added in this group. The seven CSFs were “experience of the brief writer”, “clear management structure”, “honesty”, “open and effective communication”, “control of process”, “good facilitation”, and “openness and trust”.

As indicated in previous chapters, it needs to be clarified that the briefing process in PPP projects is unique. Depending on the characteristics of the project, the stakeholders who attend the briefing process can choose suitable activities and CSFs for their own use in practice.

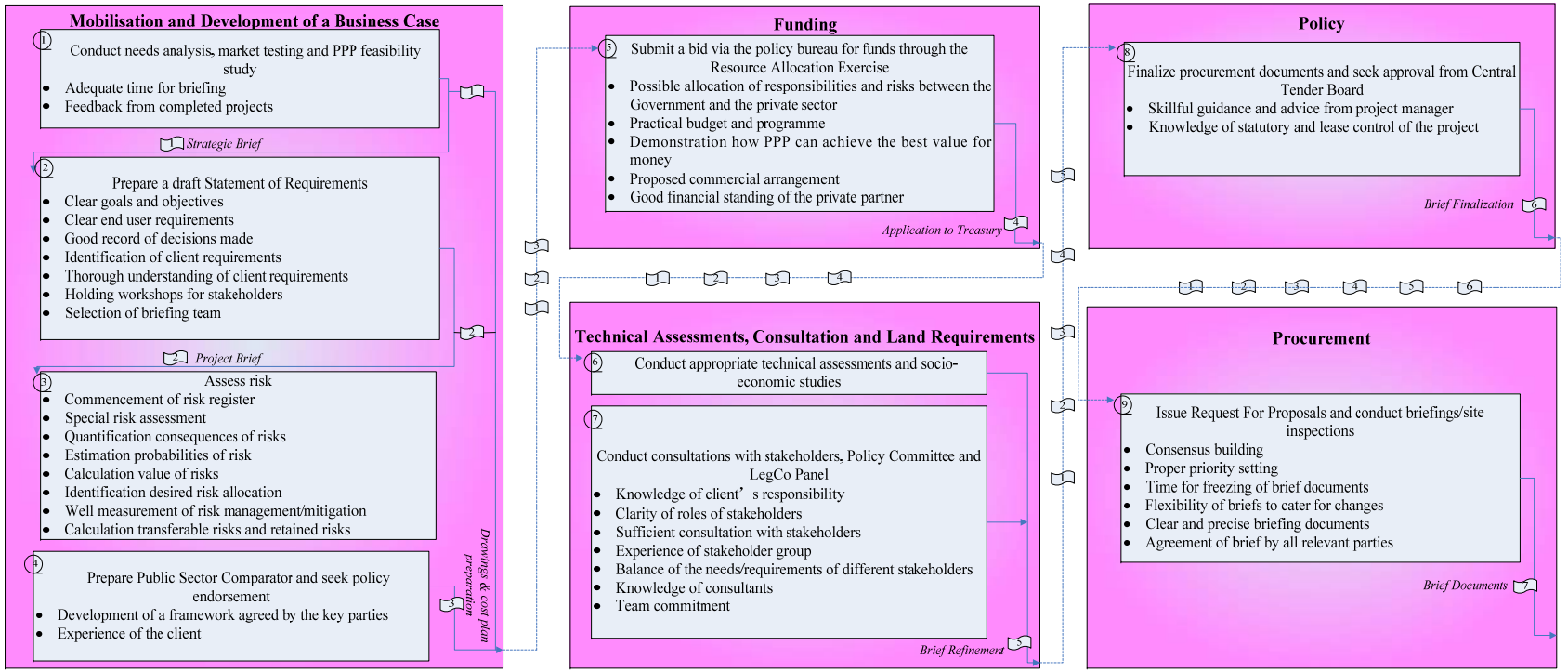

Figure 6.1 A systematic framework for the briefing process of PPP project

6.5 Summary of the Chapter

The validation of the proposed framework is described in this chapter. The research methods used in this chapter are case studied based on two real PPP projects.

The projects were selected from two countries, Australia and Hong Kong (hospital and theme part). The systematic framework in Figure 5.6 was supported, evaluated and approved by the project teams in these two projects. They found that the framework systematically illustrated the activities and outcomes during the briefing process and provided a reference and framework, from which both the public and the private sectors would benefit, by providing a reminder of steps and critical factors to facilitate briefing during their work. Findings of the case studies also demonstrate clearly the significant role of the framework as a reference in the briefing process.

The framework for the briefing process of PPP projects was finalized based on the outcomes of the case studies. One section called “uninterrupted support” is added with seven factors: “experience of the brief writer”, “control of process”, “clear management structure”, “good facilitation”, “honesty”, “openness and trust”, and “open and effective communication”. These factors are proposed by interviewees, who made the point that these factros should be supported during the whole briefing process either by the public sector or the private sector. One important conclusion is that each briefing process is content-specific, where the systematic framework should be used as a guideline for the project team in PPP projects.

CHAPTER 7

CONCLUSIONS

- *Introduction*
- *Review of on the Completion of Research Objectives*
- *Research Conclusions*
  - Critical success factors
  - A systematic framework for the briefing process of PPP projects
  - Validation of the systematic framework
- *Contributions to Knowledge*
- *Limitations of the research*
- *Suggestions for Future Research*

CHAPTER 7

CONCLUSIONS

7.1 Introduction

This chapter presents the conclusions of this research. By reviewing the research objectives, major research findings are summarized, and the contributions and significance of the research are highlighted. In addition, the limitations of the study are also appreciated thus recommendations are suggested for future research accordingly.

7.2 Review on the Completion of Research Objectives

A review of the literature shows that PPP has become an important mechanism used in the construction industry, and an effective briefing process is a key variable for the performance of PPP projects. From the perspective of project life cycle, it is found that there has yet been any methodology available to guide the briefing process of PPP projects in construction. This gap of practice is considered to be the major reason not only for the poor performance of PPP projects, but also for the limited application of the PPP method. Due to these observations, this research primarily aims to develop a systematic framework for guiding the briefing process of PPP projects.

The researcher has achieved this aim by achieving four objectives, namely:

Objective 1. To identify the critical success factors (CSFs) for the briefing process of PPP projects in the construction industry;

Objective 2. To assess the importance levels of the CSFs in the briefing process of PPP projects;

Objective 3. To conduct a comparative analysis on the CSFs in different locations;

Objective 4. To develop a framework for guiding the briefing process of PPP projects in construction.

In order to achieve these research objectives, specific research tasks were conducted by using a number of research methods, including literature review, interviews, questionnaire surveys, and case studies conducted in Hong Kong and Australia. Specifically, to achieve the Objective 1, the characteristics of the briefing process of PPP projects were described by comparing the briefing process of PPP projects and conventional projects. Based on these characteristics and review of the literature on PPP, four categories of CSFs which have an impact on the success of the briefing stage were identified. To achieve the Objective 2, interviews and questionnaire surveys were conducted to assess the importance levels of these CSFs. To achieve the Objective 3, data collected from different locations by interviews and questionnaire surveys were compared to find out whether these CSFs have universal significance in different construction environments. To achieve the Objective 4, a systematic framework for guiding the briefing process of PPP projects was

developed, and implemented to the case studies. The results were then used to inform revision of the systematic framework

7.3 Research Conclusions

7.3.1 Critical success factors

This study has found significant differences in carrying out the briefing process for PPP projects and that for conventional projects. These differences are highlighted as follows:

- Certain procurement-related steps that do not exist in conventional projects are needed in the briefing of PPP projects. For example, preparing Public Sector Comparator (PSC) is one of these steps. A PSC is an estimated, risk-adjusted cost for delivering the project output. The PSC is expressed in terms of the net present cost to the government of providing the output under public procurement, using a discounted cashflow analysis that adjusts the future value of the expected cashflow to a common reference date. This enables comparison with bids and makes allowance of the imputed cost of government borrowing;

- The private sector holds the opinion that given its market orientation, the feasibility study should be more focused in PPP projects than in conventional projects; and

- Special financial and risk-related issues in PPP projects are considered in more detail in the briefing process than those in conventional projects. For example, the department which holds PPP projects seeks approval of the Public Works Subcommittee and the Finance Committee for the capital works funding involved; the department seeks draft land grant conditions, involving more legal conditions because, for example, there will be a concessionary period later. The overall picture from this table shows that some special characteristics could be found in the briefing of PPP projects. This is the first step where we can find differences between PPP projects and conventional projects that exist in every briefing process.

Based on the literature review and findings of the differences in the briefing process for PPP projects and for conventional projects, this study found that certain categories of CSFs affect the effectiveness and efficiency of the briefing process of PPP projects. Findings from this research show that all of the CSFs are regarded as critical for the success of the briefing process by most respondents. There was a general consensus on the overall rankings of the CSFs among different respondents from the public sector. These four categories of CSFs are shown as follows:

1) Procurement-related factors

- Clear goals and objectives
- Experience of the brief writer
- Clear end user requirements
- Development of a framework agreed by the key parties

- Control of process
- Adequate time for briefing
- Consensus building
- Proper priority setting
- Time for freezing of brief documents
- Flexibility of briefs to cater for changes
- Good record of decisions made
- Identification of client requirements
- Thorough understanding of client requirements
- Feedback from completed projects
- Clear and precise briefing documents

2) Stakeholder-related factors

- Experience of the client
- Clear management structure
- Knowledge of client's responsibility
- Skillful guidance and advice from project manager
- Holding workshops for stakeholders
- Good facilitation
- Selection of briefing team
- Clarity of roles of stakeholders
- Sufficient consultation with stakeholders
- Experience of stakeholder group

- Balance of the needs/requirements of different stakeholders
- Knowledge of consultants
- Knowledge of statutory and lease control of the project
- Team commitment
- Honesty
- Openness and trust
- Open and effective communication
- Agreement of brief by all relevant parties

3) Risk-related factors

- Commencement of risk register
- Special risk assessment
- Quantification consequences of risks
- Estimation probabilities of risk
- Calculation value of risks
- Identification desired risk allocation
- Possible allocation of responsibilities and risks between the Government and the private sector
- Well measurement of risk management/mitigation
- Calculation transferable risks and retained risks

4) Finance -related factors

- Practical budget and programme

- Prepared biding for funds through the RAE process
- Conduction socio economic studies
- Demonstration how PPP can achieve the best value for money
- Proposed commercial arrangement
- Good financial standing of the private partner

7.3.2 A systematic framework for guiding the briefing process of PPP projects in construction

This researcher appreciates that establishing a framework for guiding the implementation of the briefing process for PPP projects is possible. And this systematic framework was established in this research in two phases.

In the first phase, an initial framework for the briefing process of PPP projects was developed, consisting of three components: deliverables, activities of briefing, and procedures of brief documentation. The proposal of this initial framework was based on comprehensive literature review. Some existing methods for the briefing process were used for reference.

In the second phase of establishing the framework, improvements were made to the initial framework through collecting and analyzing professionals' views and experiences. Professionals' views and experience were collected through empirical studies conducted in Hong Kong and Australia. In the improved framework, new elements were added, such as the critical success factors. The CSFs that affect

activities in the briefing process were added in the framework to help decision makers to understand and formulate the briefing process comprehensively and smoothly.

7.3.3 Validation of the systematic framework

The validation of the briefing framework was conducted by means by examining two cases. Findings show that problems and difficulties might exist in running PPP projects if the briefing process is not conducted properly. The case studies further demonstrate the need for a systematic framework for reference and guidance.

By referring to the activities in the briefing process defined in the model and the actual practice of the two cases, the effectiveness of the framework was found to be a valuable reference by participants. Professionals who participated in the case studies appreciated that all activities in the briefing process and CSFs were valuable in guiding the practice of the briefing process, and they are applicable. Findings suggest that by using the guidance framework, professionals have more confidence about selecting or rejecting particular activities in the briefing process.

Last but not least, constructive comments were also obtained from the case studies to improve the guidance framework. In line with further modification, a well-established framework for guiding the briefing process of PPP projects is presented in Chapter 6.

7.4 Contributions to Knowledge

The research has contributed to new knowledge and improved understanding of the briefing process of PPP projects in two particular aspects:

Firstly, this research has provided a relatively complete list of CSFs, and described the characteristics of the briefing process of PPP projects. These characteristics were indicated from differences between PPP projects and conventional projects in the briefing process. These findings filled up a literature gap and will help stakeholders be aware of both their responsibilities and important issues for the briefing process in PPP projects.

Secondly, this research has developed a systematic framework for guiding the briefing process of PPP projects. The framework entails the activities, the deliverables, and the brief documentation during the briefing process. This finding was adopted from existing frameworks and is an extension to previous research. The use of the framework will enable both the public sector and the private sector to implement the briefing process systematically, and ensure that important procedures and issues will not be overlooked.

7.5 Limitations of the Research

There are two limitations of the study. Firstly, the development and refinement of the framework for the briefing process of PPP projects were based on twenty-two

interviews in Hong Kong and Australia due to limited resources. Since the interviewees were only from two regions, the findings may have limitations in application. This limitation is mainly a result of limited time and resources. In order to increase the generalization of the research results, testing the model with a sample from another location other than Hong Kong was considered. Finally, the interviews and questionnaire surveys were conducted in Hong Kong and Australia (Queensland) construction. It is important to note that the construction practices from the two locations were comparable, which avoid the impact of different levels of construction practices on the research results. In interviews and questionnaire surveys, the research did not consider specific factors for other places (e.g. the UK or US). The framework was designed for general situations. However, it may be necessary to consider some special factors or activities for the framework when it is applied in other regions.

Secondly, the validation of the systematic framework for the briefing process was based on two real life projects. More case studies could be used to test the framework. As the framework needs to be applied in the briefing process, the researcher appreciates the difficulty to find out projects which happen to be at the briefing process. Furthermore projects from other regions could be used for the framework validating which is suggested for further study.

7.6 Suggestions for Future Research

Based on the appreciated limitations of the research, the researcher suggests that future studies are given particularly to the following areas:

Further studies could be conducted to examine the CSFs in other locations, for example, mainland China, the UK and etc.

Further research could be conducted to compare the applicability of the framework in more projects in different regions, for example, UK and USA. The conditions for framework application can be found with referring to different social, economical, and political backgrounds of the concerned construction projects.

APPENDICES

Appendix A: Sample of invitation letter for Questionnaire Survey

Date

Receiver's Address

Dear ,

Survey on Briefing in Public Private Partnership (PPP) Projects

I am writing to get your help based on your experience with respect to briefing in a PPP project in Hong Kong. As you appreciate, briefing is critical to the successful delivery of construction projects, where client requirements for a building project are defined and the major commitments of resources are made. PPP projects also raise interest because of their potential use in the construction industry.

Four categories of factors which affect effectiveness and efficiency of briefing process in PPP projects have been identified in my survey. The survey seeks to validate the relative importance of these factors. Your contribution to my survey would benefit my research greatly. The questionnaire is attached with this email. I would be most grateful if you and/or your colleague could participate in this research by completing the questionnaire and kindly returning it to me by email: tlyn.tang , or by fax at 2764 5131 **on or before 30 April 2009**.

Kindly note that the questionnaire is purely for academic purpose. Please be assured that your response will be held in strict confidence. Your prompt cooperation and participation in this survey is much appreciated. Should you have any queries, please feel free to contact me phone at 2766 4308 or by fax at 2764 5131.

Thank you very much for your help in advance.

Yours sincerely,

Maggie, Tang
PhD Research Student
Department of Building and Real Estate
The Hong Kong Polytechnic University

Appendix B: Sample of Questionnaire

Please return the completed questionnaire to Ms. Maggie Tang, in the enclosed stamped envelope, or by fax at 2764 5131 on or before 17 April 2009. Thank you very much for your cooperation.

Questionnaire on factors affecting effectiveness and efficiency of briefing in Public Private Partnership projects in the construction industry

Construction briefing is critical to the successful delivery of construction projects, where client requirements for a building project are defined and the major commitments of resources are made.

PPP is defined as an arrangement whereby the public and private sectors both bring their complementary skills to a project, with varying levels of involvement and responsibility, for the purpose of providing public services or projects (e.g. Cross Harbor Tunnel).

Instructions:
*Please answer the following questions by ticking **the appropriate box(es)**, e.g.* ☑ *Architect.*

Section A – Background Information
*Please answer this section with reference to your previous experience in a particular **PPP project** that you have participated in Hong Kong.*

1. The type of the PPP project:

☐ Cable car ☐ Drainage ☐ Hospital ☐ Housing
☐ Prison ☐ Rail ☐ Road ☐ School
☐ Theme park ☐ Tunnel ☐ Waste transfer station Others, please specify: ____

2. The nature of the PPP project:

☐ New build ☐ Refurbishment (including renovation, extension etc.)
☐ Scheme comprising both new build and refurbishment

3. Your role in the PPP project:

☐ Architect ☐ Administrator ☐ Client representative ☐ Contract Manager
☐ Contractor/Supplier ☐ Engineer ☐ Financial manager ☐ Legislative councilor
☐ Surveyor ☐ Others, please specify_____

4. Your experience in the PPP project:

☐ Directly involved in briefing process ☐ Not directly involved in briefing process

Section B – Factors affecting effectiveness and efficiency of briefing process in Public Private Partnership Projects in construction industry

Those writing on the subject of briefing have made the following statements. Please indicate your level of agreement/disagreement for each statement.

5. Procurement-related factors

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1) Briefing is a process which should have a clear goal and/or objectives.	☐	☐	☐	☐	☐
2) An experienced person is needed to develop a brief.	☐	☐	☐	☐	☐
3) A brief needs to make clear what the end user requirements are.	☐	☐	☐	☐	☐
4) During briefing, the process to formulate a brief needs to be agreed by the key parties.	☐	☐	☐	☐	☐
5) The public sector should lead throughout the briefing process.	☐	☐	☐	☐	☐
6) Briefing should be allocated with adequate time.	☐	☐	☐	☐	☐
7) A consensus of the brief amongst the various stakeholders needs to be developed during the briefing process.	☐	☐	☐	☐	☐
8) Priority of decision to be made should be agreed by the key parties in briefing.	☐	☐	☐	☐	☐
9) A schedule should be set for the completion of the brief.	☐	☐	☐	☐	☐
10) Flexibility in briefs should be provided to cater for possible changes.	☐	☐	☐	☐	☐
11) Decisions made should be recorded in details.	☐	☐	☐	☐	☐

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
12) Identification of client requirements should be done during briefing.	☐	☐	☐	☐	☐
13) Client requirements should be thoroughly understood.	☐	☐	☐	☐	☐
14) Feedback from completed projects are needed to improve briefing.	☐	☐	☐	☐	☐
15) A clear and precise brief should be available at the end of the briefing.	☐	☐	☐	☐	☐
16) Others, please specify_____	☐	☐	☐	☐	☐

6. Stakeholder-related factors

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1) The client should have related experience of briefing.	☐	☐	☐	☐	☐
2) The client needs a clear management organization structure for briefing.	☐	☐	☐	☐	☐
3) Knowledge of the client's responsibility is needed.	☐	☐	☐	☐	☐
4) Project manager should give appropriate guidance and advice during briefing.	☐	☐	☐	☐	☐
5) Workshops for stakeholders should be held regularly.	☐	☐	☐	☐	☐
6) Good facilitation of briefing should be given to stakeholders.	☐	☐	☐	☐	☐
7) Briefing team needs proper participant selection.	☐	☐	☐	☐	☐
8) Roles of stakeholders should be clarified clearly.	☐	☐	☐	☐	☐
9) Briefing needs sufficient consultation with stakeholders.	☐	☐	☐	☐	☐
10) Stakeholders' experience of attending briefing should be considered.	☐	☐	☐	☐	☐
11) Needs/requirements of different stakeholders need to be balanced.	☐	☐	☐	☐	☐
12) Knowledge of consultants should be considered.	☐	☐	☐	☐	☐
13) Knowledge of statutory and concession period control of the project are needed in briefing.	☐	☐	☐	☐	☐
14) Team commitment should be clear.	☐	☐	☐	☐	☐
15) Honesty among stakeholders is critical for briefing.	☐	☐	☐	☐	☐
16) Openness and trust should be built among stakeholders.	☐	☐	☐	☐	☐
17) Briefing needs open and effective communication.	☐	☐	☐	☐	☐
18) Agreement on the brief should be obtained among all relevant parties.	☐	☐	☐	☐	☐

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
19) Others, please specify_____	☐	☐	☐	☐	☐

7. Risk-related factors

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1) A list of risk issues needs to be identified in the briefing process.	☐	☐	☐	☐	☐
2) Special risk assessment should be set for the brief.	☐	☐	☐	☐	☐
3) Quantitative consequences of risks should be considered.	☐	☐	☐	☐	☐
4) Probability of risks should be estimated.	☐	☐	☐	☐	☐
5) Cost of risks should be calculated in briefing.	☐	☐	☐	☐	☐
6) Desired risk allocation should be identified.	☐	☐	☐	☐	☐
7) Possible allocation of responsibilities and risks between the Government and the private sector should be set in the brief.	☐	☐	☐	☐	☐
8) Risk management/mitigation need to be well measured.	☐	☐	☐	☐	☐
9) Transferable risks and retained risks should be calculated in the brief.	☐	☐	☐	☐	☐
10) Others, please specify_____	☐	☐	☐	☐	☐

8. Finance-related factors

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1) Practical budget and programme should be needed.	☐	☐	☐	☐	☐
2) Bidding for funds should be prepared via the policy bureau through the resource allocation exercise process.	☐	☐	☐	☐	☐
3) Socio-economic studies regarding the project need be conducted.	☐	☐	☐	☐	☐
4) Whether and how PPP can achieve the best value for money should be demonstrated.	☐	☐	☐	☐	☐
5) Proposed commercial arrangement including contract duration, payment mechanism, and other partnership/financial arrangements should be formulated in the brief.	☐	☐	☐	☐	☐
6) Good financial standing of the private partner needs be considered.	☐	☐	☐	☐	☐
7) Others, please specify_____	☐	☐	☐	☐	☐

9. In your opinion, are there any other factors that should be considered at briefing process in PPP projects in the construction industry? If yes, please list them below.

* End of Questionnaire *
** Thank you very much for your contribution **

Appendix C: Sample of Invitation Letter for Interviews

Dear,

Invitation for participating in an interview

I am a PhD research student at the Department of Building and Real Estate of the Hong Kong Polytechnic University. My research title is “Effective and Efficient Briefing in Public Private Partnership Projects in the Construction Industry” As you appreciate, briefing is critical to the successful delivery of construction projects, where client requirements for a building project are defined and the major commitments of resources are made. PPP projects also raise interest because of their potential use in the construction industry.

A structure of briefing process and four categories of factors which affect effectiveness and efficiency of briefing process in PPP projects have been identified in my research. This interview seeks to validate the correction of the structure and the relative importance of these factors. Your contribution to my interview would benefit my research greatly. The questions are attached for your information with this email. I would be most grateful if you could participate in this interview by fixing a time for a face-to-face interview.

Kindly note that the interview is purely for academic purpose. Please be assured that your response will be held in strict confidence. Your prompt cooperation and participation in this survey is much appreciated. Should you have any queries, please contact me at 27664308 or tlyn.tang . Thank you for your kind attention and I am looking forward to receiving your reply soon.

Yours sincerely,

Maggie, Tang
PhD research student
Department of Building and Real Estate
The Hong Kong Polytechnic University

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