Chapter 8

Singapore Country Report

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CHAPTER 8

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Introduction

Singapore is a city-state comprising a small island measuring 704 sq. km (including over 123 sq. km of land reclaimed from the sea). Its population in 2013 was 5.46 million (targeted to exceed 6 million). There are over 7,244 people per sq. km, the highest in the ASEAN region. Not surprisingly, much of the country is built up, consisting of houses, apartment blocks, office and retail buildings, public amenities, infrastructure facilities, and factories and workshops. It lacks natural resources, the most serious of which is a sufficient natural water supply, though it is well endowed with sheltered deep-water harbours and anchorages.

Singapore has experienced strong economic growth over the last 30 years or more, enabling its population to achieve the highest income per capita in East Asia. In tandem with its economic development, small size and dense population, Singapore's government also places a high premium on the creation of an advanced infrastructure and on the adoption of appropriate funding arrangements.

This paper first provides an overview of Singapore's government administration, economy, and public finance. The main part of the paper examines the institutional framework and financial arrangements to facilitate the development and operation of the different infrastructure sectors. Next, the role of Public-Private Partnerships (PPPs) and foreign investment in Singapore’s infrastructure is analysed. This paper will also discuss how far

Singapore's infrastructure companies have contributed to infrastructure development in other ASEAN states, and the potential for increasing their connectivity to these states. The conclusion will highlight the key features in the development, operation and financing of Singapore's infrastructure. Infrastructure sectors covered in this study consist of land transport, electrical energy, water and drainage, maritime port and airport, and information technology and communications (ITC).

Overview

Government Administration

The government administration in Singapore, known for its efficiency and professional competence, consists of a civil service of 15 ministries, each headed by a minister. Also, there are 64 statutory corporations (more popularly known as statutory authorities or boards). Although outside the civil service, each statutory authority is affiliated to a parent ministry and subject to the executive authority of the relevant minister, but at the same time is operationally autonomous. Statutory authorities depend, sometimes to a small extent, on government funding and are responsible for many areas of policy implementation, including infrastructure development and regulation.

Separate from the government bureaucracy but subject to government control are so-called government-linked companies (GLCs). The government holds an exclusive or majority stake in a GLC through a holding entity or company, mainly Temasek Holdings (other holding entities are certain statutory corporations and the Minister for Finance Inc.). Government-linked companies are required to compete with private sector companies and make profits. They have long played a key role in Singapore's infrastructure development, although in recent years the government has reduced its shareholding in many of them through a divestment programme (Jones, 2006).

The Economy

Singapore's economy is characterised by strong gross domestic product (GDP) growth rates. They averaged 6 percent per year between 2003 and 2012 but fell

to only 1.2 percent in 2012 (Table 8.1). Singapore is categorised as a high-income nation, with a GDP per capita of USS$61,103 at purchasing power parity in 2011, which is the highest in Asia. The economy is strongly export-oriented and is mainly based on high value-added products and services such as advanced technology, micro-engineering, bio-medical products, agro-technology, research and development, and a wide range of professional, business, and technical services (Ghesquiere, 2007). Given these specialised niche sectors and overall conditions conducive to business, the World Economic Forum (WEF) in 2012 rated Singapore's economy as the second most competitive among 144 countries surveyed (WEF, 2012).

Table 8.1: Singapore Growth Rates and GDP Per Capita, 2003-2011

	Growth Rates of Real GDP (%)	GDP Per Capita US$ at PPP
2003	4.0	37,783
2004	9.2	41,875
2005	7.4	45,374
2006	8.8	49,373
2007	8.9	53,048
2008	1.7	55,905
2009	-1.0	55,074
2010	14.8	57,902
2011	4.9	61,103
2012	1.2	

Source: Asian Development Bank (ADB), 2012.

Public Finances

The fiscal policy of Singapore's government down the years has been conservative, the goal being to ensure government spending and revenue aggregates remain a small proportion of GDP so as to maximise the economic resources available to the private sector. Expenditure has in nearly all years been below 18 percent of GDP and regular and sizeable budget surpluses (sometimes over 7% of GDP) have been achieved (Table 8.2). In 2012, the government expenditure was 14.5 percent of GDP, which was accompanied by a much-smaller-than-usual budget surplus of 1 percent as a result of weaker revenues due to a slowdown in the economy.

Table 8.2: Fiscal Indicators, 2007-2012

	Total Government Expenditure as % of GDP	Fiscal Balance
2007	16.4	10.7
2008	18.3	7.9
2009	15.5	1.3
2010	16.8	5.5
2011	17.6	7.3
2012	14.5	1.0

Source: IMF, 2012.

The accumulation of budget surpluses has enabled the government to build up its foreign reserve holdings. These reserves have increased noticeably over the years, rising from an already high of 60 percent of GDP in 2000 to nearly 80 percent in 2010, one of the highest aggregates of foreign reserves in the world. Because of Singapore's strong indicators (strong economic growth, conservative fiscal policies, no foreign debt, and stable political environment), various rating agencies gave the government a credit rating of triple A (1/600 chance of default). This is the highest credit worthiness category, reflected in very low bond yields (in August 2013, only 0.22% for two-year bonds and 2.46% for ten-year bonds) (Monetary Authority of Singapore, 2013; ADB, 2013a; Accountant General's Department, 2011).

Features of Singapore's Infrastructure

The road system in Singapore is highly developed. There are 161 multi-lane expressways (1,059 lane km) and 652 arterial roads (3,054 lane km) together with 2,500 paved minor and side roads (nearly 5,000 lane km). To facilitate traffic flow, there are 119 flyovers, 212 vehicle bridges and 20 underpasses and tunnels (Land Transport Authority [LTA], 2012a, 2012b). Given the size of Singapore, these figures indicate that a significant amount of land space has been used for road development. To further facilitate ease of travelling, a mass rapid transit (MRT) and a light rail transit (LRT) have been developed for over 25 years, and now consist of 99 MRT stations and 34 LRT stations over a 177-km stretch (LTA, 2012b).

The water supply in Singapore emanates from four sources: 200-300 million gallons per day are supplied from 17 artificial reservoirs in Singapore, and 250 million gallons per day are imported by pipeline from Malaysia. The supply is supplemented by 115 million gallons of recycled waste and sewerage water (about 30% of the total supply and known as NEWater), and 50 million gallons of desalinated water (about 10%). Some of the recycled water is returned to the reservoirs (Public Utilities Board [PUB], 2012).

The storm water drainage system consists of 7,000 km of public roadside drains and about 1,000 km of major canals and waterways. The main conduit of the sewerage system is a 48-km deep tunnel that channels the waste water and sewerage to the Changi Water Reclamation Plant, where the water is treated, some of which is then recycled as NEWater, as mentioned above (PUB, 2012).

Most of the electricity in Singapore is generated by five leading power companies and transmitted to sub-stations and from there to the consumers via underground cables. A total of 3,955.2 ktoe[1] of electricity was generated in 2011, mainly from natural gas. Meanwhile, electricity sales reached 41,725 Giga Watt Hours. The most energy-intensive sectors were the industrial-related (40.2%) and commerce- and services-related sectors (37.5%) (Energy Market Authority, 2009, 2011). Singapore's electricity generating capacity more than meets the demand for electricity.

The maritime port in Singapore is extensive and is one of the leading global maritime hubs, especially as an entrepôt and for transhipment. It comprises 84 container berths under two terminal companies handling over 538 million tonnes of cargo, including 32 million containers (20 feet or equivalent) in 2012 (Maritime Port Authority [MPA], 2013a). The airport at Changi is also a major global transport hub, comprising four terminals (with another one projected) with 144 parking bays and taxiways extending over 23,000 metres. It serves more than 100 airlines flying to 250 destinations in 60 countries. In 2012, the airport was used by more than 51 million passengers. Changi, too, is a leading global airfreight hub, handling large volumes of air cargo each year (Changi Airport Group [CAG], 2013a).

An advanced ITC infrastructure has developed with significant ITC penetration.

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[1] Amount of energy equivalent to that contained in 1,000 tons of oil.

About 97 percent of households have fixed-line connections. Mobile phone penetration is 153 percent of the resident population. Household wired broadband penetration is 104 percent and wireless broadband penetration is 173 percent of the resident population. The international transmission capacity owned by licensed operators has now reached near 8 million Mbps, mainly through submarine cables. A major development in recent years is the creation of fibre optic networks. For the quality and extent of its info communications infrastructure and services, Singapore was ranked second out of 144 countries by WEF in 2012 (Info-Comm Development Authority [IDA], 2012a, 2012b, 2012c; WEF, 2012).

Land Transport

Institutional Framework

The ownership of the road system is vested in the Land Transport Authority (LTA), which is also responsible for building new roads and for managing and repairing existing roads and road tunnels. It is a statutory authority, affiliated to the Ministry of Transport, and subject to the executive authority of the Minister for Transport. As a statutory authority, it remains operationally autonomous.

The LTA is also responsible for the planning, construction, development and regulation of Singapore's mass rapid transit (MRT) and light rail transit (LRT). Its regulatory function includes implementing and monitoring performance standards.

Meanwhile, the operational services are undertaken by a separate commercial entity. Up to 2011, a major portion of the network was handled by the SMRT Corporation, a GLC listed in the Singapore Stock Exchange and with 54 percent of its equity vested in Temasek Holdings. It was specifically created in 1987, when the MRT began, and was awarded the operating licence without a competitive tender for the original network known as the North-South East-West Line (NSEW). Subsequently, it was given the operating licences for two further lines (the Light Railway Transit Line and the Circle Line). However, in 2003, the licence to operate the small North-East line and, subsequently, two connecting LRT lines was awarded to SBS Transit, which is not a GLC and is majority-owned by Comfort DelGro (SBS Transit, 2013; Comfort DelGro,

2013).

The share of asset ownership has changed over the years. Initially, LTA as the development and regulatory authority, owned both the operating assets (e.g., trains, power supply equipment, cables, and signalling systems), and the non-operating assets (e.g., tunnels, viaducts, tracks, and station structures).[2] In 1998, the operating assets were purchased and managed by SMRT Corporation. For the main parts of the network under the control of SMRT, this split arrangement continues to this day (SMRT, 2013). However, for smaller lines that were created after 1998, the ownership of both the operating and non-operating assets were vested in LTA, while the SMRT Corporation and SBS Transit, as the operators, are still responsible for maintenance, repair and upgrading (LTA, 2008).

In 2011, significant changes were made to the future licensing and ownership of the MRT. When new lines are created or when existing licences expire, the contract to operate the lines will be put up to competitive tender in contrast to the previous practice, and will extend over a 15-year term only (as opposed to 20-30 years). Also under the new arrangement, the ownership of the operating assets, which had been previously vested in the operator, will be given to LTA, simply confirming the ownership model for the lines created after 1998. The shorter licence terms, combined with competitive tendering, are intended to promote contestability in the operation of the MRT with a view to creating greater efficiency and value for money. Already, the contract to operate the new Downtown Line has been put up to a competitive tender, with the contract awarded to SBS Transit for 15 years. The other tenderer was SMRT Corporation (LTA, 2008, 2012a; SBS Transit, 2013).

Financing the Road System

The capital funding of the road systems (i.e., replacement of key assets, building of new roads and extensions, and upgrade of existing ones) is financed from the capital budget of the LTA, which is mainly a capital grant from the annual budget of the Ministry of Transport. The operating expenditure

[2] In the first eight years of the MRT, the statutory authority was the MRT Corporation (to be distinguished from SMRT Corporation Ltd), which was absorbed in 1995 into the newly created LTA.

pertaining to the repair and upkeep of the road system and other activities such as managing traffic flows and regulating vehicle ownership and usage is covered by the operating budget of the LTA, of which 70 percent consists of a "management fee" paid to the agency out of the Ministry of Transport's budget (previously referred to as a grant-in-aid). The bulk of the remainder of the operating budget consists of taxes, fees, and charges levied on vehicle owners and users (LTA, 2012a; KPMG, 2012).

Financing MRT System

Operational funding: The funding of the MRT system is divided between the LTA and the operators. In return for their operational services, SMRT and SBS Transit get their revenues from the fares, rental fees of premises at stations, and advertising fees. Operating costs of operators include staff compensation, and the costs of maintenance and repair of operating and non-operating assets (this applies even when LTA is the asset owner). In addition, out of their operating revenue, the operators pay LTA each year a licence fee and, where LTA owns the operating assets, are required to pay for the lease of assets (LTA, 2012a; KPMG, 2012; SBS Transit, 2013; SMRT, 2013).

Replacement and construction funding: For the part of the main network (North-South-East-West Lines) where SMRT owns the operating assets, SMRT pays for the replacement and upgrade of these assets from its own financial resources. This consists of its retained earnings (mainly cash and near-cash assets), and debt issues composed largely of short- and medium-term notes.

However, for the other lines where LTA owns the operating and non-operating assets, it is LTA—and not the operator—who is responsible for funding their replacement from its capital budget. Up until the present, LTA has been paying for the construction of new lines and extension of those lines it owns from its capital budget sourced from the Ministry of Transport (LTA, 2008, 2012a).

Future replacement and construction funding: In future, the cost of construction as well as replacement will be shared between LTA and the operators. This will be done through a newly created Sinking Fund, into which the operators' yearly licence and lease payments will be lodged. The fund,

along with capital grants from LTA, will finance future construction and replacement expenses (LTA, 2008, 2012a).

Electrical Energy

Institutional Framework

Five of the six leading power generation companies were previously GLCs that were wholly owned or majority-owned by Temasek Holdings. Since 2005, Temasek has divested these companies either totally or to the extent where it now has a minority shareholding only (Today, its highest stake is in Sembcorp, in which it has a 49.5% shareholding.).

In the electricity sector, Singapore's retail and wholesale power generation is now a largely private and toughly competitive market where the government's stake is minimal. On the other hand, the transmission and distribution of electricity—which are separated from power generation—were previously undertaken by the Public Utilities Board (PUB), a statutory authority, but in 1995, the functions were transferred to Singapore Power Ltd (SP), a new wholly state-owned company under Temasek Holdings. This makes the SP Group—apart from being licensed to supply electricity—the owner and manager of the transmission and distribution grid (EMA, 2009, 2011; Chan, 2011).

Financing the Energy Sector

When the energy sector was corporatised and privatised in line with Singapore's strategy to liberalise the electricity market, it was understood that operators should be able to finance their operating costs as well as raise funds for capital projects. The upshot is to levy commercial prices on consumers, where prices fall under two categories. The first category refers to contestable prices that are paid by large consumers either directly from power generating companies acting as a retailers, or from a pooled or wholesale energy market. The latter is also supplied by the generating companies. The second category refers to prices set for small consumers by the SP Group. These prices are set to reflect the world price of natural gas and oil, as well as generating,

transmission and distribution costs.

Since the energy sector has to meet its own capital expenditures, the usual financing options include issuing new equity, issuing debt, obtaining loans from banks, or drawing on retained earnings. Retailers and wholesalers pay the power companies from the income they receive from consumers (EMA, 2009, 2011; SP, 2012a, 2012b).

Water Supply and Drainage

Institutional Framework

The water supply and drainage system are managed by PUB, which, as a statutory authority, is affiliated with the Ministry of the Environment and Water Resources (MEWR). This includes the purchase of water from Malaysia, and the ownership and management of the key supply and drainage assets—viz. reservoirs, pumping stations, pipelines, drains, and treatment plants. Some plants engaged in the purification and recycling under the NEWater project are also owned and operated by PUB, while others are owned and operated by commercial companies under concession contracts of 20-30 years. In particular, these commercial firms are Sembcorp NEWater and Keppel Seghers, whose parent companies (Sembcorp and Keppel) have been privatised. Likewise, the desalination plants are owned and operated by another independent company, Hyflux Ltd (Keppel Corporation 2013; Sembcorp, 2013a, 2013b; Hyflux, 2012).

It is noticeable that, unlike electricity supply, the operations to manage most of the water supply (with the exception of NEWater and desalination) have not been delegated to commercial companies. This is due to the scarcity of water in Singapore (having a small catchment and reservoir area relative to the demand for water), making it a strategic resource.

Financing Water Supply and Drainage

The PUB's revenue is sufficient to meet most of its operating expenses incurred

in the management of its assets; and in the purchase of water from Malaysia, from the NEWater plants it does not own, and from the desalination plants. In 2012, PUB financed 81 percent of its operating costs mainly from water and sanitation fees levied on households and organisations. The remaining 19 percent was covered by an operating grant from PUB's parent ministry, MEWR (PUB, 2012).

Meanwhile, PUB's capital expenditure on water supply and drainage is financed both by its own retained earnings and borrowings, and by government grants received from MEWR. During the FY 2011-2012, the cost of investments reached S$629 million (US$493 million), of which 42 percent was funded by PUB itself, and the remainder was covered by capital grants. About 31 percent of the cost of self-funded projects came from borrowings. Since 2005, PUB has regularly issued debt with maturities of up to 20 years, although most of its funding is still derived from its retained earnings and government grants (PUB, 2012).

Concession contracts to build, own and operate the NEWater and desalination plants are awarded through competitive tenders based on, among others, the selling price of recycled or desalinated water as proposed by the tenderers to PUB. The most recent tender was for the project to build and operate the second desalination plant, which was awarded to Hyflux in 2011. The companies that won the contracts for the NEWater and desalination plant projects pay for the design and construction expenses usually through borrowings. From their revenue earned from the sale of the water to PUB, they are able to pay for their operating expenses. Meanwhile, their retained earnings and additional borrowing finance other capital expenditures (Keppel Corporation, 2013; Sembcorp, 2013b; Tan, 2011; Hyflux, 2012).

Port and Airport Infrastructure

Institutional Framework

A major part of the maritime port of Singapore was previously owned and managed by the Port of Singapore Authority (PSA) and by Jurong Town

Corporation (JTC), both statutory authorities.[3] In 1996, as part of the restructuring of PSA, the arm responsible for terminal operations was hived off and transferred to a new company, PSA International Pte (Ltd), which is a wholly owned subsidiary of Temasek Holdings. The section of the port under JTC was corporatised in 2002 with the formation of Jurong Port Pte (Ltd), which remained a wholly owned subsidiary of JTC. Thus, both companies are wholly state-owned GLCs. The regulatory and planning arm of the PSA was retained as a statutory authority and renamed Maritime and Port Authority (MPA, 2013b).

The airport at Changi was previously owned and operated by the Civil Aviation Authority of Singapore (CAAS), a statutory authority. However, in a way similar to the PSA's restructuring process, the arm of CAAS that was responsible for managing Changi Airport was converted into a commercial company called Changi Airport Group (Singapore) Pte. Ltd. (CAG) in 2009. Aside from managing the airport's daily operations, CAG took over the ownership of key airport assets such as runways, taxiways, airport buildings, IT networks, and other plant and equipment, as well as the aviation hub at Seletar. The company is wholly owned by the Minister for Finance Inc. and, thus, is a GLC. Today, the CAAS continues to discharge its duties in regulating the airport, providing air navigation services including air traffic control, negotiating air service agreements with other states, and planning the long-term development of Singapore as a global air hub (CAG, 2012, 2013b).

Financing Maritime Port Infrastructure and Services

Financing the maritime port infrastructure is, of course, the responsibility of the terminal companies PSA International Pte (Ltd) and Jurong Port Pte (Ltd). The accounts of Jurong Port are not disclosed separately from its holding entity (i.e., JTC), but those of PSA International are. In the latter's case, the revenue in 2012 was nearly S$5 billion (US$3.92 billion). The operating expenses, including depreciation and impairment, amounted to nearly S$3 billion (US$2.35 billion). Capital costs of PSA International are financed from two

[3] Jurong Town Corporation is responsible for constructing, leasing, and regulating industrial sites and business parks and has been renamed JTC Corporation.

sources. One is the extensive reserves, which totalled S$8 billion (US$6.27 billion) in 2012 and are mostly retained earnings. The other is debt issues amounting to S$2.2 billion (US$1.72 billion) in 2012 mainly consisting of notes of short- and medium-term maturities (PSA International, 2013a).

Financing Airport Infrastructure and Services

The costs of CAG in operating Changi Airport (and a small airfield and aviation centre at Seletar) are paid for through the operating revenue composed of various fees and charges levied on users: airlines, passengers and retail outlets. The operating cost in FY 2011/12 was S$1.78 billion (US$1.39 billion) while operating revenue was S$1.12 billion (US$0.88 billion).

The initial capital cost incurred by CAG in the purchase in 2009 of the airport assets from CAAS (at book value) was funded by equity injection from the holding company, the Minister for Finance Inc. It should be noted that the transfer of ownership and operational rights when the airport was corporatised did not entail a competitive tender. Subsequent capital costs of CAG such as those on the construction of new runways and upgrading of terminals were paid for from its retained earnings, which totalled just under S$2 billion (US$1.57 billion) by the end of FY 2011/12. Given the strong reserves of the company, further grants from the holding company in terms of equity injection were not required. Similarly, the company had no need to borrow to finance its capital projects (CAG, 2012).

ITC Infrastructure

Institutional Framework

In the last 30 years, the ITC institutional framework has changed in tandem with the far-reaching changes in global telecommunications and digital media services. Telecommunications services were provided by the then Telecommunications Authority of Singapore (TAS), a statutory authority. However, in 1992, its business arm was corporatised with the creation of Singapore Telecom Plc (Singtel). Meanwhile, TAS remained but was merged with the National Computer Board in 1999 to form the Infocomm Development

Authority of Singapore (IDA). As IDA, it provides licences, regulates telecommunication services and promotes Singapore as a dynamic global info-communication hub (IDA, 2012a).

In the last 10-15 years, other companies have entered Singapore's ITC market in fixed line telephony, mobile and internet services, and digital media. These firms include Star Hub Ltd and M1 Ltd. This has led to significant contestability in the ITC market. An example is the Next Generation Nationwide Broadband Network, which aims to provide ultra-high speed fibre broadband to all homes and business in Singapore.

The IDA licence to design, build, own and operate the primary or passive infrastructure for a term of 25 years was put up for competitive tender (more precisely, a request for proposals) in 2008, and was eventually awarded to OpenNet, a consortium in which Singtel and Axia (a Canadian Company) are major partners. A similar licence relating to the secondary or active infrastructure was opened for competitive bidding in the following year and awarded to Star Hub for the same term of years, with its wholly owned subsidiary, Nucleus Connect, developing and operating the infrastructure.[4] These two levels provide wholesale connectivity, which will be purchased at the third level by retail service providers (RSPs) (IDA, 2012c). Various RSPs compete for business and individual customers on the basis of price packages, and the range of services and products offered (Singtel, 2013; Star Hub, 2013).

Financing ITC Infrastructure and Services

Nearly all operating costs of companies engaged in ITC are covered by their operating revenue. For RSPs, their revenue is generated from the charges paid by retail consumers. The cost of operating and maintaining the active infrastructure of the nationwide fibre optic network at the wholesale connectivity level is paid for by charges levied on the RSPs by the operating company, Nucleus Connect. Likewise, OpenNet, responsible for operating the passive infrastructure, receives its operating revenue from the charges paid by

[4] The primary or passive infrastructure consists of manholes, underground fibres and ducts, and exchanges, while the secondary or active infrastructure consists of switches, and transmission and other electronic equipment.

downstream companies for the use of its assets, including Nucleus Connect and the RSPs (IDA, 2012b; Singtel, 2013; Star Hub, 2013). In defraying capital costs, ITC companies draw upon the usual means of corporate financing: equity funding, retained earnings, and borrowings.

A comparison of the three leading local ITC companies indicates variation in the extent of borrowings. The most leveraged is M1 Ltd, with borrowings at 160 percent of its retained earnings; and the least is Singtel, with borrowings at only 8 percent. In addition, significant funding to defray capital costs (and to a small extent, operating costs) of leading ITC companies has been made available through government grants from IDA. Nucleus Connect and OpenNet together can draw upon a total grant of S$1 billion (US$0.78 billion) in developing the optical fibre infrastructure (M1, 2012; Singtel, 2013; Star Hub, 2013).

Public-Private Partnerships (PPPs) and Foreign Capital

The institutional and financing arrangements indicated above entail PPPs of different types with the government and the business sector taking on varying roles.

In one type of PPP arrangement in Singapore, the government's role entails strategic planning, regulation, licensing and, where necessary, coordination. When a new facility is to be created, the business entity undertakes the responsibility for designing, building, operating and maintaining the physical assets over the term of the licence or contract. In the case of an already existing facility, the responsibility for operating and maintaining is transferred from a government agency to the business entity for the term of the licence or contract. The ownership of the assets may be vested in the operator, or a government agency, or split between the two for the term of the licence (Gunawansa, 2012).

One variation relates to the provision of government financial support in terms of an equity injection or grant. By and large, the Singapore government prefers a fully self-financing operator. However, in certain circumstances, a government subvention is permitted, where the operation of the infrastructure facility is likely to incur losses or where the infrastructure is vital to Singapore's

future economic development, such as the expansion of the MRT and the upgrading of the ITC sector.

It is a moot point whether the arrangements described above are genuinely PPPs, when the construction and/or operational responsibilities are undertaken by wholly or majority government-owned companies (e.g. CAG, PSA International, Jurong Port, SMRT, and Singtel), although they function in a way similar to private businesses.

A second type of PPP is a partnership between a private sector company and a GLC or statutory authority in the supply chain, with the former engaged in production and the latter, in distribution. Examples are the production of recycled and desalinated water by private sector companies, which is then supplied to consumers by PUB, and the generation of electricity by privately owned power stations, which is transmitted to the consumers through the SP network.

A third type of PPP involves shared ownership of the company managing and operating the infrastructure comprising private sector investors and a government holding entity, which for the most part is Temasek Holdings. A number of operating companies are GLCs, in which the government has a majority stake, while the remainder of the ownership is vested in private sector companies. In other operating companies, the situation is reversed: the government holding entity has a minority stake only while the private sector firm holds the majority stake, as in the case of Sembcorp and Keppel. The trend has been for the government to reduce its stake in companies operating infrastructure facilities, although the extent of the divestment has occasionally been limited so that the government holding entity remains the majority shareholder, as in the case of SMRT and Singtel.

An examination of the financial reports of infrastructure companies indicates that the major private sector investors are consistently drawn from the banking and financial sector such as local banks, local subsidiaries of overseas banks, and fund management companies and trusts. Examples, amongst many, are Citibank, DBS Group, HSBC, United Overseas Bank, BNP Paribas, Aberdeen Asset Management, Merrill Lynch, and Morgan Stanley Asia. Factors such as liquidity of banks and financial institutions in Singapore, sound corporate governance of the infrastructure companies and the prospect of a low risk but profitable investment in the infrastructure network may explain why projects

are able to attract capital from the financial sector.

Foreign Investment in Singapore's Infrastructure

Foreign investment in Singapore's infrastructure has been modest. It has been limited to small stakes in infrastructure companies taken by foreign banks and financial institutions. The exceptions have been in the energy and ITC sectors. Four of the energy generating companies are owned by foreign-based companies and consortiums. Foreign investors in the ITC sector include Japanese company NTT Communications Corporation, Qatar Telecom, and the Canadian company Axia mentioned above.

There is potential to increase foreign involvement in infrastructure financing in Singapore and to diversify sources of funding by issuing long-term bonds specific to particular infrastructure projects with a relatively risk-free return. Such bond issuances would be particularly attractive to overseas pension funds, insurance companies and sovereign wealth funds. To underpin bond issuances, guarantees may be secured through the Credit Guarantee and Investment Facility (CGIF) set up by ASEAN+3 and ADB in 2010 (ADB, 2013b).

Connectivity to ASEAN

Many of Singapore's infrastructure companies have spread their wings and invested overseas. For example, SP has acquired energy-based companies in Australia, and Sembcorp has undertaken major energy investments in China, the United Kingdom, Oman, the United Arab Emirates, and India. In addition, the consultancy arms of these companies have provided technical and management expertise for infrastructure projects. This is part of a strategy to develop the external component of the Singapore economy, which is all the more important given its small size and population.

Singtel has made major investments in ASEAN by setting up five wholly owned subsidiaries as well as entering a joint venture with ITC companies in Malaysia and the Philippines. Through its wholly owned subsidiary PSA Vietnam, PSA International has joined forces with Saigon Port by taking a 49-percent stake in the new SP-PSA International Port Co. Ltd and developing and

operating its container port in Ba-Ria Vung Tau Province, Vietnam. A similar joint venture was entered into with Eastern Sea Laem Chabang Terminal Company to operate container terminals at Laem Chabang Port in Thailand (PSA International, 2013b).

Sembcorp has entered a joint venture with three other partners to build and operate the Phu My 3 electricity generating plant in Vietnam and has done likewise to develop and operate water utilities in the Philippines and Indonesia (Sembcorp, 2013c). The consultancy arm of CAG has provided technical advice in the upgrading and extension of Brunei's airport.

However, the investments of Singapore's infrastructure companies in ASEAN countries constitute at present only a fraction of their global reach and do not compare with their investments in the Middle East, China, and India. An example is Sembcorp, which has invested in 48 overseas companies either as wholly owned subsidiaries or as joint ventures, but only three are in the ASEAN region (Sembcorp, 2013c).

Several reasons may be given for the limited involvement in the ASEAN region such as:

- Limited scale of many projects, thus reducing their potential returns;
- Deficient legal and regulatory frameworks;
- Unwieldy bureaucratic controls; and
- Limitations in government capacity to prudently select, plan, organise and execute projects.

A further concern is the lack of standard termination clauses in PPP contracts. Currently, many PPP projects prevent an overseas company from exiting or adjusting a project contract in the event of non-performance by the local partner utility company. These factors significantly increase the risk to the overseas partner and render it difficult to raise finance and collateral to fund the project.

Nevertheless, there is obvious potential for Singapore's infrastructure companies to improve their connectivity to and raise their profile in the region. As the national economies in the region continue to grow, and the need arises for more advanced and extensive infrastructure facilities offering better returns, they these companies could play a role as a major source of investment, and of

technical and management expertise through joint ventures, local subsidiaries, and PPPs. In addition, Singapore is well placed to provide supportive and consultancy services for infrastructure projects in ASEAN. Of particular importance here is the Infrastructure Finance Centre of Excellence (IFCOE) set up in November 2010 as a joint initiative of Singapore's Ministry of Finance and the World Bank. The Centre can provide technical assistance and capacity building, assist regional governments in policy making, and promote the adoption of best practices via hands-on technical advice. These include feasibility studies to identify projects that are viable and of the highest priority, as well as research to determine best practices in infrastructure development and finance. Also within the remit of the Centre is to promote and market infrastructure projects in collaboration with domestic governments so as to attract private sector finance and expertise (Ministry of Finance, 2010; World Bank, 2010).

Conclusion

From the foregoing analysis, the following features have marked the development, management and financing of Singapore's infrastructure:

Corporatisation and Privatisation

In the past, much of the infrastructure was owned and operated by government agencies, either civil service departments or, increasingly over time, statutory authorities. Over the last 20 to 25 years, operational responsibilities and, in some cases, ownership have been transferred to commercial companies (often newly created). Likewise, when new infrastructure facilities are created, they are nearly always operated and, in some cases, owned by commercial companies. The exceptions have been water supply, drainage and roads, which are still managed by statutory authorities. However, infrastructure companies are still subject to the regulation by the relevant statutory authority.

Some of the leading infrastructure companies are GLCs, wholly or majority-owned by a government holding entity, Temasek Holdings being the main one. Even in some of the private sector companies, the government has retained a stake, albeit as a minority shareholder.

In most cases, companies that are responsible for operations of the infrastructure facility also own the physical assets or, in some cases, lease them from the relevant statutory authority.

Contestability

The Singapore government is committed to promote contestability in the various infrastructure sectors so as to achieve greater efficiency and value for money. This generally happens in two ways. The first type of contestability calls for companies to tender for the right to operate (and own) an infrastructure facility under a medium-term concession or licence (often for 15-25 years). The other type of contestability is to allow different companies to operate facilities and to compete for customers on the basis of price and quality of service.

Corporate Financing

With corporatisation, privatisation, and contestability, a corporate system of financing the infrastructure has been increasingly adopted. For the most part, the fees, charges, and taxes at point of delivery have been levied to provide revenue for the operator. Operating expenses are covered by the operator's operating revenue, while investment is funded mainly through retained earnings, and borrowings. Equity injection may be used if necessary to pay for the initial investment, including the purchase of physical assets when they are transferred to a new company in the case of an already established facility. Operating and capital grants from the public budget are made available only when necessary—e.g., to assist in the setting up of a new infrastructure company, to pay for a loss-making but necessary service (e.g., a future section of the MRT), or to finance part of a strategic infrastructure (e.g., roads and water supply).

PPPs

Infrastructure development and operations in Singapore have to a significant degree involved PPPs. These partnerships consist of three types: design, build,

and operate (and in some cases, own) arrangements under a concession or licence; supply chain cooperation between private sector producers and publicly owned distributors; and shared equity between government holding entities and private investors. To a limited extent, overseas investment has provided capital for infrastructure development but this could be further increased through project bond issuances designed to attract international financial institutions, with the option of a guarantee secured through the CGIF.

ASEAN Connectivity

ASEAN connectivity is so far limited, reflected in the small investment made by Singapore's infrastructure companies in other ASEAN states and the small-scale provision of consultancy services. There is, however, scope for the connectivity to increase as the region grows and requires capital and professional assistance in developing and operating advanced infrastructure facilities. Singapore is well placed to meet this need, especially through the IFCOE.

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