

APPENDIX 4

CASE STUDIES OF URBAN RAILWAY SYSTEM IN OTHER COUNTRIES

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With the purpose of reviewing i) financial frameworks, and ii) operational efficiency and service level of urban railway systems in Japan and other foreign countries, the following six urban railway systems were studied and analyzed based on available data in Japan and on internet websites:

- a) Urban railway system in Manila, the Philippines;
- b) Urban Railway Systems in Singapore;
- c) Urban Railway Systems in Kuala Lumpur, Malaysia;
- d) Delhi Metro in Delhi, India;
- e) Metropolitan Intercity Railway Company (Tsukuba Express) in Japan; and
- f) London Underground in London, the United Kingdom.

1. URBAN RAILWAY SYSTEM IN MANILA IN THE PHILIPPINES

1.1 Background

The Metro Manila (National Capital Region), holding 11.5 million people, is one of the most populated urban areas in the Southeast Asia. Manila's population has rapidly grown during the late 1970s and early 80s especially. In those days, "urban transportation" meant "jeepney" to common people in Manila. *Jeepney* was produced by converting surplus army trucks, public & private buses, and some private cars. As motorization grew in this period, the traffic jam in Manila became very serious. During the period from 1976 until 1977, a study on urban transportation in Manila was conducted with the assistance of the World Bank and this study recommended a light railway system. In 1980, the Light Rail Transit Authority (LRTA) was established as a government agency to promote an urban transportation system.

The initial assistance to a light rail transit (LRT) project came from the Belgium government, which granted a soft loan, and a consortium of Belgium companies provided a loan for the project. In 1985, the LRT first line (LRT1: Yellow Line) started full operation.

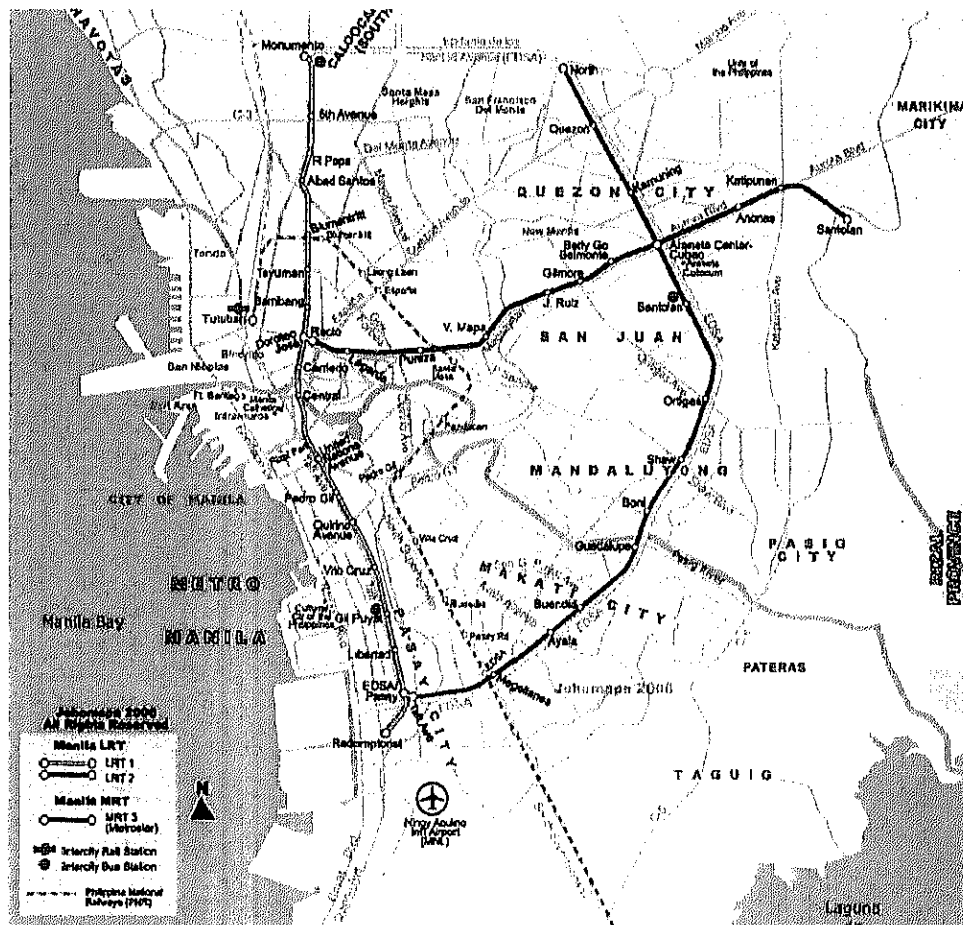
With the economic growth and continuous increase in the population in Metro Manila, the LRT1 faced with the problem of congestion in the 90s, and its transportation capacity needed to be strengthened. Two Japan's ODA loans supported the strengthening of LRT1's capacity in 1994 and 2000. Three other Japan's ODA loans were also provided for the construction of LRT2 (Purple Line).

In the 1990s, along with the trend of private sector participation in public infrastructure, the Philippine government decided to promote the development of Manila Metro Rail Transit System

(MRT). The project of MRT, MRT3 (or Blue Line), was decided to be promoted under PPP scheme. Metro Rail Transit Corporation (MRTC) was awarded the MRT3 project under a Build-Lease-Transfer (BLT) scheme. MRTC started the construction of MRT3 in 1997, partial operation in December 1999 and full operation in July 2000.

1.2 Outline of Urban Rail System in Metro Manila

As Figure 1-1 shows, LRT1 goes through Metro Manila from North to South; LRT2 penetrates from East to West; and MRT3 draws semicircle to connect to LRT1 at South and LRT2 at East.



Source: LRTA

Figure 1-1 Map of Urban Rail System in Metro Manila

(1) LRT1 (Yellow Line) and LRT2 (Purple Line)

LRT1 (Yellow Line) is the first line of the Manila LRT system, which has a total length of 15 km from Baclaran Terminal in the south to Monumento Terminal in the north with 18 stations, and is fully elevated. The line runs in a north-south direction, linking cities of Quezon, Caloocan (both in the north area), Pasay and Paranaque City (both in the south). Passengers can transfer to LRT2 (Purple Line) at

Doroteo Jose station, while to MRT3 at EDSA station.

LRT2 (Purple Line) is the second line of the Manila LRT system. The line contains eleven stations and runs 13.8 km of mostly elevated track, with exception of Katipunan station which is underground. The line runs in an east-west direction, linking cities of Manila, San Juan, Quezon, Marikina, and Pasig. Passengers can transfer to the LRT1 Line at Recto station, while to MRT3 at Araneta Center-Cubao station.

Table 1-1 Train Operation Data of LRT1 and LRT2

| Railway Operation Data | | |
|--------------------------------------|---|---|
| | Line 1 | Line 2 |
| Total Route Length | 15 Kilometers | 13.80 Kilometers |
| Route | Baclaran Terminal to Monumento Terminal (Taft-Rizal Avenue Corridor) | Santolan Terminal to Recto Terminal (Marcos Highway - Aurora Blvd. - Ramon Magsaysay - Legarda - Recto) |
| Number of Stations | 18 | 11 |
| Number of Rail Cars | BN/ACEC (1st Generation) - 64 (32 Trains @ 2 Cars) ADTRANZ (2nd Generation) - 28 (7 Trains @ 2 Cars) KINKI SHARYO (3rd generation) - 48 (12 Trains @ 4 Cars) | 72 - 18 Trainsets @ 4 Cars per Trainset |
| Daily Hour of Operation | 17 | 17 |
| Minimum Train Headway | 3 Minutes | 5 Minutes |
| Present Maximum Fare per Trip | Php 15.00 | Php 15.00 |

Source: LRTA

LRT was initially operated by an operation company specially established for LRT operation, but later the operation was taken over by LRTA in the wake of the operation company's strike in 2000. Since then, LRTA is the operator of Manila LRT System.

(2) MRT3 (Blue Line)

The Metro Rail Transit Corporation (MRTC) operates the Manila Metro Rail Transit System, known as the MRT. MRTC is a private consortium established for development and operation of MRT3.

MRT3 serves 13 stations on 17 km of line. It is mostly elevated, with some sections at grade or underground. The line commences at the Taft Avenue and ends at the North Avenue, serving cities that the Epifanio de los Santos Avenue (EDSA) passes through: Makati, Mandaluyong, Pasay, Pasig, Quezon City, and San Juan. Taft Avenue station and Araneta Center-Cubao station interchange with the LRT network. Taft Avenue station connects to EDSA station of the LRT1 and Araneta Center-Cubao station connects to its Namesaka station of LRT2.

1.3 Financial Framework of Manila Urban Rail System

(1) LRT

The initial system of LRT was financed by a combination of the official and private funds from Belgium. The Belgium government provided an interest-free loan of 300 million pesos with a repayment period of 30 years. A Belgium consortium consisting of private companies of construction, rolling stock, signal/telecommunication, and engineering provided an additional loan of 700 million pesos¹.

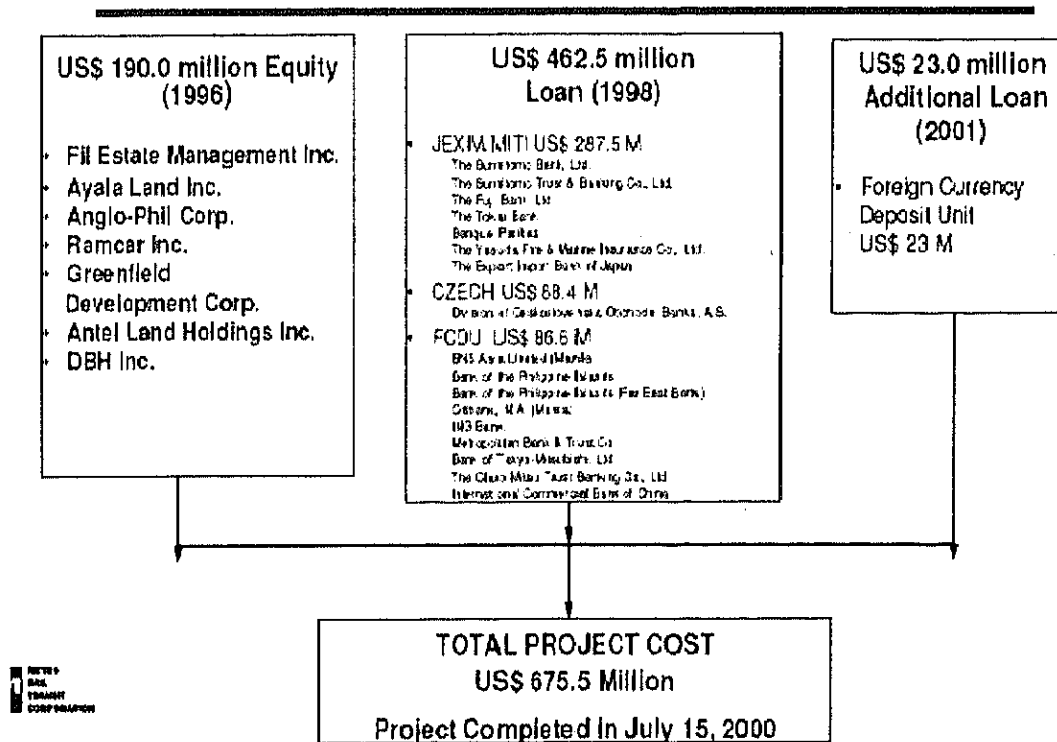
To meet a growing number of passengers of LRT1 line, Japanese ODA loans were provided with the purpose of strengthening its transportation capacity. With Japanese ODA loans, additional rolling stock was procured and railway tracks were improves. A Japanese ODA loan of ¥9.8 billion and that of ¥22.3 billion were provided in 1994 and 2000 respectively.

(2) MRT3

Infrastructure of MRT3 was constructed with Build-Lease-Operation (BLO) scheme. A BLO agreement was signed by MRTC and the Department of Transport and Communications (DOTC). The agreement governs two project phases, i.e., construction phase and revenue service phase. In the agreement, MRT should construct the system by the specified date according to the specifications and drawings approved by DOTC. The completed system should satisfy the specified capacity requirements. MRTC was also obligated to provide all equipment be used in the system, including rail vehicles. At the completion of construction, MRTC was obligated to lease the system to DOTC and provide maintenance service. DOTC was required to make payments of rental fees to MRTC.

MRT3 project was financed by sponsors' equity investment (US\$190 million) and debt financing (US\$485.5 million). Lenders for debt financing consisted of JEXIM (US\$287.5 million with an interest rate of 2.8% per annum), Czech Bank (US\$88.4 million with 7.2% per annum), and a consortium of private banks, Foreign Currency Deposit Unit (FCDU) (US\$109.6 million with LIBOR+1.875%).

¹ No detail information on financing terms and conditions for Belgium loans is available.



Source: MRTC

Figure 1-2 Financing of MRT3

1.4 Performance Summary of LRT and MRT

(1) Ridership

An average daily ridership of LRT1 is about 300 thousand trips, LRT2, 132 thousand trips, and MRT3, 400 thousand trips. The utilization level of LRT2 has been less than other two lines. A load factor (ridership/carrying capacity) of LRT1 is almost 80% against LRTA's target of 65%, which shows LRT1 is crowded most of the time.

(2) Efficiency of the Service

LRT1's daily operation hour is 5:00 am to 10:00 pm, i.e., total 17 hours daily, while MRT3 is 5:30 am to 10:30 pm.

Peak hour operation of LRT1 is 20 trains per hour (3 minutes train headway), while LRT2 is 12 trains since LRT2 ridership is relatively less than LRT1. MRT3's peak hour operation is same as LRT1, 20 trains per hour.

(3) Financial Sustainability

For LRT, fare revenue exceeds its operating cost excluding financial cost, but is not sufficient to serve debt repayment. The ridership of LRT2 is relatively low and it is presumed that the operation of

LRT2 is not financially sustainable at this stage and it is difficult to sustain LRT' service without financial support from the Philippine government.

No detail information on expenditure is available for LRT and MRT3 as well.

Table 1-2 Performance of Manila Urban Rail System

| | LRT Line 1 | LRT Line 2 | MRT3 |
|--|------------|------------|---------|
| Total route length (km) | 15 | 13.8 | 16.95 |
| Daily Ridership (no. of trips) | 308,288 | 132,154 | 393,542 |
| Annual Ridership (in million) | 111.08 | 47.57 | 142.86 |
| Fare revenue per passenger (peso) | 14.06 | | N.A. |
| Operating cost per passenger (excluding financial costs) | 10.62 | | N.A. |
| Operating cost per passenger (including financial costs) | 19.85 | | N.A. |
| Daily hours of operation | 17 | 17 | 17 |
| Minimum train headway (minute) | 3 | 5 | 3 |
| No. of trains operated at peak hour (no. of trains) | 20 | 12 | 20 |
| Maximum Fare per Trip (peso) | 15.00 | 15.00 | 15.00 |

Source: LRT: Annual Report 2006, MRT: Metro Star website (2007)

(4) Customer Satisfaction

It was reported that passengers of LRT1 evaluate alleviated congestion after the capacity expansion. However, its load factor level is still high at approximately 80% and trains are densely packed at peak hours.

Accessibility (barrier-free access to stations, escalators), shops and services, safety and security are provided in LRT1, LRT2, and MRT3 as well. Customer satisfaction for these items still needs to be assessed.

2. URBAN RAILWAY SYSTEMS IN SINGAPORE

Urban Railway Systems in Singapore has not been developed with PPP but with a unique and efficient PSC, which could be a good reference to Bangkok MRT in making a plan of MRT development with consistency.

2.1 Outline of the System

(1) Background

a. City Planning

Before its independence in 1967, it is told that Singapore had started to make the first City Master Plan in 1958. The basic objective of the Master Plan was to establish strategic land effective use. The concept of the Master Plan was succeeded and materialized in the Concept Plan made in 1967 and its revisions made in 1971 and 1991.

The objectives of the Concept Plan were to solve population centralization, traffic jam and contamination. One of the important solutions recommended in the report was to introduce mass transit system.

b. Establishment of MRTC and Start of Construction

Establishment of MRTC

Upon the completion of Mass Transit Study which was undertaken based on the concept paper, the Mass Rapid Transit Corporation (MRTC) was established as a statutory body to undertake solely construction works. All of the necessary direct construction expenses and account expenses (mainly personal cost) were provided by the Government. And MRTC was required to be financially independent although its own revenue was quite limited to license fees and so on.

Start of MRT Construction

In May 1982, the construction started for the two lines East - West Line (7.0 km) and North - South Line (6.0 km) which would be expected to complete in 1990. The first scheduled construction portion consisted of 45 km of overhead railway, 28 km of subway and 3 km of surface railway. At the offset, the construction of 19.1% of the scheduled portion was started (present network in 2008 is 138 km).

Start of MRT Operation

On November 11, 1987, in about 5 years since construction commencement, trial operation of first completed portion was started and the other portions were subsequently followed.

c. Establishment of SMRT

In advance of operation, the SMRT Corporation (SMRT) was established in August 1987 as operating company with the license which was granted by the Land Transport Authority (LTA) for a period of 10 years and was later extended to 31 March 1998. The license fee payable is 1.0% of the gross annual fare revenue.

SMRT purchased the MRT System's operating assets from LTA on April 1998 for approximately \$1.2billion. The assets included trains, permanent way of vehicles, power system, control system and other related facilities etc. SMRT received also other two financial supports from LTA, loan of \$480million and a lease relating facilities. At the end of FY2008, the loan has been repaid fully.

Authorized capital and paid-in capital as of established date were 250,000,001 shares and 150,000,001 shares (value of a share is S dollar 1) respectively of which one share (deemed as special stock) was owned by LTA and the rest were held by Tamasek Holding Pte Ltd (100% National owned holding company).

d. Start of LRT Operation

In addition to MRT, two Light Rail Transit (LRT) systems were planned and constructed. One is Sengkang LRT having 11km and the other is Punggol having 19km at the beginning. Both are under operation of SMRT since 1997.

SMRT has been granted a similar License of Agreement by LTA to operate the LRT System commencing November 6, 1999 till March 2028. LTA currently owns all the operating assets and infrastructure required to operate the LRT System.

(2) Organizational Aspect of Urban Railway Systems

a. Organizational Framework to Supervise the System

Establishment of LTA

The transportation policy of Singapore, covering from construction of road and public transport facilities to traffic control of vehicles, has been implemented under the principles of solidity and well coordination. To implement the above, in September, 1995, the Land Transport Authority (LTA) was newly established as an independent statutory board under the Ministry of Communications by integrating four government entities, i.e., SMRT, Registry of Vehicles, Transport Division of Public works, Land Transport Division of the Ministry of Communication.

Role of LTA

LTA is expected to cover a variety of functions relating to the construction and operation of land transportation, namely from construction of MRT and roads to supervision of public transportation, traffic control, registration of vehicles and collection of toll fee.

b. Tariff Regulation by PTC

Fare of MRT and LRT is regulated by the Public Transport Council (PTC) and reviewed annually as shown in the table below (Table 2-1).

Table 2-1 Fare Adjustment

| |
|---|
| <ul style="list-style-type: none"> • Fare are regulated by Public Transport Council (PTC) and reviewed annually based on max fare adjustment formula: $0.5 \Delta \text{CPI} + 0.5 \Delta \text{WI} - 1.5\%$ <p style="margin-left: 20px;">where 1.5% is the productivity index valid for 3 years</p> • Fare adjustment made for Trains and Bus in 2008 <ul style="list-style-type: none"> - Net↑0.6% fare adjustment after increase in fare rebate from 25 cents to 40 cents - Expect to yield additional \$3m in fare revenue for f |
|---|

Source: SMRT

Fare was eventually lowered to increase ridership. The current ridership and revenues of public transportation services in Singapore are shown in Table2-2. The level of fare box is low in comparing with the neighboring Asian countries as indicated later.

Table 2-2 Current Fare and Revenue of MRT, LRT and Bus Service in Singapore

| | MRT | | | LRT | | | BUS | | |
|-----------------------------|---------|---------|----------|-------|-------|----------|-------|-------|----------|
| | 1Q 09 | 1Q 08 | % Change | 1Q 09 | 1Q 08 | % Change | 1Q 09 | 1Q 08 | % Change |
| Ridership ('000) | 124,300 | 112,100 | 10.9 | 3.9 | 3.7 | 7.5 | 71.1 | 67.8 | 5.0 |
| Avg. Daily Ridership ('000) | 1,366 | 1,232 | 10.9 | 43.1 | 40.2 | 7.5 | 781.9 | 744.7 | 5.0 |
| Average Fare (cents) | 93.0 | 94.2 | (1.2) | 55.9 | 57.6 | (2.9) | 69.4 | 69.1 | 0.4 |
| Revenue (S\$ million) | 115.6 | 106.8 | 8.2 | 2.2 | 2.1 | 4.3 | 50.9 | 48.3 | 5.3 |
| EBIT (S\$ million) | 34.9 | 32.0 | 9.1 | (0.1) | (0.1) | 18.8 | (3.3) | 0.5 | (737.1) |

- Notes
1. Higher MRT operating profits due to ridership growth offset by higher electricity costs.
 2. Lower LRT operating loss due to higher average daily ridership.
 3. Lower Bus operating profits due to higher diesel costs.
 4. As of first quarter of Fiscal Year 2009.

Source: SMRT

(3) SMRT Operation

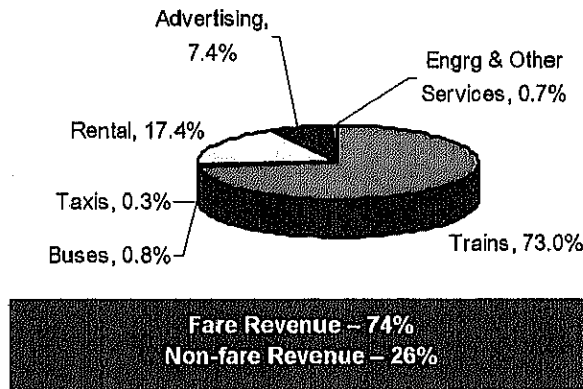
SMRT started its operation of MRT in 1987 and then expanded its railway business to LRT in 1998 and now its railway operation accounts for 73% of its total operation. SMRT has also started other related business like bus, taxi, rental and consulting services. Brief description of SMRT business is shown in Table 2-3 and the share of each business in total sales is shown in Figure 2-1.

Table 2-3 SMRT Operation

| Type of Business | Content |
|--------------------------------|---|
| MRT | <ul style="list-style-type: none"> • Dominant rail operator in Singapore with 21 years of O&M experience • Operates the North South and East West MRT Lines and will operate Circle line from mid 2009 • Average daily ridership of 1.4M (1Q of FY2009) • About 80% market share based on daily ridership |
| LRT | <ul style="list-style-type: none"> • Operates first LRT system at Bukit Panjang since 1989 • Network comprises 7.8km linking 14 stations • Average daily ridership of 43.1 thousand (1Q of FY2009) |
| Buses | <ul style="list-style-type: none"> • Owns about 860 buses running 80 basic bus services between Western and North-Western areas and the rest of Singapore • Average daily ridership of 781.9 thousand (1Q of FY2009) • About 25% market share based on daily ridership |
| Rental | <ul style="list-style-type: none"> • Rental of station spaces (about 27,000 square meters) • Total of 27 stations refurbished to-date since FY2005 |
| Advertising | <ul style="list-style-type: none"> • Provides advertising spaces on trains, buses, taxis as well as in stations • About 18% outdoor media market share |
| Taxis | <ul style="list-style-type: none"> • Second largest taxi operator with 12% market share • Manages and leases about 3,000 taxis |
| Engineering and Other Services | <ul style="list-style-type: none"> • Pursuing overseas land transport opportunities • First overseas project in Dubai • Leases fiber-optic cables |

Source: SMRT

FY2008 EBIT by Business – Group EBIT of \$178.0m



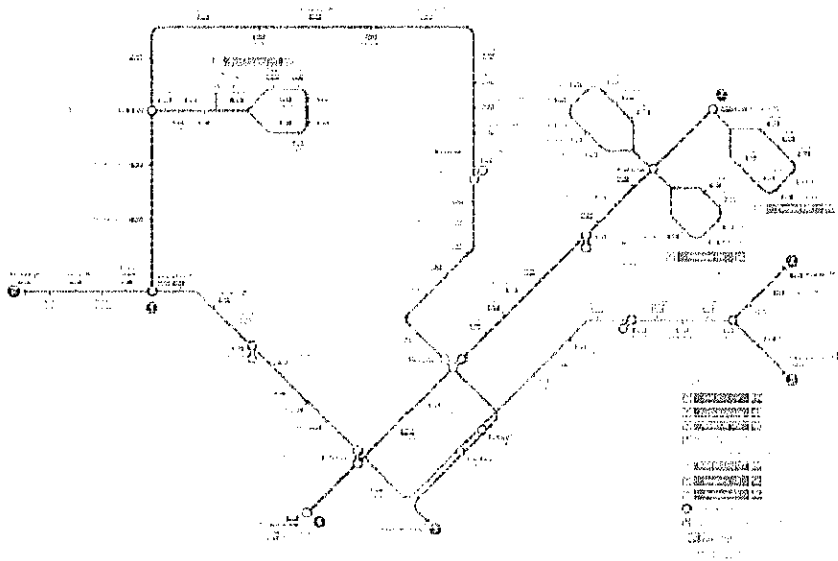
Source: SMRT

Figure 2-1 Core Businesses of SMRT

(4) Outline of Present Operational System

a. MRT and LRT Operation Map

Since the first operation of MRT in 1987 and LRT in 1998, the network of the two transport systems has been rapidly expanded and its total length of lines as of the end of 2008 is 109.2km for MRT and 28.8km for LRT as in the following figures.

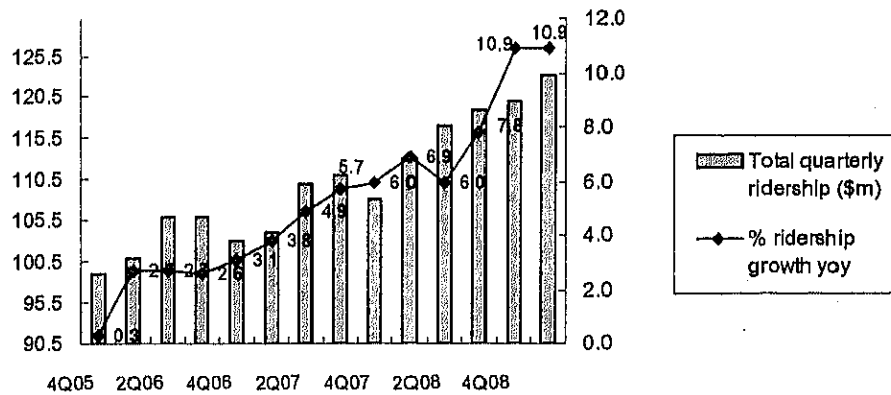


Source: SMRT

Figure 2-2 Current Operational Network of MRT and LRT

b. Ridership Development

In accompanying with the expansion of the operational network of MRT and LRT, the revenue from ridership of MRT and LRT has been successfully improved and reached to the highest level in 2008 (see Figure 2-2).



Source: SMRT

Figure 2-3 Trend of Revenue from Ridership of MRT and LRT

(5) Efficiency Level of Operations and Services

a. Customers satisfaction

It is understood that SMRT has gained enough customers' satisfaction from following.

i) Fare

Regarding published cash fare for a 10km journey, Singapore is S\$1.30 which is cheapest among the neighboring Asian countries including Bangkok of 1.81.

ii) Train Arrival (Punctuality)

In FY2008, SMRT realized a train arrival rate of 97% which is sufficiently higher than the target of 94% set by the government.

iii) Train Departure (Punctuality)

In FY2008, SMRT got a train departure rate of 98.5% which is sufficiently higher than the target of 96% set by the government.

iv) Train Service Availability

In FY2008, SMRT achieved a train service availability of 99.96% which is sufficiently higher than the target of 98.0% set by the government.

b. Efficiency of Operations and Services

It is understood the SMRT has gained good efficiency of operations and services from the following indicators.

i) Punctuality (Timelines of train arrivals)

In FY2008, SMRT got a punctuality score of 99.6 which is the lowest last 5 years.

ii) Manpower efficiency (passenger-km per staff & contractor hours)

In FY2008, SMRT got a manpower efficiency score of 100 which is the highest last 5 years

iii) Cost efficiency (Operating cost standardized place-km)

In FY2008, SMRT got a cost efficiency score of 100 which is the highest last 5 years.

iv) Safety (Fatalities due to accidents per billion passenger journeys (Cumulative))

In FY2008, SMRT got a safety score of 95.8 which is the average of last 5 years.

2.2 Financial Framework, Results and Its Efficiency

(1) Financial Framework

Construction is financed by the Singapore government utilizing MRTCA as financial channel as well as technical supervisor. Operation is made by an independent government entity, SMRT, to which the operation license is granted by the government agency, LTA. Fare is regulated by an independent government regulatory body, PTC.

(2) Financial Performance of SMRT

SMRT is profitable mainly because of its fare revenue which accounts for 74% of total revenue. Non-railway business of MRT is also becoming profitable. SMRT was listed in 2000 and its stock price has been constantly going up.

Table 2-1 Financial Performance of SMRT

| | FY2004 | FY2005 | FY2006 | Fy2007 | FY2008 |
|-------------------------------|--------|--------|--------|--------|--------|
| Revenue (\$ million) | 667.3 | 673.5 | 711.7 | 743.1 | 802.1 |
| EBITDA (\$ million) | 225.5 | 230.0 | 247.2 | 255.0 | 284.1 |
| Profit after tax (\$ million) | 90.2 | 126.6 | 103.6 | 135.8 | 149.9 |
| EPS (cent) | 6.0 | 8.4 | 6.9 | 9.0 | 9.9 |
| Net DPS (cent) | 3.6 | 5.2 | 5.6 | 7.0 | 7.75 |
| ROE (%) | 19.7 | 24.5 | 18.2 | 22.1 | 22.8 |
| ROTA (%) | 5.6 | 8.6 | 7.5 | 9.8 | 10.6 |

Note: The average growth rate of profit after tax is 13.5% during FY2004 until FY2008.

Source: SMRT

(3) Financial Efficiency of SMRT

As a result of efficient operation as well as good financial operation, overall financial efficiency of SMRT is quite noteworthy as shown in the following table.

Table 2.2 Financial Efficiency Ratios of SMRT

| | FY2008 | | FY2007 | |
|---|--------|------------|--------|------------|
| | Ratio | Growth (%) | Ratio | Growth (%) |
| Total Ridership (Million trips) | 469.3 | 7.9 | 434.9 | 5.1 |
| Car Kilometers operated (Million km) | 78.0 | 1.2 | 77.1 | 2.0 |
| Passenger Trip distance (Million km) | 5714.5 | 8.1 | 5288.3 | 4.6 |
| Average Operating Car Occupancy (persons) | 73.3 | 6.8 | 68.6 | 2.4 |

Source: SMRT

2.3 Lessons learned from Singapore MRT/LRT

Singapore urban transport system has been constructed and managed by a group of the government and public entities which have been well coordinated. Singapore's system could have been done successfully under the following conditions.

- i) Singapore government is quite strong and stable, because its political system is quite developed and well functioning;
- ii) There are a number of public entities which have high professional capability in their own field in Singapore;
- iii) Land area of Singapore is adequate size so that central government can control all the area and all the process;
- iv) Financial situation of Singapore is quite sound and the government is able to make necessary public investments. Government is also highly rated by rating agencies so that its borrowing capacity is high;
- v) Singapore government is fully aware of benefits of PPP, particularly its financial aspects; and
- vi) PPP environment in Singapore is satisfactory, particularly in terms of legal framework and financial structure.

3. URBAN RAILWAY SYSTEMS IN KUALA LUMPUR, MALAYSIA

3.1 Outline of the LRT Projects

(1) Background of the Project

Kuala Lumpur, the capital city of Malaysia, has an area of 243 km² with a population of 1.6 million in 2006. Along with the sharp economic development, vehicle ownership in the city had been

increasing rapidly. With such rapid vehicle increase, the city faced serious air pollution, traffic accident, and traffic congestion. To ease these problems, the Malaysia government decided to implement several urban railway projects.

At the planning stage of these urban railway projects, Malaysia followed a strategy of transforming the country in 30 years to a developed society (so-called "Vision 2020"). The strategy included active utilization of private finance for developing infrastructure in the country; one of the pillars of the strategy was "use the private sector and private finance as the engine of growth through the awarding of long-term concessions." This ambitious agenda was set under the sustained high growth of the Malaysian economy during the Mahathir years, and considerable success in developing expressway infrastructure.

In Malaysia, there were conglomerates with experience in infrastructure projects, a domestic capital market, and generally skilled technocrats. The success with large scale expressway projects contributed to a climate of confidence that LRT concession projects could also be implemented successfully². Given background, the government chose to privatize both the construction and operation of the LRT system.

(2) Outline of the Privatized Projects

Kuala Lumpur's urban railway system consists of 7 lines and was operated by 5 operators (currently 3 operators). Among the 5 operators, except for the Malaysian Railway (Keretapi Tanah Melayu: KTM), all other operators were private. Outline of these privatized projects are summarized as follows;

a. Two Light Rail Transit Systems

Two LRT systems, LRT System I and LRT System II were developed for shorter-distance movements within metropolitan Kuala Lumpur and its immediate suburbs. LRT System I - 27-km driver-operated rail system was constructed in two phases in the mid-1990s. The total investment in the development of LRT System I was RM 3,500 million. LRT System II - 29 km, was built at a total cost of RM 5,200 million.

b. Express Rail Link (ERL)

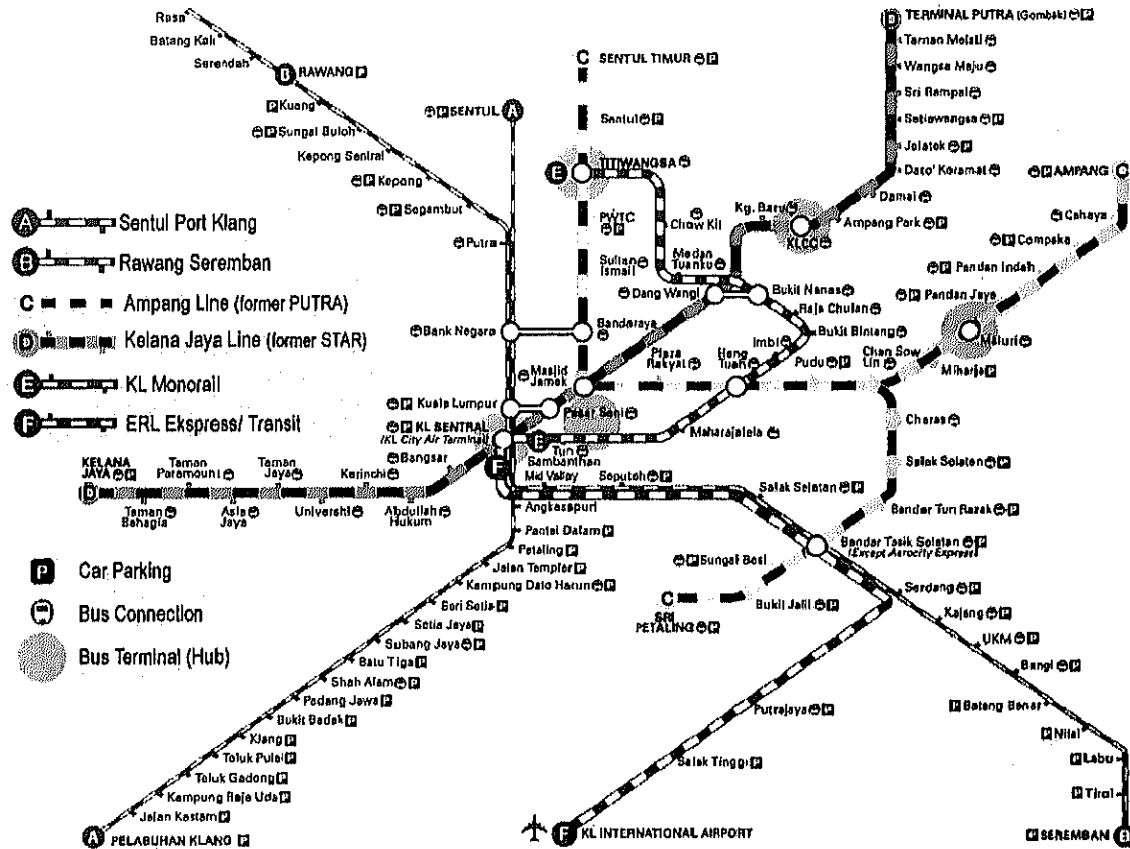
ERL is a 57 km electrified rail link between Kuala Lumpur and the Kuala Lumpur International Airport (KLIA) in Sepang. It has the longest route length track among the four privatized urban rail transit networks. Construction began in late 1998 and its services commenced in April 2002. Total investment in the project was RM 2,400 million.

c. KL Monorail

KL monorail is the most recent of Kuala Lumpur's urban rail transit systems which is a straddle beam elevated monorail system with 8.6 km dual guide way. KL Monorail service was

² George Abonyi, Luxmon Attapich, "Building an MRT Industry: Case of Malaysia", April 2007

commenced on August 31, 2003. Although the KL Monorail is a small network relative to the others, because it is an elevated system, the total project cost was RM 1,180 million.



Source: Study Team (revised based on Rapid Kuala Lumpur's network map)

Figure 3 -1 Kuala Lumpur Urban Railway Network

Table 3-1 Profile of 4 Privatized Projects

| | LRT System I (STAR) | | LRT System II (PUTRA) | ERL | | KL MONORAIL |
|--|---------------------|-----------------------------|-----------------------|-----------------------|------------------|------------------|
| | Phase I | Phase II | | Ekspress | Transit | |
| 1) Route Network | 27km | | 29km | 57km | | 8.6 km |
| 2) No. of Stations | 25 | | 24 | 2 | 5 | 11 |
| 3) Stations with Park and Ride Facilities | 17 | | 4 | 4 | | - |
| 4) Stations with Feeder Bus Service | 11 | | 14 | - | 1 | - |
| 5) Service Frequency | (a) Peak Hours | 3 min per train | | 1.5 - 3 min per train | 15 min per train | 5 min per train |
| | (b) Off-Peak Hours | 7-8 min per train per train | | 5 - 10 min per train | 20 min per train | 30 min per train |
| 6) Average Daily Traffic Volume ¹ | 94,480 | | 150,494 | 6,014 | | 27,000 |
| 7) Commencement of Operations | Dec. 1996 | Dec. 1998 | Sep. 1998 & Jun. 1999 | Apr. 2002 | | Aug. 2003 |
| 8) Rolling Stock | 17x3 car trains | | 35x2 car trains | 12 x 4 car trains | | 12 x 2 trains |
| 9) Operating Hours | 0600-2350 | | 0600-2400 | 0500-2400 | 0533-0100 | 0600-2400 |

Source: Ministry of Transport, PPP Resource & Advisory Center, Malaysia, KL Rapid, and other various sources

3.2 Financial Framework

(1) Financial Framework at Inception of the Operation

With the exception of KTM Komuter (Sentul Port Klang and Rawang Seremban) operated by KTM, the other urban railway systems were constructed under implemented under BOT (build - own - operate) scheme. Following table summarize the concession agreements of four privatized projects.

The government financed 10% of equity and 20% of concessional loan to the LRT System I project. On the other hand, in the case of LRT System II and KL Monorail, while about 25% of the project costs were covered by government's concessional loan (repayment obligations were on private concessionaires), there were no government equity injection for these projects.

As shown in the below table, out of 4 projects, concessionaires of two projects were not competitively awarded. According to the PPP Resources & Advisory Center of Malaysia, Malaysian government decided direct negotiation, because i) the transaction costs would be lower under negotiated contracting than if projects were privatized through competitive bidding, and ii) project implementation period can be much faster than under open tender bidding.

Table 3-2 Concession Models of the Four Privatized Projects

| | | LRT System I (STAR/ Ampang line) | LRT System II (PUTRA/ Kelana Jaya Line) | Express Rail Link (KLIA Express/ Transit) | KL MONORAIL |
|---------------------------|-----------------|--|--|--|---------------------|
| Privatization Method | | BOT | BOT | BOT | BOT |
| Contracting Procedure | | Direct Negotiation | Limited Tender | Limited Tender | Direct Negotiation |
| Concessionaire | | Sistem Transit Aliran Ringan Sdn Bhd (STAR) ¹ | Projek Usahasama Transit Ringan Automatik (PUTRA) ² | Express Rail Link Sdn Bhd | KL Monorail Sdn Bhd |
| Commencement of Operation | | Dec. 1996 & Dec. 1998 | Sep. 1998 & Jun. 1999 | Apr. 2002 | Aug. 2003 |
| Concession Period (year) | | 30 + 30 | 30 + 30 | 30 + 30 | 40 |
| Financing | Govt. | 10% | 0% | N.A. | 0% |
| | Govt. Loan | 20% | 25.6% | N.A. | 25.4% |
| | Private Equity | 10% | 20.4% | N.A. | 22.0% |
| | Commercial Loan | 60% | 54.0% | N.A. | 52.6% |
| Total Project Cost | | RM 3,500 million | RM 5,200 million | RM 2,400 million | RM 1,180 million |

Note 1: A Consortium, Kuala Lumpur Train Group, formed by Taylor Woodrow and Adtranz (Formed in 1990) developed LRT System I for STAR. Malaysian companies represented 55 per cent of the stake.

2: Wholly-owned subsidiary of Renong Berhad

Source: Ministry of Transport of Malaysia, PPP Resource & Advisory Center, Malaysia, and KL Rapid

(2) Bankrupt of Project Operating Entities and Subsequent Nationalization (Current Framework)

The privatization of the LRT system was based on the assumption that urban rail systems are

commercially viable whereas this has rarely been the case. In the case of Malaysia, at inception, the Sistem Transit Aliran Ringan Sdn Bhd (STAR), concessionaire of LRT System I, forecasted a positive net cash flow of RM 80.7 million in the first year of LRT System I operations, increasing to RM 1,793 million in the final year of its 30-year concession period³. The commercial outlook for the Projek Usahasama Transit Ringan Automatik (PUTRA) from its LRT System II operations was also assessed as one of high profitability.

Actual ridership volumes on both the LRT networks were much lower than forecasted by the concessionaires. Not only unrealistic ridership forecast made by concessionaires, low ridership was also due to the government's failure to implement policies to promote public transport. As a result, both STAR and PUTRA incurred huge annual deficits on their operations. The financial crisis of 1997/1998 aggravated the situation. The two companies owed a total of RM 5.7 billion of liabilities at November 2001 when the government's Corporate Debt Restructuring Committee (CDRC) restructured the debts of the two LRT companies through the issuance of government-guaranteed bonds by the Syarikat Prasarana Negara Berhad (SPNB: National Infrastructure Company Limited). On September 1, 2002, a government-owned operating company, RapidKL, officially took over LRT operations of Star-LRT and Putra-LRT. And, all the assets and liability were transferred to SPNB.

ERL and KL Monorail were also expected to be self-supporting. However, actually, fare revenues from riders were smaller than expected. Low ridership has weakened the financial viability of the railway operations. In order to salvage the networks, the Government has had to intervene and restructure the KL Monorail operations in May 2007. This has involved a Government takeover of the three LRT operations from the private sector concessionaires. Currently, Rapid KL pays an assets usage charge to SPNB, which is currently at 12 percent of the company's revenue. This charge is to increase in the future.

Not only operation of these three urban railway lines, but also that of bus service within Kuala Lumpur city were nationalized (October 2003), and are now being operated by RapidKL.

3.3 Efficiency Level of Operation and Service

(1) Operation and Service Performance during Inception Stage

As mentioned, ridership performance of the privatized LRT projects considerably lower than planned ridership envisaged at the time of feasibility study. The figure below compared the planned and actual ridership performance of privatized four projects.

³ Source: PPP Resource and Advisory Center of Malaysia, Concession agreement of LRT system I and LRT system II

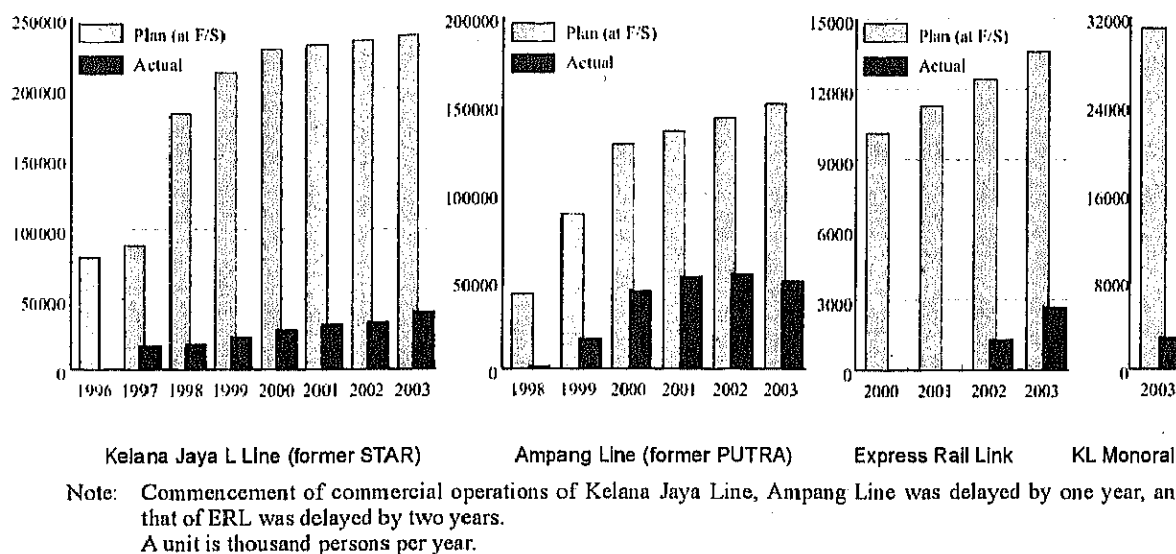


Figure 3-2 Ridership Performance of the Four Privatized Projects

According to the PPP Resources & Advisory Center of Malaysia, one fundamental reason for low ridership figures is i) the small size of the catchments areas of the LRT networks, and ii) population of Kuala Lumpur and its suburban area spreading over a large area, which is insufficient to sustain an urban rail transit system. Cheaper bus services, high motorcycle and car use intensify the competition in the limited transport market. The level of integration among transit operators, both in terms of physical integration and operational integration, such as a common ticketing system across the urban rail transit sector and bus services, was also not implemented. The limited and irregular bus services to the LRT stations, which are priced separately, and insufficient parking bays at the stations also limit the ridership of the LRT networks.

In the case of LRT systems, both STAR and PUTRA, the forecasted ridership, which was based on some aggressive assumptions of competing modes, has turned out to be unrealistic. One assumption was that bus fares in Kuala Lumpur would be raised upon the commencement of rail transit services. An upward revision of bus fares could have improved the competitive position of LRT operations vis-à-vis road-based public transport. However, such bus fare revision was not made at the time.

Also, poor integration between Ampang Line and Kelana Jaya Line, and even poor integration with other rail operators such as KL Monorail and KTM Komuter were considered to badly affect ridership performance.

(2) Current Operation and Service Performance/ Actions for the Future

After the nationalization, the performance of RapidKL is to be measured according to key performance indicators that are to be set by the Government. The Government penalizes RapidKL financially if the pre-defined targets are not met and rewards it if the targets are

exceeded. This scheme of incentives and penalties is meant to enhance efficiency and service quality of public transport in KL.

Since taking over the LRTs and bus network, RapidKL has taken steps to improve their service.

- i) LRT capacity has been increased. RapidKL and SPNB have issued tenders for the purchase of new LRT rolling stock to increase carrying capacity;
- ii) The common monthly pass for Ampang Line, Kelana Jaya Line, KL Monorail and buses operating within Kuala Lumpur has been introduced;
- iii) Former separate ticket systems by each line has been completely integrated into a common ticketing system magnetic Touch 'n Go card since March 2008, which can be used in all RapidKL buses and rail lines;
- iv) Masjid Jamek LRT station was upgraded to ensure seamless integration between Ampang Line and Kelana Jaya Line (construction was completed in November 2008); and
- v) The connectivity between LRT and bus has been improved. Trunk buses began to link hubs at the edge of the Kuala Lumpur's central business district with suburban transportation hubs. At these suburban hubs, local shuttles will radiate out from rail-based public transport stations and connect to residential areas (see Figure 3-1).

Ridership of Ampang line and Kelana Jaya line were increased up to about 43.8 billion trips per year (120 thousand trips per day) and 69.4 billion trips per year (190 thousand trips per day) respectively in 2006. However, RapidKL was still incurring an operating loss of RM 3 million (US\$0.8 million) per month on total revenue of RM 23 million (US\$6.13 million) and expenses of RM 26 million (US\$6.93 million) in 2006. The government of Malaysia currently provides no subsidy to RapidKL.

4. DELHI METRO IN INDIA

4.1 Outline of MRT Project

(1) Background of Project

India's population size is the second after China and is expected to exceed China in 2050. Traffic congestion has been a big headache for the government and Mass Transit System has long been awaited. Delhi is the Capital of India. Present population of Delhi is 14 million. City transportation was almost fully road-based until MRT was introduced, with about 38,500 buses (including medium & heavy), 75,000 auto-rickshaws, 16,000 taxis, 2.65 million two wheelers, 1.26 million cars and 135 thousand goods vehicles ply in the City. The existing railway line of 245 km carried only 2% of the

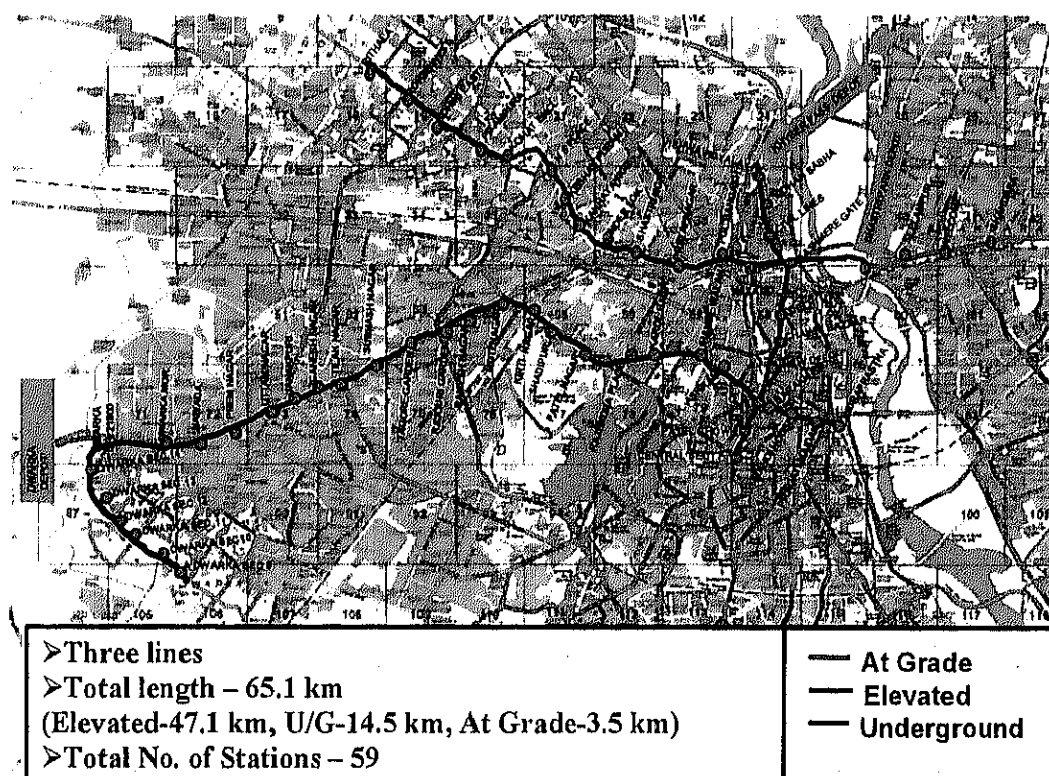
commuter traffic. Consequently, roads were constantly heavily congested, pollution levels were high and road accident rates were also very high. Under this situation, the original plan for mass transit was formed in the early 1990s and the government established a special purpose vehicle, the Delhi Metro Rail Corporation (DMRC), in 1995.

Today, DMRC is well regarded not just within India but also around the world as a highly successful case of mass transit system development in developing country. Much of the success reasons lie in how the project implementing scheme has been designed and prepared.

This case study traces back the history of DMRC and also reviews the recent performance. Notably, it is quite important to draw lessons from the soft elements of DMRC organization itself. This includes areas of governance, human resource management and other various management systems embedded within the organization.

(2) Outline of MRT Line

Phase I of Delhi Metro consists of three lines with a length of 65.1 km, of which 14.5 km is underground. Work of Phase I started on October 1, 1998 targeting completion in 10 years. The first phase of Delhi Metro was, however, completed by December 30, 2005 (exactly within 7 years and 3 months). During the construction, no major inconvenience or disruption in the city had been reported, which is quite unusual for a project of this size. Also, it is important to note that construction work was completed within the original estimated cost.



Source: Prepared by Study Team based on DMRC' data.

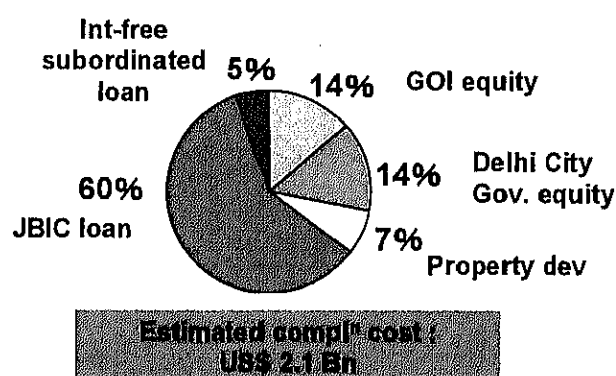
Figure 4-1 Map of Delhi Metro (Phase 1)

4.2 Financial Framework

(1) Fund Raising Method

DMRC is a fully-owned government company - 50% shares held by the Federal Government (Government of India) and 50% shares by the Provincial Government (Government of Delhi). DMRC has full autonomy and there is no interference from the government or city agencies in the working of DMRC. There are 9 part-time and 5 full-time directors in the company.

The flow of funds from the two governments and from JBIC was smooth. Therefore, work never suffered for want of funds. DMRC is now funding 10% of Phase-II from its own resources.



Source: DMRC seminar, DMRC annual report 2007

Figure 4-2 Phase 1 –Project Cost & Funding Source

(2) Role Sharing

The support of the two Governments to the project was very visible, which sent the right message to all related stakeholders. In the project, both central and city government plays a critical role in ensuring a sustainable financial structure. For example, one of the key decisions was the Government's decision to exempt DMRC from payment of taxes & duties. This reduced the cost of the project by 18%.

Also, to assist smooth implementation, the Government of India set up two committees; one under the Cabinet Secretary and another under the Group of Ministers. These committees assisted to speed up decision making and coordination required across multiple ministries.

Lands required for the project were acquired by the City Government under the Land Acquisition Act. For this, periodical meetings were held at the level of Chief Secretary (bureaucratic head of Provincial Government) to review the progress of the land acquisition. At no time, work was held up for want of land. DMRC had a well laid policy for rehabilitation and resettlement of affected persons.

Since DMRC did not have expertise for the planning and building of a metro system, it engaged a

consortium of 5 international consultants to assist as general consultants. By this, DMRC could bring in international standards of specification, quality of work and safety standards. It is important to note that capability building was one of the most important missions of the consultants. This initial investment in capability building has resulted in not only a world class metro system but also in a world class institution. As a professional organization, DMRC is now also assisting other Metros in the country and abroad.

(3) Legal Framework of PPP Model

DMRC got two enabling legislations enacted by the Parliament, i.e., legislation for the construction activities of MRT and legislation for the operation & maintenance of MRT.

Under this legal cover, DMRC was able to: i) acquire any premises; ii) create tunnel under any building or structure; and iii) be exempted from payment of property tax and other taxes.

These legislations were different from the Railway Act prevalent in the country and developed specifically for MRT, since the characteristics of urban mass transit is quite different from inter-city railway.

(4) Risk Sharing

DMRC took all revenue risk from the beginning. This contributed to the autonomy and independence that DMRC enjoys today. However, DMRC management knew that taking such risk was not an easy task. The management made sure that DMRC had a sustainable (defensible) financial structure from the early planning stage. This led to ensuring tax exemptions, stable cost of energy, government indirect support for ridership enhancement and other competitive commercial structures.

Another notable aspect of risk sharing is the way they managed vendors. The procurement package was sub-divided into many packages (probably more than 10 packages). This allowed DMRC to avoid over-dependence on selected vendors. However, this required DMRC to build in-house capabilities for “system integration,” which is quite a task with risks. The human resource pool from the Indian Railway may have contributed to such a bold strategy.

(5) Setting of Key Performance Indicators and Revenue Sharing

The specifics of key performance indicator (KPI) are not clear from publicly available information. However, several points regarding performance should be emphasized as follow:

- Commercial profitability from railway: Sustainable financial operation from core business was thought to be a high priority from beginning;
- Passenger satisfaction: There are clearly planned efforts to make passenger satisfaction a priority. They have made a plan for passenger convenience and safety facilities. This also includes the recent roll-out of Metro feeder bus service; and
- Increase in non-rail revenue ratio: DMRC has taken initiatives to diversify sources of revenue,

including consulting services and real estate business.

(6) VFM Analysis

Since DMRC is a fully government owned entity, it is assumed that there was no value for money (VFM) analysis for this project. The Study Team could not find any trace that the Government of India considered PPP concession model as an alternative. This is understandable as India had plenty of railway expertise pool from the long history of Indian Railway.

(7) Financial Analysis

Original financial analysis prior to the commencement of Phase I is not clear. However, based on indirect evidence, it is fair to state that DMRC took a conservative view on tariff and ridership forecast. One of the keys to their success is the defensible financial structure, building on a conservative ridership scenario.

2.4.3 Current Efficiency Level of Operation and Service

(1) Customer Satisfaction

DMRC has put significant efforts to maintain a high level of customer satisfaction. Reports mention a low level of customer complaints with a high level of corporate image. This is owing to their strict standards to maintain punctuality and safety. Although no publicly available customer satisfaction survey has been available, it is fair to say that DMRC has earned the trust of mass public given their generally positive public reputation.

(2) Efficiency of Operation and Service

Some notable characteristics of operation and services are:

- About 1,200 train trips a day - with 64 train sets (256 Coaches). Each train consists of 4 coaches. When traffic increases trains can be lengthened to 6 coaches and finally to 8 coaches.
- Average ridership is 550,000 trips a day. Frequency during peak hours is 4 minutes.
- Trains operate from 6 AM to 11 PM. Punctuality measured with a least count of 60 Seconds.
- Fare ranges from Rs. 6.00 (15 cents in the U.S. currency) to Rs. 22.00 (50 cents in the U.S. currency), lowest in the world.
- More than 30% of DMRC's revenue is from non-rail business sources, mainly real estate development, consulting service and advertisements.
- DMRC has introduced bus feeder services to improve the ridership.

Based on such operation and service efficiency, the system has been making operating profit from the first year. Despite heavy investment burden, DMRC has been able to service and pay back the

loans without delay.

(3) Financial Efficiency

Financial performance of DMRC is impressive. Overall, their profitability is 4%, which is relatively high for mass transit. This is because they have a very high non-rail revenue ratio of 44%. It is believed that non-rail revenue will be an inevitable part of urban railway system success, especially from a financial sustainability point of view.

Gross profitability of non-rail business such as consulting service and real estate is extremely high and contribute to the overall profitability of DMRC.

It is worth noting that non-rail business ratio of other financially successful case, such as Hong Kong MTR and Tokyo Metro, is also relatively high compared to poorly performing cases.

| | | |
|------------------------------------|----------------------|--|
| INCOME | | |
| • Traffic Operations | 2,833,832,364 | |
| • Consultancy | 134,478,705 | |
| • Real Estate | 1,534,585,697 | |
| • Others | 540,620,275 | |
| TOTAL (a) | 5,043,517,041 | |
| EXPENDITURE | | |
| • Traffic Operations | 2,003,544,264 | |
| • Consultancy | 36,807,579 | |
| • Real Estate | 65,064,880 | |
| • Others | 2,791,386 | |
| TOTAL (b) | 2,108,208,109 | |
| EBITDA (c= a-b) | 2,935,308,932 | |
| DEPRECIATION AND INTEREST | | |
| • Depreciation | 1,836,449,700 | |
| • Less:- transferred to CWIP | 66,200,013 | |
| TOTAL(d) | 1,770,249,687 | |
| • Interest & Finance Charges | 1,051,076,509 | |
| • Less:- transferred to CWIP | 85,843,779 | |
| TOTAL (e) | 965,232,730 | |
| PROFIT BEFORE TAX (f=c-d-e) | 199,826,515 | |

•Profit/Revenue=4%

•Non-rail revenue/Revenue=44%

•Gross Profit/Revenue(train)=29%

•Gross Profit/Revenue(non-rail)=95%

Source: DMRC seminar, DMRC annual report2007

Figure 4-3 Financial Highlights of Phase-I (2007) - Profit and Loss Statement

(4) Key Lessons from Delhi Case

DMRC has shown that a government agency can handle a mammoth project in a crowded city efficiently (causing no inconvenience to the public) and in time, and within budget. Delhi Metro does not receive any government subsidy for operation.

DMRC’s success has encouraged metro projects to come up in cities like Bangalore, Hyderabad, Mumbai, Chennai and Kochi. DMRC is the prime consultant to all the cities.

The innovative structure of DMRC, which is 50% owned by the Federal Government and 50% by the City Government, has contributed to the success. No one government has the majority to control the company. DMRC has full freedom and flexibility to decide on technical and financial matters.

The Board of Directors has delegated full powers to the Managing Director. Therefore, decision making process is fast.

The case of DMRC provides quite a counter-intuitive result. In conventional theory, 100% government-owned companies had been believed to be inefficient compared to private. DMRC provides a solid counter argument and proves that government entities can perform well under good governance and management system.

5. METROPOLITAN INTERCITY RAILWAY COMPANY (TSUKUBA EXPRESS) IN JAPAN

5.1 Outline of Metropolitan Intercity Railway Company (MIR)

(1) Background of MIR

In the northern part of Tokyo metropolitan area, the development of commuter lines has been left behind. The area was deemed to be one of the most undeveloped areas. Therefore, local governments along the line eagerly promoted a new commuter line to this area.

The purpose of the line is as follows;

- To implement a commuter rail network in the northern part of Tokyo metropolitan area;
- To mitigate congestion of the existing commuter railway line;
- To provide good residential area in the northern part of Tokyo metropolitan area; and
- To provide infrastructure for industries along the line and establish business core cities in the area.

In 1985 the construction of the line was proposed to the Ministry of Transport as one of the commuter lines in Tokyo metropolitan area by 2000. The construction of the line was started in 1994 and Metropolitan Intercity Railway Company (MIR) started its service in 2005.

(2) Outline of MIR

The project has been promoted by MIR who is the newest commuter rail company in Japan. This line connects Akihabara, a center of Tokyo, with Tsukuba city, research and academic city northern part of Tokyo metropolitan area. The route length is 58.3km and most of the line is elevated section except the underground section around the terminals. The number of rolling stock is 180.

5.2 Financial Framework

(1) Funding Raising Method

In Japan, it was obvious that the newly established urban railway company would generate a big debt if the existing financial scheme would be adopted. And the government does not financially support the commuter companies on the operation stage. These have brought about big deficit to them.

To support the expansion of urban transportation, therefore, the Ministry of Transport constituted the law for development of residential area and implementation of commuting railways in the metropolitan area to suppress the land acquisition cost. The Ministry also provided the large amount of capital and the funds with no interest in order to reduce total amount of debt and to suppress total construction cost.

The funds for the line were gathered from the following sources:

- i) interest-free loans from the central and local governments;
- ii) fiscal investment and loan fund from the central government; and
- iii) equity participation by local governments and private companies.

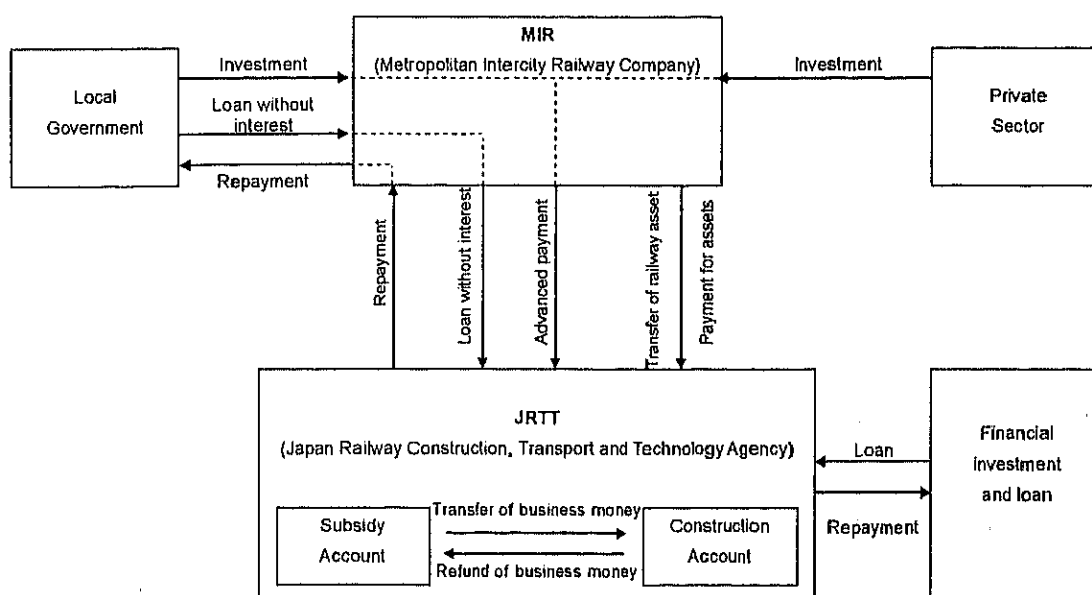
Concrete figures of funds are as follows:

| | |
|---|----------------------------|
| Loans from the central government without interest | 411.3 billion yen |
| Fiscal investment and loan fund from the central government | 61.7 billion yen |
| Loans from the local governments without interest | 411.3 billion yen |
| Equity participation by local governments | 144.0 billion yen |
| <u>Equity participation by private companies</u> | <u>19.0 billion yen</u> |
| Total | 1,047.3 billion yen |

(2) Role Sharing between the Public and Private Sectors

Financial scheme of the project is not PPP in a strict sense but the joint stock company to implement the project was established jointly by the public and public sectors. It has been eagerly pushed ahead by the local governments along the line and the Ministry of Transport. The private sector invested only 10% of the capital of the company and it did not provided a loan.

As an implementation body, MIR was newly established and as a construction body, the Japan Railway Construction, Transport and Technology Agency (JRJT) was involved. The relationship of the implementation body and construction body is described in the following figure.



Source: Study Team

Figure 5-1 Institutional Setting of MIR

a. Implementation body

The core staff of MIR was gathered together from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), JR TT and several private railways in Tokyo.

The capital of MIR is about 185 billion yen, which is the second biggest one as a railway company. This capital is contributed by local governments along the line and related private companies.

b. Construction body

The main construction body is JR TT which is a kind of government agency and has a lot of experience on construction works of urban railways and *Shinkansen*. It has carried out all the construction works of the project except procurement of rolling stock for railways.

(3) Legal Framework of PPP model

As mentioned above, this project is not implemented with PPP scheme and furthermore there is no legal framework of PPP model for railways in Japan.

(4) Risk Sharing

Basically MIR takes all the risks concerning construction and operation.

(5) Setting of Key Performance Indicators and Revenue Sharing

In Japan, each railway company is obliged to submit its train time table to MOT. And each railway company is required to get approval on its fare level from MOT. MOT also requires each railway company to make its effort to reduce the congestion ratio at peak time to 150%.

Key performance indicators of the line and figures are expressed in the following table.

Table 5-1 Key performance indicators of MIR

| KPI | Figures |
|-------------------------------------|-----------------------------------|
| Train km per day | 16,569km/day |
| Number of trains at peak time | 19 trains per hour on working day |
| Average traffic volume for all days | 193,000 passengers/day |
| Number of passengers at peak time | Not available. |
| Average travel distance | 22.2km |

Source, Railway statistical annual report 2007, Homepage of MIR (www.mir.co.jp)

All the revenue from the line goes to MIR. There is no concession agreement with others.

(6) Value for Money Analysis

It is considered that there was no consideration of value for money in this project. In order to lessen land acquisition costs, the government introduced a special arrangement by issuing a law. This is not attained by participation of private sectors.

(7) Financial Analysis

In Japan, every year each railway company is obliged to report its detailed financial results to MOT to evaluate the proposed new fare level when needed. These figures are publicly opened. Based on these figures of MIR, financial analysis was carried out.

- MIR recorded a deficit after depreciation and tax in 2007. The size of deficit is 9.4% of total revenue. MIR records a deficit even it enjoys favorable treatments such as interest-free loans and lower land acquisition costs. This deficit is considered to be due to the fact that MIR is still at the early stage of operation.
- The ratio of depreciation expense to total expenditure is around 62%. This fact shows that the construction cost of modern a commuter line is huge. The most important factor for the sustainable and sound operation of commuter line is how to share the burden of construction cost and/or how to restrain the construction cost.

Table 5-2 Profit and Loss of MIR

| Items | | Amount (¥ Thousand) |
|-------------------------------------|-------|------------------------|
| Fare box revenue | A | 25,727,316 |
| Non fare box revenue | B | 1,046,719 |
| Total revenue | C=A+B | 26,774,035 |
| Total operation cost without taxes | D | 9,063,957 |
| Taxes | E | 2,080,770 |
| Depreciation cost | F | 18,156,311 |
| Total expenditure | G | 29,301,038 |
| Profit or loss for railway business | H=C-G | -2,527,003 |

Source: Railway statistical annual report 2007

5.3 Current Efficiency Level of Operation and Service

(1) Customer satisfaction

MIR has not reported the result of customer satisfaction survey to the public. From the following aspects, the customer satisfaction of the line seems to reach a high level.

a. availability

MIR does not provide any statistics of train delay. However, no train delay of the line has been reported in newspaper since it opened. Therefore, its availability is deemed to be ensured.

b. safety

MIR is equipped with the automatic train protection (ATP). Therefore, any incident due to a signal passing accident danger (SPAD) would hardly happen. As platform doors are installed on the platform, falling-down of passengers from the platform is protected. As just described, the MIR line is highly equipped with safety measures and no serious incident was reported in the

railway statistical annual report 2007. The safety level of this line can be considered sufficiently high.

c. fare level

In Japan, the fare level of a newly opened line tends to be high for the recovery of the huge construction cost. However, the minimum fare of this line is 160 yen. This is the same as Tokyo Metro which is the largest metro in Japan. From Table 5-3, it can be seen that the average fare of MIR is smaller than that of lines operated with public & private joint scheme or that of lines operated by the public sector. It seems that the fare level of MIR is acceptable as a commuter line.

d. amenity

As MIR is a newly constructed line, a sufficient number of escalators and elevators are installed from the opening. At ticketing gates, the automatic fare collection (AFC) for smart card is installed. Universal signage is introduced for passengers to find station facilities easily. A lot of amenities are available at stations on this line. Thus, passengers may feel comfortableness on the line.

(2) Efficiency of Operation and Service

Table 5-3 shows efficiencies of operation and services by type of operator of commuter railway in Japan. Commuter railways operated by the public sector include the Tokyo Metropolitan Government Bureau of Transportation, Tokyo Metro, Transportation Bureau of City of Yokohama, Transportation Bureau of City of Nagoya and Osaka Municipal Transport Bureau. Those operated jointly by the public and private sectors are MIR, Chiba Urban Monorail, Saitama Railways, Tama Urban Monorail, Tokyo Waterfront Area Rapid Transit and Toyo Rapid Railway. Private operating companies of urban railway are Tokyu, Seibu Railway, TOBU Railway, Keio, Odakyu Electric Railway and Keihin Electric Express Railway.

The comparison with other urban railways shows:

- a) Fare per passenger km of MIR is cheaper than the average of public & private joint operators and also that of public operators. This lower fare level may be owing to suppressed construction cost. MIR's moderate fare has contributed to an increase in passengers, which is higher than estimated.
- b) The number of staff per route km of MIR is smaller than that of all types⁴. This may be brought about through the introduction of various facilities to operate with smaller number of staff. Operation with less staff leads to financial efficiency.

⁴ It should be noted that all lines operated by the public sector are underground railways that need more staff than railways on the ground or elevated.

Table 5-3 Comparison of Operation and Service Level of Commuter Lines in Japan

| Type of Operating Company | Fare per passenger km (Yen) | Number of staff per route km |
|---------------------------|--------------------------------|---------------------------------|
| MIR | 16.36 | 9.7 |
| Public | 22.6 | 35.9 |
| Public + Private (Joint) | 33.0 | 13.0 |
| Private | 11.3 | 19.9 |

Source: Railway statistical annual report 2007

(3) Financial Efficiency

Table 5-4 shows the financial efficiency and ratio of profit to railway assets by type of operator of commuter railways in Japan. From this table, the following can be pointed out.

- a) Financial efficiency and profit ratio of railways operated jointly by the public and private sectors are the worst among three types. It seems that an unprofitable railway project tend to be undertaken by an operating company jointly established by the public and private sectors.
- b) Financial efficiency and profit ratio of MIR is lower than the average of each type. This is due to a deficit.

Four years has passed since the start of MIR operation in 2005. The number of passengers is still low. However, ridership is expected to increase in the coming years. As most of operating expenses are fixed cost, it is expected that financial performance of MIR will be improved in future.

It should be also noted that the demand forecast of MIR line was carefully carried out to avoid tragedy of over-estimation because many people considered MIR would be a money-losing line at the planning stage. The current number of ridership is bigger than estimated. Thus, the ridership is still at only 234 thousand passengers per working day.

Table 5-4 Comparison of Financial Efficiency of Commuter Lines in Japan

| Type of Operating Company | Financial Efficiency (%) | Ration of Profit to Railway Assets (%) |
|---------------------------|--------------------------|--|
| MIR | 109.4 | -0.3 |
| Public | 81.3 | 2.9 |
| Public + Private (Joint) | 97.5 | 0.8 |
| Private | 80.4 | 5.8 |

Source: Railway statistical annual report 2007

6. LONDON UNDERGROUND IN THE UNITED KINGDOM

6.1 Outline of MRT Project

In the first half of the 2000's, a PPP scheme was introduced to infrastructure maintenance work of the London Underground. In this section, the PPP scheme which the London Underground has introduced is studied and evaluated as a case study in this section.

(1) Background of Project

The history of London's underground railway dates back to 1825 when the world's first underground railway opened⁵. The London Underground Limited (LUL) has played an important role of urban transportation in London for the long time. London Underground currently serves a large part of Greater London and neighboring areas of Essex, Hertfordshire and Buckinghamshire. London Underground covers 402 km of route with 11 lines and 270 stations.

In the 1990s, the aging of infrastructure and inflexible response to rapidly expanding demand were recognized as key issues of LUL. LUL could not make a persistent budget because the size of government subsidies which LUL received varied from year to year. It was considered that the private sector would be able to raise long-term funds easier than the public sector such as LUL. LUL's weak capacity of investment planning and, as a result, frequent cost overrun and delay also invited enthusiastic discussions on PPP for the underground railway in London. In February 2002 it was announced that the maintenance and renewal of LUL's infrastructure would be undertaken through three private organizations under the public private partnership (PPP)⁶.

LUL is under the Transport for London (TfL). TfL is a functional body which is responsible for transport under the Greater London Authority.

(2) Outline of PPP

In 1998, LUL was split into four organizations, i.e., an operating company for running trains and stations and three infrastructure companies (Infracos) responsible for renewing and maintaining assets. Four organizations were operated as public organizations to test a new underground railway operation system with PPP. During this shadow operation, the bidding process of PPP was preceded. In the result, three Infracos were transferred to the private sector. Private consortiums became shareholders of the Infracos. LUL signed three 30 year PPP contracts with Tube Lines for Infraco JNP in December 2002, and with Metronet for Infraco SSL and Infraco VCB in April 2003. LUL retained the ultimate ownership and responsibility for the daily operation of trains and stations, and for safety, while the private Infracos were expected to maintain and renew infrastructure including the trains, stations, track and signaling, in a whole life manner.

⁵ Transport of London, "London Underground Factsheet," February 2009.

⁶ Martin Kellaway & Helen Shanks, "Metronet, Tube Lines and the London Underground PPP," National Accounts Classification Committee, 24 September 2007

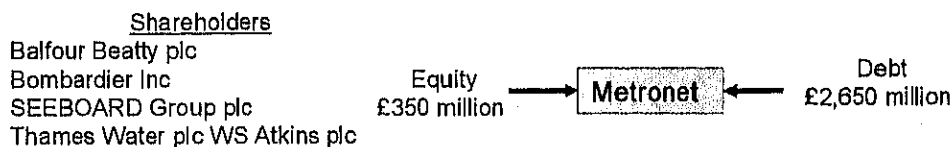
6.2 Financial Framework

(1) Fund Raising Method

a. Fund Raising by Private Sector

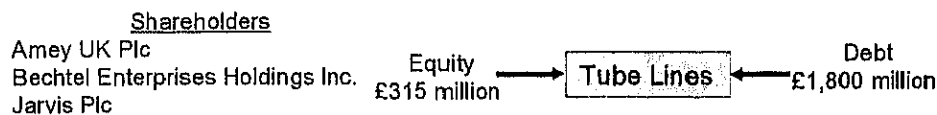
The participants in the Metronet Consortium are affiliates of Balfour Beatty plc, Bombardier Inc, SEEBOARD Group plc (part of the American Electric Power Company Inc. group), Thames Water plc (part of the RWE group) and WS Atkins plc. Metronet arranged a borrowing of £2.65 billion for the first 7-and-half-year period of the 30-year PPP contracts. In addition, Metronet's five shareholders supposed to provide £350 million in equity. Metronet planned to invest nearly £8.7 billion in its two PPP contracts during the first 7-and-half-year period split almost equally between maintenance and renewal.

The shareholders of Tube Lines Limited are affiliates of Amey UK Plc, Bechtel Enterprises Holdings Inc., and Jarvis Plc. The share capital was divided equally among shareholders. Tube Lines Limited raised £315 million in equity and arranged £1.8 billion in borrowing to help fund its planned investment of £4.8 billion during the first 7 and half years. In 2003 Grupo Ferrovial SA of Spain acquired Amey. In 2004 Jarvis sold its shares to Amey. Thus, Grupo Ferrovial SA holds two thirds of the share capital. Tube Lines increased its debt to £2.0 billion and reduced its equity to £180 million at the time of refinancing in May 2004.



Source: The Comptroller and Auditor General, "Department for Transport The failure of Metronet HC 512 Session 2008-2009," National Audit Office, June 5, 2009

Figure 6-1 Fund Raising by Metronet



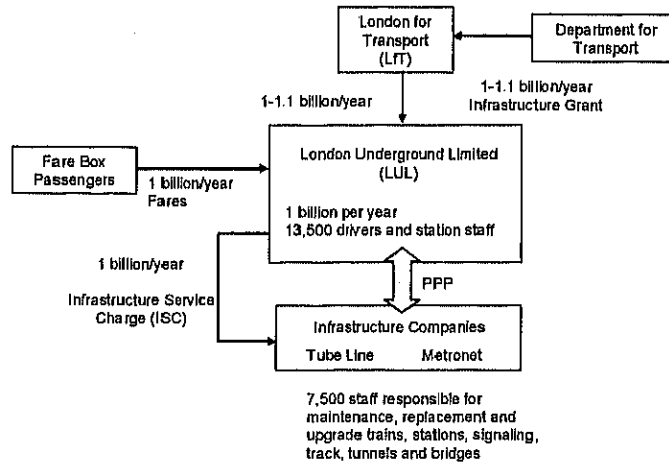
Source: The Comptroller and Auditor General, "Department for Transport The failure of Metronet HC 512 Session 2008-2009," National Audit Office, June 5, 2009

Figure 6-2 Fund Raising by Tube Lines

b. Payment of Infrastructure Service Charge to Infracos

Regular payments of an Infrastructure Service Charge (ISC) are made by four-weekly to Infracos by LUL according to a fee structure that is fixed for the first 7 and half years. The amount of payments is adjusted according to defined performance bonuses and abatements. The

adopted performance indicators are the maximum capacity of the system, the day-to-day ability of LUL to make use of this capacity, and the quality and comfort of the system as experienced by passengers.



Source: The Comptroller and Auditor General, "London Underground Are the Public Private Partnerships likely to work successfully?" the House of Commons, 14 June 2004

Figure 6-3 Flow of Service Charge

(2) Role Sharing of the Public and the Private Sector

The role sharing was arranged as follows:

Table 6-1 Role Sharing of Public and Private Sectors

| Sector | Organization | Role |
|----------------|--------------------------|--|
| Public sector | LUL | <ul style="list-style-type: none"> - retain responsibility for passenger service provision on the Underground, including operation of trains and stations; - be responsible for collecting and retaining all fares and other revenues (including from advertising, car parks etc.); - continue to manage the existing network-wide PFI contracts, and any other PFI contracts let before or after completion of the PPP (other than the NLTS Contract, which will transfer to Infracos JNP); - manage its relationship with the Infracos through the Service Contracts; - continue with marketing and planning of the whole network; - take a leading role in ensuring that the PPP arrangements maintain and improve safety in accordance with its statutory responsibilities; and - participate in changes to Underground standards and operational practices in accordance with a contractual standard setting and change process. |
| Private sector | Infracos (JNP, SSL, VCB) | <ul style="list-style-type: none"> - maintain and upgrade the track, tunnels, signals, stations, lifts, escalators and trains under 30 year contracts to LUL. After the contract period the upgraded assets will return to the public sector. |

Source: European Commission, "State aid No N 264/2002 - United Kingdom London Underground Public Private Partnership," 02.10.2002

The underground lines and assets managed by three Infracos are as follows:

Table 6-2 Lines and Assets of Infracos

| Name of Infraco/ Consortium | Participants in Consortium | Responsible Line | Assets under Management |
|--------------------------------|---|--|--|
| Infraco JNP/ Tube Lines | - Jarvis plc - Amey plc - Bechtel | - Jubilee Line - Northern Line - Piccadilly Line | - Over 370km of track - 100 stations - 250 trains - Associated infrastructure |
| Infraco SSL/ Metronet | - Bombardier Transportation - SEEBOARD Group plc - Balfour Beatty plc | - Metropolitan Line - District Line - Circle Line - Hammersmith & City Line - East London Line | - Over 690km of track - 150 stations - 350 trains - associated infrastructure |
| Infraco BCV/ Metronet | - Thames Water plc - WS Atkins plc | - Bakerloo Line - Central Line - Victoria Line - Waterloo & City Line | |

Source: European Commission, "State aid No N 264/2002 – United Kingdom London Underground Public Private Partnership," 02.10.2002

(3) Legal Framework of PPP Model

London Underground's rights of direction and control under the Service Contract arise in two main circumstances, safety and inadequate performance⁷.

(4) Risk Sharing

The risk sharing between LUL and Infracos is as shown in the following table.

Table 6-3 Risk Sharing between LUL and Infracos

| | LUL | Infracos |
|--------------|---|---|
| Revenue Risk | A risk of LUL's revenue is under LUL. | Infracos' revenue risk depends on the level of Infracos' performance as measured under the performance regime |
| Cost Risk | LUL is to cover additional costs to meet its performance requirements | Infracos take risks of changes in the projected costs |
| Event Risk | | Infracos take no risk on unforeseeable events with major potential cost consequences. |

Source: European Commission, "State aid No N 264/2002 – United Kingdom London Underground Public Private Partnership," 02.10.2002

(5) VFM Analysis & Financial Analysis

The government considered four business structures: a public sector unified business; a private sector unified business; separate private sector businesses split vertically by group of lines; and horizontally split businesses (with operations and infrastructure maintenance, renewal and upgrading

⁷ European Commission, "State aid No N 264/2002 – United Kingdom London Underground Public Private Partnership," 02.10.2002

carried out by separate businesses). The government chose the third option⁸.

LUL evaluated the net present value of three PPPs with a 6 per cent discount rate. The net present value of all three PPPs over 30 years was evaluated at £15.7 billion (with a value of £9.7 billion at 2002-03 prices over the first 7 and half years)⁹.

Ernest & Young LLP prepared a report which reviewed the value for money of LUL's PPP, "London Underground PPPs: Value for Money Review," dated February 5, 2002. In this report, Ernest & Young LLP reviewed LUL's assessments of the value for money of the PPP and concluded that overall the methodology adopted for assessing the value for money by LUL were robust and appropriate and LUL's recommendation that the PPP proposals delivered value for money was subjective. Ernest & Young LLP adopted five cases for the comparison of PSC and VFM. For each case, the comparison was made on both a cash (NPC) and value (NPV) base. The adopted cases were as shown in the following table.

Table 6-4 Prime Financial Analysis Comparisons

| Ref | Evaluation Period | PSC Funding Assumptions | Discount Rate | Comments |
|-----|-------------------|-------------------------|----------------------|--|
| A | 30 years | Traditional | 6% | This scenario represents the base case PSC. It assumes that funding will be on an annual basis. |
| B | 30 years | Traditional | 3.5% with 30% uplift | This is the main sensitivity for discount rate assumptions. It is a variant that captures the lower cost of public sector capital. To reflect the opportunity cost of Government expenditure there is 30% uplift on costs. |
| C | 30 years | Stable Funding | 6% | In order to assess the impact of a stable funding environment, additional cost savings were projected for the PSC. These were reflected in savings on investment and maintenance costs. |
| D | 7 and half years | Underlying costs only | 6% | In order to assess the underlying cost of the PPP with the PSC over the first 7 and half years. PPP funding costs are excluded. |
| E | 7 and half years | Traditional | 6% | In order to make a like-for-like comparison capturing the impact of funding that will be raised as part of the 30 year bid. This 7 and half year analysis compares the PSC with the PPP for 7 and half years plus the outstanding debt and equity amounts as of year 7½. |

Source: Ernst & Young LLP, "London Underground PPPs: Value for Money Review," February 5, 2002"

The results of comparison were as shown in the following table. The report concluded that "overall it is not possible to produce a single comparison that is able to provide indisputable evidence of value for money in either direction and the range of outcomes should be assessed. The results of the financial analysis need to be considered with the wider qualitative factors."

⁸ The Committee of Public Accounts, "London Underground Public Private Partnerships - Seventeenth Report of Session 2004-05," The House of Commons, 31 March 2005

⁹ The Comptroller and Auditor General, "London Underground Are the Public Private Partnerships likely to work successfully?" the House of Commons, 14 June 2004

Table 6-5 Summary of Comparisons

| Comparison | SSL | | JNP | | BCV | | Total | |
|------------|-------|-------|--------|--------|--------|-------|--------|-------|
| | NPC | NPV | NPC | NPV | NPC | NPV | NPC | NPV |
| A | below | below | within | below | within | below | below | below |
| B | below | below | above | below | within | below | within | below |
| C | below | below | above | below | above | below | above | below |
| D | below | below | within | below | above | above | below | below |
| E | below | below | above | within | above | above | within | below |

Note: 'below' - PPP price below 2nd quartile of PSC range

'within' - PPP price within 2nd quartile of PSC range

'above' - PPP price above 2nd quartile of PSC range

Source: Ernst & Young LLP, "London Underground PPPs: Value for Money Review," February 5, 2002.

(6) Evaluation of LUL's PPP Projects by the Government

The report of Committee of Public Accounts under the House of Commons examined the rationale of LUL's PPP projects in 2005 and made the following conclusions and remarks¹⁰:

- The PPP approach might have been restricted solely to major upgrade work which LUL was unable to implement effectively. However, the actual PPP covered ongoing maintenance and renewal work;
- The Department for Transport and LUL should have considered wider, non-quantitative factors alongside the PSC, as recent Treasury guidance downplays the role of the PSC. They should not use the PSC as conclusive evidence of the value for money of the PPPs;
- Issuance of a public sector bond should be considered for financing infrastructure projects in which significant risk transfer to the private sector may not be achievable. Bond financing would have been cheaper than the PPP financing costs;
- Disagreement between the main parties responsible for procuring and managing a PPP ideally should be resolved certainly before the terms of a PPP agreed;
- The accuracy of PSC, and value for money, is very sensitive to the costing of risk; and so forth.

6.3 Current Efficiency Level of Operation and Service

(1) Customer Satisfaction

The level of customer satisfaction for the operation of LUL has remained unchanged since the start of PPP. This means that the introduction of PPP for infrastructure renewal and maintenance has not

¹⁰ The Committee of Public Accounts, "London Underground Public Private Partnerships - Seventeenth Report of Session 2004 - 05," the House of Commons, March 2005.

give a significant impact to customer satisfaction of passengers.

Table 6-6 Customer Satisfaction Scores (%)

| | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 |
|-------------------------|---------|---------|---------|---------|---------|---------|
| London Underground | 75 | 76 | 78 | 78 | 76 | 77 |
| Busses | 76 | 77 | 78 | 78 | 78 | 79 |
| Docklands Light Railway | 92.5 | 94 | 94.9 | 95.4 | 96.8 | 97.3 |

Source: Transport for London, "Annual Reports and Statement of Accounts"

(2) Efficiency of Operation and Service

The trend of operational performance of London Underground is as shown in the following table. Such indicators as passenger journeys and kilometers operated have shown improvement. It is considered that the operation of LUL has been adequately supported by services of Infracos.

Table 6-7 Performance Indicators of London Underground

| | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 |
|--|---------|---------|---------|---------|---------|---------|
| Passenger journeys (millions) | 942 | 948 | 976 | 971 | 1,014 | 1,073 |
| Kilometers operated (millions) | 66.0 | 67.7 | 69.4 | 68.8 | 69.8 | 70.5 |
| Percentage of schedule operated (per cent) | 92.2 | 93.1 | 95.3 | 93.6 | 94.5 | 94.8 |
| Excess journey time (weighted) (minutes) | 9.7 | 7.4 | 7.2 | 7.5 | 8.1 | 7.8 |

Source: Transport for London, "Annual Reports and Statement of Accounts"

At the introduction of PPP, it was estimated that that the PPP would realize an investment in underground railway infrastructure of over £16 billion over the first 15 years. Sustained investment has been made along with the PPP arrangements. Line upgrades are due to realize a 25% increase in transportation capacity by 2018 and most of the significant capacity increases are due between 2010 and 2017. Therefore, investments to increase the capacity of LUL must be continued to accommodate the increasing passengers. The progress of line upgrading program is as shown in the following table.

Table 6-8 PPP Line Upgrading Program and Progress

| Line | Eventual Peak Capacity Increase | Contractual Completion Date | Proportion Complete (As of End of 2007/08) |
|-------------------|---------------------------------|-----------------------------|--|
| Sub-surface lines | 48% | 2012-18 | 13% |
| Victoria | 19% | 2013 | 39% |
| Bakerloo | 38% | 2020 | 0% |
| Waterloo & City | 25% | 2007 | 100% |
| Jubilee | 33% | 2009 | 61% |
| Northern | 20% | 2012 | 34% |
| Piccadilly | 25% | 2014 | 19% |

Source: Transport Committee, "Delays possible Maintaining and upgrading the London Underground," March, 2009.

(3) Financial Efficiency & Financial Sustainability

The income statement of Tube Lines (Infracos JNP) is as shown in the following table. Tube Line has maintained an operating profit, and profit on ordinary activities after interest payment.

Table 6-9 Table Income Statement of Tube Line

| | 2003/04 | 2004/05 | 2005/06 |
|---|---------|---------|---------|
| Turnover | 597 | 864 | 875 |
| Operating costs | -522 | -736 | -800 |
| Operating profit | 75 | 128 | 75 |
| Interest receivable and similar income | 35 | 63 | 87 |
| Interest payable and similar charges | -69 | -137 | -99 |
| Profit on ordinary activities before taxation | 42 | 54 | 63 |
| Tax on profit on ordinary activities | -16 | -11 | -20 |
| Profit on ordinary activities after taxation | 26 | 43 | 44 |

Source: Tube Line, "Tube Lines Directors' Report & Accounts."

In July 2007, Metronet BCV and Metronet SSL became unable to meet their spending obligations and were placed under the administration of government. TfL purchased 95% of Metronet's debts from the private sector lenders in February 2008¹¹. The Department for Transport (DfT) provides a grant of £1.7 billion of grant available to TfL for this deal. Two Infracos of Metronet were transferred to TfL on May 27, 2008. LUL takes the responsibility of delivering Metronet's work program.

The National Audit Office pointed out in its report¹² that the main cause of Metronet's failure was its poor corporate governance and leadership. According to the report, the five shareholders were Metronet's suppliers and had different interests. At Metronet, many decisions had to be agreed unanimously by five shareholders. The management of Metronet had poor access to cost information of the suppliers and could not monitor costs of works. The executive management of Metronet changed frequently.

The summary of the project implementation schemes of urban railway systems adopted as case studies is shown in Table 7-1.

¹¹ The Comptroller and Auditor General, "Department for Transport The failure of Metronet HC 512 Session 2008-2009," National Audit Office, June 5, 2009.

¹² The Comptroller and Auditor General, "Department for Transport The failure of Metronet," National Audit Office, June 2009.

Table 7-2 Comparison of Urban Railway Systems in Japan and Other Foreign Countries

| Item | Urban Railway System in Manila (Philippines) | Urban Railway System in Singapore (Singapore) | Urban Railway System in Kuala Lumpur (Malaysia) |
|--|--|---|--|
| 0 Type of Financial Framework, i.e., state operation or PPP | LRT and MRT have been operated in Manila. LRT is under government operation, while MRT is operated by the private entity. | Both LRT and MRT are Public, not PPP. Government made overall plan. Government entity MRTIC is in charge of construction and another government corporation SMART (100% of share is owned by government entities) in charge operation. | Kuala Lumpur's urban railway system consists of 7 lines. While 3 lines are operated by Malaysian Railway (KTM), remaining 4 lines were developed and operated by 4 different companies under private participation scheme (BOT). However, after facing the financial difficulty, newly established government-owned operating company (Rapid KL) took over 3 private LRT operators of StarLRT and Putra-LRT, and KL Monorail. |
| 1 Fund Raising Method | MRT construction was financed by the private sector. | Construction cost is paid by government budget. | Four privatized LRT projects were implemented under BOT scheme. Government provided concessional loan for LRT System I, II and KL Monorail projects. Also government provided 10% grant based equity injection for LRT system I project. |
| 2 Roles and Responsibilities of Stakeholders, i.e., the public sector and private sector | The private sector financed and constructed MRT. The railway asset has been leased to the Government and MRT receives the fee. Operation is carried out by the private sector according to the agreement with the Government. Details is unknown. | Construction is made by MRTIC and its cost is fully covered by the government. MRTIC staff salary is also supplied by the government. Revenue sources of MRTIC are limited to only license fee and consulting fees. | LRT System I: Govt. equity: 10%, Govt's loan: 20% concessional loan, 80% and private sector's equity: 10% LRT System II: Govt's loan: 25.6% Commercial Loan: 54.0%, and private sector's equity: 20.4% KL Monorail: Govt's loan: 23.4% Commercial Loan: 52.9% and private sector's equity: 22.0% Express Rail Link: Unknown |
| 3 Legal Framework of PPP | BOT Law officially "in act" authorizing the financing, construction, operation and maintenance of infrastructure projects by the private sector and for other purpose" exists. The terms and conditions that an act applies and procedures are legalized in BOT Law. | NO PPP/infrastructure projects and there is no PPP law (to be confirmed). | The Railway Act 1991 (Act No. 463) provides a legal framework for the privatization of railway operations in the country. |
| 4 Risk Allocation | It depends on the type of contract. In case of MRT, construction, finance, and operation risk are born by the private sector, while the government takes liability risk. Since BOT contract is not available, risk allocation of MRT is unknown. | Construction risk, demand risk (market risk), revenue risk and other risks are taken by government and public entities. Cost of taking risk is absorbed by government. | Major risks during construction phase and operation phase are deemed to be shouldered by private concessionaire. Land acquisition risk, political risk and were considered to be taken by public sector. |
| 5 Service Standard and Revenue Sharing | Service standards for LRT and MRT are unknown. Revenue of MRT may be determined in BOT contract, which is not available. | Government emphasizes to promote transport system development. SMART promotes land transports (train, bus, taxis etc). The service levels made by SMART are enough higher than the Bench Marks of the services set by the government. Government will get only License Fee from SMART which will maximize its revenue by diversifying its revenue sources. | After the privatization, the performance of RapidKL is to be measured according to key performance indicators (KPI) that are to be set by the Government. The Government penalties RapidKL financially if the pre-defined targets are not met and rewards if the targets are exceeded. |
| 6 Method of VIM Analysis | It may be discussed in the Government but not known. | VFM together with similar concepts would be reviewed by the government. No detail information is available. | No information available. |
| 7 Premise of Financial Analysis of Project and Content of Financial Analysis | Revenue of stakeholders of LRT covers its operation and maintenance cost but interest payment and depreciation cannot be covered. No detail of expenditure available. No financial data of MRT. | SMART is listed and now understood as a profitable company. Its ratios of profitability (after tax) revenue and profitability (dibao)/assets are 18.7%, 22.8% respectively. | No data available. |
| 8 Customer Satisfaction | LRT passengers are not comfortable by congestion. No detail information about customer satisfaction for both LRT and MRT. | Accuracy of departure and arrival 98.5% (95%), 97.0% (94%). Availability 99.9% (98.0%) Note: () Government target. | No data available. |
| 9 Operational Efficiency | No detail information available. | Profitability (after tax) revenue: 18.7% Probability (dibao)/assets: 10.6% | No data available. |
| 10 Financial Efficiency | No detail information available. | Accuracy of departure and arrival 98.5% (95%), 97.0% (94%). Availability 99.9% (98.0%) Note: () Government target. | No data available. |
| Overall Evaluation | Both LRT and MRT have been recognized as convenient means of transport in Metro Manila. Analysis and evaluation are unable, since detail information on operation, finance, and other related matters are not available. | Singapore LRT and MRT are planned, constructed and operated by government with its public entities. This urban transport system itself is highly evaluated for its operational and financial efficiencies. It is observed the success is attributed to the government intervention with full financial support. Another salient feature is its implementation system consisted of government to make policy and planning, MRTIC to make efficient construction and SMART to make profit at maximum level as a listed profitable company, which is regarded as the most efficient and well organized. | Actual ridership volumes on privatized LRT systems were much lower than forecasted by the concessionaires. Not only unrealistic ridership forecast made concessionaires, low ridership was also due to the government's failure to implement policies to promote public transport as well as poor integration between urban railway systems, and even poor integration with other mode of transport (such as bus). As a result, STAR, PUTRA, and KL Monorail incurred huge annual deficits on their operations. These three LRT systems were then nationalized. Malaysian government leveled heavy burden to salvage the network. LRT systems in Kuala Lumpur are considered to be one of the failure examples of urban railway projects through private participation. Urban railway systems in Kuala Lumpur were developed both under private sector participation schemes and state operation schemes. However, out of 4 privatized lines, concessionaires of 3 lines were bankrupted and these lines were eventually nationalized. This case is considered to be very informative guide to study about Financial Framework of urban railway systems in Thailand. |

Source: Compiled by Study Team

Study on Financial Frameworks in Mass Transit System Project in Thailand

Table 7-2 Comparison of Urban Railway Systems in Japan and Other Foreign Countries (Continued)

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| 9 Operational Efficiency | No detail information available. | Profitability (after tax) revenue: 18.7% Probability (dibao)/assets: 10.6% | No data available. |
| 10 Financial Efficiency | No detail information available. | Accuracy of departure and arrival 98.5% (95%), 97.0% (94%). Availability 99.9% (98.0%) Note: () Government target. | No data available. |
| Overall Evaluation | Both LRT and MRT have been recognized as convenient means of transport in Metro Manila. Analysis and evaluation are unable, since detail information on operation, finance, and other related matters are not available. | Singapore LRT and MRT are planned, constructed and operated by government with its public entities. This urban transport system itself is highly evaluated for its operational and financial efficiencies. It is observed the success is attributed to the government intervention with full financial support. Another salient feature is its implementation system consisted of government to make policy and planning, MRTIC to make efficient construction and SMART to make profit at maximum level as a listed profitable company, which is regarded as the most efficient and well organized. | Actual ridership volumes on privatized LRT systems were much lower than forecasted by the concessionaires. Not only unrealistic ridership forecast made concessionaires, low ridership was also due to the government's failure to implement policies to promote public transport as well as poor integration between urban railway systems, and even poor integration with other mode of transport (such as bus). As a result, STAR, PUTRA, and KL Monorail incurred huge annual deficits on their operations. These three LRT systems were then nationalized. Malaysian government leveled heavy burden to salvage the network. LRT systems in Kuala Lumpur are considered to be one of the failure examples of urban railway projects through private participation. Urban railway systems in Kuala Lumpur were developed both under private sector participation schemes and state operation schemes. However, out of 4 privatized lines, concessionaires of 3 lines were bankrupted and these lines were eventually nationalized. This case is considered to be very informative guide to study about Financial Framework of urban railway systems in Thailand. |

Source: Compiled by Study Team

APPENDIX 5

COMPARISON OF FINANCIAL AND OPERATIONAL INDICATORS OF URBAN RAILWAY IN OTHER COUNTRIES

