

COMPARATIVE ANALYSIS OF PFI'S BOT APPLICATIONS TO TRANSPORT INFRASTRUCTURES IN MAJOR CITIES OF ASIA

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ABSTRACT

In this study, the comparative analysis of BOT applications (one of the scheme of the PFI) to urban expressways and urban railways in major cities of developing Asia was carried out and its effectiveness was examined. Characteristics of each case were identified, which were then analyzed by comparing different types of projects and transport infrastructures between cities and countries.

Keywords: PFI, BOT, Transport Infrastructure, Asia

INTRODUCTION

In developing Asia, the build-operate-transfer (BOT) scheme for inputting private funds into the management of transport infrastructure started to be implemented from the late 1980s. Despite unsuccessful precedents, BOT-based transport infrastructure projects are still being planned in many Asian nations today. The build-operate-transfer (BOT) scheme (one of the scheme of the PFI) for inputting private funds into the management of social infrastructure started to be implemented in Asian nations from the late 1980s. Besides BOT, its similar forms of projects financed by the private sector are build-transfer-operate (BTO), build-lease-transfer (BLT) and several others (UNESCAP, 2007). In this study, these schemes are considered to be represented by BOT in a broad sense, and therefore collectively treated as BOT.

The objective of this study is to carry out the comparative analysis of BOT applications to transport infrastructures in major cities of Asia and to examine its effectiveness. Specifically, characteristics of each case are identified, which are then analyzed by comparing different types of projects and transport infrastructures between cities and countries. Consequently, issues to be addressed toward the future implementation of BOT-based projects are to be clarified. Transport infrastructures to be analyzed are urban expressways in Metro Manila, Bangkok and Shanghai, and urban railways in Metro Manila, Bangkok and Kuala Lumpur. These infrastructures are currently in operation. Those in the process of planning, negotiation or construction are not included.

To collect information for each case, written records were explored. In addition, an interview survey was conducted to relevant parties in a particular city. The information obtained were: the historical and political background for the introduction of the BOT scheme, BOT procedures (project type, concession period, financing, etc.), relevant laws and systems (tax benefit, subsidy, risk sharing, etc.), and data (financial statements, charge, number of users, etc.) Information obtained for each case is sorted out. Then, their characteristics are identified through comparative analysis.

1. Private Finance Initiative

The private finance initiative (PFI) is a plan to efficiently and effectively carry out the private-sector-led development and management of social infrastructure which used to be undertaken publicly, by injecting private capital and management knowledge. PFI was originally developed by the UK where public projects have been reviewed since the 1980s, under which office works have been streamlined, privatized and agent-oriented. In the course, after learning through the failure of partial privatization, PFI was designed and institutionalized in November 1992 as one measure to improve public projects. As for the private sector, entrusted parties of this particular project usually organize a consortium (a group of companies formed to execute a specific project.) The consortium invests money in the above mentioned project company. When the term of contract expires after passing all the stages of finance, construction and management, the project company transfers the operation and facilities of the project to the public sector and its task is completed. Figure 1 indicates some PFI models where the private sector is given opportunities to participate in public projects.

	Commitment of public sector
commitment	1. Contribution Contract 2. O & M Contract 3. Design Build (DB) 4. Design Build Major Maintenance 5. Design Build Operate (DBO) 6. Lease Develop Operate (LDO)
Risk	7. Build Lease Operate Transfer 8. Build Transfer Operate (BTO) 9. Build Own Transfer (BOT) 10. Build Own Operate Transfer (BOOT)
↕	11. Build Own Operate (BOO)
↑	12. Transfer to Quasi Public Authority
↑	13. Build Buy Operate
	Commitment of private sector
As the relative importance of the project increases in numerical sequence, the role and risk that the private sector assumes become heavier.	

Figure 1. PFI models

2. Status of the BOT Scheme in East Asia

The BOT scheme has been adopted mostly in East Asia and Latin America. Not limited to the transportation sector alone, this tendency is observed in other sectors too. Between East Asia and Latin America, the following two differences are pointed out. (1) BOT is mostly applied to small-scale infrastructure projects in Latin America whereas it is implemented in large-scale projects in developing East Asia, which entail enormous maintenance cost (ADB, 2000). (2) The transfer of infrastructure ownership by selling off the right of its management to the private sector is practiced generally in Latin America whereas more than half the number of projects are new contracts in East Asia (IFIC, 2005). Thus, the BOT scheme has been applied to new large-scale infrastructure projects in developing Asia.

After 2010, PPP projects in the transportation sector in East Asia which reached agreement were mostly carried out under the BOT scheme. In other areas, many cases are repairing projects to which the rehabilitate-operate-transfer (ROT) or rehabilitate-lease-transfer (RLT) scheme is applied. BOT-based new projects are far dominant in East Asia.

3. Urban Expressways

(1) Metro Manila, the Philippines

The Philippines adopted the BOT scheme first in Asia. Institutionalized in 1990, the existing BOT Law has been effective to the present since its 1994 amendment. Main additions to the amended law were the new provisions concerning ROT and BLT, and the clear definition of unsolicited projects.

In a typical BOT procedure, private operators in response to public invitation from a government agency submit their proposals to the relevant office and bid to get the concession contract.

Another approach is the submission of a 'unsolicited proposal,' which is sent from the private sector to the public sector, not in response to request from the official body. Projects based on unsolicited proposals are seen quite frequently for the improvement of social infrastructure in developing nations. Unsolicited proposals are highly expected to contain novel and unconventional ideas that the government cannot come up with.

Llanto (2008) remarked that unsolicited proposals were necessary measures for the government in the Philippines -- because (1) the government bodies might not be able to execute a reliable feasibility study due to inexperience and restricted budget and (2) the close coordination between relevant bodies and agencies could not always be secured, even if public invitation projects were pursued. At the same time, however, he pointed out that projects on the basis of unsolicited proposals were unclear, and therefore easy to induce political bargaining. Further, screening of projects would become more complicated, putting burdens on the government bodies. In the Philippines, most of unsolicited proposals are poor in quality and therefore it takes long time for them to be approved. Nevertheless, the number of unsolicited proposals is nearly equivalent to that of solicited proposals in this country (Llanto, 2008).

In the Philippines, some expressways are developed according to a joint venture (JV) program. Under the JV program, all the tasks of developing social infrastructure are entrusted to the private sector without the intervention of the government. The Metro Manila Skyway, for example, is one of major expressways in the Philippines, developed according to the JV program. The JV-based infrastructure development program is not regulated by the BOT Law. The government takes part in licensing a toll plan and approving business continuity, but not acquires the ownership. The system is quite similar to those of private railway businesses operated in Japanese major cities. The development of the Metro Manila Skyway was executed by the Indonesia-based private company. Likewise, other expressways currently under construction are mostly funded by foreign capitals from Hong Kong and Malaysia.

Although BOT-based infrastructure projects are concentrated mostly in Metro Manila, some interurban expressways are also developed under the BOT scheme. One of them is the Southern Tagalog Arterial Road (STAR) which has been in service since 2008. But the other projects are still under construction or not even started yet. The reasons why their construction works have not commenced yet are attributed to lack of funds, obscure risk sharing, improper charge system, delayed land acquisition, and insufficient coordination between government offices (JICA, 2005).

STAR was the only expressway that was developed and opened in the BOT scheme in the Philippines. Its management is carried on in the BTO program, which was approved in 1998. The concession period is 30 years from 2000 to 2029. The project consists of two stages. The first stage (22.2km) was completed by ODA from Japan and started its operation in 2006. The second stage (19.7km) which opened in 2008 was developed only by BTO.

(2) Bangkok, Thailand

In Thailand, the National Economic and Social Development Plan was drawn up in 1962. Since then, it has been renewed every five years.

Among Thai BOT projects, there was a failure example of elevated highway and rail construction project -- the Bangkok Elevated Road and Train System Project, commonly known as the Hopewell Project, for which Hong Kong-based Hopewell Holdings (HH) received an order. The Hopewell Project was supposed to complete a 3-story viaduct system extending a total length of 60.1km (north-south and east-west lines) within the grounds of the State Railway of Thailand under a 30-year BOT concession agreement, in which a development plan of surrounding areas was included (Sugita, Suzuki and Zhao. 2001).

The project was approved in 1990 and the construction started in 1993. In 1998 after the Asian financial crisis, however, the project with no more than 20% of completion was canceled by the Thai government. The reason for the failure of the Hopewell Project is explained by Tam (1999). So, details are not discussed here, but the Asian financial crisis was not a major reason. It might have some impact on the project though, as the construction works had been behind the schedule in the first place. In fact, no debt default was involved.

(3) Shanghai, China

The Shanghai municipal government has implemented various policies so that special purpose companies (SPC) can promote the BOT-based construction of expressways (Dai, 2006).

(i) Land use: The Shanghai municipal government rents a construction site from landowners to hold land-use-rights, and bears expenses for the demolition of old buildings and compensation for residents' forced removal. An SPC pays landowners an annual rent of 45,000 yuan/Ha to cover their long-term basic living expense.

(ii) Tax revenue: During the construction period of a BOT project, the payment of a business tax is reprieved. A corporate tax on an ordinary company is 33%, but an SPC is required to pay 15% under the BOT program.

(iii) Internal subsidization: The same toll rate and concession period are applied to all the BOT routes in the Shanghai expressway. But profits may differ between routes naturally because of different traffic volumes. For this reason, the Shanghai municipal government practices the internal subsidization to balance revenues between routes by collecting a portion of the profits from high-yield routes and making it up for low-yield routes. At the time of bid acceptance, an agreement is made between the Shanghai municipal government and an SPC that they will share profits of high-yield routes and that the government subsidy will be granted to low-yield routes.

(iv) Share transfer: An SPC can receive a loan from a financial institution on its operation right. The term of repayment is determined according to the cash flow of the SPC, which is usually 10 years or longer. To encourage the cash flow, the government has relaxed restrictions on the share transfer of BOT projects. Accordingly, SPC equity can be transferred with the approval of the government after the opening of a highway to traffic.

5. Urban Railways

(1) Metro Manila

The urban railway network in Metro Manila consists of three lines, namely LRT-1, LRT-2, and MRT-3. LRT-1 was constructed with Belgium ODA and started its operation in 1984. LRT-2 was originally called for bids together with LRT-1 under the BOT program, which however ended in failure. Eventually, LRT-2 was constructed with Japanese ODA, partially opened in 2003 and completed with the present line in 2004. These two lines are also written as MRT-1 and MRT-2.

MRT-3 with a length of 16.9km was constructed through a BTL program under the BOT Law and started its operation in 1999. The BOT Law defines BLT as follows (BOT Center, 2006) -- "A private entity as a project proposer finances, builds infrastructure and develops facilities. After completion of construction, the private entity operates the facility for the duration of the lease and draws its income from the public organization. After the expiry of the lease, the private entity transfers ownership to the public organization."

The owner of MRT-3 is the Metro Rail Transit Corporation (MRTC), a private consortium. After construction work is done, MRTC leases MRT-3 to the government body, and assumes its management for a concession period of 25 years. MRTC also holds the right of commercial development in the surrounding area for 50 years.

Although the number of potential MRT-3 users is estimated to be 600,000 a day, its carrying capacity currently is limited to 450,000 due to shortage of trains. Therefore, the train is considerably crowded at a peak period. However, the government determined no more support would be offered, suggesting in 2007 that the management would be transferred to another private entity before expiration of the contract term. But nothing has changed because MRTC opposed that plan. Thus, the government has mostly borne the commercial risk of MRT-3. There is no cooperation with buses and Jeepneys although they could be complementary to MRT-3.

(2) Bangkok

The urban railway system in Bangkok consists of two elevated railways called BTS and one subway line. They are operated in the BOT program.

The 20km-long subway system with 18 stations, which started its operation in 2004, is owned by the Mass Rapid Transit Authority of Thailand (MRTA). The project was completed in two phases. Civil engineering works (i.e. underground tunnel, rails, car maintenance base, stations, etc.) were built with Japanese ODA, and the trains and system were supplied in the BOT scheme. Under the BOT program with a concession period of 25 years, the private entity provides, installs and maintains the trains and system.

(3) Kuala Lumpur

The Kuala Lumpur urban railway system consists of three lines, which were built in the BOT scheme. The LRT operated first was System Transit Aliran Ringan Sdn Bhd (STAR) with a total length of 27km. It was an unsolicited proposal from a foreign-based company, which the government accepted in order to make the 1998 Commonwealth Games successful. The scheme of the project is build-own-operate (BOO) with a concession period of 60 years. As for the building cost, 10% was granted by the government, 20% covered with a low-interest loan from the government, 10% in stocks, and the remaining 60% from domestic capital.

In concluding the concession contract, the government made an arrangement to offer reasonable railway fares, which would be reviewed every year. Under this system, the government guarantees a certain level of profits and grants a subsidy in accordance with a compensation mechanism if a given level is not attained. As a result, the fare was reduced throughout the routes, ranging between 0.75 and 2.95 ringgits.

The three BOT-based LRT lines in Kuala Lumpur were transferred to the government before the expiration of the concession period because of immense debts accumulated by loans for construction. Their failure is attributed to low demand, fare-dependent profit structure, obscure risk sharing, and no cooperation with bus transport (WB, 2004).

In the meantime, the WB (2004) recognized -- without private concessions, these LRT projects would not have happened or they would have happened much later. In fact, STAR and PUTRA were built with all haste to make the Commonwealth Games held in 1998, and such a statement by the WB sounds reasonable in a sense. But, the government was ridiculed as guarantor of last resort for giving relief to the indebted public transportation (Kiggundu, 2009). These examples are easygoing ways of BOT applications with no foresight as to long-term business finance.

6. Comparative Analysis

(1) Differences between business forms

The urban expressways introduced in this study were those managed under two programs: BOT (Shanghai) and BTO (Metro Manila and Bangkok). As for the urban railway, schemes applied were BOT (Bangkok subway, Kuala Lumpur PUTRA and monorail), BTO (Bangkok BTS), BOO (Kuala Lumpur STAR), and BLT (Metro Manila MRT-3). The concession period differs considerably among projects, ranging from 25 to 60 years. The duration of a concession period may put a great impact on overall profits of the business but no program gave a logical account.

Under both BOT and BTO schemes, a private entity takes care of management during a concession period. In this case, risks are usually assumed by the private entity. A property tax, if any, is not levied on the BTO program. The BOT scheme is applied to the urban expressway in Shanghai, but it is regarded as a semi-government company because the state-owned corporation invests in Shanghai-based SPC. As for the urban railway, Bangkok BTS was built under the BTO program, which exempts the private entity from burdening the expense of route extension, but at the same time, the private entity is not allowed to participate in the planning of route extension.

Few BLT cases are known in the transportation sector. Its application to Metro Manila MRT-3 in this regard is worthy of special mention. Stable income from lease is desirable to the private entity for business stability. In the case of MRT-3, however, a subsidy is granted to cover reduction in fare and the private entity rarely bears commercial risk. BLT should not be evaluated from this single example because the reason why BLT was chosen for MRT-3 among various private finance initiatives was not clear. As far as this case is concerned, however, the application of BLT seemed to be unsuccessful.

(2) Differences between social infrastructures

Once the urban railway commenced its operation, it was found that the number of users fell below the demand forecast in all the three cities of Metro Manila, Bangkok and Kuala Lumpur. In developing nations, where different transportation modes are used depending on income class, the uncertainty in demand forecast is significant. Particularly in the case of the urban railway, its fare system in relation to other competitive modes like buses puts a great impact on the demand pattern. In Metro Manila and Kuala Lumpur, the fare was reduced in order to boost demand. However, it caused the income shortage for which subsidies were provided by the governments. The private operator of Bangkok BTS asked the Bangkok Metropolitan Administration (BMA) for price raise a number of times. For fear of decrease in demand, the BMA responded to the request only by adding five bahts to the starting fare in 2007.

A complementary relationship with other public transportations is important to increase accessibility to and from the station. Bangkok BTS provided a bus service for free after the start of operation until 2005, which however was abandoned because of financial burden. In Metro Manila and Bangkok, para-transit services such as minivans spontaneously play a complementary role.

The three lines in the Malaysian urban railway were handed over to the government before the expiration of the concession period. Factors contributing to such a failure may be insufficient examination of risk sharing, heavy burden of commercial risk on the government, and negligence on the part of the private entity in meeting expectations. Similar problems were found in the Metro Manila urban railway.

The WB (2004) pointed out that the application of a simple BOT model to those urban railways was questionable and there were a number of concession forms with promise that may have application. One example is a reverse-tender BOT (where bids are evaluated on the basis of the lowest public sector subsidy required). This implies difficulties in managing the urban railway without subsidies from the public sector.

In Bangkok, the number of highway users has steadily increased in proportion to the size of vehicle ownership with the progress of motorization (EXAT, 2009). The demand for expressways in Shanghai seems to have increased rapidly as well although no official data has been presented (JICA, 2005). The price elasticity of demand for expressways is not as large as that for railways. This is because most car users in developing Asia are in a higher income bracket. If a toll highway is developed in an area of road traffic congestion, its demand is expected to certainly escalate.

Harris et al. (2003) gathered cases about cancelled BOT projects. Noticing that the number of projects canceled was a small fraction of the total, they gave the reasons for cancellation by sector. As for the transportation sector, they considered a loosely estimated demand forecast was a major factor of cancellation. The long-term demand forecast for the transportation sector is not easy regardless of whether the BOT scheme is applied or not. Prolonging a concession period to make the accounts of a private entity balanced is a means for business security, but at the same time the uncertainty of demand forecast increases. Again, both expressway and urban railway should be developed in the area of heavy traffic congestion where their definite demand is highly expected.

(3) Differences between cities/countries

The BOT Law has been in force in the Philippines whereas there is no law with regard to BOT in Thailand and Malaysia. In China, each city has its own institution to deal with the infrastructure development. The necessity of soundly designed system has been suggested by many existing studies. However, the presence of the law does not necessarily make a BOT program successful.

In the case of the Philippines, even though the BOT Law has been enacted, the law is not observed fully and efficiently (Llanto, 2008). An absence of competitive bidding in contract award, for example, was reported in many cases (ADB, 2000). As a result, the development of an expressway is not carried on according to schedule. In addition, highway planning is frequently changed, and there is considerable inconsistency in the government policies.

As seen in the case of SES as Bangkok expressway, changes in policy and intervention by politicians hampered the progress of the BOT project in Thailand. Since investors lost trust in SES, contracts for BOT projects have not been concluded in recent years in Thailand. Because several government bodies are associated with both highway and railway, difficulty in putting decisions together between sections is also a problem. Although an organ in charge of coordinating opinions of relevant parties was established to arrange a master plan for urban transportation, practical adjustment in decision making is not worked out.

Regarding fund procurement, foreign investment is not introduced in China and Malaysia. By contrast, foreign capital has been attracted actively by Metro Manila and Bangkok, which caused to increase risk of exchange fluctuations. In recent years, the exchange rates of major currencies have been unstable. Thus, risk management is necessary for the introduction of foreign capital under the BOT program.

7. Conclusion

In this study, BOT applications to transport infrastructures in major cities of Asia were analyzed and the effectiveness of the BOT scheme was examined. In Section 6, characteristic differences of the BOT programs disclosed in Sections 4 and 5 were analyzed and compared between business forms, between social infrastructures, and between cities/countries. Although accessible data and information were restricted, we exerted all possible efforts at the analysis.

Considering that the situations of PPP were totally different before and after the 1997 Asian financial crisis, the IFIC (2005) grouped those in the former period into the first generation of PPP projects and the latter into the second generation of PPP projects. The projects analyzed in this study are mostly in the first generation, except the Shanghai expressway in the second generation.

The BOT programs in China are heavily intervened by the government, but the government instead bears the risks. Since transportation demand is still expanding, their outcome should be re-evaluated a few years later. During the period of the first generation, the governments and private entities in developing countries overly put their hopes on private participation in social infrastructure projects. In that period, motives of relevant parties were not able to be duly fathomed, but there may have been a belief that the BOT scheme would bring about success.

Unless the BOT program is implemented under the firmly established institution, not only the private sector but the government and further the nation as a whole will suffer losses, because taxes are used to compensate for losses.

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