



# Cross-country comparisons of key drivers, critical success factors and risk allocation for public-private partnership projects

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## Abstract

Public-private partnerships (PPPs) are an effective and established strategy for procuring infrastructure. Although numerous countries have implemented PPPs for infrastructure development in recent years, not all projects have been successful. Most PPP failures result from inappropriate risk allocation and a lack of information on success factors in specific countries. For this study, we compared the categories of key drivers, critical success factors (CSFs), and preferred risk allocation in PPPs established in Taiwan, Singapore, China, the United Kingdom, and Indonesia. Mean value analysis, confirmatory factor analysis, and dimensional importance were used to analyze and compare these categories. Data on PPPs in Taiwan, Singapore, China, and the United Kingdom were obtained through comprehensive literature reviews. Data for Indonesia were obtained through structured surveys distributed to PPP practitioners and academicians. Considering Indonesia as the baseline, the results revealed that Indonesia and Taiwan exhibit several similar indicators of key drivers. Furthermore, comparisons with several countries revealed that Indonesian CSFs are most similar to those of China. Regarding risk allocation preference, the analytical results indicated that Singapore exhibits the most similarity with Indonesia. This study provides useful information for people seeking to invest in PPP projects, enabling them to enhance their understanding of key drivers, CSFs, and risk allocation in the researched countries. Based on our findings, international investors can apply investment strategies by considering the similarities and differences in each country.

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## 1. Introduction

A major concern in numerous countries is infrastructure development. Both developed and developing countries acknowledge that improving their socioeconomic infrastructure can increase their autonomy. A study on infrastructure development showed that transportation, telecommunications, sanitation, and energy are essential for national economic development (Carnis and Yuliawati, 2013). In most countries, the government assumes responsibility for financing and building infrastructure (Kingombe, 2011). In recent decades, however, private entities have begun to provide financing (Grimsey and Lewis, 2002).

To address the challenges of infrastructure procurement including legal, social, political, and financial concerns, the governments of several countries have begun to invite private parties to join long-term contractual agreements based on public-private partnerships (PPPs) (Grimsey and Lewis, 2002). The capability of PPPs in harnessing the innovative capability and capital of the private sector has been recognized (Chou et al., 2012; Russell et al., 2006). A PPP allows a government to benefit from the participation of the private sector in managing and financing public service expansion by outsourcing risk to private entities. Consequently, the government can focus on policymaking, planning, and regulation (The World Bank, 2011).

Moreover, PPPs are believed to provide a high value for investments into infrastructure procurement (Bing et al., 2005a; Hwang et al., 2013; Ke et al., 2010). In fact, 139 developing

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countries have dynamically invited private entities to participate in PPP programs (Chou et al., 2012) to accelerate infrastructure development. Numerous countries have used PPPs because they improve operational efficiency, enable the innovation of technological and managerial skills, and increase the involvement of private entities in public services (Chowdhury et al., 2011; Hwang et al., 2013).

For effective PPP implementation, important factors and preferences regarding risk allocation should be identified before the commencement of a project. Chou et al. (2012) classified important factors as key drivers and critical success factors (CSFs). In PPPs, key drivers can be defined as the motivation regarding the adoption of a PPP, indicating advantages and the likelihood of success for any project. A CSF can be defined as several crucial areas of activity in which favorable results are vital to enable a manager to attain designated goals (Bing et al., 2005b; Chan et al., 2010; Rockart, 1982).

Chou et al. (2012) presented evidence that risk allocation is one of several CSFs in PPPs. The inappropriate allocation of risks in PPPs affects private participation and the PPP success rate. Hence, risks should be allocated adequately to parties that can manage them effectively (Hwang et al., 2013). Those categories are considered important aspects of a PPP. Because construction projects can vary considerably, each country uses specific indicators in each category. The objective of this research was to compare the indicators of key drivers, CSFs, and risk allocation between Taiwan, Singapore, China, the United Kingdom, and Indonesia.

Key drivers, CSFs, and risk allocation data for Taiwan, Singapore, China, and the United Kingdom were obtained through a comprehensive literature review. Additionally, PPP project risk allocation factors previously reported in Australia (Jin, 2010), Tehran (Heravi and Hajhosseini, 2012), and India (Singh and Kalidindi, 2006) were included to develop a questionnaire for Indonesia. Key drivers and CSFs data on Indonesia were simultaneously collected by distributing the comprehensively designed surveys to PPP practitioners and academicians in the country. The survey results were analyzed using mean value analysis (MVA) and confirmatory factor analysis (CFA) measurement models. Comparisons were performed through importance and descriptive analysis. Indonesia was selected as a basis of comparison with Taiwan, Singapore, China, and the United Kingdom because of its numerous large development projects and its sought-after investment opportunities. The World Bank (2014) ranks Indonesia as the 10th most favorable PPP investment target.

The purpose of the comparisons is to provide information for investors who intend to invest in infrastructure procurements based on PPPs, and to enhance our understanding of country profiles (i.e., key drivers, CSFs, and risk allocation preference). The analytical results revealed the comparisons of key drivers, CSFs, and risk-allocation preferences for five countries. International investors can use the information to implement preventive strategies based on the similarities and differences of PPPs in each country. The research results are also useful in considering country risk profiles when devising procurement agreements. For academicians, this research contributes to PPP-related literature by enhancing the data available for various countries. For

practitioners, this study enables project managers to take preventive action based on the information provided.

The remainder of this paper is organized as follows. Section 2 presents a literature review regarding PPPs in Taiwan, Singapore, China, the United Kingdom, and Indonesia, as well as background information on indicators for key drivers, CSFs, and risks. Section 3 details the research methodology, survey process, and the methods of analysis as well as a comparison. Section 4 provides the analytic results and cross-country comparisons. Section 5 presents a discussion on the findings and limitations of this research. Section 6 offers a conclusion and recommendations for further study.

## 2. Literature review

### 2.1. Public-private partnership development

PPPs are well known, and have been widely used in numerous countries to solve problems involving infrastructure procurement. In developed countries, PPPs have been used since 1990. The European Union registered 1,400 PPPs between 1990 and 2009, with a total value of more than €260 billion (Kappeler and Nemoz, 2010). The value of PPP infrastructure investment in developing countries since 2000 has reached US\$64 billion (Asian Development Bank, 2008). However, not all countries have implemented PPPs successfully.

In a study on the successes and failures of build-operate-transfer (BOT) projects in Asia, especially in Hong Kong and Thailand, Tam (1999) reported that PPPs have been more successful in Hong Kong than in Thailand. Examples of successful PPPs in Hong Kong include the Cross Harbour Tunnel, Eastern Harbour Crossing, and Western Harbour Crossing (Tam, 1999). By contrast, in Thailand PPPs have resulted in numerous failures such as the Bangkok elevated transport system, the Bangkok second expressway system, and the Bangkok Don Muang toll way. The failures of PPPs in Bangkok have resulted from inadequately managed risk, mistrust between public and private parties, and disagreements regarding toll increments and changes in policy (Tam, 1999).

Additional examples of unsuccessful PPPs are available from Southeast Asia. Throughout the region, PPPs were widely implemented successfully in the 1990s, and accounted for a cumulative investment of approximately US\$18.7 billion (Economic and Social Commission for Asia and the Pacific, 2012). However, the practice of establishing PPPs decreased markedly after the 1997 global financial crisis. Private-sector investment in Southeast Asia decreased by 40% to US\$10.4 billion because of inadequate preinvestment work, an absence of proper feasibility studies, a lack of competitive tendering, inaccurate estimates of demand, and the inadequate completion of projects.

By contrast, PPPs have been successful in the Asia-Pacific region, for example, in India and South Korea. Kappeler and Nemoz (2010) reported that India was the largest market for PPP investment, and that the Indian government fully supported PPP development in the country. In 2009, South Korea successfully completed a PPP in infrastructure

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