SOME ASPECTS OF THE PPP APPROACH TO TRANSPORT INFRASTRUCTURE DEVELOPMENT IN HONG KONG

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Abstract

This paper discusses Hong Kong's experience in the delivery of transport infrastructure projects with particular emphasis on the use of non-government funds. It also discusses the increasing role of the private sector in highway maintenance.

Keywords: PPP, BOT, BOO, railway, highway, Hong Kong

1. Introduction

With over 1900 km of public roads and freeways, and a railway network of some 200 km, Hong Kong has one of the most effective transport infrastructure systems amongst major cities in the world.

Hong Kong embarked on a major expansion of her railway network in the last twenty years. The new railway lines were built, owned, operated and managed by two railway corporations with the Hong Kong Government as the major/sole shareholder. These two corporations operate according to prudent commercial principles. With revenue from fares, and income from commercial and property development, the railway projects are basically financially viable projects. In 2004, the railway system carried an average daily patronage of about 3.2 million, which was 30% of the total daily domestic public transport trips and 70% of the land-based cross-boundary passenger travel.

Whilst Hong Kong's highway network is predominantly built by public funding using the conventional re-measurement form of contract, the Build-Operate-Transfer (BOT) approach was adopted in the construction of Hong Kong's first cross harbour tunnel as early as 1969. Since then, the BOT approach has been used for the implementation of a number of other road and tunnel projects.

The Build-Own-Operate (BOO) and the BOT models are different forms of the Public-Private-Partnership (PPP) approach to project implementation. In 2004, the Highways Department has extended the PPP approach to highway maintenance with the award of a pilot contract for the maintenance of the high-speed roads in the city.

This paper examines how Hong Kong has delivered her transport infrastructure works with focus on the PPP approach and the use of non-government funds.

2. Transport infrastructure development in Hong Kong

From the late 1960's, Hong Kong entered into an age of large-scale public works construction. We saw peak periods of public spending associated with decisions taken on the Mass Transit Railway System, the modernization of the Kowloon-Canton Railway, the New Town Programme and the

related connecting highway network expansion plans. The most notable decision concerned the building of a new airport for Hong Kong taken in 1989. Today, these major infrastructures have become the fabric of a modern city essential for the lifestyles of its 6.8 million population. Transport infrastructure spending has become an important area in the Government's annual expenditure.

The Government expenditure on transport infrastructure in the last 4 years is given in the table below. It is expected that the same level of expenditure will be sustained in the next few years.

Year	Total Government Capital Works Expenditure (HK$ million)	Expenditure on Transport (HK$ million)
2001/02	29,600	3,300
2002/03	32,300	4,800
2003/04	35,600	6,900
2004/05	38,000	9,700

In Hong Kong, a highway or a railway project typically takes about 10 years from inception to completion. The development process of the infrastructure projects can be grouped into 5 stages, viz.

Stage 1 - Conceptualization and strategic planning

Comprehensive Transport Studies are conducted to determine the future transport demands and the highway or railway network expansion plan to meet the forecast demand, the preferred network configurations and the route alignments, the implementation priorities and programme.

Stage 2 - Project definition and detailed planning

New highways or railways are packaged into projects with clearly defined scopes. Key implementation issues are identified to facilitate the selection of the best implementation method.

Stage 3 - Project initiation, funding and authorization

The necessary legal, financial and institutional matters are decided at this stage to enable the authorization of the new projects. These would include environmental impact assessment; public consultation, public exhibition and objection handling.

Stage 4 - Design, construction and commissioning

The scheme for the infrastructure is developed into detailed engineering designs, interfacing issues identified and resolved; and the actual construction to be followed by testing and commissioning.

Stage 5 - Operation, management and maintenance

The highway or railway system is handed over to the operating body who would operate, manage and maintain the system.

This process enables the Government to realize its aim to develop the transport infrastructure in a coherent manner through the formulation and establishment of the conceptual infra-structural blue prints. These blue prints are the skeletal framework for more detailed investigations into the requirements and implementation timing of individual projects. The process also allows agencies other than the Government to put forth cost-effective implementation plans for the infra-structural projects.

3. Railway Development – the BOO model

The evolution of Hong Kong's railway system forms a unique part of the history of Hong Kong's public transport development.

The idea of building a mass transit railway system in Hong Kong was conceived in the 1960's and the decision to build the system was taken by the Government in 1973. The Mass Transit Railway Corporation (MTRC) was established under the MTRC Ordinance in 1975. It was a statutory corporation, wholly owned by the Hong Kong Government, and entrusted with the task to construct and operate the mass transit railway system. The first section of Hong Kong's mass transit railway system commenced operation in 1979.

In 2000, the MTRC was partially privatized through the sale of a minority (23%) of its shares and a listing of the shares on the Stock Market. This structural change in the organization of the MTRC marked the beginning of direct private sector involvement in the business of the mass transit railway service. The Mass Transit Railway Corporation (MTRC) was transformed into the MTR Corporation Limited (MTRCL) and became a publicly listed company. The Company now operates a railway system of some 88 km route length, consisted of 5 lines – the Kwun Tong Line (15.8 km), the Tsuen Wan Line (16.9 km), the Island Line (13.3 km), the Tseung Kwan O Line (10.7 km) and the Tung Chung Line (31.1 km) which shares a major part of its track with the dedicated Airport Express Line (35.3 km).

The predecessor of the Kowloon Canton Railway Corporation (KCRC) was the Kowloon-Canton-Railway (KCR), a government department responsible for the operation and maintenance of the KCR - Hong Kong's first railway, which was built in 1910. The situation of the KCR remained unchanged until 1983. As part of the modernization of this railway line, the KCRC was established under the KCRC Ordinance and took over all the asset of the KCR.

The KCRC is a statutory corporation and the Government is the sole shareholder. The corporation now operates a railway system consisted of 4 lines: the KCR East Rail (35 km), the West Rail (30.5 km), the Ma On Shan Rail (11.4 km) and a Light Rail network (36.2 km) that serves the north-western part of the New Territories.

In developing Hong Kong's railway system, the Government has assumed a central role in formulating two Railway Development Strategies respectively in 1994 and 2000. These strategies set out the development priorities and recommended timing for the investment of some HK$200 billion into the development of 12 new railway lines to meet projected demands.

At the invitation of the Government, the two Corporations prepared detailed proposals to implement the railway projects. The Corporations, working under prudent commercial principles, will have to examine the business case for all potential projects taking into account the full-life cycle cost of constructing, operating and upkeeping the railway systems in question. They will assess possible schemes that can meet the transport requirements and, at the same time, are technically feasible before they arrive at innovative and cost-effective plans for implementation. The model in which the Government is responsible for the strategic planning and the corporation responsible for the detailed project implementation using various funding sources has so far been successful in the development of Hong Kong's railways.

The following table and figure summarize the new railway projects completed in the last ten years.

Project	**Construction commencement date**	**Completion date [anticipated]**	**Cost ($M) (Money of the day(MOD))**	**Equity injection ($M) (MOD)**	**Property development rights**

Airport Railway	11-1994	7-1998	35,100	23,700	Y
Tseung Kwan O Line	11-1998	8-2002	16,000	0	Y
East Rail Extensions	11-2000 3-2001 10-2002	12-2004 10-2004 [2007]	26,700	8,000	Y
West Rail	9-1998	12-2003	46,400	29,000	0
Disneyland Resort Line	7-2002	[9-2005]	2,000	798	0

Table 1: Completed railway projects in the last ten years and projects under construction

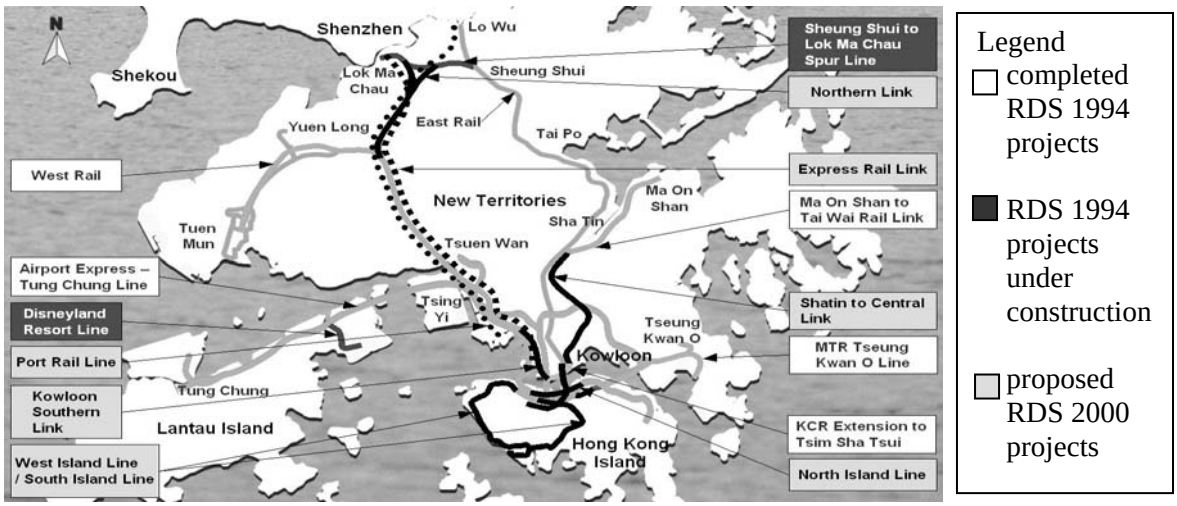

Figure 1: RDS 1994 and RDS 2000 projects

4. Highway Development – the BOT model

Highway construction has traditionally been Government's responsibility as the provision of other infra-structural facilities for the community. However, early initiative in 1969 to construct the first Cross Harbour Tunnel as a Build-Operate-Transfer (BOT) project has provided Hong Kong with a unique experience. The project has undoubtedly played an important role in supporting Hong Kong's economic development. Yet, at the time, many viewed this new initiative to be a speculative investment and it was not without hesitation before the final decision was made for its construction.

Looking back today, the success of the Cross Harbour Tunnel as a BOT project is almost legendary. Before the tunnel was opened, people and vehicles had to cross the harbour by ferries. Given the ferries were providing an effective and non-expensive service, it was said that the traffic consultants at that time considered that a tunnel with a single lane in each direction would suffice to meet the traffic demand. But the tunnel franchisee insisted that a two-lane tunnel for each direction was to be built. The popularity of the tunnel soon spoke for itself. In just three and a half years after opening, the toll revenue collected from the tunnel was more than enough to pay back the construction cost.

Throughout the franchise period, the Cross Harbour Tunnel has provided a safe and reliable service for the community. In 1999, 30 years after the signing of the BOT franchise, the tunnel was "transferred" back to the Government, thus concluding this BOT project for the delivery of an important piece of infrastructure in Hong Kong.

The BOT project for the Cross Harbour Tunnel is definitely a success. The experience also demonstrated well the vision and skill of the private sector, especially the use of innovative

methods – the immersed tube technique - in the delivery of a viable infrastructure project. However, it should be noted that many factors contributed to the success of the Cross Harbour Tunnel -- it was the first cross-harbour tunnel and occupied strategically the "best" location for harbour crossing. The franchise period coincided with a period of Hong Kong's rapid development.

It was not until some 17 years later, in 1986, when Hong Kong implemented the second BOT project. This was Hong Kong's second cross harbour tunnel – the Eastern Harbour Tunnel. In 1988, the BOT model was again adopted for the Tate's Cairn Tunnel, a land road tunnel; and in 1993, the Western Harbour Crossing and in 1995, the Route 3 Country Park Section, another land tunnel. These four BOT tunnel projects all have a 30 years franchise period. They are still on-going projects and it will still be some years to appraise the overall performance of these BOT projects that whether they will provide the desired return for the investors.

The plan and the table below provide more details of Hong Kong's five BOT tunnel projects.

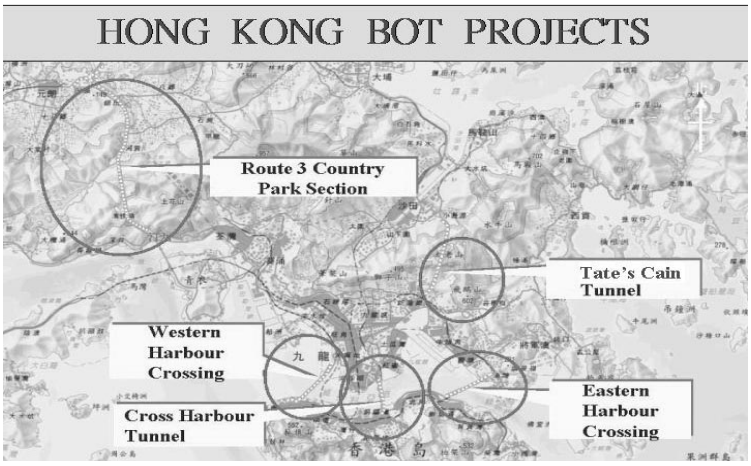

Figure 2: Hong Kong BOT Projects

Project	**Construction Commencement date**	**Time for Completion (month)**	**Actual time for completion (month)**	**Commence operation**	**Franchise period (year)**	**Expiry of franchise**
Cross Harbour Tunnel	9-1969	47	36	8-1972	30	9-1999
Eastern Cross Harbour Tunnel	8-1986	42	37.5	9-1989	30	8-2016
Tate's Cairn Tunnel	7-1988	37	34	6-1991	30	7-2018
Western Cross Harbour Tunnel	8-1993	48	44	4-1997	30	8-2023
Route 3 (Country Park Section)	5-1995	38	36	5-1998	30	5-2025

Table 2: Information on BOT projects in Hong Kong

5. Highway Maintenance – the PPP approach

Hong Kong spends over HK$700 million each year to maintain her highway assets, comprising over 1900 km of roads and the associated highway structures, roadside slopes and street furniture. The objective is to upkeep the safety and serviceability level of the road system.

The traditional mode of highway maintenance is to employ works contractors to carry out the maintenance works when the Government staff is responsible for inspecting the public roads, identifying and planning the maintenance works. Since most maintenance works involve very minor and piecemeal works items, the conventional contracts would require the Engineer to issue numerous works order to the contractor for all the items of repair works identified. This is a highly labour intensive process consuming much manpower in site inspection, preparing estimates, checking, approving and issuing works orders, evaluating works orders, interim and final measurement and payment. The new PPP approach will drastically simplify this process by redefining the role of the Engineer and the Maintenance Contractor.

Under the new form of the maintenance contracts, the role of the Contractor is changed from a pure works agent to an asset manager. The inspection duties through which the maintenance needs are established, are now to be carried out by the contractor. The contractor has to schedule his works to fulfil a set of performance standards defined by the Government. The contractor also needs to establish his own system of supervision to ensure that the works are properly carried out, and in a cost-effective way.

Under conventional maintenance contracts, payment to the contractor is made based on works carried out. In the new approach, payment is linked to the performance standards of the highway system achieved by the contractor. The role of the Government staff has also changed to be an auditor - to measure the performance standard achieved against the preset performance indicators and to ensure the overall performance of the contractor is satisfactory.

Because of the heavy involvement of the contractor in the entire process, this new form of highway maintenance is considered to be a PPP approach. The experience in its first year of operation has resulted in a 90% reduction in the number of works orders issued. This has meant a major saving of administrative costs and staff time. Based on the experience of the first contract, the Highways Department has decided to extend this approach to other maintenance contracts by combining contracts to enlarge the scope as well as lengthening the contract duration.

The maintenance expenditure on the road network and the area of roads maintained are shown in the table below.

Year	Expenditure (HK$ million)	Approx. area of roads maintained (million sq. m) (year)
2004/05	784.8 (estimated)	22.3 (2004)
2003/04	738.8 (estimated)	22.2 (2003)
2002/03	801.1 (actual)	22.1 (2002)
2001/02	777.0 (actual)	21.9 (2001)

Table 3: Maintenance funds and the quantity of the road network in the last 4 years

6. The Partnership

At the heart of the PPP approach is the ability to establish a sustainable partnership that is beneficial to all parties concerned. This will involve the project promoter who can either be the franchisee of a BOT project, a Railway Corporation in the delivery of a new railway line, or a

contractor responsible for up-keeping of the state of service of the city's public roads, and the Government who represents the public and is responsible for formulating the PPP arrangement and where necessary the control of the use of public funds. In addition, it is important to secure general public acceptance of this approach that it will not only give rise to short-term financial benefits to the Government, as in BOT or BOO projects, but long term benefits to the community after the project is commissioned.

6.1 The Project-promoter

What made a Project Promoter interested in a BOT project? The project must be a viable project and demonstrates a good business case.

On the other hand, any BOT project is risky. Although some BOT projects can promise a more stable income, it is only fair to say that all commercial activities will, regardless of their nature, contain elements of risk. It is not possible to predict accurately what will happen in a thirty-year period. The traffic demand is very dependent on the economic situation and the toll level has to be marketable. In a free market economy, competition from alternative routes and other modes of transport is an inherent risk factor. Government's stance in the BOT projects is that it will not bind itself not to develop other projects to preserve the exclusivity of the BOT project. In other words there will not be a monopoly.

At the end, it is matter of striking the right balance to construct a sustainable business case that is both acceptable to the community and still attractive to the business sector who will become the franchisee.

6.2 The Government

As the project originator, the role of the Government is to assess all alternative ways to implement any project and to select the most cost-effective method that is also fair and equitable. The process will involve the formulation of the project framework and the establishment of an open and fair environment for the private sector to take part in the project.

The risk considerations apply equally to the Government in formulating the project package. The Government has to realize at the outset that the goals of the Government and the private sector are determined by their perceptions of the future and their social and business interest. As Government officials, they have a dual role here. On the one hand, they have to be removed from the commercial sector and their acts are subject to close public scrutiny. On the other, they have to assume a more forward outlook and be innovative in the formulation of a project package that is attractive to the business sector.

6.3 The Community

The focus of the general community must be on the service level that any project can bring about and the affordability of the price they will have to pay for it, such as the fare level. The community may or may not be too concerned with how the projects are implemented. Very often, it is a matter of balancing different interest: the long-term interest of having a road to serve your locality and the short-term suffering of having a construction site at your doorstep for several years; the interest of having more hospitals, schools and social services at the expense of more expensive fares in transport.

With increased interest from the public on issues like fares and viability of projects and the ever-increasing demand for transparency, the community will continue to make their wish known and make sure that decisions made are accountable.

6.4 Some Observations

The transport infrastructure development has transformed Hong Kong's environment drastically in the past thirty years and many of the benefits we now enjoyed have already been taken for granted (an example will be the MTR service). These transformations have actually mirrored the demand and aspirations of a constantly expanding society.

The transport infra-structural development is inherently uncertain as forecasts are influenced by many external factors many of which are not directly controllable at the time the forecasts are made.

It is against such a background that the PPP approach has opened a new front of project implementation. Hong Kong has benefited in the past from overseas experience and in the course of our own development, accumulated some useful and successful experience in the PPP approach. At the same time, we also recognize the limitation and pitfalls of the new approach.

In the continued pursuit of innovative implementation method, it remains the task of the Government, and the private sector, to learn from the past and to overcome any inadequacies identified. It is hoped that with more collaboration, this approach will bring better services to the public and open up business opportunities to the private sector.