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Delivery of Economic Benefits using Public Private Partnerships in the Development of Infrastructure Projects

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This paper intends to evaluate the delivery of economic benefits using public private partnerships (PPP) in the development of infrastructure projects. By applying a model that considers the social and economic factors of two recently completed projects in Sydney, the paper argues that there are long term economic benefits embodied in PPPs even though public opinion may perceive one venture as a failed project. By focusing attention on the collaborative advantages in PPP, this paper argues that these advantages can enhance the delivery of economic benefits to the community.

Field of Research: Finance and Economics

1 Introduction

Public private partnerships (PPPs) in project finance involve both the public and private sectors working together to develop large scale infrastructure projects. Their joint involvement necessitates the creation of collaborative arrangements to deliver essential infrastructure. Some of this involvement was due to severe constraints on public sector budgets and significant liquidity in world financial markets along with a belief that the private sector would manage the development of major projects more efficiently than the public sector (Vickerman, 2004). Proponents of PPPs argue that these collaborative arrangements enable the public sector to accelerate the development of infrastructure projects and deliver economic benefits to the public (Akitoby et al., 2007). Critics of PPPs argue that since most of these projects are broadly classified as public goods and services, they should be the responsibility of the public sector. By allowing active private sector involvement, the economic and social benefits of such projects may exclude some members of the community. PPP model has been extensively used in project finance but there are concerns about private sector efficiency in delivering projects on time and to budget. These concerns have raised questions over the allocation or sharing of risks between the public and

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private sectors (Bing et al., 2005). The failure to collaborate effectively is often blamed for reducing the potential benefits to the wider community

In this paper, we address key issues which have emerged from an empirical based comparison of two road tunnel projects in Sydney. Both projects were under construction over similar periods of time and were completed within one year of each other, but had different public acceptance outcomes. Lane Cove Tunnel (LCT) experienced wider public acceptance and was considered by the media as a success story which delivered economic benefits to the community. The Cross City Tunnel (CCT), in contrast, faced adverse publicity and hostile media commentary when it was officially opened. CCT was regarded as a failed PPP.

This paper begins with a review of project finance risks by examining how risk sharing, as opposed to risk allocation, can enhance success in PPPs and yield economic benefits. It then reviews the mixed goods character of PPPs and what economic benefits can be derived from the completion of an infrastructure project. Critical questions on collaborative advantages in collaboration theory are also reviewed. A framework for the empirical based comparison of these two tunnels is developed and applied to each of the two tunnels to investigate the degree of collaboration and how it enhances the delivery of economic benefits. It concludes by highlighting the importance of capturing synergy in collaborative advantages.

2 Literature Review

2.1 Project Finance Risks in PPPs

The central theme surrounding PPPs are the potential financial benefits and ability to transfer risks from the public sector to the private sector. It is often argued (Yescombe, 2002, Tinsley, 2000, Esty, 2001) that in allocating risks, the risks should be carried by the party best able to control, manage or mitigate the risks. The focus on risk allocation by the public sector in most cases leads to outright shifting of risk to the private sector. Infrastructure project risks are numerous. These include risks related to environmental issues, delays in construction, cost overruns, service availability and quality, uncertainty about revenue flows during operation, changes in discount rates and asset values. Most of these risks cannot be allocated outright or completely transferred from one party to another.

There is increasing support for risk sharing rather than risk transfer in PPPs, given that certain risks can be influenced by the public sector (Akitoby et al., 2007). The party that has control and influence over risk should bear a greater share of it while allowing the other party to take on a smaller share (Bing et al., 2005). Public sector concessions are a legitimate form of government support for infrastructure projects (Akitoby et al., 2007). In areas where the public sector can anticipate and control risks especially relating to getting necessary approvals and environmental licenses, they must take on greater responsibilities. Construction and revenue risks are more difficult to manage. While these risks are normally allocated to the private sector, there must be some form of concessions such as penalties waived when project deadlines cannot be met. These concessions are often subject to public scrutiny

resulting in criticism that the government provides too many incentives to the private sector.

2.2 Economic Benefits of PPPs as "Mixed Goods"

Most public goods and services are provided by government to underpin economic development and enhance national productivity. Since the 1990s there has been a gradual shift from public provision to an increased role for private sector participation. From an economic perspective PPPs are neither pure private goods nor pure public goods in terms of their availability and use. To the extent that public access to transport infrastructure such as motorways and tunnels can be made excludable, by a toll barrier, the facility has features of a private good. In other words the benefits of consumption accrue to those individuals who pay and consume the service. It is the non-rivalrous nature of transport infrastructure which weakens the private good character of a PPP and makes it more like a public good. Arguably, this places many PPPs in the economic category of 'mixed goods'.

Cases of mixed goods and their role in market economies inevitably invite controversy due to the competitive and collaborative relationships surrounding their provision (Lieberman and Hall, 2005). Opponents of PPPs argue that governments do not always get good value for money when they enter into collaborative agreements with private parties aimed at achieving economic efficiency (Stilwell and Jordan, 2004). Moreover, contractual based relationships like PPPs are not costless to the participants. A government, like any other contracting agent, suffers from imperfect information in the marketplace. Considerable time and organizing effort must be spent searching for suitable collaborative partners, negotiating price arrangements and monitoring the agreement after both parties have reached a deal (Boyce and Ville, 2002).

Another problem with PPPs is that private sector involvement may reduce the likelihood of an equitable provision of services. The promotion of private sector involvement may distort public spending priorities and crowd out other suitable competitors as the ability to attract private involvement becomes a key consideration in project starts. At other times a political commitment to private finance funding has resulted in delayed project starts (Vickerman, 2004). There is also the problem of lack of economic incentives for the private sector to adjust activity to changing needs and market conditions. It is sometimes argued that the only incentive motivating the private sector will be the tendency towards cost cutting rather than service enhancing activities (Forrer et al., 2002). The possible economic benefits of PPPs however, may have been underestimated and more attention needs to be given to them. Given the ability of the public sector to define public service outputs in a sufficiently specific manner to facilitate enforcement, infrastructure projects can bring about economic benefits to the wider community (Forrer et al., 2002). Expanding the private sector role may well be attractive to the public sector. All these factors increase the probability of successful completion of projects to the benefit of the wider community.

2.3 Collaborative Advantages

The essence of collaboration in a partnership is to achieve a majority of objectives which would not be achieved by any one partner acting alone. This is one of the primary concepts in collaboration research leading to the theory of collaborative

advantage. Collaborative advantages fundamentally capture the synergy argument (Huxham, 2003, Huxham, 1993). Huxham (2003) found that collaborative inertia impedes progress in collaboration because the output appears to be insignificant. PPPs face collaboration inertia because of conflicts arising from the differences in the respective objectives of the parties and possibly, due to a lack of mutual trust. Kanter (1994) presented eight factors that can lead to successful partnerships, six of which are especially relevant to PPPs. Firstly, the partnership must fit major strategic objectives of the respective parties, such that they want to make it work. Partners have long term goals which play a key role in shaping the partnership. Bennett, *et al* (2000) contended that strong foundations for PPPs are based on complementary goals. Not only should the respective strategic objectives be upheld, the partnership will improve the chance of success if the goals of the project sponsors are mutually compatible. Secondly, the partners know that they need each other. They have complementary assets and skills and neither can accomplish alone what both can achieve together. Thirdly, the partners need to invest in each other to demonstrate their long term commitment. They need to pledge financial and other resources to the partnership. Fourthly, the partnership must be given a formal status with clear responsibilities and decision making processes. Fifthly, there must be open communication where partners share information on technical data and knowledge of changing situations. The need to share information is important as it forms a common basis of agreement, including compensation plans when certain risks become more prominent. Finally, mutual trust must exist between the partners. Middleton and Davies (2001) advocate trust and teamwork as the key to success in PPP projects. It is expected that there will be areas of tension in the partnership. The partners are faced with the need to cooperate enough to reach mutually acceptable agreements while simultaneously satisfying individual interests (Polzer et al., 1998). Collaboration in PPPs thus poses challenging tasks when both parties with disparate goals attempt to align their interest when negotiating risk sharing.

3 A Framework to Measure Economic Benefits of PPPs

Measuring the success of PPP projects is often controversial because of different criteria used by academics and practitioners. This is further complicated by the expectations of the wider community who are be affected by the projects. Long term financial sustainability has often been used to measure the success or failure of PPPs. An often neglected measure of success of PPP projects is the extent of long term community benefits against the cost to the government. Such costs include concessions given to the private sector and the price the public has to pay when using these facilities (O'Neill, 2005a). Levinson et al (2006) have used four criteria: public sector acceptance and society acceptance, in addition to budget and timeliness, to measure PPP success. There are some limitations to their approach. First, it focuses on the outcome and not the process. Success can be shaped by the process used in establishing the partnership and analyzing the collaborative process can provide a better understanding of the outcome (Barrett, 2002).

Secondly, the four criteria used are broad and do not include factors behind the determination of each of these criteria. The absence of a detailed investigation of each of these criteria can lead to a lopsided conclusion. Thirdly, the first two criteria focus on acceptance, while the latter two focus on project outcome. These two sets

of criteria are contextually different in the PPP literature and it may be unwise to integrate these criteria in the same analysis. Consequently, this paper modifies the framework of Levinson et al (2006) by analyzing both the process during implementation and the outcomes of PPP projects separately. It then draws conclusions on whether PPPs deliver actual economic benefits. This study first focuses on the process based on collaborative advantages. It is hypothesized that the ways in which collaborative advantages in the partnership are applied will determine the degree of collaboration in PPPs. This in turn will play a role in enhancing or diminishing success. The success of the project is then assessed by analyzing public acceptance of concessions given by the public sector, toll charges, improved lifestyles and environmental issues. A high acceptance rate is recognition of the real economic benefits which accrue to the wider community.

4 Findings

4.1 Cross City Tunnel (CCT)

4.1.1 Background

Increasing traffic congestion within Sydney prompted the Government to construct a 2.1km-long east-west tunnel that crosses the city. The Government awarded Cross City Motorways (CCM), a consortium formed by the lead private sector sponsor, Cheong Kong Infrastructure (CKI), to undertake the project. The contract was to build, own and operate the tunnel for 30 years after which it would be handed back to the Government. The project cost was estimated at $680m but the final cost was $900m (Pretorius, 2007). Construction commenced in January 2003 and completed three months ahead of schedule. It was opened to motorists in August 2005 and immediately received negative feedback from motorists angry about the high toll. They were also dissatisfied with the closures of road access aimed at funneling traffic into the tunnel. This resulted in a public “boycott” resulting in fewer motorists using the tunnel. The operator responded by offering a three week toll-free period plus a commitment to freeze further toll increases for twelve months. With continued non-acceptance of the toll after the toll-free period, the operator decided to halve the toll for three months and also reverse some earlier public road closures. In November 2006, CCM was in financial difficulty and needed additional equity to avoid bankruptcy. Without any support from the public sector, the project was put into receivership in December 2007 (John et al., 2007).

4.1.2 How Collaborative Advantages were Managed

The Government decided that CCT should be constructed under PPP program because of budgetary and public borrowing constraints (Parliament-of-NSW, 2006). An initial concept paper was prepared to consider environmental impacts. The Government acknowledged that the project would bring potential economic benefits to the community in terms of employment and to financial institutions in terms of greater participation in capital markets. Moreover, as CCT was one of the most complex tunnel projects ever undertaken in Sydney (O'Neill, 2005a), the technology transfer to local engineering firms promised long term benefits.Meanwhile CKI with a

vision to become an international infrastructure portfolio investment company was seeking investment opportunities overseas (Pretorius, 2007). Tolled transportation was attractive to CKI because of the finite-life concession period and relatively low regulatory and political risks in Australia. CKI regarded infrastructure projects to be medium risk with an internal rate of return between 15% and 18% (Fislage and Heymann, 2003).

The partnership fitted the major strategic objectives of both parties, and the partners had complementary assets and skills that allowed them to achieve these objectives. In addition, setting up CCM gave the project a formal status with clear decision making responsibilities. The objective of the Government was to minimize its financial exposure and deliver the project at no cost to itself. The Government also specified that the tender should include a business consideration fee, aimed at recovering costs relating to the development of the initial concept. CCM included a fee of approximately AUD110m in the bid. The contract included provision for CCM to increase the Base Toll if the Government required certain changes during the construction phase. A compensation plan to pay CCM was allowed if there were changes to the public transport system that would affect the volume of traffic using CCT.

Unfortunately, the level of open communications and mutual trust was low. Firstly, CCM projected over 90,000 vehicles per day using the tunnel by 2006 and over 100,000 by 2016 while the Government estimated 86,300 and 101,700 respectively (Pretorius, 2007). This was not openly discussed to enable a more realistic number to be used in the revenue forecast. Secondly, knowing that substantial risks would be transferred to them, CCM did not openly discuss this issue with the Government. Thirdly, the Government was aware that some of the compensation plan could not be easily administered, but did not communicate this to CCM. There were high levels of interest alignment on risk sharing. CCM took on the risks arising from any mistakes in their own planning during the tender process. Entrepreneurial risks during construction and operation phases were also borne by CCM, especially the shortfall in revenue arising from variances in traffic demand forecast. On the other hand, risks relating to mistakes during the planning phase were borne by the Government.

4.1.3 How Collaboration Enhanced the Delivery of Economic Benefits

The extent of collaborative advantages that was practiced in the partnership showed that the level of collaboration is not high (Table 1). The high business consideration fee provided to the Government to achieve its “no-cost” objective sparked public outrage because the public believed this inflated the toll set by the operator. Part of the public dissatisfaction was targeted not at the level of concession given but rather the lack of it. On the other hand, local road closures on the public streets around the tunnel resulted in traffic congestion and caused confusion. The low level of acceptance was evidence that the concession provided did not match the economic benefits promised to the community.

Table 1: Extent of Collaborative Advantages Practiced in CCT and LCT

	Criteria: Extent of Collaborative Advantages applied to partnership	Cross City Tunnel	Lane Cove Tunnel
1	Extent partnership fits major strategic objectives of both sectors.	√√√√	√√√√
2	Extent partners have complementary assets and skills that allow them to accomplish what they could	√√√√	√√√√
3	Extent partnership is given a formal status with clear responsibilities and decision making processes.	√√√√	√√√√
4	Extent financial and other resources are committed by both partners.	√	√√
5	Extent of open communication: sharing of technical data knowledge and interest alignment on risk sharing.	√√	√√√
6	Extent of mutual trust between partners.	√√	√√√
	Score [1]	17 √	20 √
	Percentage of Maximum Score	70.8%	83.3%

Footnote 1: 0 represent no collaborative advantages being practiced. √, √√, √√√, √√√√ represent a low level, average level, high level and a complete level of collaborative advantages. A 75% score is used in this paper to classify the project as a high degree of collaboration through the practice of collaborative advantages.

Table 2: Delivery of Economic Benefits based on Public Acceptance

	Criteria: Public acceptance	Cross City Tunnel	Lane Cove Tunnel
1	Acceptance of concessions given by public sector	√√	√√√
2	Acceptance of toll charges	√	√√√
3	Acceptance of improved lifestyles	√√√√	√√√√
4	Acceptance of environment issues	√√√√	√√√
	Score [2]	11 √	13 √
	Percentage of Maximum Score	68.8%	81.2%

Footnote 2: 0 represent no public acceptance. √, √√, √√√ and √√√√ represent low level, average level, high level and complete level of public acceptances respectively. A total score of 75% is used in this paper to classify successful PPP projects in delivering economic benefits to the community.

The high construction cost incurred arising from the engineering complexity resulted in the high toll but the public reacted adversely to this. A survey conducted in Sydney showed that about 72% of the respondents endorsed the need to pay a toll in order to enjoy the lifestyle gains from the CCT (O'Neill, 2005b). The initial bad publicity of CCT altered the views of one-third of the respondents about the benefits of privately-operated toll roads (O'Neill, 2005b). The community did not feel that the high toll translated into the level of economic benefits expected from their use of the tunnel. On the positive side, the construction and operation of the tunnel addressed most environmental issues under the Environmental Impact Statement (EIS) which was prepared with feedback from the community. Based on these four factors, the overall level of public acceptance was below average (Table 2) because the total economic benefits to the community did not meet the expectation of the public. This shows that an average level of collaboration from not fully practicing collaborative advantages was responsible for the average level of public acceptance.

4.2 Lane Cove Tunnel (LCT)

4.2.1 Background

To allow for quicker traveling time between the north west of Sydney to the City, the Government engaged Connector Motorways (CM) in December 2003 to design, construct, maintain and operate the LCT. As a special purpose vehicle, CM was given the concession to operate for 33 years, after which the tunnel would be returned to the Government. The lead private sector sponsors were Leighton Holdings (LH) and, again CKI (NSW-Government, 2006). LCT is a 3.6km tunnel and

the construction cost was estimated at $1.1bn. Previously, motorists had to drive through gridlocked suburbs for a few kilometers. LCT cut traveling time by 17 minutes. The tunnel also provided a direct link to Sydney's expanding orbital motorway network and public transport (NSW-Government, 2006). CM designed and constructed the tunnel and its associated works to create a "sense of place" for local community by providing architecture that enhanced the journey and its vicinity. It also attempted to address the environmental problems (NSW-Government, 2006). Local community, commercial and industrial groups formed the Lane Cove Tunnel Action Group (LCTAG) to voice concern over the way construction was to be carried out, the community development around the tunnel, and the air quality coming out of the tunnel through the ventilation stacks. Construction commenced in April 2004 and was completed in March 2007, two months ahead of schedule. Sydney commuters initially embraced the new LCT during its month long toll-free use, despite minor operating problems. The project was reported in the media as a successful PPP. While the number of motorists using the tunnel was initially below the original forecast of 100,000, it was not a major financial concern then (Rochfort, 2008). However, one year after its operation, the traffic volume was only about 60,000 motorists – a level which seriously impacted on the financial performance of CM (Besser, 2007).

4.2.2 How Collaborative Advantages were Managed

The Government's objective in this project was to improve traffic flow. To undertake the project itself, the Government would have to acquire additional financial burden and project risks that it could not manage. Lacking experience in undertaking infrastructure projects, the Government compensated with their skills in developing initial concepts and finalizing development proposal. The private sector sponsors' objective was to expand its development portfolio. The partnership effectively fitted the major strategic objectives of both sectors and the formation of CM gave the project its formal status. The Government did not pledge financial contribution but provided resources in dealing with the community. Pressured by LCTAG, the bore-driven tunnels were being constructed as against the original cut and cover method. Though at a higher cost, the former method would not disturb the road surface and reduce inconvenience. However, the in-tunnel filtration was not constructed because the Government believed the ventilation stacks were sufficient to improve the air quality (Lane-Cove-Community-Group, 2006).

While the Government was bogged down in dealing with LCTAG, the private sector concentrated primarily on the construction. Both sectors recognized their respective roles and focused on completing the project on schedule. But there could have been greater collaboration to integrate their effort in dealing with LCTAG to gain greater public acceptance. The Government did not undertake to conduct a study on the projected traffic volume. The private sector uses its own traffic forecast to set the toll charges. Risk sharing and transfer were clearly set out. There was sufficient interest alignment in negotiation of risk sharing. The toll cost was explicit and discussed. However, there was no open discussion on compensation when changing conditions disrupted the long-term traffic volume. Plans to funnel traffic into the tunnel were made explicit, even though both parties knew that there could be potential public dissatisfaction with the measure. Anticipating this, the Government decided to postpone this plan and amended the Project Deed to include compensation of $25m to CM (Moore, 2008). The agreement not to disclose to the public the

correspondences on the $25m compensation package was not openly communicated between both parties.

4.2.3 How Collaboration Enhanced the Delivery of Economic Benefits

Based on the practice of collaborative advantages, the model shows that there was a high level of collaboration (Table 1). This high level of collaboration aided in enhancing a high level of public acceptance because greater economic benefits to the community were felt by the public. To avert public outcry, CM decided to offer a one month toll-free concession to all motorists using the tunnel. Greater management of traffic flow around the entrances to the tunnel gave the public the perception that the concessions granted by the government were socially acceptable. Some critics observed that if the government had partially funded the project, the toll charges would have been lower. Nevertheless, there was a generally higher acceptance of the toll charges, reflected in the greater number of motorists using the tunnel. Generally, lifestyles improved as a result of a reduction in traveling time. It was accepted that the tunnel was essential to improve traffic flow. Today, the project continues to enjoy an overall high level of public acceptance. However, there remain lingering concerns that not all environmental issues have been adequately addressed. Despite this reservation, the high level of public acceptance indicates that the public believed economic benefits had been conferred upon them (Table 2).

5 Discussion and Conclusion

There are different criteria for judging whether PPPs are successful which range from financial to socio-economic considerations. CCT and, to a smaller extent, LCT faced financial problems one year after they were opened. Arguably, classifying PPPs as successful from a financial perspective confines us to a narrow understanding of infrastructure development. Even when projects are found to be financially unviable, there still remain public concerns over a lack of proper comparison on the cost-effectiveness of private sector involvement versus the traditional public sector funding approach. Greater public acceptance of PPP projects therefore provides an alternative measure of success. This is because of the potential economic benefits the projects can confer on the public. PPPs are aimed at increasing the delivery of services in an era of public financial rectitude by using the resources of the private sector (Levinson et al., 2006). The intention is to improve efficiency by providing more services for less government outlays. Because these projects affect the wider community, they are often controversial, subject to public debate and external scrutiny. There are concerns raised about the balance of risks and overall benefits. The private sector will price any risk that is being transferred to it and seek public concessions to improve profits. When the desired concessions are not forthcoming, the project may result in higher developmental costs, which will be passed on to the users.

Working on collaborative advantages in PPPs can steer the partners towards higher degrees of collaboration which in turn can enhance economic benefits to the

community. Successful PPP projects are meant to deliver improved service quality to the community. Using the approach set out in this paper, it was observed that LCT had a higher degree of collaboration than that of CCT (Table 1). LCT also delivered higher economic benefits to the community (Table 2). Therefore the study shows that there is a positive correlation between higher levels of collaboration and higher levels of economic benefits to the community when PPPs are used in the development of infrastructure projects. This paper has identified a number of underlying themes in PPPs when providing public goods and services. The role of collaboration in PPPs is critical in enhancing success. Understanding the need to capture and build collaborative advantages in PPPs suggests that the public sector needs to retain greater interest in planning and management of PPP projects. This can lead to greater probability of success in delivering economic benefits to the community.

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