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A ROBUST SOLUTION FOR URBAN TRANSPORTATION INFRASTRUCTURE AND SERVICE DEVELOPMENT: PRIVATE SECTOR PARTICIPATION

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ABSTRACT

This paper proposes private sector participation, PSP, as a robust solution for urban transportation infrastructure and service development. It confirms that the renewal of urban transportation PSP is in its infancy when much more promotion and trust building is needed. At the same time, much has been learned about PSP, and there have been beacons of innovation. Nevertheless, much more PSP novelty and advancement are possible and needed. There are positive and negative sides to PSP, but if properly applied it will be a robust solution for many of the current and future urban transportation problems. The PSP experiences are promising and growing. They were found to be a means of raising fund and improving management. They have been applied mostly to reduce and share financial, economical and technological risks. They may also be used to reduce and share urban transportation social, political, legal, regulatory, institutional and environmental risks. The paper proposes identification and balanced treatment of involved urban transportation processes via PSP instead of solely considering financial and management issues. In confronting the upcoming and escalating governance risks of 21st Century, Governments may look for a balance and harmony in public-private alliances for a sustainable urban transportation in people-centred cities of globalizing world.

Keywords: Infrastructure building and development, urban transportation, project construction and management, project financing, private sector participation, public private partnership

1. INTRODUCTION

Private Sector Participation (PSP) in transportation is not new, dating back to 17th Century canal, road and railway concessions in Europe and the United States of America. Notwithstanding, the general definition of “participation” as “sharing in and taking part” reflects much earlier PSP existence, perhaps dating back to creation of any state or

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government. Nevertheless, during 19th Century, many early public transportation systems in the European and American cities were deployed by the private sector, within the context of “formal” PSP’s, under various municipal charter or franchise forms with revenues coming from fares and land development (ADB, 2000; Menckhoff and Zegras, 1999). The 20th Century economic and political advancements put more emphasis on automobile oriented urban transportation. This resulted in straining most of public transportation operations, and then leading them mostly toward liquidation and a consequent shift towards public sector or government takeover and ownership. Recent years have seen a rebirth of urban transportation PSP, matching also the ideological shift towards free market and privatisation.

During the last half a century, urban transportation evolution has been witnessed in mainly two phases. The first phase, taking place mainly due to rapid growth of cities, can be called “infrastructure intensive growth phase”. In the United States of America, urban areas started as a first stage with highway widespread expansion to satisfy the demand of automobile oriented urbanization and sub-urbanization. Next, they focused on public transportation growth to alleviate externalities of the overwhelming private transportation, and to address social and environmental issues. These two stages may have been in the reverse order or concurrent for many cities in European and Asian countries. Subsequently, came the second phase that can be called “management adjustment phase”. After the extensive infrastructure expansion, urban transportation systems encountered many financial and efficiency problems. The main public transportation concern became financial viability, whereas congestion and safety became the major issues for highway networks. The second phase therefore was a phase of transportation revitalization and performance adjustment. This phase mainly consisted of treating financial and efficiency crises that resulted from mismanagement of the transportation services. Urban areas in developing countries are experiencing one or concurrent mixes of these two phases where their resource constraints are becoming more stringent every day. During the last decade, in view of these management and resource limitations of urban transportation, the possibility of PSP, as a vital solution for both developed and developing nations, has received renewed interest and attention (ESCAP, 1997; ESCAP, 2001).

Provision of efficient and effective transportation services are among the key governance components to create well-functioning and people-friendly cities. Balanced transportation infrastructure and services are conducive to and essential for economically, financially, socially and environmentally sustainable cities. To achieve these objectives, over the past ten years, the private sector has become increasingly involved in urban transportation infrastructure and service development. The objective of this paper is to provide an overview of PSP in urban transportation. The first section briefly discusses the urban transportation PSP characterisation. The second section provides PSP modalities. The third section reviews a subset of PSP experiences. The fourth section highlights the learned lessons.
2. PSP CHARACTERIZATION

Urban transportation consists of several key interrelated processes. Furthermore, each process often consists of six components, namely inputs, process, management, decision-making, ownership and outputs. Figure 1 shows the five key processes with their relevant inputs and outputs. They are infrastructure development, vehicle production and maintenance, energy development, transportation service production and development, and transportation service utilization, respectively. The life cycle phases of a process usually consisted of six parts, namely planning (including R&D), design, procurement, operation, rehabilitation and maintenance, respectively. Private sector can participate in any of the urban transportation processes, their components and their life cycle stages. The PSP may also include other related urban transportation processes not shown in Figure 1. Formal PSP is often perceived as Public-Private Partnership (PPP). A definition for “formal” participation is proposed as “a form of documented and agreed participation for a well defined period of time pertinent to one or more specific life cycle phases of one or more urban transportation processes.” The responsibilities and authorities of both private and public sectors are often defined in an agreement, desirably including all possible punitive damages in case of non-compliance with its terms. During the last decade, the formal urban transportation PSP’s have been mostly “observed” for the two processes of infrastructure development, and transportation service production and development.

The private sector has a predominantly commercial incentive for participation. Its prime interest in participation is to obtain an acceptable return on their resource commitment and investment. The private sector return is often collected as documented in the agreement. The public sector interest is in acquiring management and input resources, and risk reduction. The city governance approach for PSP therefore should be conducive to balanced risk management for public and private sectors according to each party’s ability to manage and bear each risk (Fayard, 1999). The risks involved in urban transportation development and service supply can be classified as:

1. Financial risks (for example, funds scarcity, capital and operating cost escalation, revenue reduction and budget control);
2. Economic risks (for example, unbalanced costs versus revenues and uneconomical processing);
3. Technology risks (for example, technology misuse, deprivation, retardation and regression);
4. Social risks (for example, health, safety, equality and equity deficiencies, transportation disadvantaged mobility and accessibility deprivation);
5. Environmental risks (for example, environmental degradation and externalities spill over);
6. Regulatory, legal and political risks (for example, sovereign risks, political, legal, regulatory misuse and instability); and,
7. Institutional risks (for example, institutional capacity and management deficiencies, inefficacious planning, design, procurement, rehabilitation, operation and maintenance).
Private sector may share risk types 1, 2, 3 and 7, if it perceives participation rewarding. Private sector may take on risks that can be controlled and predicted with a reasonable degree of accuracy. Political and legal risks are very difficult to predict even in developed nations. International guarantee systems would encourage governments to respect their commitments.

The involvement of private sector is on a voluntary base, whereas the public sector is interested in securing proper urban transportation service provision for the whole society. Public sector is often responsible for risk types 4, 5 and 6, but is interested to share all risk types by private sector, especially types 1, 2, 3 and 7. The total risks can hardly be transferred to private sector; and public sector often remains accepting several involved risks. Furthermore, sovereign risks can hardly be absorbed by local authorities, in cases such as nationalization, exchange rate fluctuations and repatriation of funds.

\[\text{Figure 1. Urban transportation development and service utilization}\]
3. PSP Modalities

Any acceptable PSP classification should be based on key PSP characteristics. Several classifications can be proposed. The widespread classification for the two processes of infrastructure development, and transportation service production and development is based on a subset of life cycle phases and process components. The main life cycle phases used are design, construction, operation, maintenance and rehabilitation. The main process components used are inputs, ownership, and management. The following “formal” PSP types are distinguishable from the literature (ABD, 2000; Menckhoff and Zegras, 1999):

1. **Financing**: The private sector participates in the finance such as in borrowing via bank loans and bonds, and in investment. Financing of the infrastructure development is an important issue when resource constraints are becoming more stringent every day.

2. **Building**: The private sector undertakes construction and procurement. The schemes include Build & Transfer (BT), and Design, Build & Transfer (DBT). For BT, the private sector constructs, and then transfers to public sector when its participation brings cost-effective construction. For DBT, private sector designs, builds and then transfers to public sector such as turnkey contracts.

3. **Outsourcing**: Specific activities are unbundled and given to private sector. The private sector may undertake any outsourcing such as operation or maintenance, or both without direct management responsibility for the service. The private sector may undertake only operation of an existing infrastructure such as operation contracts, when it usually provides higher operational efficiency. The private sector may also undertake only maintenance of an existing infrastructure such as infrastructure service contracts, road repairs, vehicle maintenance and repairs. Private sector participation in maintenance is usually cost-effective in meeting the technical service needs.

4. **Managing**: The private sector undertakes management including maintenance and operation of an existing infrastructure such as management contracts.

5. **Conceding**: The concessions include leasing, franchising, Build, Operate & Transfer (BOT) arrangements. They have defined duration terms and geographical boundaries. The specific rights of private sector are well defined and granted. The agreement describes details regarding PSP objectives and responsibilities. For leasing, the private sector takes on the responsibility for management including operations and maintenance, and accepts commercial risks. Franchising is similar to leasing, but operation is fully specified by the franchising authority. For BOT, the private sector undertakes and finances construction and operation for a period, then transfers to public sector. So far, this has been popular for the PSP, especially for infrastructure development. The BOT has many forms including Design, Build, Finance & Maintain (DBFM); Design, Build, Finance & Operate (DBFO); Design, Build, Operate and Maintain (DBOM); Build, Lease & Transfer (BLT); Build, Own, Operate & Transfer (BOOT); Design, Build, Finance & Operate (DBFO); Rehabilitate, Operate & Transfer (ROT); and Contract, Add & Operate (CAO).
key attribute of the concession is the defined terms for its period of existence and its expiration.

6. Owning & Divesting: The private sector takes over the ownership often through building, owning and operating. The public sector or governments relinquish ownership such as in Build, Own & Operate (BOO). The public sector sales the assets and shares fully or partially. A complete divesture, like a concession, gives the private sector full responsibility for operation, maintenance, and investment. But, unlike a concession, a divesture transfers ownership of the assets to the private sector. The government’s role after the sale is limited to protecting consumers from monopolistic pricing and poor service. Divesture can occur via sale and license.

The aforementioned classification is mainly based on life cycle phases and ownership status. Another proposed modality distinguishes different types and levels of stakeholders’ participation. This classification is less sensitive to life cycle phases and identifies three main groups (Declercq, 1999):

1. Basic: The private sector participates and teams up with public sector for procurement and operation and all non-core activities are out sourced to outsiders. This enables decision makers to scan the market to find the best available option in terms of investors and contractors.

2. Controlled: The private sector participates in finance and decision-making, and therewith participates in the control. This is the strongest of collaboration given that the investor is participating in monitoring and auditing.

3. Integrated: The private sector participates, including all other stakeholders, during the entire life cycle. This requires participation of all the stakeholders with a well-defined level of involvement during the life cycle.

Based on Figure 1, a generic classification can also be proposed. This classifies any private sector participation based on three components named such as X, Y and Z, respectively. Where X identifies the involved process, Y identifies the phase of life cycle and Z identifies the involved process component. Other classifications can also be categorized under this proposition. For example, the BOO type of PSP reflects X as infrastructure development process, Y as build and operate, and Z as private sector ownership. Although the possible combinations of X, Y and Z are enormous, only few have been practiced and experienced so far. The generic classification may be found useful in exploring new schemes by looking into the universal set of X, Y and Z instead of their subsets.

The review of modalities shows that there are many options available, and there may not exist a universal or standard PSP. For each case, PSP may be customized to best fit to the problem at hand characteristics and peculiarities. Past experiences should not limit evaluating new schemes in any future urban transportation governance.
4. PSP EXPERIENCES

Much can be said about urban transportation PSP experiences since the beginning of 17th Century with a mixture of success and failure stories. Nonetheless, the recent formal PSP practices in infrastructure and service development are of more significance and interest. The development of highway sector in several Asian capital cities have benefited from BOT schemes. In Asia, for example, the ADB has reported 52 urban expressway BOT projects with 20 already operating (ADB, 2000). Furthermore, 5 mass rapid transit projects in Asia, 2 in Bangkok, 2 in Kuala Lumpur, and 1 in Manila are among the projects that have benefited from PSP. The followings are few examples picked from the literature; briefly explaining selected urban transportation PSP experiences around the globe. They present just a small subset of PSP experiences.

**Bangkok experience:** The private sector has played a major role in infrastructure development of the Bangkok toll roads in recent years. A total of 148 km of expressways and ring roads are built or proposed to serve the city with majority as BOT projects. The BTSC urban mass transit system in Bangkok, known as “skytrain”, is an elevated rail system that has been in operation since 1999. A private sector operator has built the $1.36 billion system as a BOT project under a 30-year concession. An underground rail transit system of similar capacity is under construction that will be operated by private sector. Furthermore, a large fleet of transit and paratransit vehicles are operating under licensing schemes such as taxis, samlors (3-wheelers), silors (4-wheelers), boats, ferries and motorcycles. Arising out of Bangkok experience is issues related to financial, economical, social, environmental and institutional risk prediction and sharing.

**Dhaka experience:** The city has primarily a road-based transportation system with 60 percent of trips are made by foot. Private sectors have introduced about 200 air-conditioned buses. The provided air-conditioned service could have been only financed and materialized by private sector. The paratransit service is mostly provided by the private sector including rickshaws, 3-wheelers and taxis. These PSP cases are the same for most of the Asian cities and urban areas around the globe. Arising out of Dhaka experience is issues related to environmental and financial risks.

**Kuala Lumpur experience:** Severe financial problems forced a Government takeover in June 2001 of PUTRA and STAR urban mass transit systems in Kuala Lumpur. The Malaysian Government has arranged M$ 5.5 billion bond issue to buy the assets of these two companies. The assets are then being leased back to them. The private sector financing and the Government takeover are allowing the Kuala Lumpur urban mass transit systems to be restructured and survive. Arising out of this experience is issues related to financial and economical risks versus social and environmental risks.

**Singapore experience:** Singapore has developed an advanced urban transportation system with a variety of high quality public transportation schemes. The city has also introduced several intelligent transportation systems (ITS). The city uses the Internet technology to
provide real-time travel information to the public through a system called Traffic Scan. Introduced in 1999, the system is linked to other ITS systems including gathering information on travel speeds by probing into the global position system (GPS) technology currently used by taxi companies. Arising out of this experience is issues related to technology risks.

**Buenos Aires experience:** The Buenos Aires aggressive use of concessions has resulted in significant infrastructure development. The concession process started in 1989, which aimed to reduce the public deficit, privatise state enterprises and revitalize the economy. Its motorway and railway concessions are impressive due to rapid implementation. This has been due to strong and consistent government policy, a simple and transparent bidding process, good entrepreneurial response, and stable currency. Through the concessions, the government has achieved important cost reductions. In the rail sector this was achieved in part through the private sector’s ability to undertake massive labour productivity enhancement. In the road sector, the concessions have attracted over $1 billion in private funding during the 1995 to 2000. Furthermore, the number of paying passengers on the suburban rail and subway has increased significantly. Arising out of Buenos Aires experience is issues related to financial, economical, institutional risk reductions.

**Leesburg experience:** Washington Dulles International Airport is one of the major airports of Washington Metropolitan Area in the United States of America. The privately built Dulles Greenway is a 23 km four lane expressway connecting the airport with Leesburg, Virginia. The expressway was opened in 1995 with a price of $358 million. On opening, the toll was $1.75 per trip with a plan to raise it to $2.00 in 1996. Overestimation of the demand resulted in toll reduction to $1.00 in March 1996. Lowering of the toll attracted more users, but not enough to increase total revenues. In July 1996, the Greenway failed to make a quarterly $7 million interest payment to its lenders and $3.6 million payment to the State of Virginia. Arising out of this experience is issues related to financial and economic risk prediction and sharing.

**Manchester experience:** The United Kingdom has been at the forefront of PSP as part of a broad national policy started since 1979. Manchester Metrolink is a good example started operation 1993. The initial results of the concession were very positive with significant ridership increase. Fare increases, meanwhile were in line with inflation and private operations were profitable from the start. From the first days of operation, it was found that concession payment was too low, since profit was materialized almost immediately. Partly to correct this and partly to expand the system, the government exercised in 1996 the contract termination clause after four years of operation. A new bid tender, for an extension of the network and for operation and maintenance of the entire system, was issued and awarded. Arising out of the Manchester experience is issues related to financial, economical institutional, regulatory and political risks.

**Sao Paulo experience:** To reduce subsidies required to operate a publicly-owned bus system and to produce a network extension, a concession scheme as the first effort in Brazil...
was exercised in 1995. Although contracts were awarded, none of the concessions materialized due to lack of financing. Among the lessons this experience offers for such an innovative proposal, financing can prove difficult and costly if adequate guarantees are not planned. Furthermore, around the same time another concession regarding busway network was carried on. The state busway had been designed as an electric trolleybus corridor, but costs precluded the complete development. The goals of this concession were to reduce state’s involvement in operation and management, and to complete the network. The concession went through and operation was initiated in 1997. This concession benefited from CAO scheme with less financing risk.

The range of experiences briefly reviewed herein is limited by the fact that most started less than a decade ago. Furthermore, their assessment reporting is predominantly at the preliminary stages. Nevertheless, the overall assessment is that PSP offers an important tool in urban transportation infrastructure and service improvement. If appropriately practised, PSP can significantly reduce public sector’s different urban transportation financial, economical, social, technological, political, regulatory, institutional and environmental risks.

5. PSP LEARNED LESSONS

The aforementioned experiences showed that PSP has great potentials in urban transportation. Not only it can address many of the current financial and efficiency crises in urban transportation around the globe, it can be conducive to sustainable communities. The overview of PSP characterization, modalities and practices lead to the following interrelated lessons and recommendations:

1. Private sector participation is growing, however, after more than a decade of rigorous advocacy and effort, the implementation has not matched the expectations. There has been resistance to some of the proposed private sector return payment schemes by the service users. Several PSP guarantees to private sector did not materialized. The recent global market crises have raised the financial risks. International collaboration has been slow. There have been concerns also that corruption, nepotism and cronyism have reduced the effectiveness of private sector participation in some cases. Much more acceleration is needed in efficacious participation.

2. The environment for participation is far from perfect. Economic stability, political will and consistency, institutional and financial flexibility are critical. Without these, considerable amount of resources may be wasted even if PSP is practiced. The within and surrounding PSP environment should be improved at project, sector and cross sector levels. Developing a pipeline of urban transportation PSP “projects” requires government to determine a process at all levels.

3. The observed bureaucracies in participation can be modified. The major problem of participation is not the lack of private sector sources but is with the development of the PSP mentality. It may occur within the context of unambiguous transportation
policy, proper institutional, legal and regulatory frameworks.

4. Institutional capacity building is a prerequisite to a formal large scale PSP. Furthermore, it needs to emerge within a clear overall strategy of the transportation sector and cross sectors. Nevertheless, adopting flexibility and adaptability in PSP must not be interpreted as a government hands-off approach.

5. PSP modalities are far from showing large varieties and there is much more room for innovation. The BOT schemes cover majority of the reported experiences during the last two decades. Exploring the urban transportation involved processes, their components and their life cycle phases, as explained in previous section on PSP characterization, can be conducive to new schemes.

6. Lack of national political leadership and stability, sufficient and growing income, fair income distribution, stable inflation and exchange rate, sound macro-economy, concerned domestic and international capital markets can hamper PSP. Furthermore, the traditional PSP practices with much emphasis on economical and financial issues may overlook many social and environmental issues.

7. The much needed PSP information and knowledge are not accessible or do not exist. The literature on PSP is scarce, but is growing. In-depth assessments have been often hampered by the fact that much of the information was not readily available. Information sharing is also important and there is a need to build capacities in both the public and private sectors. The PSP information systems, community relations and awareness are much in their infancy stage. Much more acceleration is needed in relevant information dissemination.

8. The renewed PSP practice is young. Many of the PSP undertakes have not reached to their life cycle maturity stage. The precise long-term assessment is unreliable or unattainable. Time and endurance are needed for PSP to establish itself.

9. PSP needs more promotion. The public sector should be more aggressive in promoting and advocating PSP through tangible and quantifiable directives. Governments, NGO’s, interest groups, stakeholders, mass media, national and international agencies should play a proactive role with respect to PSP promotion. The public sector can promote private sector participation by different schemes such as creating competition “in” and “for” the market.

10. The PSP needs enhancement of safeguards. Several of the past PSP practices lack private sector safeguards. In addition to being clear, it is often necessary to consider income volatilities with capping mechanisms.

The overview confirms that proper private sector participation can resolve or reduce many of the urban transportation problems. Several of the current infrastructure and service financial and efficiency crises could have been resolved with effective PSP.

6. CONCLUSIONS

This paper provides an overview of urban transportation private sector participation. It is neither all-inclusive, nor prescriptive. The paper confirms that the renewal of urban transportation PSP is in its infancy. Much more promotion and trust building is needed. At
the same time, much has been learned, and there have been beacons of innovation. Nevertheless, much more novelty and advancement are possible and needed. There are positive and negative sides to PSP, but if properly applied it can be among the best solutions for many of the current and future urban transportation problems. The PSP experiences are promising and growing. They were found to be a means of raising fund and improving management. They have been applied mostly to reduce and share financial, economical and technological risks. They may also be used to reduce and share urban transportation social, political, legal, regulatory, institutional and environmental risks. The paper proposes identification and balanced treatment of involved urban transportation processes via PSP instead of solely considering financial and management issues. In confronting the upcoming and escalating governance risks of 21st Century, Governments may look for a balance and harmony in public-private alliances for a sustainable urban transportation in people-centred cities of globalizing world.

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