

Stakeholder-Associated Transaction Costs in Privately Financed Public Infrastructure Projects

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Abstract

Governments around the world have been gaining finance through private sector capital, and utilizing Public Private Partnerships as a vehicle for public infrastructure delivery. This research aims at improving value-for-money in Australian privately financed public infrastructure projects by systematically identifying stakeholders-associated transaction costs in PPP projects using transaction cost economics and stakeholder management theories. The outcomes will broaden PPP decision-makers' awareness of stakeholders and the associated transaction costs, and enhance their ability to perceive, understand, assess, and reduce transaction costs in an effective and efficient way; thereby value-for-money or economical sustainability, a public sector probity issue, could be better achieved in these important infrastructure projects. This paper reports on the preliminary work of the project, including the literature review, establishment of research questions and objectives, and research design.

Keywords: Transaction costs, stakeholder, public-private partnership, infrastructure, construction industry.

1. Introduction

Accelerating urbanization around the world has created an unprecedented demand for public infrastructure. In Australia, an important strategy in the long-term blueprint for making 18 capital and major regional cities more productive, sustainable and liveable is to develop high quality public infrastructure systems to improve civic quality of life. Increasingly, governments around the world have been gaining finances through private sector capital, and utilizing Public Private Partnerships (PPPs) as a vehicle for delivery. PPPs have the potential to gain efficiency, innovation and better Value for Money (VfM) through pooling resources with the private sector while offering essential social and economic services to society.

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However, embedded with PPPs are the high transaction costs among multiple stakeholders. In many instances, these transaction costs erode all the benefits of the PPPs and ultimately render an inferior alternative for procuring infrastructure. Further added onto high transaction costs are the involvement of multiple stakeholders and their differing interests, expectations, and influences. Australia is not exempted. The lack of a theoretical foundation and appropriate methods for analysing stakeholder-associated transactions and transaction costs and their interdependencies in infrastructure projects to a great extent hinders the achievement of value-for-money, which is the core principal of PPP projects.

A large-scale (3 to 5 years) multinational research project is thus proposed to, by comparing with the practice of other major nations (both developed and developing) adopting PPPs and by adopting cutting-edge artificial intelligence techniques including fuzzy logic and artificial neural networks, ultimately develop a holistic stakeholder-associated transaction cost analysis and reduction model for Australian privately financed public infrastructure projects so that value-for-money is achieved. The current paper explains the cornerstone research work that must be carried out so that the preliminary findings can be utilised as the foundation of the aforementioned large-scale project. The study that is reported in this paper allows an analytical framework based on the experts' opinions elicited via in-depth interviews and the analytical hierarchy process (AHP) to be established.

Therefore, the **research problem** for the large-scale research project is: *How to analyse and reduce stakeholder-associated transaction costs in privately financed public infrastructure projects so that value-for-money is achieved?*

Accordingly, in the foundation project (for which this paper is written), the main **research questions** to be addressed in depth include:

1. What are the major transaction costs that are involved in privately financed public infrastructure projects in Australia?
2. Who are the major stakeholders, among which major transaction costs incur during a project's lifecycle?
3. What are the transaction costs that could be reduced by stakeholders and their level of possibility and extent to be reduced?
4. What are the measures that could be implemented by stakeholders to control and reduce transaction costs and their relative effectiveness?

Corresponding to the research questions, specific **research objectives** are to identify:

1. the major transaction costs that are involved in privately financed public infrastructure projects;
2. the major stakeholders, among which major transaction costs incur during a project's lifecycle;

3. the transaction costs that could be reduced by stakeholders and their level of possibility and extent to be reduced; and
4. the measures that could be implemented by stakeholders to control and reduce transaction costs and their relative effectiveness.

This paper reports on the preliminary literature review of the research project. Research methods are also briefly explained.

2. Literature Review

In most countries, the stock of infrastructure projects represents an enormous asset, which effectively managed, plays a critically important role in attracting investment and supporting a nation's social, cultural and economic stability, productivity, development and prosperity. In Australia, the Government is committing \$8.5 billion to 15 nationally significant infrastructure projects from 2008-09 to 2013-14 (DIT, 2011). Particularly, according to the National Urban Policy (MCU, 2011), an important strategy in the long-term blueprint for making the nation's 18 capital and major regional cities even more productive, sustainable and liveable is to develop high quality public infrastructure systems to improve civic quality of life.

2.1 Public-Private Partnerships (PPPs)

Public Private Partnerships (PPPs) are being increasingly utilized for the procurement of public infrastructure worldwide. The term Public-Private Partnership has been interpreted widely in the literature to encompass any arrangement between the government and private sector to deliver services to the public (see, e.g., Holland (1984), Harding (1990), Carroll and Steane (2000), and Broadbent and Laughlin (2004)). In this study, drawing on the literature on PPP definition, especially that in the Australian context (see, e.g., DFA (2005a); NSW Treasury (2006); and DTF (2006)), PPP refers to a complex and long-term contractual arrangement between government and private sector, which involves creation of infrastructure assets and/or delivery of ongoing services through private sector financing and ownership control for a specified period.

PPP is a method of procurement which is used most frequently for major infrastructure procurements. It involves the use of capital from the private sector to fund an asset that is used to deliver outputs for a government agency. Emphasis is placed on the service or capability that the public sector requires rather than the assets used to provide them (Baldry, 1998). The private sector is contracted to invest in the creation or acquisition of the assets required to facilitate the delivery of a service or capability. The payment mechanism of PPPs is distinct from that of traditional delivery arrangements (Aziz, 2007). The revenue generated from the completed facility usually becomes the main source of security for debt repayment (Tiong, 1990). Alternatively, the government provides the private developer with the payments that are contingent on their performance. A PPP project is usually structured to have limited or no recourse to the project developer or the government, which requires the setup of a separately incorporated entity, known as a Special Purpose Vehicle (SPV) (DFA,

2005b). The arrangements are long-term in nature, typically extending over 15 to 30 years (DFA, 2005a).

The key drivers for the use of PPPs over traditional procurement, such as risk transfer and innovation, allow for infrastructure to be designed, constructed and operated by the private sector, which is better equipped to take the risks involved and more able to effectively manage the costs of providing the infrastructure. Therefore, in theory these principals allow social and economic infrastructure to be created at a lower cost to society. However, although increased efficiency in the design, construction and operation has led to savings in PPPs, these savings are often eroded by the increased transaction costs between the public and private partners (Jin, 2010; Jin and Doloi, 2008).

2.2 Transaction Cost Economics

Transaction cost is the focus of transaction cost economics (TCE). The TCE approach developed out of the institutional economics of Commons and the analysis of administrative behaviour by the Carnegie school (Winch, 1989). This approach emerged from the economist Coase's seminal work, in which he advanced his theory of the existence of firms and argued that, in the absence of transaction costs, there is no economic basis for the existence of the firm (Coase, 1937). TCE recognizes that there are costs of using the pricing system and that such costs give rise to various forms of economic organizations (Coase, 1988). It represents a major attempt to combine economic and sociological perspectives on industrial organizations (Winch, 1989). This analysis supersedes neoclassical economic analysis, which assumes that economic activities can be coordinated costlessly by a system of prices and tells nothing about the organizational structure (Hart, 1990).

TCE adopts a contractual approach to the study of economic organization (Williamson, 1996). Modest research objectives of TCE include *'to organize our necessarily incomplete perceptions about the economy, to see connections that the untutored eye would miss, to tell plausible ... causal stories with the help of a few central principles, and to make rough quantitative judgments about the consequences of economic policy and other exogenous events'* (Solow, 1985, p.329). The basic framework was first presented by Williamson in 1975, and has been elaborated since without losing its initial insight.

The essential insight of TCE is that in order to economize on the total costs of producing a good or providing a service, both (1) production costs, which are the costs of producing a good or providing a service by adopting a certain production technique without governance requirements, and (2) transaction (or governance) costs, which are the costs of governing the transactions inherent in that choice of production technique, must be taken into account (Williamson, 1985, 1996; Winch, 2006). A production technique that has the lowest production costs might not be the economizing choice if transaction costs are also taken into account (Winch, 2001). While a traditional economic analysis can identify the most efficient choice of production technique, it cannot explain the most effective use of that production technique (Winch, 2006). The firm focus on transaction costs in the TCE research is simply a strategy of focusing on its distinctive contribution (Winch, 2006).

2.3 Transaction Costs

Put in a theoretical context, transaction costs are the costs of running the economic system. These costs add nothing to the final value of the product, however are required in order for production to be conducted or outsourced, and hence are regarded by many as the economic friction when transferring risk, responsibility and/or roles between parties (Jin, 2010). Transaction costs are significantly larger in value in PPP projects than in traditional procurement, and it is accepted that one of the greatest setbacks when determining whether to utilize a PPP or a traditional form of infrastructure delivery (Dudkin and Valila, 2005).

The reasons for high transaction costs in PPPs include the long-term nature of a PPP project, the heavy investment in an asset, the large scale of the project and incomplete project the use of an often incomplete contract which all increase the amount of uncertainty involved in the inception of a project (Jin, 2011). In particular, the involvement of multiple stakeholders in PPP projects and their differing interests, expectations, and influences incurs high transaction costs when compared to the traditional procurement methods of infrastructure delivery.

Dahlman (1979) grouped transaction costs into search and information costs, bargaining and decision costs, and policing and enforcing costs and boiled the three categories down to one: resource losses due to lack of information. Williamson (1985) described transaction costs as drafting and negotiating agreements, setup and running costs of the governance structure which monitors and settles disputes, haggling costs, and bonding costs of effecting secure commitments.

If a PPP project is mishandled, possible resultant transaction costs may include, among others, (1) the extra costs for clients of a higher contingency (or premium) included in the bid price from contractors; (2) the extra costs for clients of more resources for monitoring the work; (3) the extra costs for clients and/or contractors of recovering lower quality work for a given price; (4) the extra costs for contractors of increasing safeguards (both *ex ante* and *ex post*) against any opportunistic exploitation of one's own specific assets by other parties; (5) the extra costs for contractors of the resources dedicated to lodging claims; (6) the extra costs for both parties of dealing with the disputes or litigation.

2.4 Stakeholder-Associated Transaction Costs

The list of stakeholders in an infrastructure project is often long and would include the owners and users of facilities, project managers, facilities managers, designers, shareholders, legal authorities, employees, subcontractors, suppliers, process and service providers, banks, insurance companies, media, community representatives, neighbours, general public, government establishments, visitors, customers, regional development agencies, the natural environment, the press, pressure groups, civic institutions, etc (Jin *et al.*, 2012). Each stakeholder plays a different role in the planning, construction and operation of an infrastructure product, and has different levels and types of investments and interests in the project. Due to their varied roles and expectations in infrastructure projects, conflicts and controversies among stakeholders exist and can create huge transaction costs.

The main parties in a PPP transaction, amongst whom risks will be allocated, include (1) the public agency; (2) the developer or promoter or concessionaire or PPP company, and as a consequence, the equity investors; (3) the debt lender or financiers; (4) the designer, construction contractor, facility contractor, and probably their parent companies as guarantors; (5) insurers; and (6) subcontractors and suppliers. All of the parties from the private sector are usually referred as a consortium, whose roles and responsibilities are multifaceted (Tiong, 1990).

Although a high level of collaboration is expected in a partnership, public and private partners' aims are not identical (Ng and Loosemore, 2007). The public sector intends that the private partner provides the community with facilities and services that are timelier, more cost efficient and of higher quality than if the public sector has to provide them by itself. In contrast, the aim of the private partners is to achieve a return on their investment by generating sufficient future cash flows to cover initial capital and financial costs, thereby providing enough profit to invest in future projects and pay dividends to shareholders. Due to such a disparity, the debate on the appropriateness of PPPs will not end until sufficient projects have been studied in detail over their entire life-cycle (Tiong, 1990).

The stakeholder-associated transaction costs can be difficult to identify and control than first thought and very difficult to reduce effectively. An evaluation of the influence of the stakeholders and the costs associated with the transactions among them should be considered as a necessary and important step in the planning, implementation, and completion of any construction project. Any negligence or mismanagement of the stakeholders-associated transaction costs will have huge impact on achieving project objectives and success.

2.5 Research Gap

Previous studies on PPPs focused on VfM measurement, and whether the PPP method of procurement is more advantageous than traditional infrastructure projects (Soliño and Gago de Santos, 2010). The costs in transferring risk and responsibilities from the public partner to their partners in the private sector have had little focus until recent years. However, a main **research gap** is that previous studies failed to provide a holistic account of the major transaction costs incurred in PPPs and ignored a fact that transaction costs are interrelated and associated with project stakeholders.

Therefore, on the one hand, 'hidden/invisible' transaction costs, which may have little apparent influence, but could cause major disruption to the infrastructure projects through unseen power and influential link, cannot be identified; on the other hand, transaction costs of similar nature are deemed to have the same impact on project objectives. Actually, they, more often than not, are associated with different stakeholders, and consequently exert different impacts on a project. In order to achieve VfM in PPP projects, it is crucial for project decision-makers to not only know 'what' the transaction costs are and 'where' do they exist, but also understand 'which' stakeholders these costs are associated with, and 'why' they are critical in the whole transaction networks. As such, 'how' transaction costs can be reduced will be better understood.

3. Research Method

In order to achieve the specified research objectives, the research is planned to be carried out in the following stages:

Stage 1: Establishing an initial stakeholder-associated transaction costs theoretical framework and associated analysis method. In this stage, focus will be on the underlying theory of transaction cost economics and stakeholder analysis. It starts with a comprehensive and critical review of the latest developments in the proposed area. Various theories, including but not limited to transaction cost economics, stakeholder management theory, social network theory, fuzzy theory and decision theory, will be investigated. The outcomes include a theoretical foundation for the proposed investigation, and an initial stakeholder-associated transaction cost analysis method.

Stage 2: Preparing for data collection by interviews and AHP. A questionnaire will be designed for the semi-structured interviews. Ethics approval will also be obtained at this stage. Interviewees with expertise in PPPs will be identified from both industry and academia. Meanwhile, the recruiting process will start as soon as possible to secure a qualified Research Assistant.

Stage 3: Data collection by interviews and AHP. A total of ten semi-structured interviews will be conducted with these experts in PPP infrastructure projects in five major capital cities in Australia, including Sydney, Melbourne, Brisbane, Adelaide, and Perth to obtain first-hand information on various transaction costs, the associated major stakeholders and their impacts on transactions, the characteristics of stakeholder-associated transactions, the measures for reducing stakeholders' transaction costs, and the perceived effectiveness of such measures, all in privately financed public infrastructure projects. Meanwhile, the *Analytical Hierarchy Process* (AHP) will be conducted in order to, in the following stage, prioritise the respective transaction costs and their reduction measures following their respective identification from data obtained during the interviews.

Stage 4: Data processing and analysis. In this stage, the Research Assistant will process and edit the data so that data analysis can be conducted. The *Analytical Hierarchy Process* (AHP) technique will be used to analyse the data obtained from the interviews. The AHP is a technique that accommodates subjective analysis by identifying and ranking process related variables (Saaty, 1990). AHP is often used as a research method where there is uncertainty and multiple criteria characteristics. The appropriateness of using AHP is justified since this method remains rigorous during the ranking of qualitative data.

Stage 5: Writing report and disseminating findings. By 31st December, 2013, a research report will be developed. CI Jin will also seek to present and disseminate findings by submitting at least two papers to refereed journals (such as *Journal of Construction Engineering and Management* – ERA-A*, *Construction Management and Economics* – ERA-A, and/or *Australasian Journal of Construction Economics and Building* – ERA-B), and another two papers to international conferences.

4. Conclusion

This paper reports on the preliminary literature review of a university-funded research project. This research leverages the collective knowledge of transaction costs and stakeholders to generate more effective ways to analyse and reduce transaction costs in PPP projects. It provides project management teams with an approach that broadens awareness of influential transactions and enhances project decision-makers' ability to perceive, understand and reduce transaction costs in an effective and efficient way. Thereby value-for-money could be achieved in infrastructure projects. This can contribute to the development of infrastructure projects in Australia.

The findings and achievements of this research are expected to be of interest to decision-makers from both public and private sectors, who are involved in PPP infrastructure projects. The stakeholder-associated transaction costs framework to be established in this proposed foundation project and the subsequent stakeholder-associated transaction costs analysis and reduction model to be established in the larger-scale project will make it much easier for decision-makers to understand why some stakeholders and transaction costs deserve their substantial attention in order to ensure an efficient problem predicting and solving process. Meanwhile, by developing and demystifying transaction networks, the internal and external stakeholders in infrastructure projects can strengthen mutual understanding, expand common ground, deepen trust, and consequently promote cooperation.

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