PUBLIC PRIVATE PARTNERSHIPS IN LOGISTICS AND TRANSPORT DEVELOPMENT: THE SINGAPORE EXPERIENCE

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Introduction

Asia faces a huge demand for infrastructure investment driven by rapid economic growth and urbanisation which is expected to continue over the next two decades. According to the World Bank (2014), the annual percentage growth rate of Gross Domestic Product (GDP) of East Asia (which accounts for about two-fifths of global economic growth) was 6.8% in 2014. Asia has witnessed the rise of megacities (urban areas with population exceeding 10 million). According to Demographia (2015), 9 of the world's 10 megacities are in Asia.

The joint study by Asian Development Bank and Asian Development Bank Institute (ADB/ADBI, 2009) estimated that Asia needed US$8 trillion in infrastructure investment from 2010 to 2020, of which 68% will be for new infrastructure and 32% will be for maintaining and replacing existing ones. ADB President Takehiko Nakao reported in the G20 Australia Summit (2014) that "*Public and multilateral resources are limited … Private-sector financing, including through public private partnerships (PPPs), needs to be increasingly tapped in order to direct private money and skills into much-needed infrastructure projects*."

While government budgets have been the traditional source of infrastructure financing, they may be unable to bridge the gap in investment needs moving forward. PPP models are increasingly seen by governments and development agencies as a possible mechanism for financing infrastructure projects in Asia. This paper presents the experience of Singapore related to PPP in the development of logistics and transport infrastructure. The paper reviews the projects implemented in Singapore that are recognised as PPP by Singapore's Ministry of Finance. We examine the background of these PPP projects and strategies used so as to uncover some of the challenges and issues involved in making these projects work.

Literature Review

Public private partnership (PPP) is a collaborative relationship structure between the public and private sectors to deliver services. The partners agree to share risks, resources and decisions in the development and implementation of projects. Grimsey and Lewis (2004) define PPPs as "*arrangements whereby private parties participate in, or provide support for, the provision of infrastructure, and a PPP project results in a contract for a private entity to deliver public infrastructure-based services*."

In the 1990s, the UK government introduced policies to provide greater transparency and value for money in public accounting (Lovells, Lee and Lee, 2009). This led to the introduction of the UK Private Finance Initiative (PFI). This was set against the backdrop of meeting infrastructure demand with limited public funds coupled with the UK government's pursuit of public sector reform and the need to increase the role of the private sector.

According to Pierson and McBride (1996) cited in Keremane (2011), PPP arrangements may incorporate some or all of the following features:

- the public sector entity transfers land, property or facilities controlled by it to the private sector entity (with or without payment in return) usually for the term of the arrangement
- the private sector entity builds, extends or renovates a facility
- the public sector entity specifies the operating services of the facility

- the private sector entity provides the services for the term of the arrangement with conditions on operating standards and pricing
- the private sector entity agrees to transfer the facility to the public sector (with or without payment) at the end of the arrangement.

Governments play a major role in the formulation of PPP projects, and depending on the risk level and degree of private sector involvement there can be very different PPP models. There is no standard template for a PPP model. Figure 1 describes the spectrum of PPP models to understand the varied approaches to PPPs. In such a framework, the degree of risk transferred to the private sector usually increases with greater private sector involvement. With greater private sector involvement, the government's role shifts from being a supplier to a buyer of services.

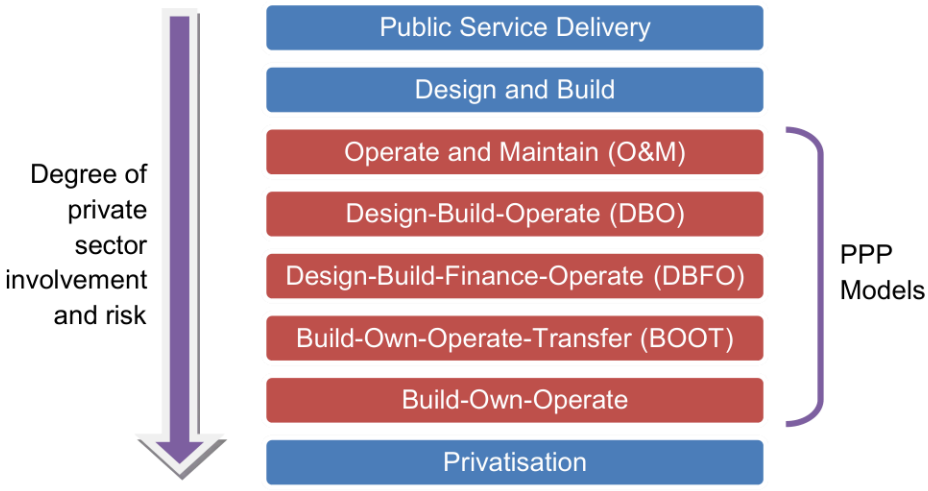

Figure 1: The spectrum of PPP models (Source: Anwar and Ng, 2014)

Both public and private parties have to assume considerable risks during the life cycle of a PPP project. Usually, the risks are borne by the party that is able to manage it most efficiently. Table 1 summarises the possible types of risks in PPP projects and the parties most affected by or are likely to assume these risks.

Party Affected by or Assuming Risk	**Type of Risk**
Public sector	*Political risk:* potential changes in public policy *Bankruptcy risk:* Private company declares bankruptcy while working on a contract
	Closure risk: Inability of bidding party to reach financial closure
	Land risk: expropriation and eminent domain issues, difficulties acquiring land
Private sector	*Design, construction and maintenance risk:* day-to-day operational and management risks, delays in acquiring necessary permits, problems with subcontractors, completion risks, cost and schedule overruns
	Demand/revenue risk: includes unexpected high or low demand compared to initial market assessments
	Political risk: changes in government, changes in public policy, corruption and favouritism, lack of sanctity of contract, arbitration difficulties
	Currency risk: unexpected severe depreciation or appreciation of currency that affects the service provider's ability to pay investors

Table 1: Risk allocation in PPPs (Source: Das and James, 2013)

Singapore's Logistics & Supply Chain Management Industry

The logistics and supply chain management industry is a key pillar of Singapore's economy. The sector contributed to about 7% of the nation's GDP (Singstat, 2015) and employed some 189,000 jobs. Singapore is among the most competitive and efficient nations globally. The island state is well known for its world-class infrastructure, excellent connectivity by sea and air to major markets, high use of information technology (IT), pro-business environment and stable government. It has become a prime location for major logistics firms; 21 of the top 25 global logistics players base their operations here, e.g. Agility, DHL, FedEx, Kuehne+Nagel, Sankyu, Schenker, Toll, UPS and Yusen Logistics. Table 2 provides an overview of Singapore's transport indicators.

Transport Infrastructure	Indicator	2014 Figures
Port of Singapore	Vessel arrivals Shipping tonnage ('000 GT)	134,883 2,371,107
	Total cargo ('000 tonnes) • General • Bulk	581,268 384,418 196,850
	Total container throughput ('000 TEUs)	33,869.3
Changi Airport	Aircraft arrivals Aircraft departures	170,680 170,706
	Air cargo handled ('000 tonnes) • Discharged • Loaded	1,843.8 1,004.6 839.2
Land Transport	Total road length (lane-km) • Expressway • Arterial road • Collector road • Local road	9,233 1,093 3,146 1,599 3,394
	Total rail length (km) • MRT • LRT	183.0 154.2 28.8

Table 2: Transport indicators of Singapore (Source: Singstat, 2015 and LTA, 2014a)

Singapore is connected by 200 shipping lines to more than 600 ports in over 120 countries, with daily sailings to every major port of call in the world. The Port of Singapore is the world's busiest transhipment hub, accounting for about one-seventh of the world's total container transhipment throughput (over 33 million TEUs in 2014). Changi Airport is one of Asia's largest cargo airports and is served by over 6,500 weekly flights connecting to 240 cities in 60 countries, handling about 2 million tonnes of cargo. Both sea and air ports are accessible through a well-planned domestic road network to ensure that Singapore-based companies are well-positioned to serve customers and manage their operating entities. The mass rapid transit (MRT) and light rail transit (LRT) systems serve domestic passengers and do not carry freight.

Singapore's Experience with PPPs

Singapore has engaged in public sector reform since the 1990s (Lam, 2004) and has been open to adopting best practices in many fields, both locally and overseas. PPPs are implemented based on best practices from the UK and Australia. Singapore's Ministry of Finance (MoF) launched its PPP initiative with a PPP Handbook in 2004 that was revised in 2012 to reflect more up-to-date issues (MoF, 2012). Having PPP guidelines on par with international standards has helped to attract overseas investors, especially companies who are familiar with the type of risk allocation and contract structures. In turn, these companies bring in financial institutions to participate in projects. MoF (2015) provides a list of PPP projects that have been awarded in Singapore.

Examples of Design-Build-Own-Operate PPPs

Tuas Desalination Plant (Public: Public Utilities Board / Private: SingSpring)
Singapore's first PPP involved a desalination plant project under the Public Utilities Board (PUB). The contract was awarded to SingSpring in 2003 and the plant opened in September 2005. The supply contract was for 136,000 cubic metres (30 million gallons) of water per day for a 20-year period from 2005 and 2025. The choice of the desalination technology was left to the private sector while the PUB was able to purchase desalinated water at a competitive price. The estimated cost of the project was S$250 million.

Ulu Pandan NEWater Plant (Public: Public Utilities Board / Private: Keppel Integrated Engineering Limited)
This PPP involved the supply of NEWater (which is high-grade reclaimed water purified with advanced membrane and ultraviolet technologies) to the PUB. The contract was awarded to Keppel Integrated Engineering in January 2005 and the plant opened in March 2007. The award was for the supply of 148,000 cubic meters (32 million gallon) of NEWater per day for a 20-year period from 2007 to 2027 to industries and commercial buildings. This PPP approach has helped lower the overall cost of supplying water for the PUB.

Incineration Plant (Public: National Environment Agency / Private: Keppel Seghers Engineering Singapore Pte Ltd)
The PPP contract was awarded to Keppel Seghers in November 2005 and the plant opened in January 2009. The contract was to incinerate 800 tonnes of refuse per day for a 25-year period from 2009 to 2034. This was part of the move to open up the incineration industry to the private sector in line with National Environment Agency's aim of becoming more pro-business and service-oriented by leveraging on the strengths of both public and private sectors.

Examples of Design-Build-Finance-Operate PPPs

Institute of Technical Education College West (Public: Institute of Technical Education / Private: Gammon Capital)
This was the first social infrastructure PPP project completed in Singapore. The project was awarded to Gammon Capital in November 2007 and the College opened in July 2010. The contract was for Gammon to design, build, maintain and operate the education facility for a period of 27 years for an estimated cost of S$400 million.

Singapore Sports Hub (Public: Singapore Sports Council / Private: Singapore Sports Hub Consortium)
This project, the largest sports infrastructure PPP in the world, was awarded to Singapore Sports Hub Consortium led by Dragages Singapore Pte Ltd in August 2010 and opened in June 2014 after many challenges. The Sport Hub comprises a new 55,000-seater National Stadium with retractable roof, an aquatic centre, a multi-purpose indoor arena, a water sports centre, and supporting commercial facilities. This was a landmark PPP deal with a 35ha site to cater to both sports and non-sports enthusiasts for a period of 25 years at an estimated cost of S$1.8 billion. In evaluating bid submissions, higher weightage was placed on the bidder's ability to develop major sports, entertainment and leisure programmes.

Logistics- and Transport-related PPPs in Singapore
Key logistics infrastructure projects in Singapore (e.g. port, airport and logistics parks) are considered public sector projects and not classified as PPPs. Singapore does not have inland clearance depots (ICDs). The two examples of PPPs are from the information technology (IT) and public transport fields.

TradeXchange (Public: Singapore Customs / Private: CrimsonLogic Pte Ltd)
This was the first IT PPP where the government wanted to create a one-stop integrated logistics information system portal. The contract was awarded to CrimsonLogic Pte Ltd in December 2005 to develop the software, maintenance and operation of the system for a 10-year period from 2007 to 2017. The project originated in the mid-1980s when the government reviewed the processes involved in regulatory approvals for trade to improve Singapore's

trade competitiveness and adopted IT to streamline trade processes by reducing costs and improving efficiency as well as turnaround time. TradeNet was launched in 1989 as a one-stop service to achieve several transactions with multiple government agencies. Figure 2 describes the impact of TradeNet on trade processes in Singapore.

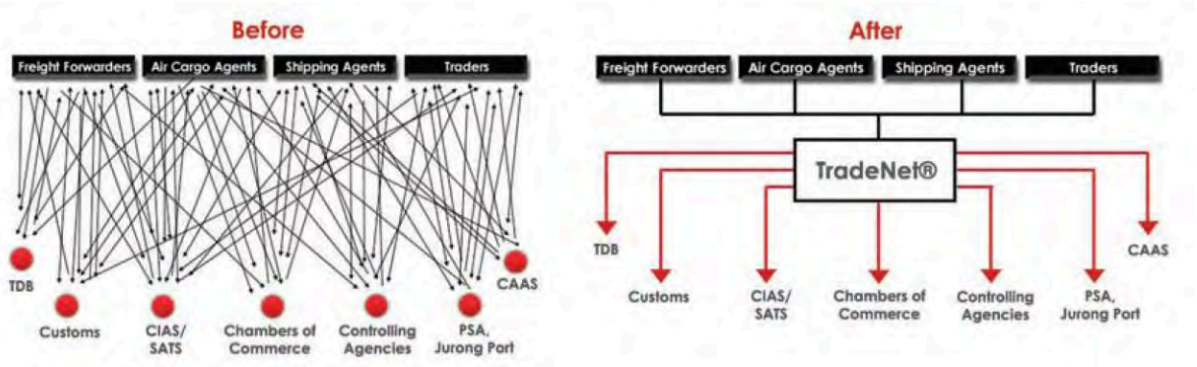

Figure 2: Before and after TradeNet (Source: CrimsonLogic, 2014)

TradeXchange, and the new TradeNet which is a core application, represents a major upgrade. It provides a neutral and secure IT platform that enables the seamless exchange of information between businesses as well as businesses to related government agencies to facilitate the flow of goods within, through and out of Singapore for trade and logistics businesses (Figure 3). The platform provides greater operational efficiencies and clearer visibility to businesses across the supply chain.

Figure 3: Conceptual diagram of TradeXchange platform (Source: CrimsonLogic, 2014)

The government through its agency, Singapore Customs:

- owns and regulates the TradeXchange
- pays the operator a fixed fee to as a steady income stream and a variable fee to incentivise the operator to drive adoption of the system over the contract period
- The government has the right to terminate the contract, e.g. due to breach of contract by the operator or if the operator becomes insolvent.

The private operator, CrimsonLogic:

- develops and operates the system for 10 years
- pays for the capital, operating and maintenance costs
- collects the fees from the users and remits the government's share
- The operator has no right to terminate as TradeXchange is an essential service.

In relation to data ownership and data privacy, the government owns the information and data collected by agencies as a result of statutory and regulatory requirements. The companies that create the data own the commercial data and consent to share data has to be obtained from data owner.

Bulim Bus Package (Public: Land Transport Authority / Private: Tower Transit)
The public bus industry in Singapore is moving towards a government contracting model through a competitive tendering process (LTA, 2014b). The aim is to make bus services more responsive to changes in ridership, introduce more competition into the industry by lowering barriers of entry, and improve service levels. Currently, the bus industry is a privatised model with two incumbents, namely SBS Transit and SMRT. The government realised that it was difficult to increase capacity and improve service standards as operators have to cover their capital and operating expenses and earn from fare revenue. Under this new contracting model, bus services in Singapore are bundled into 12 packages with 300 to 500 buses for each package.

The Land Transport Authority (LTA) awarded the inaugural bus contract to London-based Tower Transit in May 2015 (Straits Times, 2015). The contract is to operate the new Bulim bus depot in Jurong and 26 bus services from Jurong East, Bukit Batok and Clementi bus interchanges from the second quarter of 2016 for a 5-year period from 2016 to 2021. This contract can be extended by another 2 years based on good performance. The estimated fee for this contract is S$556 million.

The government through its agency, LTA:

- owns all bus-related infrastructure such as depots, buses and fleet management system
- regulates the bus operations by determining the services to be provided and service standards while ensuring the affordability of fares for commuters
- pays the operator the fees to operate the services; retains the fare revenue

The private operator, Tower Transit:

- operates the Bulim bus depot and 26 bus services that meets the stipulated service standards for 5 years
- is responsible for recruitment and training of staff including bus captains and technicians.

Table 3 summarises the responsibilities of the public and private sectors for infrastructure and operations based on Singapore's PPP projects discussed in this paper.

		Infrastructure	
		Public	*Private*
Operations	*Public*	Classic public sector provision	
	Private	O&M TradeXchange Bulim Bus Package	DBOO Tuas Desalination Plant Ulu Pandan NEWater Plant Incineration Plant DBFO ITE College West Singapore Sports Hub

Table 3: Strategies for Singapore's PPP projects

Conclusions and Recommendations
PPPs mark a fundamental shift in focus of the role of the government from being a service provider to a purchaser of services. They can operate within a spectrum of models and there is no standard template to follow. A well-designed PPP allows efficient risk-sharing to take place; risk can be allocated to the party with the greatest incentive and ability to manage it.

The PPP environment in Singapore benefits from a stable regulatory framework, clear and transparent processes, and robust contracts that deal with risk allocation. With the

government as the central actor, PPPs have enabled the private sector to play a greater role in the delivery of traditional public services such as utilities (e.g. desalination, NEWater and incineration plants) and essential services (e.g. TradeXchange and public transport). This enables the government to focus on policy formulation and provide safeguards for the public interest.

PPPs have the potential to provide value for money and quality of services needed, and give strong incentive to ensure projects are completed on time and designed to minimise operational costs. They facilitate the development of specialist expertise, provide opportunities for attracting foreign investment and stimulate the exchange of ideas between local and international companies. For PPPs to be successful, there needs to be long-term political support and government commitment to PPPs for business confidence, standardisation of the contractual framework to improve transparency and efficiency in PPP process balanced with enough flexibility to promote innovation and continuous improvement.

References

ADB/ADBI (2009), *Infrastructure for a Seamless Asia*, Asian Development Bank and Asian Development Bank Institute.

Anwar, K. and Ng, K.S. (2014), "Making inroads: capturing infrastructure opportunities in Asia", *IE Insights*, International Enterprise Singapore, Vol.18 Oct, 18pp. Available at: http://www.iesingapore.gov.sg/~/media/IE%20Singapore/Files/Publications/IE%20Insights/Vol18_Infrastructure_Asia_Oct2014.pdf (accessed 15 Oct 2015).

CrimsonLogic (2014), "Trade facilitation", CrimsonLogic Pte Ltd, Singapore. Available at: http://www.crimsonlogic.com/trade-faciliation.html (accessed 13 May 2015).

Das, S.B. and James, C.R. (2013), "Addressing infrastructure financing in Asia", *ISEAS Perspective*, #27, Institute of Southeast Asian Studies, Singapore, 15pp. Available at: http://www.iseas.edu.sg/images/pdf/ISEAS_Perspective_2013_27.pdf (accessed 15 Oct 2015).

Demographia (2015), World Megacities: Urban Areas with more than 10,000,000 population (2015). Available at: www.demographia.com/db-megacity.pdf (accessed 15 Oct 2015).

G20 Australia Summit (2014), "Bridging Asia's infrastructure gap", G20 Australia Summit, Brisbane, p 82. Available at: http://g20.newsdeskmedia.com/Images/Upload/micro_sites/G20_Australia/PDFs/Bridging-Asias-infrastructure-gap.pdf (accessed 15 Oct 2015).

Grimsey, D. and Lewis, M.K. (2004), *Public Private Partnerships: The Worldwide Revolution in Infrastructure Provision and Project Finance*, Edward Elgar, UK.

Keremane, G. (2011), "Public private partnerships in urban wastewater management: the Adelaide experience and lessons for developing countries", *Economic Journal of Development Issues*, Vol. 13 & 14, No. 1-2 Combined Issue, pp 34-50.

Lam, P. (2004), "Public private partnerships and the search for value", *Ethos*, July, Civil Service College, Singapore. Available at: https://www.cscollege.gov.sg/knowledge/ethos/ethos%20july%202004/Pages/Public%20Private%20Partnerships%20and%20the%20Search%20for%20Value.aspx?print=1&sts=wi (accessed 15 Oct 2015).

LTA (2014a), Publications and Research, Land Transport Authority, Singapore. Available at: http://www.lta.gov.sg/content/ltaweb/en/publications-and-research.html (accessed 15 Oct 2015).

LTA (2014b), "Transition to a government contracting model for the public bus industry", News Release, Land Transport Authority, 21 May 2014. Available at:

http://www.lta.gov.sg/apps/news/page.aspx?c=2&id=28fca09a-bed6-48f4-99d4-18eeb8c496bd (accessed 15 Oct 2015).

Lovells, Lee and Lee (2009), *Privatisation and public private partnerships in Singapore*. Available at: http://www.hoganlovells.com/files/Publication/11ce9dad-5909-4a45-9945-43951fd0c878/Presentation/PublicationAttachment/fcc73761-7f40-427e-a29a-482eaf582640/PrivatisationandPPPinSingapore.pdf (accessed 15 Oct 2015).

MoF (2012), *Public Private Partnership Handbook*, Version 2, Ministry of Finance, Singapore.

MoF (2015), "Procurement process", Ministry of Finance, Singapore. Available at: http://www.mof.gov.sg/Policies/Government-Procurement/Procurement-Process (accessed 15 Oct 2015).

SingStat (2015), Department of Statistics, Singapore. Available at: http://www.singstat.gov.sg/home (accessed 15 Oct 2015).

Straits Times (2015), "London-based Tower Transit wins first government bus contract to run services in Jurong", *Straits Times* 8 May 2015, Singapore Press Holdings.

World Bank (2014), GDP growth (annual %), Available at: http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG/countries/4E-XD-XM?display=graph (accessed 15 Oct 2015)