



# Identifying the strengths, weaknesses, opportunities and threats to TOT and divestiture business models in China's water market

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Received 23 May 2012; received in revised form 18 April 2013; accepted 30 April 2013

## Abstract

This study attempts to enhance the understanding of the two emerging public–private partnership (PPP) business models – Transfer–Operate–Transfer (TOT) and divestiture – in the context of Chinese water sector. Foreign investors aiming to enter or expand their share in the market need to select an optimal PPP model between competing ones through a strengths, weaknesses, opportunities, and threats (SWOTs) analysis. For the purpose, we employ the triangulation approach consisting of an opinion survey to measure the level of consensus on each of a total of eleven SWOT factors surrounding TOT and divestiture models, and in-depth case studies on the two-representative TOT and divestiture projects. Our assessments indicate the emergence of a strong consensus between interviewees regarding bid premium, financial burden, and bidding method in TOT and fixed-return provisions, operational management efficiency, majority control, and equity transfer proportion in divestiture. However, it is advised that foreign investors should be flexible in interpreting the factors and respond them at the solution level considering a project-specific environment.

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*Keywords:* China; Divestiture; PPP; SWOT; TOT; Water

## 1. Introduction

The Chinese water sector faces many challenges, such as the rampant discharge of wastewater from households and industry, overexploitation of underground water, low efficiency in water use, and under-investments in water and sanitation services (Chen, 2009; Yang and Teng, 2008). In the late 1990s, these complex challenges led the Chinese government to allow private sector participation in the effective management and operation of water and wastewater plants monopolised by the public sector (Choi et al., 2010; Meng et al., 2011). Public–private partnership (PPP) is a remarkable business model by which governments choose to overcome these problems in

cooperation with private firms. In this model, firms design, integrate, and deliver complex systems and then finance and operate the built environment for a contracted period. The PPP business model flows from the evolution of infrastructure privatisation, the origin of which can be traced back to the concept of optimising public administration, also known as the ‘new public management’ (Alfen, 2009).

Build-Operate-Transfer (BOT) is one of the most frequently used PPP business models. It fits perfectly into the definition of the integrated solutions (IS) approach, a collective offering of goods, services, knowledge, support, and self-service for customers with a keen interest in the life-cycle costs of their investments (Kujala et al., 2011). In infrastructure development projects such as power, transport, telecommunication, and process plants, the trend towards IS has been attributed to the emergence of BOT in the 1980s (Brady et al., 2005). In contrast to the generic four-phase project life-cycle (concept, definition,

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execution, and closeout), IS delivery projects extend projects' timescale backwards into the pre-bid phases and forward beyond the post-construction phase into the operational life of the built environment designed for user needs (Brady et al., 2005). In project-based firms, this approach follows the definition of 'full-service' solutions combining traditional transactional projects associated with minimum product services into operational and management (O&M) services to offer one integrated life-cycle value proposition (Brady et al., 2005; Kujala et al., 2011).

Although up to the late 1990s, a few PPP projects were implemented in the Chinese water sector, 2002 was a turning point for foreign investors willing to enter a new market: the entire municipal water service sector, including water distribution networks, were opened to foreign investment. Since then, foreign investors have been able to maximise the project operation efficiency by utilising their competencies in the distribution side of the water business (Ganesan et al., 2005; GWI, 2004). By extending their services into O&M of the installed plant and occupying a larger share of the customers' businesses, they have enhanced the possibility of capturing a larger portion of the overall value stream (Davies, 2004).

From 1990 to 2009, PPP water projects gained increasing popularity in the market and more than 500 projects utilised the BOT, transfer-operate-transfer (TOT), and divestiture business models. Market analyses suggest that, while China's water market has utilised BOT as extensively as have other developing countries, PPP project types such as TOT and divestiture are attracting attention because these accommodate the needs of local governments and private investors (ICF International, 2008; Zhong et al., 2008). The TOT business model is a type of concession in which a private entity takes over the ownership and operating rights of a state-owned water company to rehabilitate and operate an existing facility at its own risk and then returns ownership to the local government at the end of the contract period. The divestiture business model is an acquisition whereby a private entity buys an equity stake in the state-owned water companies through asset sales; the divestiture can be either full or partial, depending on the percentage of equity transferred (PPI On-line Database, 2008).

The BOT model is appropriate for privately financed projects and the TOT model for existing projects already in operation (Meng et al., 2011). Divestiture is suitable for a state-owned water supply company willing to enhance its services, including the purification of raw water, distribution and sale of potable water via pipeline networks, and enhanced management. In both TOT and divestiture, the major interest of the private companies is the long-term operation of the acquired plant or waterworks company rather than participation in construction.

Among the studies focusing on PPP in the construction industry, the major focus is on either the BOT business model or large-scale BOT case studies, as exemplified in studies on the water sector (Chen, 2009; Qiao et al., 2001; Senturk et al., 2004; Zeng et al., 2008; Zhong and Fu, 2008). This view is strongly supported by Al-Sharif and Kaka (2004) and Tang et al. (2009); they reviewed PPP articles in the leading construction

management journals and affirmed that none dealt with the important aspects of either PPP business models or projects other than BOT. Lam (1999) briefly addressed a few residual risks related to a telecommunications TOT project and a water privatisation project. Meng et al. (2011) proposed the critical success factors for TOT water supply projects in China but failed to differentiate between TOT and divestiture projects.

There is a paucity of information on the key features of successful TOT and divestiture water projects in terms of risk management and market participation. For example, many Korean engineering and construction companies and multinational manufacturers such as LG, Samsung, and SK are eager to participate in the Chinese water market via PPP models. However, few practitioners have an in-depth understanding on key internal and external strategic issues related to successful TOT and divestiture deals. Foreign firms having specialisation in water projects need to fully understand and utilise the strengths and business opportunities of the TOT and divestiture business models to successfully participate in the market, recognise and avoid the weaknesses of the models, and avoid the dangers identified through experience. A clear understanding of the current Chinese water market and a strengths, weaknesses, opportunities and threats (SWOT) analysis of the two emerging models will lead to well informed decision-making on market participation and successful prearranging of the identified SWOT issues prior to project contracting. This study thus attempts to fill the research gap concerning PPP business models in China's water market with the following three research questions:

- Among the various PPP business models, what are the different PPP business models implemented by water project firms in the Chinese water market?
- What are the internal and external issues surrounding the TOT and divestiture models in terms of their strengths, weaknesses, opportunities, and threats (or constraints)?
- How do water professionals perceive those features? Are the features applicable to all TOT and divestiture projects?

## 2. Research methodology

In order to answer for the research questions raised in Section 1, this research utilised a three step study methodologies, 1) summarization of research background information regarding the most frequently used PPP business models and comparison of the models, 2) an opinion survey on SWOT factors related to TOT and divestiture business models, and lastly, 3) an in-depth investigation of each SWOT factor of the two models by exemplifying two representative real cases. The first method is to provide information on diverse types of PPP business models, the use trend of each model over time, and comparative information between them through the business model analysis framework proposed by Kujala et al. (2011).

The second part of the study employed a SWOT framework to categorize the SWOT factors generated from an exhaustive literature review concerning the Chinese PPP water market situation and TOT and divestiture models. Particularly, those

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