Over the last ten years, public–private partnerships (PPPs) have become ever more popular worldwide, expanding the body of experience among construction professionals, government agencies and industry. In these economically challenging times, public–private partnership (PPP) has emerged as a crucial framework for providing infrastructure, and also to boost construction industry activity, while shielding the taxpayer from some of the cost. Understanding the lessons learnt is essential to ensuring the success of future projects, and this timely book will prepare the reader to do just that.

Starting by defining PPP itself, Part I is designed to help the novice to get to grips with the basics of this topic. Part II tackles the practicalities of PPPs, including successful implementation, managing the risks involved and how to assess the suitability of a project for the PPP route. Part III presents detailed case studies from Asia, Africa and Australia to illustrate how PPPs should be managed, how problems emerge, and how PPPs can differ across the world.

Drawing on extensive internationally conducted research, from both industry and academia, the authors have written the essential PPP guide. Taking into consideration the perspectives of those in the public sector and the private sector, as well as built environment professionals, it is essential reading for anyone preparing to work on public–private partnerships in construction.

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Public–Private Partnerships in International Construction
Learning from case studies

Albert P.C. Chan and Esther Cheung
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Preface

Many governments have been suffering from significant budget deficit since the last global financial turmoil. Under such a tight budget shadow, many have taken the initiative in radically increasing the private sector involvement in the delivery of public services and infrastructure to the community. Public–private partnerships (PPPs) are collaborations where the public and private sectors both bring their complementary skills to a project, with different levels of involvement and responsibility, for the sake of providing public services.

Over the years public–private partnership (PPP) application has extended from the traditional transportation type projects to more complex social projects such as art and culture facilities. The financial arrangements have also been repackaged into different forms and types, where more possibilities have been revealed. Traditional PPP projects have very much relied on full private financial support whereas modern projects have shown that PPP projects can also be supported partially or solely by the public sector.

PPP has been practised in many developed countries in Europe, North America and Australasia for delivering construction and building projects. But unfortunately not all of these PPP projects have been equally successful. For countries that are new at adopting PPP it is important for them to identify the critical success factors in order to maximise the advantages of this method and to allocate the risks of the concerned parties equitably.

Risk is inherent and difficult to deal with in PPP projects and requires a proper risk management framework. Governments procuring a PPP project would specify its preference as to how the project risks should be shared; private investors would assess their capability of taking these risks, and then propose a bidding price. The contract negotiation would probably focus on the risk-sharing mechanism. A generally accepted principle is that risk should be allocated to the party best able to manage it and at the least cost.

Therefore this book aims to evaluate the merits and shortcomings of PPP, determine the best condition for adopting PPP, identify a series of critical success factors for implementing PPP based on the lessons learned, as well as to develop an equitable risk allocation scheme for delivering PPP projects.

This book is divided into three parts. Part I of the book consists of three chapters which look at the principles of PPP. The first of these chapters looks at the fundamentals and specific features related to PPP. The second chapter presents
Preface

six financial models for conducting public works projects where varying levels of public and private sector involvement can be seen. Chapter 3 examines the development of PPP on an international level by looking at the past, present and future of PPP across five different continents. Part II of the book consists of five chapters looking at the perspective of PPP according to different parties. Chapter 4 looks at the views from the public sector, private sector and researchers; a comparison between different countries was also conducted. Chapter 5 presents the findings of a questionnaire survey conducted with practitioners which identifies the attractive and negative factors of PPP. Chapter 6 continues to present other findings from the same questionnaire, including the reasons for implementing PPP projects, the factors for successful PPP projects, and also the measures to enhance value for money in PPP projects. Chapter 7 illustrates an evaluation model for assessing the suitability of PPP projects using a high-profile case study. Chapter 8 identifies and ranks the risk factors associated with using PPP. Part III of the book presents three chapters which analyse some interesting PPP case studies from around the world. Chapter 9 looks at an innovative type of PPP where projects are financed solely by the public sector, and where the private sector is involved for other benefits. Chapter 10 looks at some less successful case studies where valuable lessons can be learnt. The final chapter, Chapter 11, looks at the struggles of using PPP in the developing world and how different variations of the model have been attempted.

We would like to take this opportunity to thank those who have supported us throughout the course of this book and contributed towards its completion. Without them this book would definitely not have been possible. These include Dr Daniel W. M. Chan, Dr Edmond W. M. Lam, Dr Kim-wah Chung, Dr Patrick T. I. Lam, Miss Zoe Wang, Mr Ernest E. Ameyaw, Mr Tong Peng, Dr Yelin Xu, Prof. Yat-hung Chiang (Hong Kong Polytechnic University, Hong Kong), Dr Bing Li (Xiamen University, China), Dr Chi-pang Lau (Lingnan University, Hong Kong), Dr John F. Y. Yeung (Hong Kong Baptist University), Dr Yong-jian Ke (The University of Newcastle, Australia), Prof. Akintola Akintoye (University of Central Lancashire, UK), Prof. Bo Tang (University of Hong Kong, Hong Kong) and Prof. Shou-qing Wang (Tsinghua University, China).

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Preface

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Foreword

Public-private partnerships have continued to play an important role in the construction industry. The success of public-private partnerships has been a result of combining the best of the government and the private sector to provide better public projects. Public-private partnerships have also demonstrated huge risks and failures. Consequently, countries are both keen and concerned about their adoption.

This book is a great read for academics and practitioners as well as students. It is based on the fundamental concepts of public-private partnerships which are illustrated by both successful and unsuccessful real life case studies from around the world. The book is divided into three main parts. The first covers some general background, principles and history of public-private partnerships. The second part looks primarily at what different stakeholders say about the approach such as the differences in views between stakeholders, the consolidated reasons for implementation, the success factors, the approaches for enhancing value for money, evaluation of projects and the potential risks involved. The last part of this book presents case studies from Asia, Australia and Africa, including innovative examples, poorly conducted projects and also the approach in the developing world.

It is my pleasure to highly recommend this book to those that are both experienced and inexperienced with public-private partnership projects. The book is easy to grasp for beginners but also resourceful and enlightening for more experienced readers.

Sr Stephen Lai
President, The Hong Kong Institute of Surveyors
February 2013
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACRHB</td>
<td>Advisory Committee on Revitalisation of Historic Buildings</td>
</tr>
<tr>
<td>AVRL</td>
<td>Aqua Vitens Rand Ltd</td>
</tr>
<tr>
<td>BOO</td>
<td>Build Own Operate</td>
</tr>
<tr>
<td>BOOR</td>
<td>Build Own Operate Remove</td>
</tr>
<tr>
<td>BOOT</td>
<td>Build Own Operate Transfer</td>
</tr>
<tr>
<td>BOT</td>
<td>Build Operate Transfer</td>
</tr>
<tr>
<td>BTO</td>
<td>Build Transfer Operate</td>
</tr>
<tr>
<td>CCT</td>
<td>Cross City Tunnel</td>
</tr>
<tr>
<td>CHT</td>
<td>Cross Harbour Tunnel</td>
</tr>
<tr>
<td>DBFO</td>
<td>Design Build Finance Operate</td>
</tr>
<tr>
<td>DBFOM</td>
<td>Design Build Finance Operate Manage</td>
</tr>
<tr>
<td>DBO</td>
<td>Design Build Operate</td>
</tr>
<tr>
<td>df</td>
<td>degree of freedom</td>
</tr>
<tr>
<td>GWCL</td>
<td>Ghana Water Company Limited</td>
</tr>
<tr>
<td>GWSC</td>
<td>Ghana Water and Sewerage Corporation</td>
</tr>
<tr>
<td>HK$</td>
<td>Hong Kong dollars</td>
</tr>
<tr>
<td>HKYHA</td>
<td>Hong Kong Youth Hostels Association</td>
</tr>
<tr>
<td>HKZMB</td>
<td>Hong Kong–Zhuhai–Macau Bridge</td>
</tr>
<tr>
<td>JV</td>
<td>joint venture</td>
</tr>
<tr>
<td>KPI</td>
<td>key performance indicator</td>
</tr>
<tr>
<td>l/hd</td>
<td>litres per head</td>
</tr>
<tr>
<td>LROT</td>
<td>Lease Renovate Operate Transfer</td>
</tr>
<tr>
<td>NDRC</td>
<td>National Development and Reform Commission</td>
</tr>
<tr>
<td>NGO</td>
<td>non-governmental organisation</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>OM&amp;M</td>
<td>Operate Maintain and Manage</td>
</tr>
<tr>
<td>PFI</td>
<td>Private Finance Initiative</td>
</tr>
<tr>
<td>PPP</td>
<td>public-private partnership</td>
</tr>
<tr>
<td>PPPs</td>
<td>public-private partnerships</td>
</tr>
<tr>
<td>PURC</td>
<td>Public Utilities Regulatory Commission</td>
</tr>
<tr>
<td>RMB</td>
<td>renminbi</td>
</tr>
<tr>
<td>S</td>
<td>score assigned by user for individual factor within factor group</td>
</tr>
<tr>
<td>SCAD HK</td>
<td>Savannah College of Art and Design, Hong Kong</td>
</tr>
<tr>
<td>SETP</td>
<td>South Bank Education and Training Precinct</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>TAFE</td>
<td>technical and further education</td>
</tr>
<tr>
<td>TS</td>
<td>total score of factor group</td>
</tr>
<tr>
<td>US$</td>
<td>American dollars</td>
</tr>
<tr>
<td>VFM</td>
<td>value for money</td>
</tr>
<tr>
<td>W</td>
<td>Kendall's coefficient of concordance</td>
</tr>
<tr>
<td>WATSAN</td>
<td>Water and Sanitation Committees</td>
</tr>
<tr>
<td>WHC</td>
<td>Western Harbour Crossing</td>
</tr>
<tr>
<td>WKCD</td>
<td>West Kowloon Cultural District</td>
</tr>
<tr>
<td>WSDB</td>
<td>Water and Sanitation Development Board</td>
</tr>
<tr>
<td>Wt</td>
<td>weighting of individual factor within the factor group</td>
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Part I

Public–private partnership principles
1 Fundamentals and features of public–private partnership

Introduction

Public–private partnership (PPP) is a procurement approach where the public and private sector join forces to deliver a public service or facility. In this arrangement normally both the public and private sector will contribute their expertise and resources to the project and share the risks involved. The definition of PPP may differ slightly among different jurisdictions, depending on which part of the arrangement the importance is focused on. For example, PPP is defined as any agreement where the public and private sectors work together to deliver a public project: ‘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’ (Efficiency Unit 2012a).

Another source describes the term PPP as: ‘An arrangement for the provision of assets or services, often in combination and usually for a substantial or complex “package”, in which both private sector supplier and public sector client share the significant risks in provision and/or operation’ (Infrastructure Implementation Group 2005). In this definition there is an emphasis that both the public and private parties share a large proportion of the risks in a PPP project. In reality it is not always that an equal split of risks is experienced. Naturally, each party will want to pass on more risks to the other party. It is noticed that this occurrence is more common in developing countries or jurisdictions where the government has less experience in this alternative procurement method. Previous publications have indicated the importance of the financing of PPP projects and how passing on financial risks to the private sector is appealing to governments: ‘Privately financed projects involve provision by investors of equity capital and debt capital to fund what might otherwise be wholly publicly funded projects financed from Government borrowings and/or budget revenue’ (Infrastructure Implementation Group 2005).

This chapter looks specifically at the fundamentals and features of PPP projects in general. The areas considered include a comparison with the traditional practice, some background information, and the attractive factors, negative factors, value for money and critical success factors of PPP.
Traditional versus PPP

The procurement processes for the traditional approach and PPP approach are similar. PPP is a contractual agreement involving the private sector in the delivery of public services. Irrespective of whether the project is adopting a traditional or PPP approach, the procuring government departments should follow the same relevant regulations and procedures.

According to the Efficiency Unit (2008), the steps involved in the procurement of public works projects are as follows:

- **Step 1**: The client department will define a facility or service that is required. The relevant works department will produce a design. In a PPP approach the design may be very preliminary so that there is room for private sector innovation. In the traditional approach the design would be a lot more concrete.
- **Step 2**: The client department establishes a Project Steering Committee comprising civil servants, and possibly external experts if required, to monitor the project.
- **Step 3**: The works department will conduct public consultations and obtain financial endorsement.
- **Step 4**: After the planning and approvals are obtained, an output-based service specification would be prepared where the private sector will be involved with the delivery of public services.
- **Step 5**: The project may adopt a two-envelope tender evaluation approach, where the successful bidders should pass all the mandatory requirements and obtain the highest combined scores in the technical and non-technical assessment in general.
- **Step 6**: For traditional projects, the works department would monitor the construction process whereas in PPP projects the client department deals with the consortium only and the contractors are monitored by the consortium.
- **Step 7**: When the project is completed, the works department would inspect the works for traditional projects, but for PPP projects the client department or a third party would verify the facility to be fit for purpose. Payment would be made to the private party either directly by the government or by the end-users of the project.

Background of PPP

**The evolution**

PPP projects can be dated as far back as the 1800s during the railway construction boom in the UK (Grimsey and Lewis 2004). PPP is a relatively modern term for this arrangement used only more commonly in the last decade. Previously, variations of the arrangement included Private Finance Initiative (PFI), which is a more familiar term to many people due to its popular development in the UK during the early nineties (Tieman 2003).
It would not be incorrect to say that the PFI practice developed in the UK raised the world’s attention to this alternative option for delivering public infrastructure and services. PPP projects now account for about 15 and 8 per cent of infrastructure spent in the UK and Australia respectively (Ernst and Young 2005). As of 2011, approximately 700 PFI contracts had been secured in the UK, with 500 of these being in England. The combined capital value of these projects is almost £50 billion (HM Treasury 2012). Furthermore, the local Treasury estimates that there will be approximately £200 billion worth of PFI contracts within the next 25 years in the UK. By using the PFI approach, the local Treasury claims that annual savings are around £2–3 billion per year (National Audit Office 2011). However, Maltby (2003) asserted that PPP/PFI should be abolished for smaller projects and for information technology schemes.

Partnership UK was set up in 2000 to succeed the Treasury Taskforce. The Taskforce was set up in 1997 to oversee the implementation of PPP/PFI projects (Partnerships UK 2012a). One observation is that Partnerships UK was initiated by the local Treasury. The team is generally responsible for providing project advice and support, developing government policies, providing co-sponsorship and investing in PPP/PFI projects.

Due to the long history of PPP/PFI projects in the UK, Partnerships UK has a very comprehensive collection of guidelines and policies on implementing PPP projects for all sectors in many aspects. Case study reports can also be found in the public domain. Amongst the projects conducted by Partnerships UK the majority included projects for schools, hospitals and transportation. Other projects which have also been conducted include environment ones, leisure facilities, prisons and detention centres, housing, and so on (Partnerships UK 2012b). The extent to which PFI could be used and the advantages created were the main drivers attracting other countries to start adopting or improve their practice in PPP.

A more specific term used more commonly decades ago is Build Operate and Transfer (BOT). This arrangement was commonly adopted for transportation projects. This is because transportation projects tend to be larger in size and also because their long physical lives fit well into the procurement model. Early types of public infrastructure projects that involved the private sector include the turnpikes built in the UK and the US, and also the water facilities that the French delivered through the concession approach (Grimsey and Lewis 2004). Although water projects tend not to be particularly large in project sum, the advantages were noticed early on of introducing private expertise to deal with tasks that the public sector was probably not as efficient or experienced in carrying out. On the other hand, PPP also plays a significant role in the infrastructure development of developing countries. Figure 1.1 presents the annual private investment between 1990 and 2006 in the public services of developing countries (World Bank 2008).
Types of PPP

There are many types of PPP used around the world. Most of them operate in similar ways and the name differs depending on the country it is used in, whereas in some cases there are major differences to the approach. Some of the commonly mentioned different types of PPP are now described.

Design Build Finance Operate (DBFO) is similar to BTO; the government will retain title of the land and lease it to the private consortium over the life of the concessionary agreement (Levy 1996).

Operation and Maintenance (O&M) is where the private company operates and maintains a publicly owned asset. This is especially common in mainland China as traditionally the majority of assets are state owned. The large number of state-owned facilities and services have meant that the Chinese government has held a heavy burden, and by adopting PPP this financial commitment can be released. This type of PPP is sometimes not as favourable as ones that start from scratch. For new projects the benefits of employment are obvious, but on the other hand for existing facilities and services a consortium taking over can affect the existing employees.

Private Finance Initiative (PFI) is commonly used in the UK; there is great emphasis on private financing.

Build Operate Transfer (BOT) is one of the most traditional types of PPP used in the early days mainly for transport economic infrastructure projects. This has also been the traditional option used in Hong Kong. BOT involves the construction of the facility as well as its operation. At the end of the contract period it will be transferred back into the hands of the government.
Build Own Operate (BOO) was commonly used in Australia at the start. Build Own Operate Transfer (BOOT) was also commonly used in Australia at the beginning. It is similar to BOT but with a larger emphasis on ownership. Build Transfer Operate (BTO) is a method of relieving the consortium of furnishing the high-cost insurance required by the project during operation of the facility (Levy 1996).

Joint venture (JV) describes situations where the public and private sectors jointly finance, own and operate the facility (Grimsey and Lewis 2004).

Leasing is where all or a substantial part of all risks associated with funding, developing and operating the facility are assumed by the private sector, with the public sector entity taking the facility on lease (Sapte 1997).

The PPP process

This section of the chapter looks at the PPP process in detail. In a typical PPP project the government will invite private consortia to bid by submitting a project proposal. The successful bidder will need to design, construct and manage the facility (or service) for the agreed concessionary period, which is typically ten to thirty years. Over the concessionary period the private consortium will need to maintain and operate the facility according to the contract terms defined by the government. Normally certain quality standards or performance targets must be achieved. Part of the profit made from the project will be used to repay the loan that the consortium took out to cover the design and construction costs. The remaining proportion becomes their profit, so obviously it is to their benefit to manage the project well. At the end of the concessionary period the private consortium will normally hand back the facility into the hands of the government.

In general, the typical processes for delivering PPP projects in New South Wales include five major steps: (1) Project identification; (2) Project approval; (3) Planning assessment; (4) Project delivery; and (5) Project implementation (Infrastructure Implementation Group 2005). Before a project is even considered for the PPP path it will go through a series of governmental in-house procedures to decide whether it is a public facility or service that is needed. If deemed to be necessary, the project will have to be approved via the Gateway review process and to see which procurement option it should adopt. Planning assessment via a number of different line agencies would be necessary. Finally the project will be offered to the market, consortia will bid for it and the government will select the most suitable candidate after a long series of negotiations. The project will be designed and constructed typically over three to five years. It will then be operated and maintained for a further twenty-five to thirty years as the concession period. Thereafter, the project will normally be returned to the government, completely ending its life as a PPP project.

The parties involved in a PPP project

In a PPP project there are usually four key parties involved: the local government department (public sector), the consortium (private sector), the employees of the project and also the public and end-users of the facility or service (Figure 1.2).
In traditional PPP projects the government is usually more concerned with transferring the risks associated with design, construction, management, operation and so on to the private sector and satisfying the needs of the general public. On the other hand, the consortium is usually willing to accept some risk but in return expects a more satisfactory financial profit. In the traditional practice the government and the consortium are more self-centred, focusing on their own benefits rather than trying to achieve a win-win scenario. Recent years have shown a change to this practice; the parties are more willing to share responsibility, communication is increased and the partnership apart from being based on finance is also concerned with maximising the benefits that can be adopted from the private sector and bringing in skills and innovations that the public sector does not possess.

The employees of a PPP project benefit through employment. For this group of people a successful PPP project often indicates job security. The general public end-users have been known to have a large effect on the success of a PPP project. Often it is not whether a PPP project is finished ahead of time or is making a huge profit that determines its success. In many cases it is often its image perceived by the general public from the media that is its key to success. Public opinion is important; hence a successful PPP project must consider its overall image. For example, a project that needs to cut down forests for construction may be seen to fail at the beginning due to its lack of environmental awareness. Therefore a strategic plan must be considered at the start, possibly even before the drawing board.

**Research conducted in PPP**

With the increasing popularity of adopting PPP projects around the world, research in this field has also become more important to both researchers and practitioners (Al-Sharif and Kaka 2004). A comprehensive literature review of PPP research was
previously conducted by Ke et al. (2009). A total of 148 recent publications from renowned journals were studied. The findings showed that researchers from the UK were the originators of most PPP papers, followed by the US, Singapore, Hong Kong, China, Australia and Germany. It was assumed that construction education, national economics and mother language were all factors affecting which countries published more PPP papers.

In academic institutions, Nanyang Technological University in Singapore, the University of Hong Kong, National University of Singapore and Glasgow Caledonian University were all identified as active in pursuing PPP research. It was also found that various modes of PPP have been applied in different parts of the world, and the diverse concept of PPP has been publicly accepted instead of the more traditional BOT scheme alone.

PPP topics that were found to be of particular interest to the researchers included ‘Risk’, ‘Procurement’ and ‘Finance’. Seven more specific categories were derived from these topics including (a) Investment environment; (b) Procurement; (c) Economic viability; (d) Financial package; (e) Risk management; (f) Governance issue; and (g) Integration research. For these research studies, the techniques adopted vary from qualitative to quantitative analyses, some of which have included more rigorous techniques and/or theories in researching.

Attractive factors of PPP

The attractive factors of PPP have been discussed by many previous researchers. This section looks briefly at some of these. So why are governments across the world favouring the approach of PPP to provide for their public services and facilities? The very first PPP projects that opted for this approach were simply to bring in private investment for public services and facilities. These services and facilities were often essential for the public but to provide for them using the government’s capital would put pressure on the government’s financial status. Therefore, it was an ideal situation that the public had what they wanted provided for without the government having to pay, and also business opportunities were widened for the private sector.

As PPP has developed over the years the associated advantages have become more obvious. Walker and Smith (1995) suggested three main reasons for using the PPP approach:

- In general, the private sector possesses better mobility than the public sector. For example, the private sector is not only able to save the costs of project planning, design, construction and operation, but also avoid the bureaucracy and to relieve the administrative burden;
- The private sector can provide better service to the public sector and establish a good partnership so that a balanced risk-return structure can be maintained; and
- The government lacks the ability to raise massive funds for the large-scale infrastructure projects, but private participation can mitigate the government’s financial burden.
Public–private partnership principles

In addition, Walker and Smith (1995) maintained that PPP is a win–win solution and recognised a number of benefits to the general public and government:

- Relief of financial burden;
- Relief of administrative burden;
- Reduction in size of (inefficient) bureaucracy;
- Better services to the public;
- Encouragement of growth; and
- Government can better focus and fund social issues such as health, education, pensions and arts.

It is anticipated that there will be more PPP projects, for two main reasons according to Ghobadian et al. (2004). First, the private sector will get to know the needs of the public sector client over time. Second, the private sector has more to give than the public sector in terms of skills, technology and knowledge, therefore providing better quality facilities.

Askar and Gab-Allah (2002) summarised eight advantages of PPP in their paper:

- The use of private sector financing to provide new sources of capital, thus reducing public borrowing and improving the host government’s credit rating;
- The ability to accelerate the development of projects that would otherwise have to wait for scarce sovereign resources;
- The use of private sector capital, initiative and know-how to reduce project construction costs and schedules and to improve operating efficiency;
- The allocation of project risk and burden to the private sector that would otherwise have to be undertaken by the public sector;
- The involvement of private sponsors and experienced commercial lenders, providing an in-depth review and additional assurance of project feasibility;
- Technology transfer, training of local personnel and development of national capital markets;
- In contrast to full privatisation, the government’s retention of strategic control over the project, which is transferred back at the end of the contractual period; and
- The opportunity to establish a private benchmark to measure the efficiency of similar public sector projects and thereby offer opportunities for the enhancement of public management of infrastructure facilities.

Risk transfer is one of the main reasons for adopting the PPP approach. The private sector is in general more efficient in asset procurement and service delivery and as a result it is to the government’s advantage to share the associated risks with the private sector. In line with widely accepted principles, the Hong Kong government’s Efficiency Unit (2008) advocated that the most ideal situation is to allocate the risk to the party most able to manage and/or control that risk. For example, the contractor would take up the construction risk, the designer would take up the design risk, the government would take up environmental approval risks, land acquisition risks, and so on (Corbett and Smith 2006; Chan et al. 2006; Grimsey...

Cost certainty is more easily achieved in PPP projects as financial terms are identified and included within the contract. Since the private consortium will normally be responsible for financing, designing, constructing and operating the facility over an extended period, any cost saving can naturally result in a better chance of securing profit. Hence they are keen to control their spending tightly (Corbett and Smith 2006; Chan et al. 2006; Environment, Transport and Works Bureau 2004; Boussabaine 2007).

Innovation is another important advantage that the private sector can bring to public services. Generally speaking, the public sector may not be as innovative as the private sector. The private sector on the other hand is continuously searching for new products and services to increase their competitive edge and to save costs (Chan et al. 2006; Environment, Transport and Works Bureau 2004; Akintoye et al. 2003; Li et al. 2005b; Li 2003; Efficiency Unit 2008; New South Wales Government 2006; British Columbia 1999).

The private sector is made responsible for ensuring that the asset or service delivered meets pre-agreed quality benchmarks or standards throughout the life of the contract. Sometimes, the private consortium would only receive payment upon meeting certain requirements of the project; or it is motivated by the incentive payments to reward the high quality of service to be provided.

In a PPP project the consortium is also responsible for the long-term maintenance of the facility or service. The concession period may range from a few years to decades. Therefore, the consortium is keen to design and construct it to ensure better maintainability (Chan et al. 2006; Environment, Transport and Works Bureau 2004; Grimsey and Lewis 2004; Boussabaine 2007; Li 2003; Efficiency Unit 2008), at least within the concession period if not beyond.

Public sector projects delivered by the PPP model can often be completed on time and even with time savings because the consortium would start receiving revenue once the facilities/services are up and running. Therefore, the project team is keen to complete design and construction as quickly as possible. Once it starts to accrue revenue it can begin to pay off the initial costs and build up profits, whereas in a traditionally procured project there are no extra financial incentives for public servants to deliver projects faster. As a result, projects can at best proceed as scheduled (Environment, Transport and Works Bureau 2004; Grimsey and Lewis 2004; Akintoye et al. 2003; Li 2003; Efficiency Unit 2008).

Time certainty is found to be more easily achieved in PPP projects. The consortium is often paid according to milestones in the project schedule and any delay might be subject to liquidated damages. Therefore the consortium is often motivated to reach these milestones on time, if not earlier. This is a common behaviour observed in the private sector but it may not be the case in the public sector (Chan et al. 2006).

To the government, PPP frees up fiscal funds for other areas of public service, and improves cash flow management, as high upfront capital expenditure is replaced by periodic service payments and provides cost certainty in place of uncertain calls for
asset maintenance and replacement. Public sector projects delivered via the private sector normally involve private sector funding. Consequently, the public funding required for public services can be reduced and redirected to support sectors of higher priority, such as education, healthcare, community services, and so on (Li et al. 2005b; Efficiency Unit 2012a).

To the private sector participants, PPP provides access to public sector markets. If priced accurately and if costs are managed effectively, the projects can provide reasonable profits and investment returns on a long-term basis. Also, these projects tend to be large and require expertise from many areas. Hence co-operation among different collaborating parties is encouraged (Environment, Transport and Works Bureau 2004; Grimsey and Lewis 2004; Boussabaine 2007; European Commission Directorate 2003; United Nations Economic Commission for Europe 2004).

Business opportunities are also created, due to the large scope of works that can benefit different sectors (Li 2003; Efficiency Unit 2008; United Nations Economic Commission for Europe 2004; British Columbia 1999).

Negative factors of PPP

Similarly the negative factors for PPP were also reviewed and a summary has been given in this section. Berg et al. (2002) also summarised some disadvantages of PPP projects:

- Lengthy bidding process: from initial phase of public sector assessment to signing of contract takes up to two years. The process of inviting, preparing, assessing and refining bids and negotiating contracts is complex and procedural.
- High bidding costs: the detailed and lengthy nature of the bidding process implies increased transaction costs.
- Small number of bidders
- Cost overruns: considerable scope for cost inflation through the bidding process.
- Excessive risks: not clear to what extent the government can shift risk.

The impact of risks to project objectives in completing a PPP project is usually significant, and these risks arise from multiple sources including the political, social, technical, economic and environmental factors, due mainly to the complexity and nature of the disciplines, public agencies and stakeholders involved. Both the private and public sectors need to have a better understanding of these risks in order to achieve an equitable risk allocation and enable the project to generate better outcomes (Chan et al. 2006; Environment, Transport and Works Bureau 2004; Gunnigan and Eaton 2006; Koppenjan 2005; Li 2003; Merna and Owen 1998; Mustafa 1999; Ng and Wong 2006; Satpathy and Das 2007; Xenidis and Angelides 2005; Zhang 2001; Zhang and AbouRisk 2006). In fact, a fair and reasonable allocation of various risks is vital to PPP success. If risks are inequitably or wrongly allocated beyond the capacity of the parties concerned, PPP projects
would fail (for example, the demand risk resulting from town planning falling on a private consortium).

PPP projects may fall apart due to failure on the part of the private sector participants. In contracting out the PPP projects, the government should ensure that the parties in the private sector consortium are sufficiently competent and financially capable of taking up the projects. Due to a lack of relevant skills and experience of project partners, PPP projects are more complex to procure and implement (for example, the London Underground).

One common problem encountered in PPP projects is the high bidding costs, caused by increasing project complexity and protracted procurement process. The private sector incurs high bidding costs partly due to the consideration of the client's and their financiers’ objectives. Lengthy negotiations and especially the cost of professional services may increase the bidding costs further (Chan et al. 2006; Corbett and Smith 2006; Environment, Transport and Works Bureau 2004; Li 2003; Li et al. 2005b; Mustafa 1999; Xenidis and Angelides 2005; Zhang 2001).

The PPP bidding process is also regarded as lengthy and complicated. For example, bidders are required to prepare tender proposals attached with a bundle of additional materials. Such a process may take three to four months. Besides, another several lengthy negotiations will be required for the formation of the contract. Clearly, setting up a complicated agreement framework for successful PPP implementation can slow down the bidding process (Chan et al. 2006; Environment, Transport and Works Bureau 2004; Grimsey and Lewis 2004; Li 2003; Li et al. 2005b; Merna and Owen 1998; Mustafa 1999; Zhang 2001).

One other reason for failure is opposition from the stakeholders and the general public. Whether the proposed project is consonant with the interest of the public is important, as public opposition can adversely affect the funding for the project from the public sector (El-Gohary et al. 2006; Grimsey and Lewis 2004; Zhang and AbouRisk 2006). PPP in public projects typically incurs political and social issues like land resumption, town planning, employment, heritage and environmental protection. These could result in public opposition, over-blown costs and delays to the projects.

Another common complaint by the public is the high tariff charged for the services provided. Often, the private sector faces a political uphill struggle in raising tariff to a level sufficient to cover its costs and earn reasonable profits and return on investment. The participation of the private sector in providing public service will undoubtedly bring innovations and efficiencies in the operation, but may produce a fear of downsizing in the public sector. To a certain extent, there would be fewer employment opportunities if no regulatory measures were implemented (Li 2003; Li et al. 2005b; Zhang and AbouRisk 2006).

The introduction of PPP exerts unprecedented pressure on the legal framework as it plays an important role in economic development, regeneration and mechanism for developing infrastructure. However, some countries do not have a well-established legal framework for PPP projects and the current legal framework is only supposed to deal with the traditional command and control model. Although PPP involves a great deal of legal structuring and documentation to deal with potential disputes amongst PPP parties, a ‘watertight’ legal framework is still
lacking (for example, protection of public interests versus the legitimate rights of the private sector). Without a well-established legal framework, disputes are inevitable (Grimsey and Lewis 2004; Li et al. 2005b; Satpathy and Das 2007).

Private sector investors bear financial risks in funding the investment. Seeking financially strong partners in a PPP project is regarded as difficult. In most PPP arrangements, the debt is limited-recourse or non-recourse, where financiers need to bear risks. In fact, most stakeholders are not willing to accept excessive risks. The lack of mature financial engineering techniques on the part of the host countries can be another problem (Grimsey and Lewis 2004; Zhang 2001). An unattractive financial market (for example, with political instability or high interest rate) is often a negative factor to PPP success. Therefore, a conducive financial market is important for the private parties to drive PPP projects.

Value for money of PPP

One of the main reasons that projects are procured by PPP is to enhance value for money (VFM) by inviting the private sector to handle public works projects. As a result there has been much literature on how VFM in PPP projects can be achieved. This section reports only a few examples of how VFM can be achieved in PPP projects.

VFM, was defined by Grimsey and Lewis (2004) as the optimum combination of whole life cycle costs, risks, completion time and quality in order to meet public requirements, is another important consideration when deciding whether to proceed with the PPP option, especially for the public sector (Chan et al. 2006; Boussabaine 2007; Li et al. 2005b; Li 2003; Efficiency Unit 2008; Ingall 1997; New South Wales Government 2006; European Commission Directorate 2003). ‘Public sector comparator’ is the most common tool used by the public sector to show how much it would cost the government to build the asset through public funding, which is then used to compare with how much it would cost to build it as a PPP (Farrah 2007). In the case of the University College London Hospital Redevelopment in the UK, the PPP option cost 6.7 per cent less than the public sector comparator, while maintaining the same output and user requirements as demanded (Efficiency Unit 2012b).

Cost savings refer to the reduction in price as a result of delivering a project by PPP instead of traditional methods. The saving could be a result of the private sector’s innovation and efficiency which the public sector may not be able to achieve (Corbett and Smith 2006; Environment, Transport and Works Bureau 2004; Grimsey and Lewis 2004; Akintoye et al. 2003; Li et al. 2005b; Li 2003; Efficiency Unit 2008; European Commission Directorate 2003; United Nations Economic Commission for Europe 2004; British Columbia 1999). The private sector generally achieves higher operational efficiency in asset procurement and service delivery by applying their expertise, experience, innovative ideas and/or technology (such as using durable materials to reduce future maintenance cost) and continuous improvements. Overall cost savings to the project can be achieved by striving for the lowest possible total life cycle costs while maximising profits.
PPP project arrangements are complex and involve many parties with conflicting objectives and interests. Hence, PPP projects often require extensive expertise input and high costs, and deal negotiation can be lengthy. The high transaction costs and lengthy time may not represent good value to all parties and as a result the deal may not materialise in the beginning, or may falter in the end. PPP projects may incur higher transaction costs than those under the conventional public sector procurement. The legal and other advisory fees would be included as lawyers are involved in all stages of a PPP project, as well as the cost of private sector finance, and the price premium for single point responsibility arrangement. The potentially high transaction costs may have a negative impact on the objective of securing the best value (Corbett and Smith 2006; Environment, Transport and Works Bureau 2004; Grimsey and Lewis 2004; Li 2003; Li et al. 2005b; Merna and Owen 1998; Zhang 2001; Zhang and AbouRisk 2006). Complex PPP projects require inputs from many parties with differing expertise. Therefore, the projects should be economically viable to cover such costs.

Critical success factors of PPP

In order to achieve successful PPP projects, some suggestions have previously been reported in literature. This section reports only a few examples of how successful PPP projects can be achieved.

Under PPP contracts the government should be concerned that the assets are procured and services are delivered on time with good quality, and meet the pre-agreed service benchmarks or requirements throughout the life of the contract. However, the government should be less concerned with ‘how’ these are achieved and should not impose undue restrictions and constraints on the private sector participants. The government should be relegated to the primary role of industry and service regulation; it should be flexible in adopting innovations and new technology; it should provide strong support and make incentive payments to the private sector where appropriate. On the other hand, the government should retain control in case of default and be prepared to step in and re-provide the service if necessary (Abdul-Rashid et al. 2006; Corbett and Smith 2006; El-Gohary et al. 2006; Jamali 2004; Kanter 1999; Li et al. 2005c; Tam et al. 1994; Tiong 1996; Zhang 2005a).

A transparent and efficient procurement process is essential in lowering the transaction costs, shortening the time in negotiation, and completing the deal. Having a clear brief on the project and client requirements should help to achieve these in the bidding process. In most cases, competitive bidding solely on price may not help to secure a strong private consortium and obtain value for money for the public. The government should take a long-term view in seeking the right partner (Corbett and Smith 2006; Gentry and Fernandez 1997; Jefferies et al. 2002; Jefferies 2006; Li et al. 2005c; Qiao et al. 2001; Zhang 2005a).

Successful PPP implementation requires a stable political and social environment, which in turn relies on the stability and capability of the host government (Wong 2007). Political and social issues that go beyond the private sector’s domain should be handled by the government. If unduly victimised, it is legitimate that the
private sector participants should be adequately compensated. Unstable political and social environments have resulted in some failed rail projects (for example, frequent change in government premiers in Bangkok leading to the cancellation of many new public infrastructure projects originally procured under the PPP approach (Khang 1998; Cobb 2005)).

Many researchers (Akintoye et al. 2001; Corbett and Smith 2006; Jefferies et al. 2002; Li et al. 2005c, Zhang 2005a) have found that project financing is a key success factor for private sector investment in public infrastructure projects. The availability of an efficient and mature financial market with the benefits of low financing costs and a diversified range of financial products would be an incentive for private sector take-up of PPP projects.

Chapter summary

This chapter has provided some background on PPP projects in general. The traditional practice of procuring public works projects was reviewed to highlight the similarities and differences compared with the PPP method. The early developments of PPP have been briefly reviewed and the features of PPP presented. This chapter has formed an informative foundation for the following chapters in this book.
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