Socialist Republic of Vietnam
Hanoi People's Committee (HPC)
Hanoi Metropolitan Railway Management Board (MRB)

Special Assistance for Project Implementation (SAPI) for Establishment of an Organization for the Operation and Maintenance of Metropolitan Railway Lines in Hanoi City

Final Report (Summary)

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Japan International Cooperation Agency (JICA)

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Acronyms and Abbreviations

ADB	Asian Development Bank
AFC	Automatic Fare Collection
AfD	Agence Française de Développement
BMCL	Bangkok Metro Public Company Limited
BOT	Build-Operate-Transfer
BTO	Build-Transfer-Operate
BT	Build- Transfer
BTSC	Bangkok Transit System Company
DMCL	Delhi Metro Company Limited
DFR	Draft Final Report
DOF	Department of Finance
DOT	Department of Transport
EIB	European Investment Bank
EMU	Electric Multiple Unit
EPC	Engineering Procurement Construction
ERP	Electric Road Pricing
FS	Feasibility Study
GC	General Consultant
GDP	Gross Domestic Product
HAIDEP	The Ha Noi Integrated Development and Environment Programme
HAPI	Hanoi Authority for Planning and Investment
HPC	Hanoi People's Committee
HR	Human Resources
HRB	Hanoi Metropolitan Rail Transport Project Board
I/F	Interface
IC Card	Integrated Circuit Card
IMO	Infrastructure Maintenance and Operations
IPO	Initial Public Offering
ITO	Integrated Train Operation
ITR	Interim Report
JICA	Japan International Cooperation Agency
JKT	JKT Association
L/A	Loan Agreement
LRTA	Light Rail Transit Authority in Manila
MD	Minutes of Discussion
MOT	Ministry of Transport
MRB	Hanoi Metropolitan Railway Management Board

MRT	Mass Rapid Transit
MTR	Mass Transit Railway
NFPA	National Fire Protection Association
O&M	Operation & Maintenance
OCC	Operation Control Center
ODA	Official Development Assistance
PPP(1)	Public-Private Partnership
PPP(2)	Purchasing Power Parity
PSO	Public Service Obligation
PTA	Public Transport Authority
PTKA	PT Kereta Api Indonesia
PU	Preparation Unit
RPMU	Railway Project Management Unit
SAPI	Special Assistance for Project Implementation
SCADA	Supervisory Control And Data Acquisition
SMRT	Singapore Mass Rapid Transit
TAC	Track Access Charges
TC	Technical Cooperation
TEDI	Transport Engineering Design Incorporate
TOR	Terms of Reference
TRTC	Taipei Rapid Transit Corporation
URMOCC	Urban Railway Management & Operation Control Center
UTC	University of Transport and Communications
VNR	Vietnam Railway Corporation
VNRA	Vietnam Railway Administration
WB	World Bank

Chapter 1 Background and Objectives

1.1 Background

The National Assembly issued Resolution Ref. No. 15/2008/QH12 relating to the revision of the administrative boundaries for Hanoi and relevant provinces on August 1, 2008. Under this revision, the area of Hanoi increased 3.6 times and its population almost doubled to approximately 6.6 million in 2009 and is still growing. Currently, the road traffic volume is rapidly increasing, especially in the urban areas, which is causing issues such as traffic jams, deterioration of traffic safety, air pollution and difficulties in access to urban services. As such problems in urban transportation are expected to worsen, it is imperative that a trunk urban transport system that will enable the development of the urban areas on a sustainable basis be established.

On July 9, 2008, the Vietnamese Prime Minister approved the Transport Development Plan for Hanoi Metropolitan area up to 2020 (Decision No. 90/2008/QD_TTg) based on the result of JICA study (completed in March 2007), which defines the master plans for urban development in each field including urban transportation toward 2020.

Line-2 project supported by Japan, which is under the jurisdiction of the Hanoi Metropolitan Railway Management Board (MRB) and supported by the Government of Japan, is scheduled to start operation in 2017. The Line-2A (Cat Linh-Ha Dong), which receives assistance from China, and Line-3 (Nhon-Hanoi Railway Station), which receives assistance from the French Government, AfD, EIB, and ADB, are under construction, with operation scheduled to start earlier than Line-2. Under these circumstances, there is an urgent need to establish an organization for the operation and maintenance of the Metropolitan Railway lines in Hanoi (hereinafter referred to as the “O&M organization”).

MRB is planning to submit its basic plan to the upper level organization, and the Hanoi People's Committee (HPC) is expected to approve it within year 2012. Due to a lack of knowledge and experience in the establishment of an O&M organization for urban railway transport, MRB has asked the Japanese government for assistance.

In order to develop a system to operate and maintain urban railways in Hanoi, there is an urgent need for assistance in establishing an appropriate O&M organization headquarters and its site offices. This will be accomplished by discussions with the Vietnamese Governments, for instance Hanoi People’s committee (HPC) and the central government, and developing coordination among the relevant donors who are managing the construction progress of their respective lines.

This study is carried out as a SAPI (Special Assistance for Project Implementation) for Hanoi City Urban Railway Line-1 and Line-2 Projects, for which loan agreements (L/A) were signed in March 2008 and March 2009 respectively.

Table1. 1 Projected Schedule for Establishing O&M Organization and Construction of Urban Railways in Hanoi

Date	Milestone
Feb. 2011	- Approval for preparatory plan for an O&M Organization for urban rail lines in Hanoi
up to Dec. 2011	- Planning for O&M Organization (with support of GOJ)
	- Submission of O&M Organization Plan from MRB to HPC
Approx. July 2012	- Approval of Plan by HPC
2015	- Commencement of operation of Line-2A
2017	- Commencement of operation of Line-3
2018	- Commencement of operation of Line-2
2018	- Commencement of operation of Line-1

1.2 Objectives for the Study

Although the project owners and/or donors are different for each line in Hanoi, establishment of ONE O&M Organization will be pursued. This study targets three lines (2, 2A, &3), which are / will be under the authority of HPC, as the first to be integrated, with the organization for the remaining lines to be addressed at a later date.

In this study, the framework and procedures for the establishment of an O&M organization will be discussed. In this regard, the role of the Regulator for urban railways will be considered as well.

This study is to support the development of a plan for the establishment of an O&M organization for urban railways in Hanoi by obtaining a thorough understanding of the latest project status for each of the relevant lines, including schedules, and by defining the functions that the O&M organization should perform at each stage. The major tasks are summarized below.

(1) To develop a basic plan for the O&M organization for urban railways in Hanoi.

(2) To develop a roadmap up to the commencement of operation on the respective lines.

(3) To develop a detailed work plan for establishing the O&M organization.

(4) To examine the relationship between the O&M organization, and other organizations or agencies.

1.3 Study Area and Counterparts

(1) Study Area: Hanoi, Vietnam

(2) Counterpart: Hanoi People's Committee (HPC)
Hanoi Metropolitan Railway Management Board (MRB)

(3) Other related agencies:

a. Department of Transport (DOT), Department of Finance (DOF), Hanoi Authority for Planning and Investment (HAPI), Department for Home Affairs (DHA) and other departments under HPC

b. Center for Transport Development-University of Transport and Communications (UTC)

c. Vietnam Railway Administration, Ministry of Transport (VNRA, MOT)

d. Agence Francaise de Developpment (AfD), Asian Development Bank (ADB), European Investment Bank (EIB) and World Bank (WB)

e. Vietnam Railways Corporation (VNR)

Chapter 2 Current Conditions and Outstanding Issues

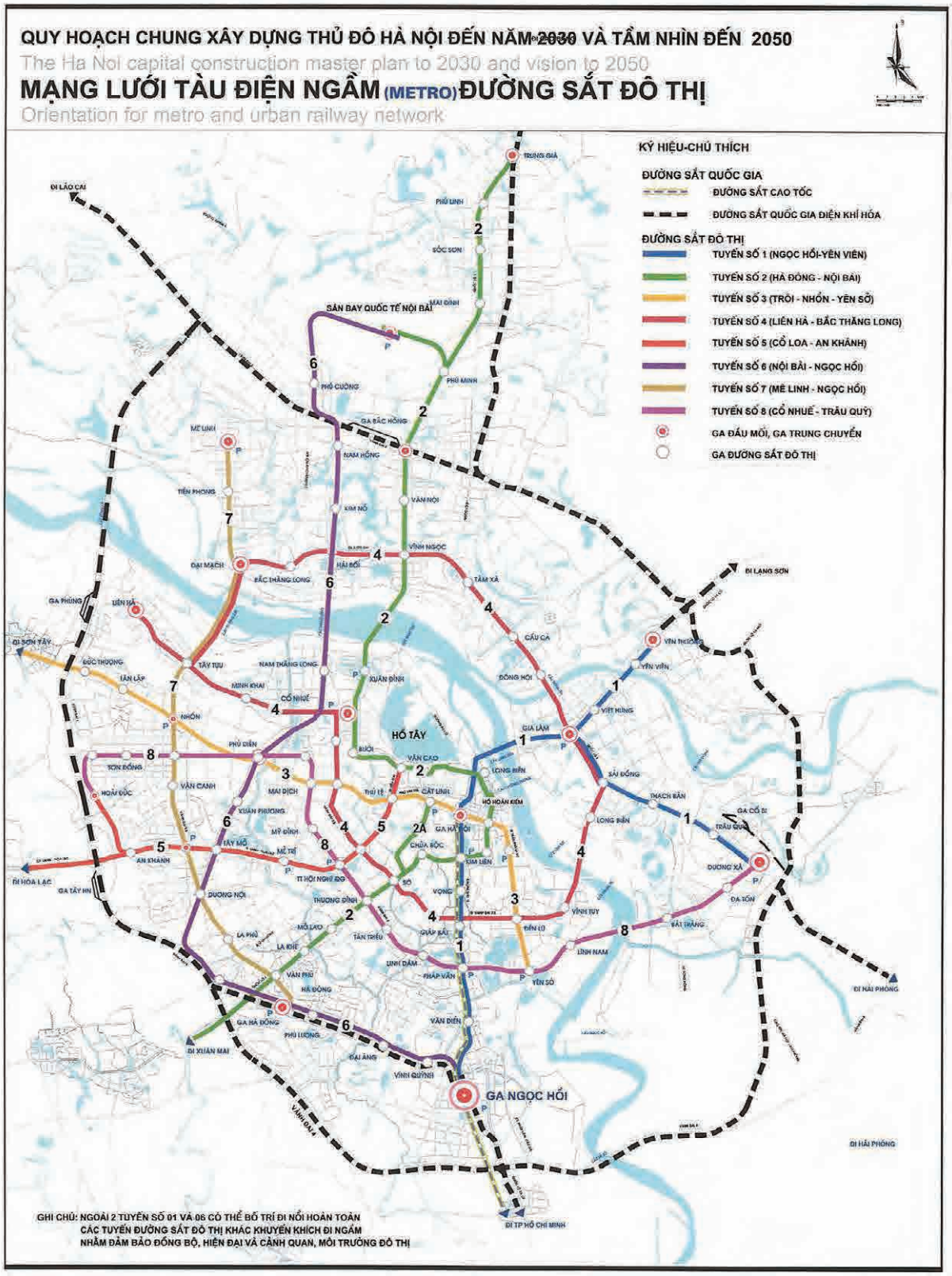
2.1 Current Status

The government promulgated a new Master Plan entitled “General Planning for the Construction of Hanoi Capital up to 2030 with a Vision to 2050 (1259/QD-TTg)” on July 26, 2011. Accordingly, nine urban railway lines are to be developed by 2030.

At present, there are four on-going lines: Line-1, Line-2, Line-2A and Line-3; Line 5 is currently undergoing a feasibility study (FS). As shown in the table below, there are different authorities responsible for the construction in Hanoi, thereby necessitating a study for coordinating all the projects.

Table 2.1 Summary of Urban Railway Lines in Hanoi

Line	Length	Route	Status	Authority for Construction
Line 1	38.7 km	Ngoc Hoi - Yen Vien, Nhu Quynh	On-going by Japanese ODA for the first section (15.36km)	VNR
Line 2	35.2 km	Nhat Tan - Vinh Ngoc - NoiBai.	On-going by Japanese ODA for the first section (11.5km)	HPC
Line-2A	14km	Cat Linh - Hao Nam - La Thanh - Thai Ha - Lang street - NgaTu So - National Highway 6 - ThuongDinh (linking with Line 2) - Ha Dong - Ba La.	On-going by Chinese ODA.	MOT
Line 3	21 km	Nhon - Hanoi Station- Hoang Mai	On-going by French, ADB and other loans from other donors for the first section (12.5km)	HPC
Line 4	53.1 km	Dong Anh - Sai Dong - VinhTuy/Hoang Mai - Thanh Xuan - TuLiem - Thuong Cat - Me Linh	No specific study.	N.A.
Line 5	34.5 km	South West Lake - Ngoc Khanh - Lang - Hoa Lac	FS is being conducted by JICA.	MOT
Line 6	47 km	Noi Bai – Phu Dien – Ha Dong – Ngoc Hoi	No specific study.	N.A.
Line 7	35 km	Me Linh – An Khanh – Duong Noi	No specific study.	N.A.
Line 8	28 km	Co Nhue - Mai Dich – Yen So – Linh Nam – Duong Xa	No specific study.	N.A.



Source: Prime Minister's Decision No. 1259/QD-TTg

Figure2. 1 Urban Railways in Hanoi Transport Master Plan up to 2030

2.2 Outstanding Issues

Nowadays, urban railways are one of the key infrastructures in Asian megacities. A huge number of passengers have been using urban railways, but the financial conditions of the respective operators vary greatly among countries and cities. It can be seen that the railway operators, whose governments have good perspective and plan by themselves as well as providing the necessary support to the operators, show a revenue surplus. The railway operators, whose governments have relied on private money, tend to hold a huge debt on their businesses.

In Japan, it is highly respected to learn from "failures." Usually the reasons for failures are hidden and are seldom revealed. Therefore, the revealing of the facts about failures in the annual reports by some railway operators may help the stakeholders in Hanoi to understand the various critical factors.

Table2. 2 Financial Status and Critical Factors of Urban Railway Operators in Asia

City,/Country	Financial Status	Critical Factors
Bangkok, Thailand	One of the two railway companies has gone bankrupt, and the other is facing financial hardship.	Depends too much on private investments and foreign companies. No subsidy from the government.
Delhi, India	Sound	Delhi Metro Company was given the necessary power and authority from the government, which enabled the construction to be completed as planned. This helped to reduce overall investment cost. The government gave some land to the O&M organization for stabilizing the management.
Singapore	Sound	To reduce the expense of the operation companies, all infrastructure and facilities including rolling stock were owned by the government and lent with small fee at the initial stage. Currently, railway system components, such as rolling stock and signaling, are owned by the operator. Some part of the purchasing cost was granted by the government. The government has been conducting various TDM (traffic demand management) policies such as road pricing in order to promote more usage of public transport including urban railways.
Jakarta, Indonesia	It shows positive profit-loss, but the train operations are not well organized.	The fare is set at a very low level due to political reasons while the subsidy from the government is not enough. The management lacks competence, for instance, they don't spend the money for keeping the train operation as planned since they want to show a positive profit-loss statement.
Manila, Philippines	Poor management	The fare is set at a very low level due to political reasons. The Government support is not enough.

Source; JICA Study team

Chapter 3 Basic Institutional Policy

3.1. Scheme of the O&M Organization

In the examination by the study team, it was found that the most of the urban railways in the world are operated by public entities, not by a joint stock company. On the other hand, under the current conditions, Vietnamese regulations require that the O&M of urban railways be carried out by a 100% state-owned company. And the study result shows that operation by the O&M organization would be more advantageous than direct operation by a department of HPC. It also shows that a 100% state-owned company can provide profit to its founders when an IPO is issued in the future.

Interviews and discussions with stakeholders of this study indicated that there was no support for the option of direct operation as a department under HPC. Consequently, the Study Team recommends the adoption of a “100% state-owned company” as a company scheme.

3.2 The Domain of the O&M Organization

It is true that when the domain of the O&M organization becomes large, the passengers will receive better services, the O&M organization can be managed in a more efficient manner, and consequently the subsidy HPC provides can be minimized without any special arrangements. A special arrangement could include the vertical separation of assets and the use of a gross cost system, so that the financial burden on the O&M organization may be reduced. In vertical separation, the government owns the assets other than the operating equipment and/or rolling stock, and the O&M organization owns only the assets for operation. The gross cost system is the system where all operational risks are shouldered by the government. In this system, the Regulator takes all fare income and distributes the money equal to the full operation cost to each O&M organization.

From the study of the current conditions of each line, it was found that integration of Line-2, 2A and 3 in the O&M organization seems to be relatively easy. This is because Line-2 and 3 are constructed by MRB under HPC and Line-2A can be transferred to HPC from MOT/VNRA after completion. Integration of Line 1 and/or 5 may be rather difficult. The major reason for this comes from the differences of their owners and types of funds from the other three lines. Specifically, the funds for Line-5 is from private sources. In the following table, the options for a consolidated O&M organization are explained.

Table 3. 1 Options for the Consolidated O&M organization

	Targeted Lines	Description
Option-1	1,2, 2A, 3, 5	This may be rather difficult since the owner of Line-1 and 5 is not HPC. Specifically, the owner of Line-1 is VNR, and the owner of Line-5 is private. If the operation of Line-1 is consigned to VNR, the train operation of Line-1 can be well managed. However, the asset transfer from VNR to HPC may be difficult, and it also will not be easy to enter into a business agreement for the consignment of train operation. If the gross cost system is adopted, Line-5 can be integrated.
Option-2	1,2, 2A, 3,	It may be rather difficult since the owner of Line-1 is VNR, not HPC and its type of the funding is different from that of the other lines. If the operation of Line-1 is consigned to VNR, the train operation of Line-1 can be well managed. However, the asset transfer from VNR to HPC will be difficult and it also will not be easy to enter into business agreement for the consignment of train operation.
Option-3	2, 2A, 3, 5	This may be rather difficult since the owner of Line-5 is private, not HPC. If the gross cost system is adopted, Line-5 can be integrated.
Option 4	2, 2A, 3	This option may be easier than Option-1, 2 and 3

Source: JICA Study Team

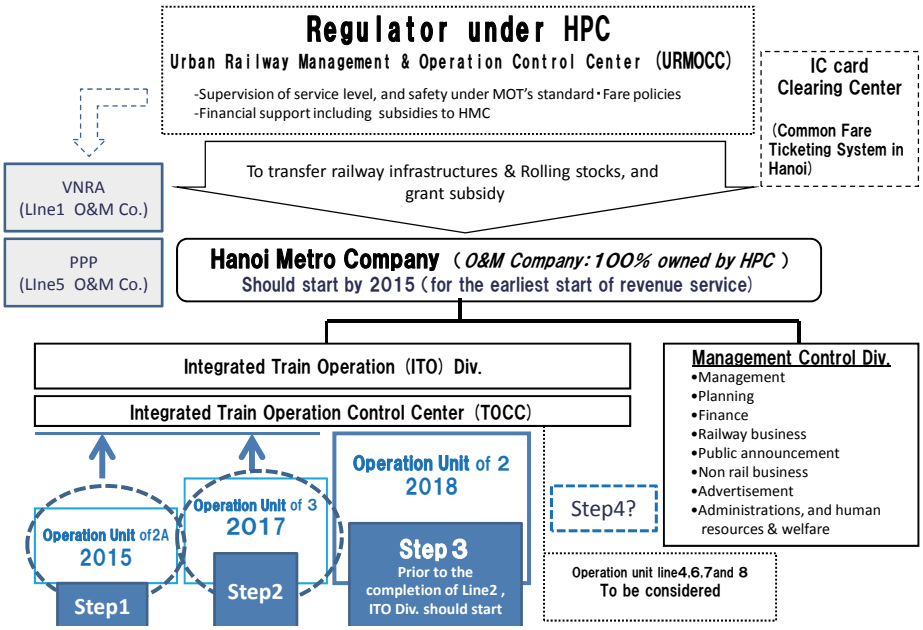


Figure 3. 1 Proposed Overview of the Management Structure for Urban Railways in Hanoi

3.3 Common Fare System and the Financial Scheme

An "independent companies by lines" policy may result in an increase in the amount of subsidies from the government. Please refer to Figure 3.2.

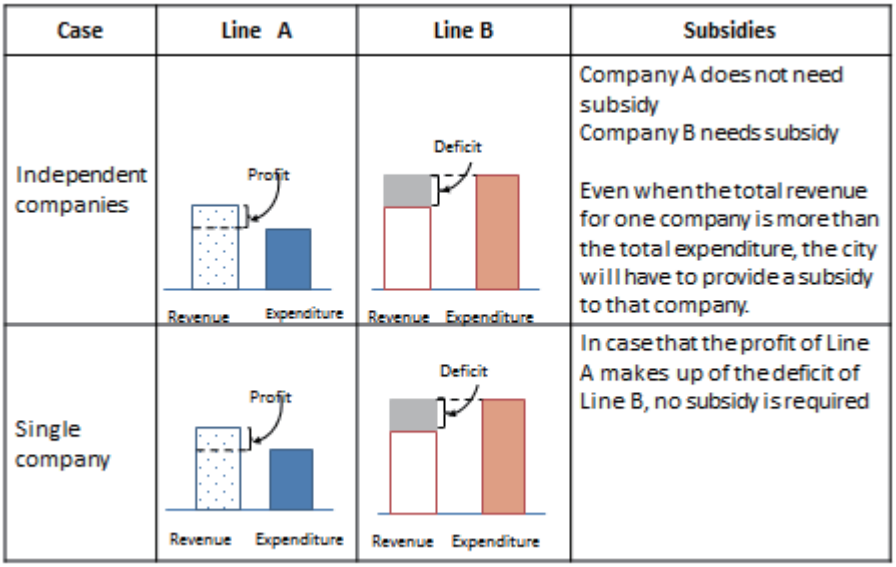


Figure 3.2 Comparison of Subsidies for an Independent Companies versus a Single Company

The common fare system will be difficult to be handled, regardless of the method, but the common fare system is basically a system for the passenger convenience and may entail costs.

Table 3.2 Issues Brought Out in HPC by the Common Fare System

	Cases	Issues	Remarks
1	Independent companies by lines	Subsidy may not be minimized.	
2	Single company	Subsidy can be minimized	
3	Gross cost system under HPC	The Regulator has to have the management capability of the operating companies. The workload of the Regulator may increase drastically.	This is the same as when the Regulator operates all the companies under HPC.

Source: JICA Study Team

In Singapore and Seoul, the common fare system has already been established. Those integrated transportation providers share a common feature; namely, each used to be a single company. On

establishing the second company, the common fare system was developed based on a common foundation. Hanoi has a different background. Each line is newly established under different forms of financial assistance. Each line has independent plans and policies for the design of the system. It will not be easy to establish the common ticketing service with such varied systems.

A common fare system can be established easily within a company. In order to enhance the convenience for passengers, it is important to involve the lines integrated into the O&M organization as much as possible so that the area of the common fare system can be as wide as possible.

The advantages and disadvantages of the common fare system from the viewpoint of the authority, railway operator and passengers are summarized in the following table.

Table 3.3 The Advantage and Disadvantage of Common Fare System

	Advantage	Disadvantage
Authority	May accelerate the development of the city and mitigate the road congestion. Complaints on inequity may not be brought about from citizens.	As a result of introducing the common fare system, discount on base fare is required, resulting in the increase of financial support from the city.
Railway operator	Demand will increase since the usage of the public transport becomes convenient. Cost reduction by the simplification of ticket gate work can be expected.	Cost increase may be brought about since fare clearing works among companies becomes complicated.
Passengers	Passengers can buy a single ticket at their departure station that can be used all the way to the destination station, even if they change lines. Passengers can travel with the charge for the shortest route regardless of their actual travel route.	Not identified especially

Source: JICA Study Team

3.4 Integration of AFC

As the urban railway lines are supported by three different donors, the AFC needs to incorporate a common specification for interoperable AFC services that can be used on all lines.

Under an interoperable AFC system, all the railway lines constitute a unified railway network. Passengers can start from any station to any destination using a single ticket that is valid for the entire railway network, regardless of which companies are operating the lines. Without the interoperable

AFC system, the railway system is only an assembly of independent railway lines where passengers must purchase a ticket for each transfer.

"Studies on interoperable AFC system" is attached to this report as the supplementary report. The main contents are as follows.

The interface specification for the electronic ticket and station equipment is the crucial issue. If the AFC system accepts multiple types of technology for the electronic ticket, each line will be able to adopt respective electronic ticket. However, the AFC equipment needs to be multiple functional units with a unified system configuration, which unfortunately adversely affects processing speed, cost and system simplicity. Obviously, a simple technology for the electronic ticket is preferable.

The use of Type C smart cards is recommended for the following reasons.

a. The processing speed of the Type C smart card is faster than that of other card types and it has a high level of security.
   Based on the experience in Japan, it is needed to have fast processing at station gates in order to secure the safety of passengers by mitigating congestions at platforms. The security of card itself is also critical since it contains the money of passengers. Type C can be considered as the best type of the IC card for railway passengers.
b. Use of the Type C smart card would bring support from Japanese railway operators.
   In Japan, the railway operators, for instance JR east and Tokyo Metro etc., have designed and introduced this technology proactively, and they have much experiences and knowledge on this as they became the largest issuers for public transport smart cards in the world. These companies are currently very positive to support the introduction of their system to Vietnam with a strong support of the Government of Japan.
c. There is a rumor which says that it is a supplier's monopoly of card technology for type C therefore the price is much higher than others but this is not true.
   There are several suppliers of type C card in the world and the unit price of Type C smart cards nowadays can be made to be the same level as other card by revising the specifications for production in foreign countries other than in Japan.

3.5 Integrated Operation Control Center

Regarding the lines whose plans are already approved by HPC, some delay might be seen if their OCC were to be transferred to the integrated OCC. Therefore, the target lines for establishment of the integrated OCC can be limited to the lines whose plans have not yet been approved by HPC. In this case, there may be cost saving in adopting a strategy where the OCC building should be designed for whole lines in HPC and the OCC space should be expanded according to the opening of a new line. The following are the concrete plans for the establishment of the integrated OCC:

(1) The integrated OCC is proposed for two purposes. One is to enhance the service level, and the other is to enable the development of an efficient operation scheme.

(2) The space for the integrated OCC including the headquarters' office for the O&M organization is 2000 to 3000 square meters based on the assumption that they are built as multiple story buildings.

(3) These space can be secured inside the depot of Line-2.

3.6 Role of the Regulator for Urban Railways

In Vietnam, management of the urban railways is consigned to provincial governments. Therefore, there is a need to establish the Regulator system for urban railways in Hanoi. In other countries, generally the Regulator for urban railways system has been adopted. Due to these facts, The Study Team recommends the establishment of the Regulator system for the urban railways under HPC.

The basic tasks for the Regulator for urban railways are as follows.

(1) Accreditation of the proper fare level

(2) Accreditation of necessary support, such as a subsidy from HPC.

(3) Supervision of the proper operation.

(4) Supervision of safety.

(5) Promotion of urban railways to commuters.

(6) Securing the internal return of the area development along the lines.

Regarding the consolidation with PTA, this should be discussed after development of the Regulator system for the urban railways.

The Study Team will propose a Regulator for urban railways system, tentatively called the "Hanoi Urban Railway Management Center," for the urban railways under HPC.

3.7. Legal Study of the Related Laws and Regulations

In reviewing many arguments and Prime Minister Decision 263/2006/QD-TTg about state-owned enterprises (SOEs) in Vietnam, the Study team understands that SOEs have been instructed to

transform into Limited Liability Companies (LLCs) or Joint Stock Companies (JSCs) with many members or a single state member as defined in the Enterprise Law in order to reduce state subsidies.

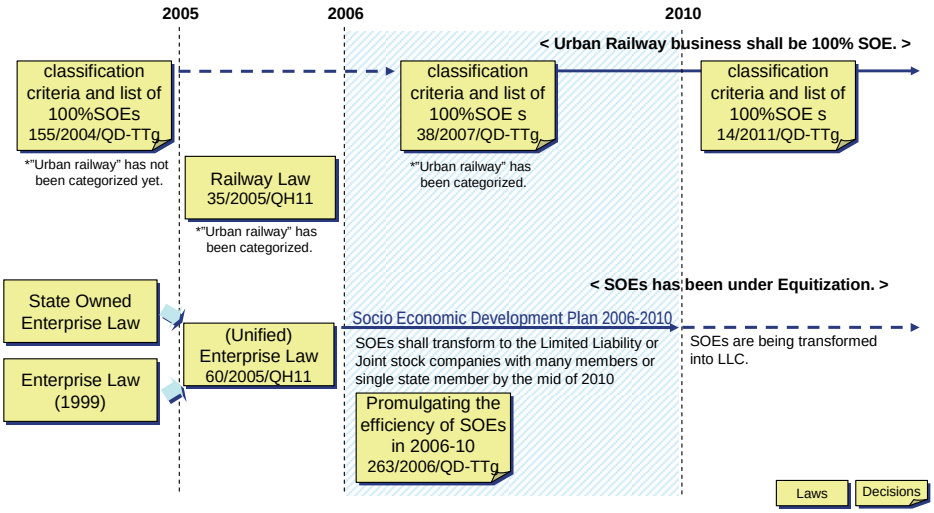


Figure 3. 3 Vietnamese Legal Framework for the Establishment of O&M Organization

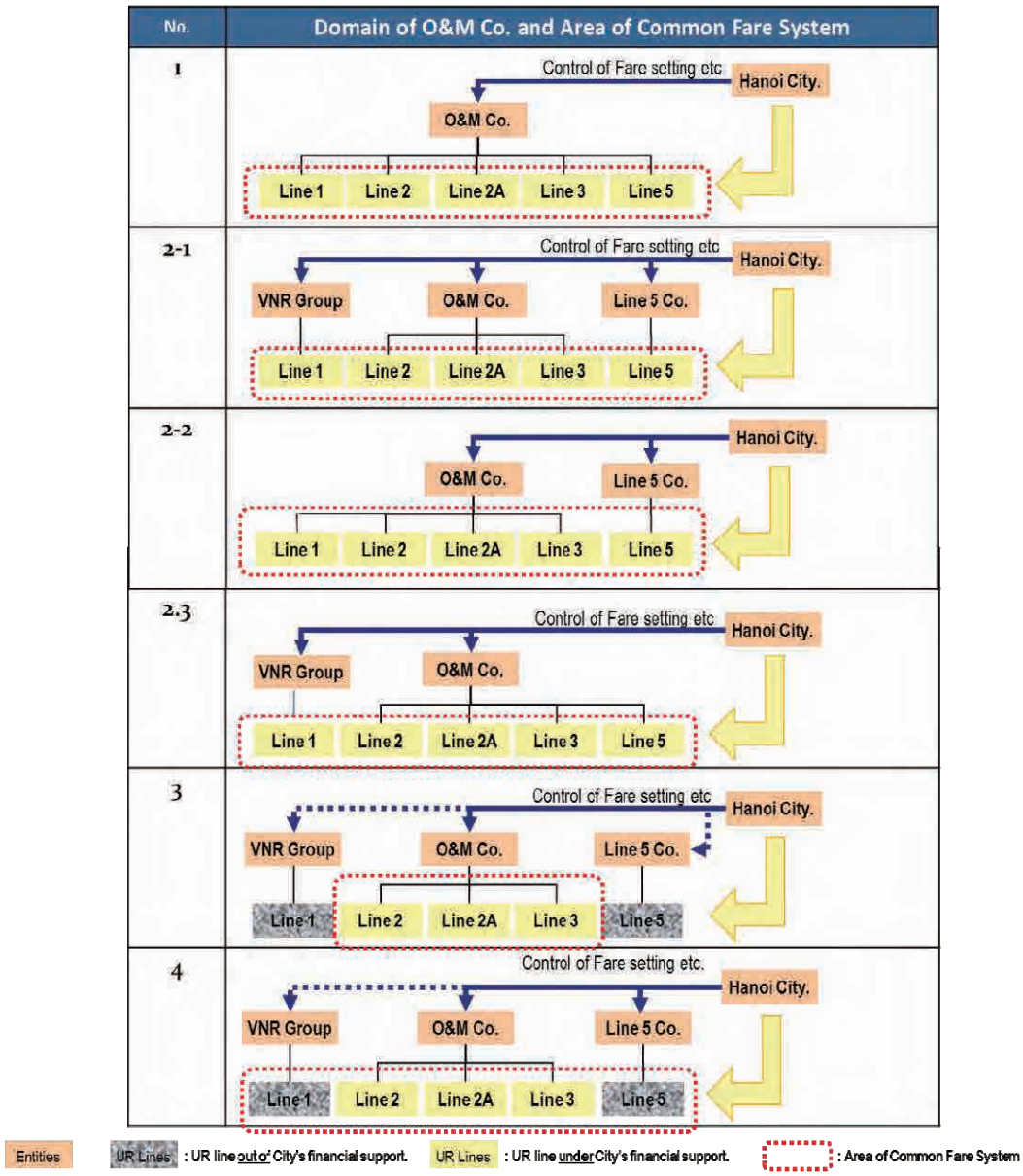
In this regard, O&M organization for urban railway must be established as a LLC of which 100% of its charter capital is held by the state. The option of having operation and maintenance work for an urban railway handled directly by state organization is quite unrealistic, since other transport modes, such as the national railway and bus in Hanoi, have already been transferred from direct operation by state to one-LLC in order to realize financial transparency.

3.8. Summary of the Basic Institutional Policy

(1) The wider the domain of the O&M organization becomes, the more convenience and services the passengers will enjoy.

(2) The area the common fare system covers should fit with the domain of the company. If this is not done, HPC cannot minimize the subsidy to be given to the operation companies and risks will be raised, such as that the Regulator for urban railways under HPC will have to supervise every expenditure which the O&M organization makes and the O&M organization may lose its independence. In such cases, they will become unattractive companies for investors when they go public.

Based on these two constraints, the following six options can be provided for the domain of the O&M organization.



Source: JICA Study Team

Figure 3. 4 Options for the Domain of the O&M organization and the Areas for Common Fare System

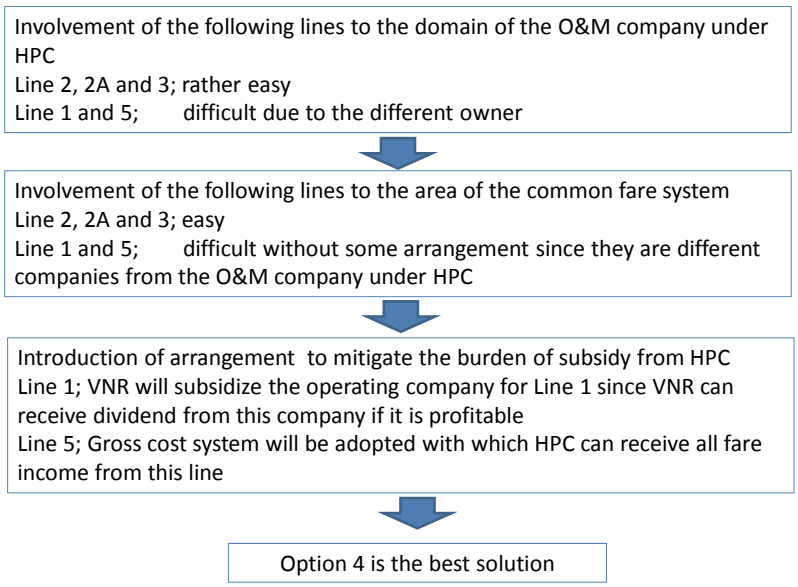


Figure 3. 5 Approach to Select the Best Solution

Chapter 4 Proposed Basic Financial Schemes Based on Financial Analysis

4.1 Overview

In this chapter, in order to compare the options described in Chapter 3, the financial conditions of the O&M Company and Hanoi City in regards to the options are reviewed in four steps along with the basic concepts of the financial scheme. This process helps clarify the conditions for financial sustainability. Since the cash flow is the most important indicator of a sustainable operation and MRB has to consider the minimization of subsidies in its proposal to HPC, this process is focused on the cash flow as it relates to both parties.

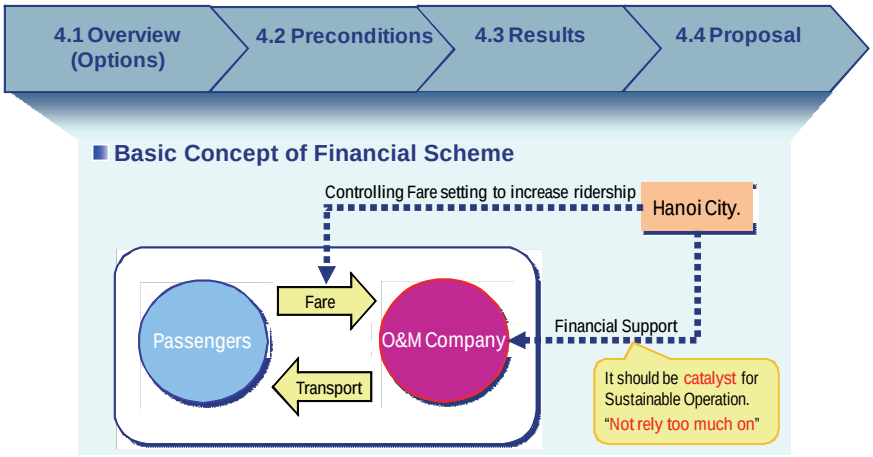


Figure 4.1 Concept of Financial Analysis

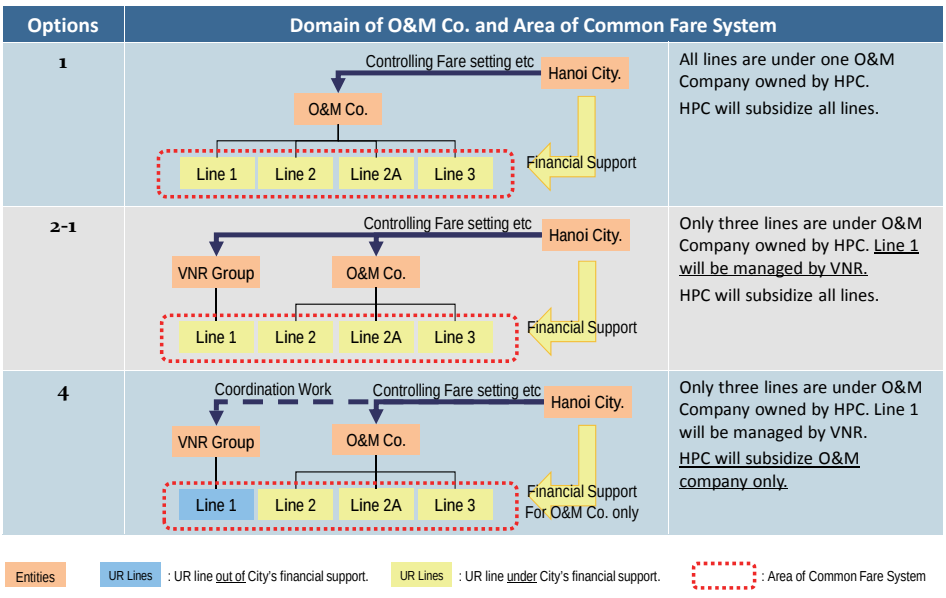


Figure 4.2 Options for the Financial Analysis

4.2 Precondition for Financial Analysis

(1) Asset Ownership

All assets are to be delivered to the O&M Company as an in-kind contribution from Hanoi City and, essentially, the O&M Company is assumed to be responsible for adding to and renewing the assets.

Asset Ownership for Line 2, 2a and 3

		Option A	Option B	Option C
Assets Transferred from State to O&M CO		None	Only E&M assets, as equity in kind	Both E&M and infra assets, as equity in kind
Ownership of Original Assets (with responsibility of Asset Renewals)	E&M (Operating)	State	O&M CO	O&M CO
	Infrastructure	State	State	O&M CO
Advantage / Disadvantage	Pros & Cons			
evitavisduO	Incentive to Efficiency	Least	Large	**Largest**
	Risk Separation from HPC	Least effective	Modestly effective	**Most effective**
evitavisduO	Anticipated Cash Shortage	Largest	Least	**Least**
	Net Present Value	Least	Modest	**Largest**
	Expected Timing of Realizing a Profit	**Earliest**	Middle	Last

• Asset owner should prepare the maintenance budget for their own assets every year.

Figure 4.3 Comparison Benefits of Asset Ownership for Line 2, 2A and 3

(2) Fare Revenue

In order to maintain sustainable operation, fare price increases until 2040 based on the costs of the O&M Company including depreciation cost for renewal of E&M assets.

Table 4. 1 Fare Price for Revenue Calculation

Year	Fare level in each year	Average fare price
2015-2017	VND 6,800 + 680 x (Travel length in km)	VND 10,500
2018-2025	VND 8,000 + 800 x (Travel length in km)	VND12,500
2026-2037	VND 10,500 + 1,050 x (Travel length in km)	VND16,000
2038-2044	VND 14,000 + 1,400 x (Travel length in km)	VND21,500

Note: 5.3 km is used for average travel length.

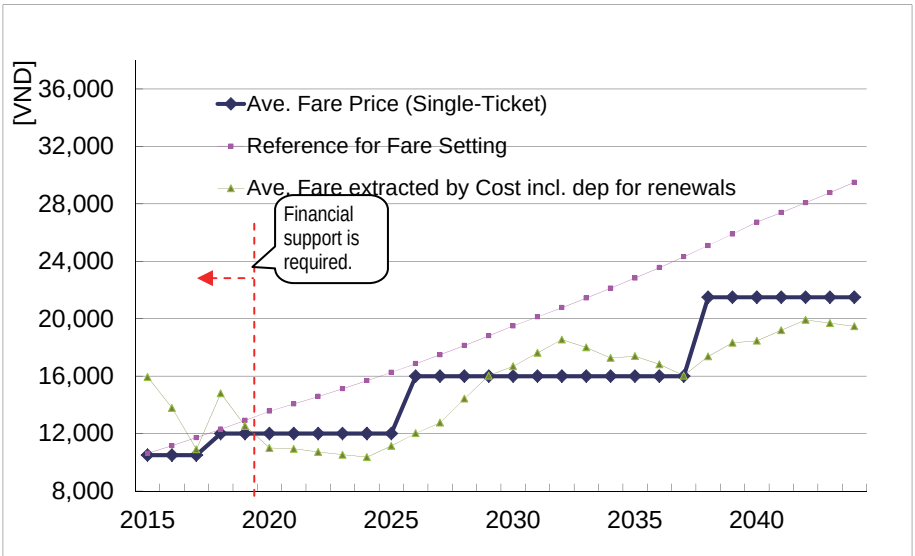


Figure 4. 4 Average Fare Price for Revenue Calculation

Note: Above is based on the O&M company covering Line 2, 2A and 3

In order to check the likelihood of demand forecasts for each project in Hanoi, the actual ridership of urban railways in the neighboring cities in South East Asian such as Bangkok, Delhi and Manila were obtained and used as a base for adjustment of the values of Hanoi.

Table4. 2 Ridership for Revenue Calculation

Lines	Year of Operation	Length (KM)	No. of Passengers (pax/day)		Ave. Passengers per KM (pax/day/km)		Peak Load (pax/hr/direction)		Adjusted Ratio
			2020	2030	2020	2030	2020	2030	
Line-1	2018	24.1	241,400	395,900	10,000	16,400	11,300	19,100	67.3%
Line-2	2018	11.5	115,000	188,600	10,000	16,400	6,500	10,600	25.0%
Line-2A	2015	12.7	151,100	233,700	11,900	18,400	3,900	5,900	26.8%
Line-3	2017	21.0	222,600	359,100	10,600	17,100	8,600	11,400	49.8%

Note: These figures are calculated based on the ridership forecast of each line project as of 1 October 2011, and the actual ratio of the increase in ridership in other Asian countries.

4.3 Result of Financial Analysis on O&M organization

Based on the financial analysis, it can be seen that it is almost impossible to expect that the fare income plus non-fare box business would be sufficient for covering all investments for the urban railway lines. The portion of the accumulative cash flow that can be considered as a resource for repayment is approximately 10-15% of the initial investment cost for Electrical and Mechanical (E&M) portion, which includes rolling stock, signaling, power supply and others. (Please refer the Figure 4.5).

If the fare level is set to an amount that could compensate the initial investment cost for E&M, the passengers have to pay much more than their affordable price during the first 25 years of operation. (Please refer the Figure 4.6).

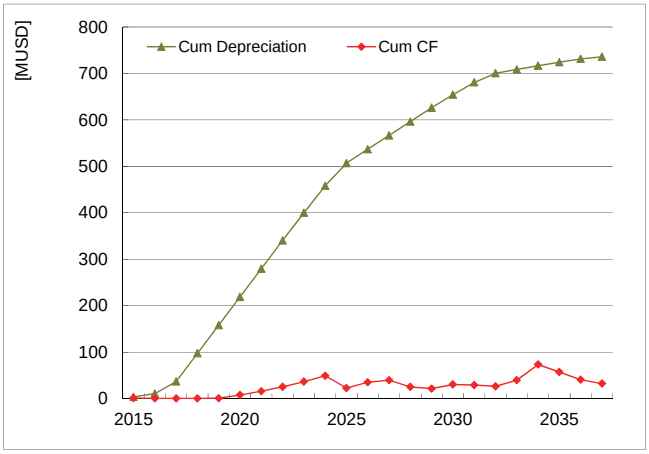


Figure 4.5 Cumulative Cash Flow of O&M organization with Repayment of Initial E&M Assets and Cumulative Depreciation of Initial E&M Assets

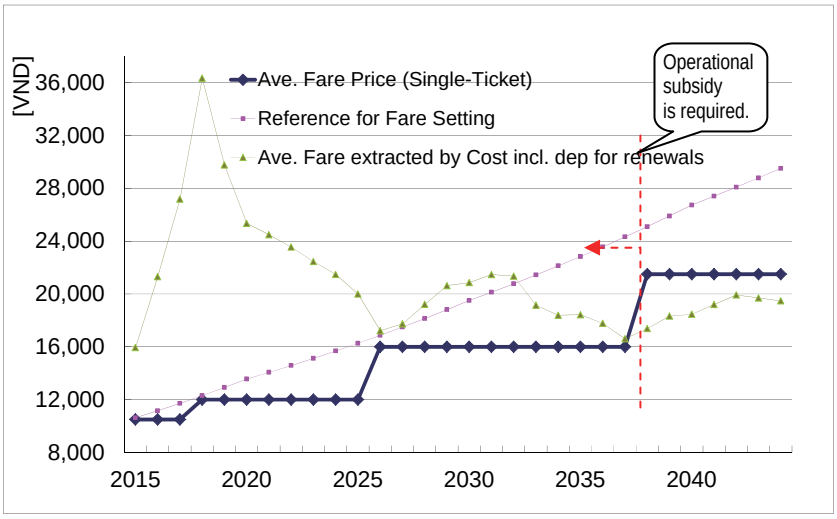


Figure 4. 6 Average Fare Based on Costs including Initial E&M Depreciation

4.4 Proposal for Basic Scheme for the O&M organization

- Charter Capital
  - Initial Capital: At the establishment of the O&M Company there are no railway assets. Therefore capital in cash will be the charter capital. The amount of capital in cash should be decided based on the opening expenses.
  - Contribution in kind: In consideration of the rational coordination of maintenance and renewal (i.e., upgrading, overhaul or replacement) and to enable efficient tax saving, it is recommended that all infrastructure and equipment from the city to the O&M Company be a

contribution in kind. However, since some assets such as bridges are not subjects to renewal work, there are assets that should be retained by the city and provided to the O&M organization free of charge, as shown in the table below.

- Financial Support from HPC

  Basically Study Team plans to develop the financial scheme of the O&M company based on a self-financing source. However, the O&M organization will need financial support from HPC in the following areas.

  - When cumulative cash flow of the O&M organization falls into the red, the company may borrow funds from banks. In this case, HPC provides the O&M organization with some portion of the interest as financial support to mitigate the burden of the interest.

    If the cumulative cash flow were to be greatly in the red, such as from an investment in additional rolling stock or equipment, and the repayment of the principle becomes impossible, HPC could consider supporting a portion of the investment costs. In addition to the above, HPC could also support the O&M company with tax reductions or exemptions.
  - If the cumulative cash flow were to be greatly in the red due to improper suppression of enhancement of fare level by HPC, HPC could consider supporting financially.

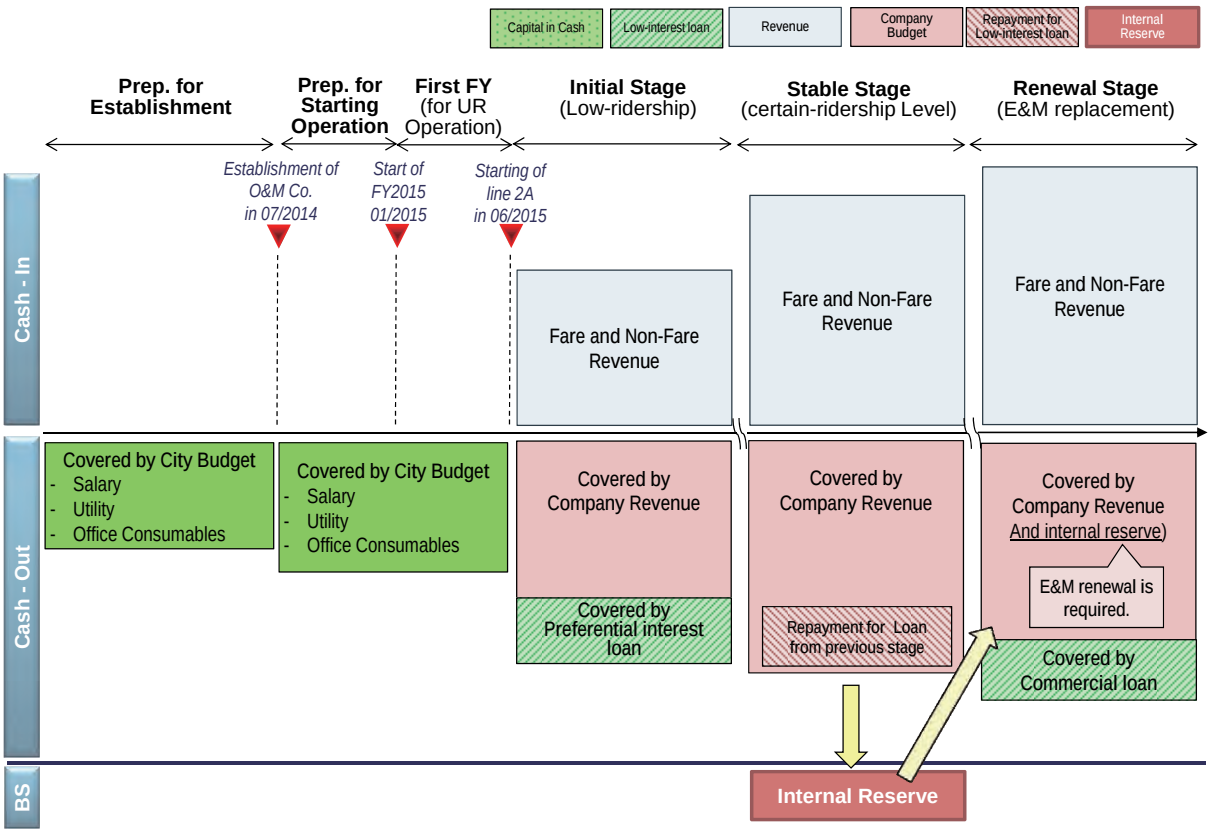


Figure 4.7 Financial Resources of O&M organization

Chapter 5 Roadmap for the Establishment of O&M organization

5.1 Concept of Roadmap

Key dates are as follows:

- The Preparation Unit for setting up of the O&M Company and the railway Regulator will start within this year (2012).
- The O&M Company and railway Regulator will be set up in the middle of 2014.
- The first line for the O&M organization will be put in service in the middle of 2015.

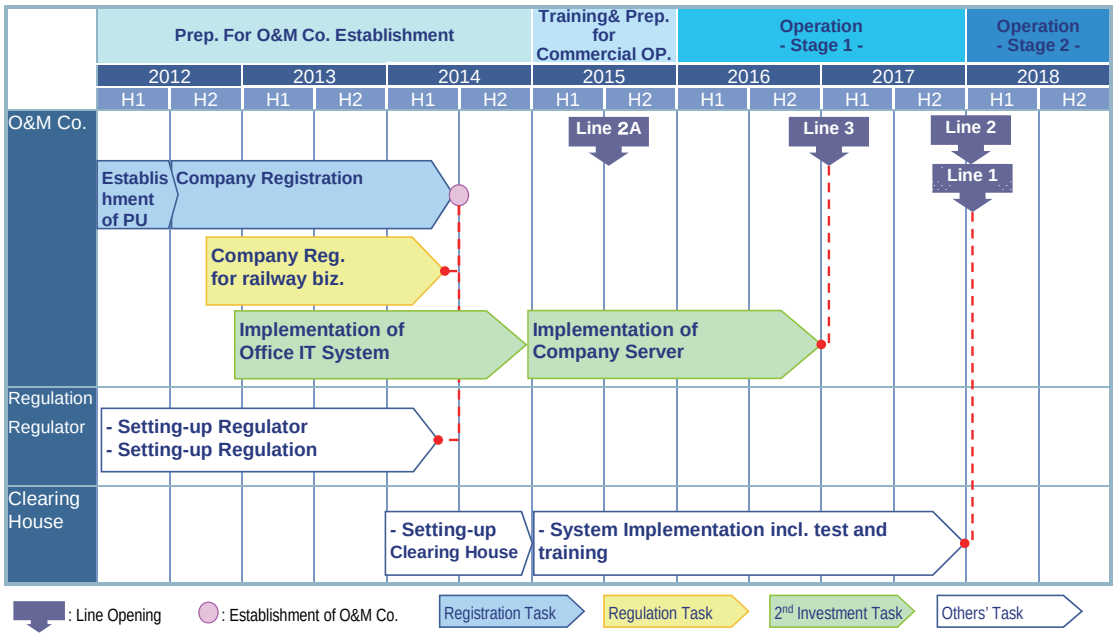


Figure 5. 1 Roadmap for Establishment the O&M organization

5.2 Definition of Time Schedule for Each Line

Because Line-2A ownership will be transferred in the period of July to December of 2014 and the trial run will be conducted between January and July of 2015, the Study Team suggests that the O&M organization should be established and start trial operation by July 2014 at the latest.

Table 5. 2 Identified Timelines for Each Line

Lines	Given Condition	Assumed Milestones			
	Scheduled Date of the Commencement of Operation	Asset Transfer Date	Trial Run	Staff Hiring	
				Management	Staff
Line-2	01/2018	12/2017	06 to 12/2016	06/2016	01/2017
Line-2A[*1]	06/2015	06 to 12/2014	01 to 06/2015	Q1/2012	Q1/2012
Line-3	01/2017	12/2016	12/2016	06/2015	01/2016

Note[*1]: Information regarding staff hiring in Line-2A was obtained from RPMU of VNRA.

5.3 Crucial Issues for the Development of the Roadmap

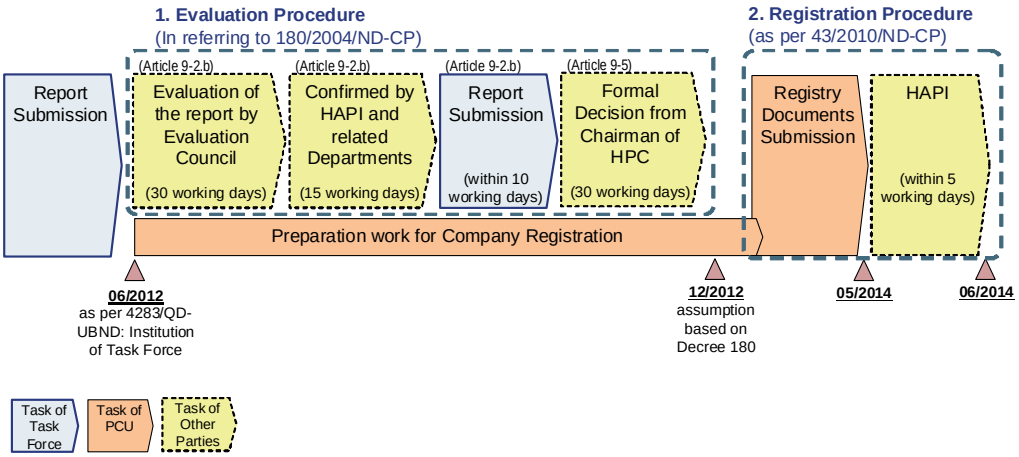
A process of setting up a state-owned enterprise (SOE) currently consists of the following two steps.

Step 1 To get an internal approval within the various state agencies, and

Step 2 To officially register the business.

As Decree 180/2004/ND-CP stipulates, the establishment of a state company such as an urban railway must be confirmed by the related parties before the registration. Upon obtaining confirmation, the registry documents are to be prepared and submitted to authorities in accordance with the enterprise law and related decrees. According to the decision known as “Institution of a Task Force assisting HPC to develop O&M and Exploitation entity program for urban railway lines at Hanoi City” 4283/QD-UBND, the Task Force is requested to submit a final report that includes an “organization, business plan, financial plan and roadmap” to HPC for their approval by the second quarter of 2012. The Study Team understands that the evaluation work stipulated in Decree 180 will be started at this time. Registration documents are to include a draft company charter and a list of authorized representatives as of the date of the company registration.

Because it is the first urban railway company in Hanoi, it is possible that it will take a rather long time to prepare such a report. Therefore the Study Team recommends that HPC should form a preparation unit (PU) for company registration by the date of report submission, December 2012, so that the PU can proceed with the preparation work for company registration in parallel with the evaluation tasks.



*1: Evaluation procedure is based on Decree 180/2004/ND-CP. Decree 180 specifies procedures for the establishment of a new State-owned enterprise, although it must be noted that Decree 180 is for implementing the Law on State Owned Enterprises which, in theory, has been superseded in so far as establishment procedures are concerned, by the Law on Enterprises.
*2: The registration procedure is based on Law on Enterprise 60/2005/Q11 and Decree 43/2010/ND-CP.

Figure 5. 2 Administration Procedure for a State Company

As discussed in Chapter 3, a Regulator for urban railways to govern urban railways in Hanoi is based on the regulation. Whether it is newly established or a part of existing organization, it is an essential component for realizing a sustainable urban railway operation.

One of the important roles of the Regulator for urban railways is to set the fare level for the urban railway. In consideration of the time needed to prepare the business plan for the O&M company, the fare, together with other regulations, must be set one year prior to the opening of Line-2A in July 2014. In addition, the Regulator for urban railways must be sufficiently qualified to supervise the daily operations by the opening date of Line-2A.

The current regulations related to the railway law raise another issue. They have been established to regulate railways in general, including urban railways. However, they have been defined for an intercity railway and utilize experience-based standards. For example, as shown in Table 5.3 a trainee for train driver is required to have 24 months experience as an assistant driver before being licensed as a driver. It can be said that such standards could become huge obstacles to the establishment and operation of an urban railway business. Thus, the Study Team specifies in the roadmap the activities that must be conducted by the relevant Regulator for urban railways and VNRA in order to realize the regulatory development suitable for the expansion of urban railways and their sustained operations in Hanoi City and in other cities in Vietnam as well. These activities should start immediately because these regulations need to be ready before Line-2A starts its trial run in January 2015.

Table 5.3 Legal Constraints in Railway Law and Decrees

Position		Qualification	Work Experience
Personnel in the prime responsibility for technical management of (*1) (*2)	transport operation	A university degree	At least three years' experience in railway transport operation
	railway infrastructure	A university degree	At least three years' experience in operation of railway infrastructures
The leader in charge of safety affairs (*2) (*3)	railway transport	A university degree in railway transport	At least three years' experience in railway transport management
	railway infrastructure	A university degree in railway facilities	At least three years' experience in managing railway infrastructure
Personnel in direct service of train operation (*4)		Professional diplomas or certificates suitable to their titles granted by training establishments recognized by the MoT.	*- Not in particular -*
Train drivers (*4)		Professional diplomas or certificates in driving railway traffic means, granted by training establishments.	Train assistant-drivers for 24 consecutive months or more

*1: Decree 109/2006/ND-CP
*2: This may not apply to all managers but only to the leader of operation/maintenance/safety department of the O&M company.
*3: Decision 61/2007/QD-BGTVT (amended and supplemented by Circular 09/2011/TT-BGTVT) *4: Railway Law 35/2005/QH11

Chapter 6 Setting up of the O&M organization and the Regulator for Urban Railways in Hanoi

6.1 Lines Covered by the O&M organization and Other Issues

As mentioned in Chapter 3, the scheme that covers all lines in Hanoi City under one company is the most efficient. The comparison of two schemes is shown in the table below.

Table 6.1 Comparison of Company Schemes

Item	Scheme A (All lines by one company)	Scheme B (One line by one company)	Remarks
Responsibility of sustainable management	One exclusive company has responsibility.	Each company has responsibility for its own line.	Regulator for urban railways has responsibility for supervising company(s), not for management.
Decision on the investment issues across multiple lines.	It can be done under one management.	If there are different opinions among the lines, it would be difficult to make a decision.	Financial support in Scheme B by Hanoi city could be higher than one in A.
Mutual financial support among the lines.	It can be done under management decision.	It cannot be done without Hanoi City's control.	-
Utilization of human resources across lines	It can be done under management decision.	It cannot be done without Hanoi City's control.	The training about other lines is required prior to a personnel reshuffle.

Source: JICA Study Team

Due to the nature of urban railways, when different companies do not operate on the same tracks it may appear that there is a business monopoly. In this case, it may prompt some concern for passengers as follows.

- Fare price will be increased only for the benefit of the company.
- The company probably is not making an effort to reduce costs.
- The company may allow low levels of service to be acceptable.

The Figure 6.1 shows how the above concern could be eliminated.

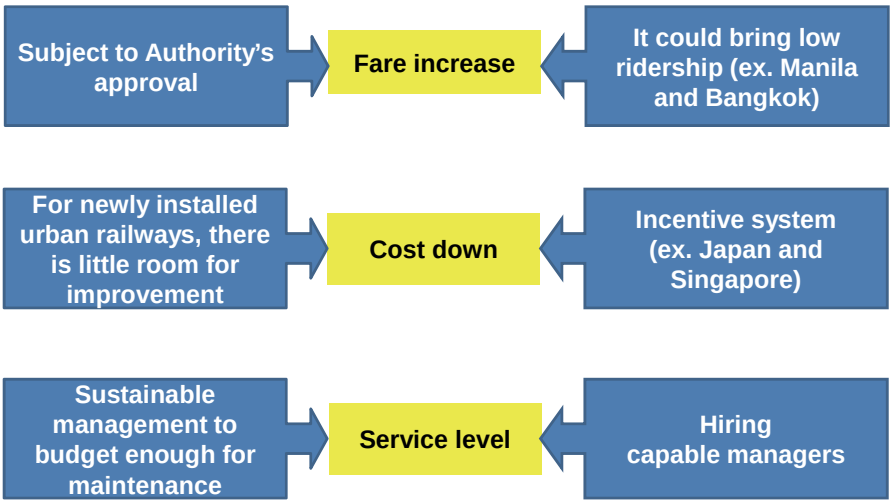


Figure 6. 1 Factors and Strategies to Eliminate Customers' Concern

6.2 Financial Framework

(1) Capital

- The amount of the initial capital will be calculated in the implementation stage.
- After establishment of the company, initial assets are to be contributed in kind to the O&M Company by Hanoi City.

  If all assets were to be contributed to the O&M Company, the asset value of the O&M organization would be huge, causing large depreciation that would lead to a loss. As long as positive cash flow is generated, this would not be problem. However, there are some assets that do not have to be periodically replaced and should be exempted for financial reasons. For example, long-life assets that are utilized over many years, such as bridges, could be among the items to be retained at the city. The details will be discussed with DOF during the Technical Cooperation (TC) project.

Table 6.2 Funding Sources and Repayment Responsibility by Asset Type

Asset Type	Capital (ODA)	Repayment	Ownership of Assets
Infrastructure	Granted from Central Government to HPC	Central Government	Non-replacement assets: HPC own and lend it to O&M company free of charge. Assets subject to periodic replacement such as rails, catenaries etc. should be contributed to O&M in kind.
Equipment and Rolling stock	Transferred from Central Government to HPC on-lending	HPC	O&M company

Source; JICA Study team.

(2) Financial Support

When the cumulative cash flow of the O&M Company falls into the red, the company may borrow funds from banks. In this case, HPC provides the O&M Company with the financial support to cover some portion of the interest (in order to realize a low-interest loan).

In the future, when the cumulative cash flow is likely to result in a large deficit due to the addition or renewal of the facilities, such as rolling stock, and the only possible way for this to occur is with low-interest loans, Hanoi city should consider to partially subsidize these costs in order to avoid this kind of financial problem from occurring. In addition to the above, Hanoi City should support the O&M company finding ways for tax exemptions.

(3) Fare Level

The fare level should be set to match to affordability level of the passengers. (For details, please refer to Chapter 4.) Actual prices will be determined a year before the commencement of the commercial operation of the first line. At this stage, the fare levels are assumed to be as shown in the following table. The fare revising system will be discussed in the next TC project.

Table 6. 3 Fare Level in Respective Year Periods

Year	Fare level in each year	Average fare price
2015-2017	VND 6,800 + 680 x (Travel length in km)	VND 10,500
2018-2025	VND 8,000 + 800 x (Travel length in km)	VND12,500
2026-20370	VND 10,500 + 1,050 x (Travel length in km)	VND16,000
2038-2044	VND 12,000 + 1,300 x (Travel length in km)	VND20,500

Source: JICA Study Team

(4) Business activities of the company

The business activities of the O&M Company will be as follows.

- Operation and maintenance of the urban railway.
- Related businesses using urban railway assets and facilities, such as retail businesses inside stations, advertisements in cars, service activities related the urban railway, telecommunications utilizing optical fiber cables. etc.

These activities will be added to the company based on the actual management conditions and then gradually added to the company charter.

6.3 Involvement of the Relevant Authorities and Companies

The role of relevant authorities and companies are expressed as follows.

(1) Hanoi City: organizing Preparation Unit with MRB and the Joint Coordination Committee

(2) MOT: forming rules and guidelines about safety

(3) VNR (Line-1 Related): being a member of the common fare system

(4) WB and Other Donors: coordinating with relevant authorities and other donors

6.4 Management Control Division, Related Organizations and Staffing Numbers

At the initial stage in 2014, it is recommended that the departments displayed in Table 6.4 be integrated to make the system more efficient. Combining the business department and transport department would create the transport and business department. There are also examples of the rolling stock department and equipment department being integrated to make one department. The initial business of the non-fare section is to be limited to its smallest possible size.

Table 6. 4 Staffing Numbers in Management Control Division (Draft)

Departments			Initial stage (2015) B=A x 1.2 +1	Matured stage (2040) C=A x 3+1
Department	Unit	Unit number A		
Managing director/Deputy MD			2	4
Auditor			1	1
Planning	Management planning, Investment planning and environment	3	5	10
Administration	Administration, secretary, IT, legal affairs and publicity	5	7	16
Safety	Safety planning, incident investigation and operational rule	2	3	7
Human Resource (HR)	Recruitment and appointment, staff allocation, salaries, sanctions, training and welfare and pensions	6	8	19
Financial affairs	Accounting, budget, finance and procurement	4	6	13
Business	Fare level, station business, service and non-fare business	4	6	13
Integrated train operation	Traffic planning, drivers' operation planning and travel time / operation facilities	3	5	10
	Mechanical equipment, electric facilities for rolling stock and inspection	3	5	10
	Tracks, signal/telecom, power supply, low power supply/ architecture, mechanical equipment and AFC	6	8	19
Total		36	56	122

Source: JICA Study Team

Note: The number of dispatchers in the OCC and indirect staff, such as secretaries, are not included (for the number of dispatchers). The number of the Operation Unit staff members is not included.

The following figure shows the organization at the commencement of the revenue operation of Line-2A and what it will look like in the year 2040.

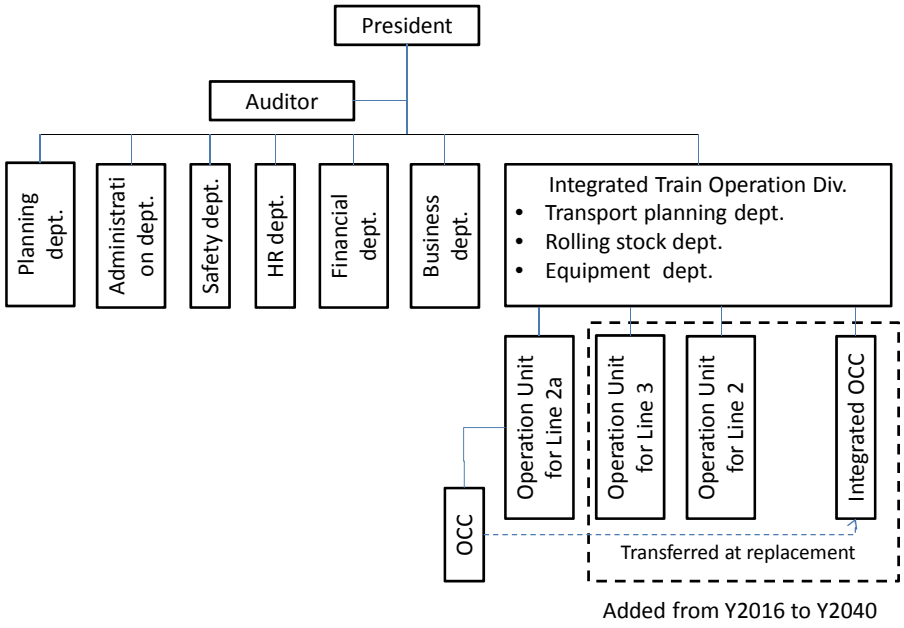


Figure 6. 2 Organization Chart of O&M Organization in 2015 and 2040

Figure 6.2 shows the relationship among the work sites, the Operation Units and the Integrated Train Operation Division. In a typical railway company, the Integrated Train Operation Division is the integration of the transport, rolling stock, and facility departments. The Operation Unit is the organization that is responsible for daily train operations for the designated line. There are work sites beneath the Operation Unit and above it is the Integrated Train Operation Division. Hence it may not be very large in scale and only have a staff of 10 persons at most.

The Railway Projects Management Unit (RPMU) for Line-2A says that there will be 975 staff members at its opening, apparently including the management staff, dispatchers and work site staff. The number of staff for the work site will be 948, which is worked out by sending 10 to the Operation Unit and 17 (as estimated by Study Team) to OCC (975-10-17=948).

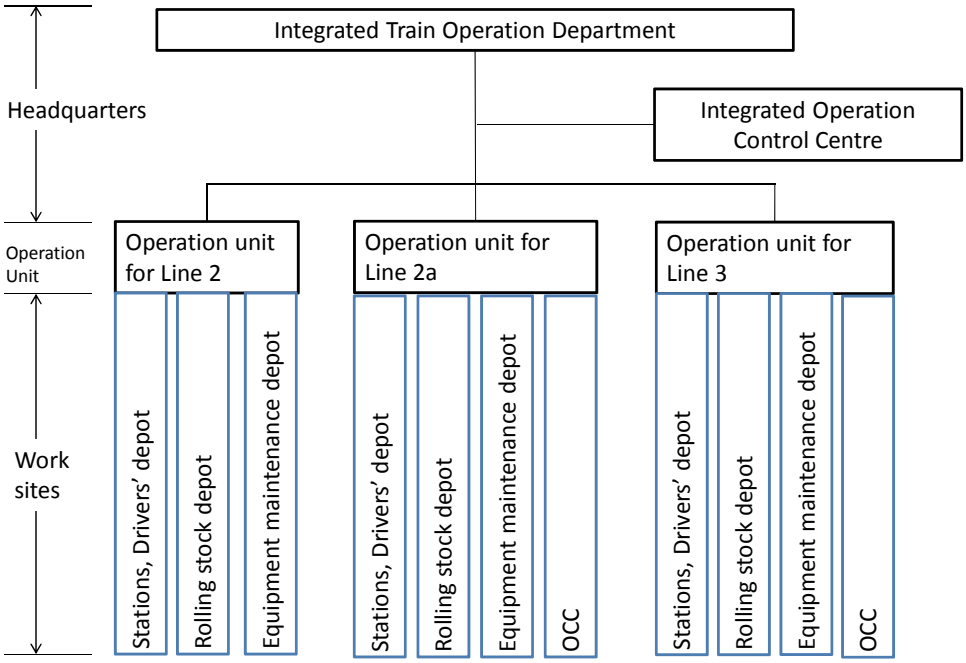


Figure 6.3 Relationship Among Work Sites, Operation Unit and Integrated Train Operation Division

6.5 Integrated OCC and Management Control Division

Given their current status, incorporating Line-2A and 3 into an integrated OCC may cause delay in progress and additional cost. Therefore, Line 2A and 3 should keep their original plan at present and consider integration at the timing of equipment replacement. If the useful life of OCC equipment is 20 years, the completion of an integrated OCC could be achieved around 2035 and 2040. Even if the OCCs for Line2A and 3 not integrated, the operational information can still be shared with the staff in the integrated-OCC by providing operation status monitors for each line.

Table 6. 5 OCC Arrangement

Stage	Integrated OCC	Non-Integrate OCC
1	-	Line-2A
2	-	Line-2A, Line 3
3	Line 2	Line-2A, Line 3
4	Line-2, A and B	Line-2A, Line 3
Completed (Integration at the time of equipment replacement for Line 2A and 3)	Line-2A, Line 2, Line3, Line A & B	-

Source: JICA Study Team

6.6 Office IT System

Some equipment, such as an office IT system in the integrated OCC and the headquarters, is required for the Management Control Division of the O&M organization. At this moment, there has not been any equipment of the kind or buildings planned at any Railway Project Management Unit (RPMU) yet. Funds must be secured in order to provide such items and steps must be taken to arrange the implementation plan.

6.7 Transferring Line-2A to Hanoi City

The following are the major points to be considered when transferring Line-2A to Hanoi City.

Table 6. 6 Major Points of Consideration When Transferring of Line-2A

	VNRA's plan	SAPI's plan	Next Action
Company management	Before, management exclusive to 2A had been in the plan.	One management system for all lines.	Proceed with SAPI's plan.
	Structure of organization and their roles are defined	There is no big difference between SAPI and VNRA.	To be studied in TC project
The staff number in management division	211	Approx. 50	To be studied in TC project
Training outside Vietnam	-Engineering and Operation (10days) - Management (5 days) -Corporate Strategy and Culture (5 days)	Site training in Japan (2 months)	To be studied
Company regulations	To be developed by each department manager	To be developed based on the drafts in HCMC project.	To be studied in TC project
Repayment	O&M organization will repay loan for E&M assets	MOT/Hanoi city will repay loan for E&M assets	Proceed with SAPI's plan

Source: SAPI Study Team

6.8 Investment in the O&M organization

The following investment in the O&M Company needs to be added to the existing construction projects.

(1) Office IT Systems (1.5-2 Billion JPY)

This includes servers to maintain financial data (revenue and expenditure) and HR management data, as well as to manage the email system and intranet website. The number of users is assumed to be 60 people.

(2) Central server for interoperable AFC (1.5-2 Billion JPY)

This server is needed to collect fare data from the line servers for each of the respective lines and maintain them. This fare data is used to calculate total fare revenue as well as the revenue from each line.

(3) Integrated OCC and Building for Management Control Division (0.6 Billion JPY)

Two buildings are to be constructed inside the depot site for Line-2. One is the Integrated OCC building having enough space to house the Integrated OCC for eight lines. At the beginning stage, a building that will only be used for Line 2 will be constructed and then expanded for other lines upon demand including the machine room. The total area would be approximately 2,000 m^2, but the budget would not include equipment procurement costs. The other building would be for the office of the Management Control Division.

Chapter 7 Proposed Detailed Action Plan on Technical Cooperation

7.1 Plan of Operation

A Plan of Operation (PO) is proposed for establishing the O&M Company and the Regulator for urban railways. This is subject to JICA's implementation of the Technical Cooperation agreement. The proposed PO is shown in Table 7.1.

Important points of this PO include:

(1) The General Consultant has the responsibility for developing the organization for daily train operation under the EPC contract. The first line to be operated is assumed to be Line-2A, therefore this Plan of Operation is based on the assumed schedule for Line-2A, which is shown as being a "Main Event."

(2) TC is to support PUC members in charge of establishing the Management Control Office (the HQ) in the O&M organization for urban railways by preparing the necessary rules and know-how.

(3) The actions required for the approval of the HPC out of the actions for the various internal rules prepared by PUC and TC team are Action 2Action 3, Action 5 and Action 9-4.

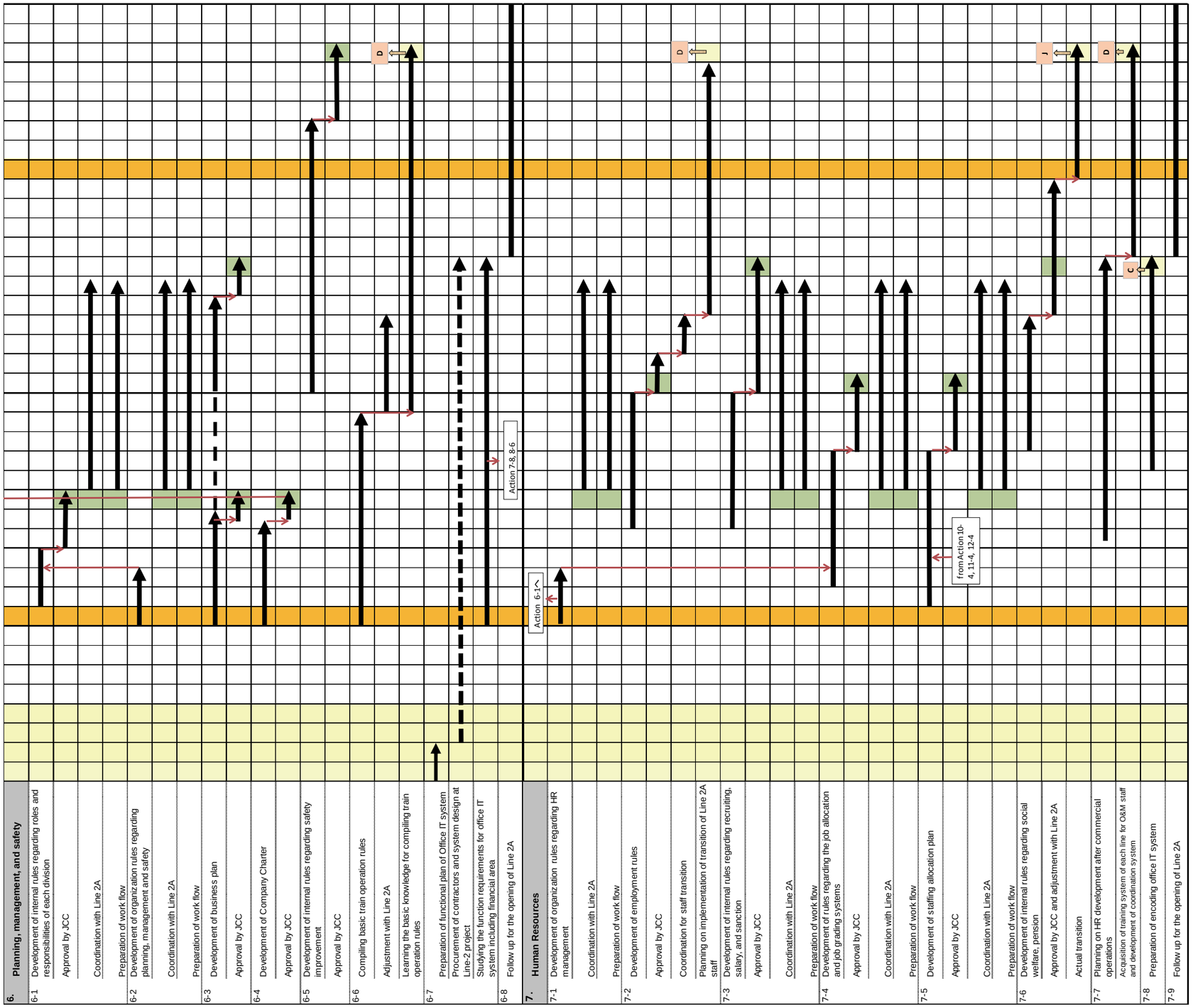
(4) The actions which RPMU on Line-2A and TC need to work with are Action 6-1, Action 6-2, Action 6-6, Action 7-1, Action 7-2Action 7-3, Action 7-4, Action 7-5, Action 7-6, Action 7-7, Action 8-1, Action 8-2Action 8-3, Action 8-4, Action 9-1, Action 9-3, Action 9-6, Action 10-1, Action 11-1, Action 11-2Action 11-5, Action 12-1, Action 12-2and Action 12-5.

(5) All tasks (actions) in TC should be subject to the timing of external factors ("Main Events"), such as the reports and approvals by HPC and JCC for each action for the Line-2A project and should be specified clearly in order to avoid any delay of the work.

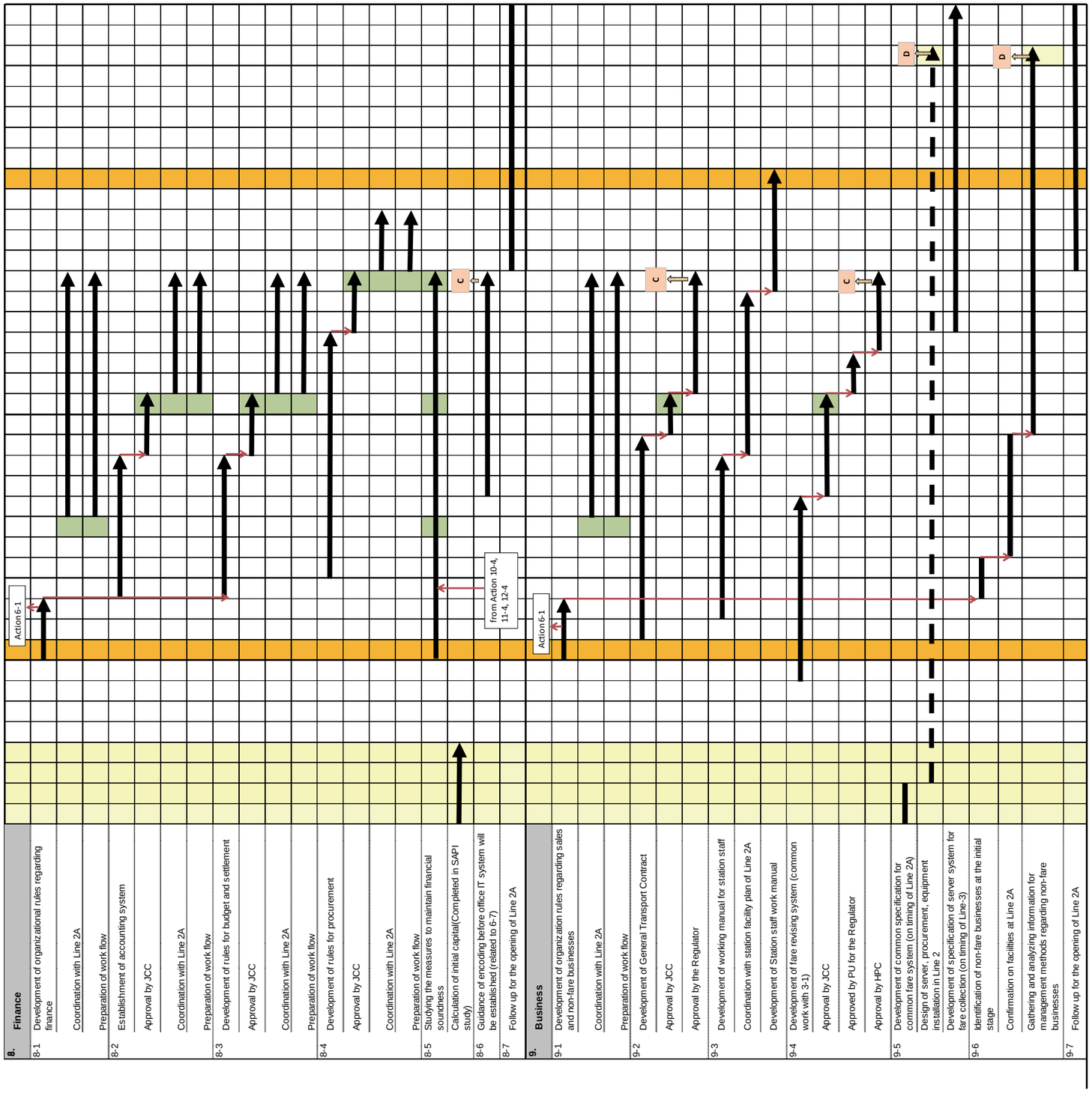
(6) The tasks on this table are considered to be necessary for establishing the O&M Company and the Regulator for urban railways. It should be noted that there are some tasks that are not included clearly on the TOR of TC since they are common to the companies also in Vietnam and it does not need to consider the special features of urban railways to such tasks.

Table 7.1 Plan of Operation (Draft)

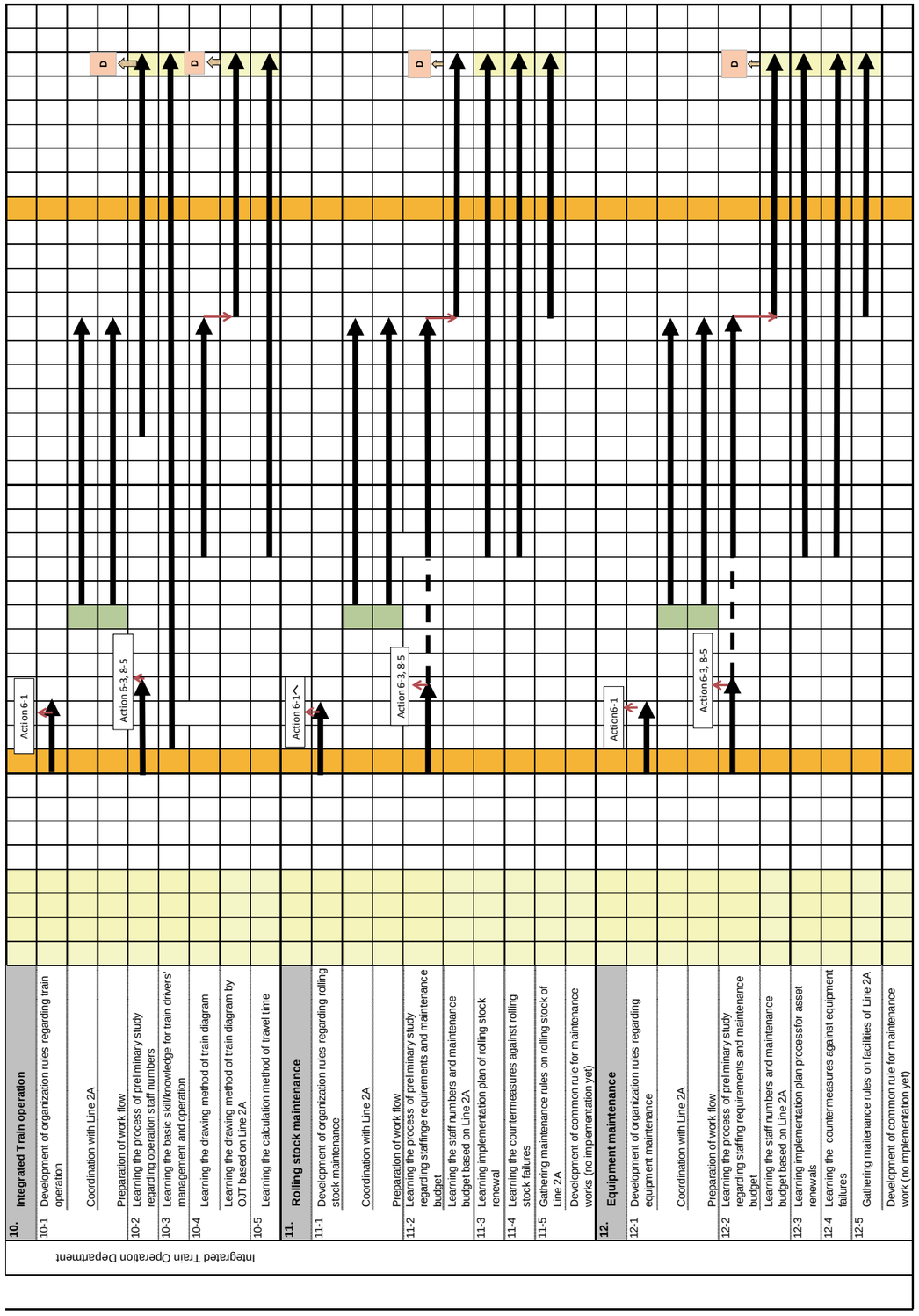
		Project: SAPI	Start of TC	Technical Cooperation	End of TC	Y2013												Y2014												Y2015								
		Actions	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Main Events		**Main event**																																				
	A	Approval on the establishment of the Regulator and the O&M Company by HPC by written document									A																											
	B	Completion of Registration of the O&M Company																									B											
	C	Establishment of the O&M Company																																				
		General consultant (Line 2A) schedule																																				
		Recruiting and training of the staffs for Line 2A (assumption)																																				
	D	Opening of 2A line																												D								
		Schedule of JCC meeting			△																									△								
Preparation	**1**	**Common issues**																																				
	1-1	Allocation of Preparation Unit (common)																																				
		Allocation of PU staff to the Regulator																																				
		Allocation of PU staff to the O&M Company																																				
	1-2	Development of general project implementation plan and its target list (WBS)																																				
		Approval by JCC																																				
Regulator for urban railways	**2**	**Enhancement of the organization for policy management on the urban railways**																																				
	2-1	Coordination on the Regulator plan with MOT																																				
	2-2	Development of the Railway Regulator's organization and the function & powers in the Railway Regulator																																				
		Approval by HPC																																				
	2-3	Study policy menus to encourage use of urban railways																																				
	2-4	Follow up for the opening of Line 2A																																				
	3	**Development of the fare settlement and subsidy system**																																				
	3-1	Development of fare revision system																																				
		Approval by JCC																																				
		Approval by HPC																																				
	3-2	Establishment of subsidy system																																				
		Approval by JCC																																				
		Approval by HPC																																				
	3-3	Studying the fare level of Line 2A at the opening																																				
		Approval by HPC																																				
	3-4	Follow-up for the opening of Line 2A																																				
	4	**Supervision system for train operation plan and safety**																																				
	4-1	Development of draft on the submission system of train operation plan and others to ensure the level of service																																				
		Approval by JCC																																				
	4-2	Re-confirmation with MOT on the management system for safe operation																																				
	4-3	Development of accident report system																																				
		Discussion with VNRA																																				
		Approval by JCC																																				
	4-4	Development of accident investigation system																																				
		Discussion with VNRA																																				
		Approval by JCC																																				
	4-5	Follow up for the opening of Line 2A																																				
	5.	**Registration of the O&M Company**																																				
	5-1	Apply for establishment of Regulator and O&M company by HRB																																				
		Review by HPC																																				
		Registration procedure																																				
		Establishment of O&M Company																																				



		the O&M Company
6.	**Planning, management, and safety**	
6-1	Development of internal rules regarding roles and responsibilities of each division	
	Approval by JCC	
	Coordination with Line 2A	
	Preparation of work flow	
6-2	Development of organization rules regarding planning, management and safety	
	Coordination with Line 2A	
	Preparation of work flow	
6-3	Development of business plan	
	Approval by JCC	
6-4	Development of Company Charter	
	Approval by JCC	
6-5	Development of internal rules regarding safety improvement	
	Approval by JCC	
6-6	Compiling basic train operation rules	
	Adjustment with Line 2A	
	Learning the basic knowledge for compiling train operation rules	
6-7	Preparation of functional plan of Office IT system	
	Procurement of contractors and system design at Line-2 project	
	Studying the function requirements for office IT system including financial area	
6-8	Follow up for the opening of Line 2A	
7.	**Human Resources**	
7-1	Development of organization rules regarding HR management	
	Coordination with Line 2A	
	Preparation of work flow	
7-2	Development of employment rules	
	Approval by JCC	
	Coordination for staff transition	
	Planning on implementation of transition of Line 2A staff	
7-3	Development of internal rules regarding recruiting, salary, and sanction	
	Approval by JCC	
	Coordination with Line 2A	
	Preparation of work flow	
7-4	Development of rules regarding the job allocation and job grading systems	
	Approval by JCC	
	Coordination with Line 2A	
	Preparation of work flow	
7-5	Development of staffing allocation plan	
	Approval by JCC	
	Coordination with Line 2A	
	Preparation of work flow	
7-6	Development of internal rules regarding social welfare, pension	
	Approval by JCC and adjustment with Line 2A	
	Actual transition	
7-7	Planning on HR development after commercial operations	
	Acquisition of training system of each line for O&M staff and development of coordination system	
7-8	Preparation of encoding office IT system	
7-9	Follow up for the opening of Line 2A	



8.	**Finance**
8-1	Development of organizational rules regarding finance
	Coordination with Line 2A
	Preparation of work flow
8-2	Establishment of accounting system
	Approval by JCC
	Coordination with Line 2A
	Preparation of work flow
8-3	Development of rules for budget and settlement
	Approval by JCC
	Coordination with Line 2A
	Preparation of work flow
8-4	Development of rules for procurement
	Approval by JCC
	Coordination with Line 2A
	Preparation of work flow
8-5	Studying the measures to maintain financial soundness
	Calculation of initial capital(Completed in SAPI study)
8-6	Guidance of encoding before office IT system will be established (related to 6-7)
8-7	Follow up for the opening of Line 2A
9.	**Business**
9-1	Development of organization rules regarding sales and non-fare businesses
	Coordination with Line 2A
	Preparation of work flow
9-2	Development of General Transport Contract
	Approval by JCC
	Approval by the Regulator
9-3	Development of working manual for station staff
	Coordination with station facility plan of Line 2A
	Development of Station staff work manual
9-4	Development of fare revising system (common work with 3-1)
	Approval by JCC
	Approved by PU for the Regulator
	Approval by HPC
9-5	Development of common specification for common fare system (on timing of Line 2A)
	Design of server, procurement, equipment installation in Line 2
	Development of specification of server system for fare collection (on timing of Line-3)
9-6	Identification of non-fare businesses at the initial stage
	Confirmation on facilities at Line 2A
	Gathering and analyzing information for management methods regarding non-fare businesses
9-7	Follow up for the opening of Line 2A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Action 6-1
Action 6-3, 8-5
Action 6-1
Action 6-3, 8-5
Action6- 1
Action 6-3, 8-5
Integrated Train Operation Department
10. Integrated Train operation
10-1 Development of organization rules regarding train operation
Coordination with Line 2A
Preparation of work flow
10-2 Learning the process of preliminary study regarding operation staff numbers
10-3 Learning the basic skill/knowledge for train drivers' management and operation
10-4 Learning the drawing method of train diagram
Learning the drawing method of train diagram by OJT based on Line 2A
10-5 Learning the calculation method of travel time
11. Rolling stock maintenance
11-1 Development of organization rules regarding rolling stock maintenance
Coordination with Line 2A
Preparation of work flow
11-2 Learning the process of preliminary study regarding staffinge requirements and maintenance budget
Learning the staff numbers and maintenance budget based on Line 2A
11-3 Learning implementation plan of rolling stock renewal
11-4 Learning the countermeasures against rolling stock failures
11-5 Gathering maintenance rules on rolling stock of Line 2A
Development of common rule for maintenance works (no implementation yet)
12. Equipment maintenance
12-1 Development of organization rules regarding equipment maintenance
Coordination with Line 2A
Preparation of work flow
12-2 Learning the process of preliminary study regarding staffing requirements and maintenance budget
Learning the staff numbers and maintenance budget based on Line 2A
12-3 Learning implementation plan processfor asset renewals
12-4 Learning the countermeasures against equipment failures
12-5 Gathering maitenance rules on facilities of Line 2A
Development of common rule for maintenance work (no implementation yet)

7.2 Implementation Items for Establishment of the Regulator for urban railways for Urban Railways

The roles of the Regulator for urban railways are described at Chapter 3. The first task will be obtaining the approval of HPC for setting up the Regulator for urban railways. The specific tasks of the Regulator for urban railways include the development of a framework for a policy for promoting the usage of the urban railways, the introduction of a fare/subsidy policy and the management of train operation and safety.

Table 7.2 Objectives of the Regulator for urban railways

Item	Details
Role and responsibility	(1)To materialize the policies on urban railways (mainly the ones for promoting the usage of urban railways). (2)To make a plan for fare setting and get approval by HPC. (3)To make a plan for subsidies and get approval by HPC. (4)To monitor the level of services of urban railways (by receiving operation reports from O&M companies and checking the result of operations). (5)To monitor the safety operation of urban railways (by receiving accident reports from O&M companies and conducting investigations if needed).
Organization	There are two options, namely an independent organization under HPC or one of the departments under MRB. [Advantage of independent organization under HPC] Easy to consolidate to PTA [Advantage of one department under MRB] Easy to manage urban railways totally
Budget	HPC is in charge of budgeting this.
Schedule of establishment	A year prior to the opening of the first urban line in Hanoi (July Y2014)

Source: JICA Study Team

7.3 Implementation Items for Setting up the O&M organization

(1) Registration of the Company

The procedures and the time flow for the registration of the company are as shown below.

Table 7.3 Procedures and Time Flow for the Registration of the Company and Commencement of Revenue Operation

Time	Event
End of 2012	• Decision of HP
Middle of 2013	• Recruitment of operation staff
Middle of 2014	• Registration completed • Development of company rules and institution
First half of 2015	• Completion of Line-2A and transferring from MOT to HPC • Opening of Line-2A

Source: JICA Study Team

The charter capital for the registration of the company is as follows.

Table 7.4 Charter Capital of the O&M Organization by Time Period

Time	Establishment of the Company	When Transferring the Assets of Line-2A
Charter capital	The amount of funds required for the operation of the company at the initial stage (mainly the wages and power cost).	The charter capital at the establishment of the company plus the evaluated amount of the assets that are transferred to the O&M company.

Source: JICA Study team

(2) Planning, management, and safety

The business plan is an essential document for explaining the company in general. The main purpose of this at the launch of PUC/TC project is to introduce the basic concepts and the general information about the company to the stakeholders. After the opening of the lines, the purpose is to report about business results and management issues.

Table 7.5 Table of Contents of Business Plan (Draft)

1. Purpose of the O&M company	
2. Target of the train operation by the O&M company	
3. Domain of the O&M company	3-1 Outline of the urban railway network in Hanoi City 3-2 Outline of Line-2A
4. Financial basis of the O&M company	4-1 Capital

	4-2 Fare level 4-3 Financial support from Hanoi city
5. Organization and staffing	5-1 Organization 5-2 Staff number at the initial stage
6. Operation policy of the O&M company for the initial five years	6-1 Safety policy 6-2 Quality of service and fare level 6-3 Policy on financial soundness
7. Financial forecast for the initial five years	7-1 Balance sheet 7-2 Profit and loss table 7-3 Cash flow statement
8. Actions to be taken prior to the opening	8-1 Grand schedule 8-2 Staff training plan 8-3Demarcation of budget between construction project and the O&M company

Source: JICA Study Team

(3) Human Resources (HR)

In the Operation Management Office in each Operation Unit, common sections such as HR will not be independently organized. The Management Control Division of the O&M Company will handle the common sections of the organization, such as HR operations and financial management, from the beginning.

Basically, as each line is the EPC package, the training for operation and maintenance is conducted by each line. There is no urban railway in Vietnam yet; therefore, EPC contractor plans to provide trainings with a special approval of VNRA. However, the training on new staff after commencement is out of the EPC contract and there is no preparation from each project.

- **Table 7.6 Training Plans for Drivers in each Project**

Line		Line-2A	Line 2	Line 3
Staffs for opening	Opening year	Y2015	Y2018	Y2017
	Theoretical training	EPC package	Supplier or Technical Corporation	Supplier
	Practical training	EPC package	Supplier or Technical Corporation	Supplier
	Supplemental training after opening	Not planned		
Staffs after opening	Theoretical training	Railway vocational college or the training center established by the O& M company		

	Practical training	Railway vocational college or the training center established by the O& M company＋the O&M company
	Repetitive training after initial trainings	The O&M company (the training center established by the O& M company)

JICA Study Team

(4) Finance

In this category, not only developing various rules such as accounting system, rules for budget and settlement and rules for procurement but also studying the measures to maintain financial soundness are conducted.

The requirements for accounting system are defined clearly in the accounting regulations and the Tax Laws in Vietnam. The accounting system and internal rules of the O&M Company should be based on these related laws and regulations. The accounting system itself can be handled in the office by the IT system. The practical task for this is simply inputting the accurate data into the system after which the proper accounting treatment will be done automatically.

Table 7.7 Income and Expenses for Railway Operators

Item		Description	Remarks
Expenses	HR Cost	Fixed	
	Power Cost	Proportional to train operation-km	
	Maintenance Cost (Spare parts)	Proportional to train operation-km but it can be adjusted by changing the maintenance schedule intentionally.	It is dangerous to prolong the period for maintenance because of the bad management.
	Depreciation Cost	Fixed	This can be lowered by prolonging the timing of renewal, but this will result in increased maintenance work volume.
Fare Income		Proportional to the number of passengers, not to train operation-km.	

Source: JICA Study Team

(5) Business

The Operation Management Office for each line will not have specific sections for handling common business affairs. The Management Control Division (headquarters) of the O&M Company will conduct the business for passengers of each line from the beginning.

In this category, not only developing General Transport Contract but also various implementation measures such as working manual for station staff, fare revising system and a common specification for a common fare system are prepared.

The General Transport Contract is a contract between the O&M Company and the passengers. The one which made in HCMC TC project can be used. The contracts of buses in Hanoi and VNR as well as the General Transport Contract used by Japanese railway operators can be referred, too.

In the TC project, a fare level at the opening that is affordable by citizens will be proposed based on the estimation by the questionnaire survey and discussions with the PTA study team from the World Bank. While there are numerous ways to establish the fare, such as a uniform fare system and a zone fare level, the distance-based fare system to be adopted in HCMC should be studied. This system consists of the initial fare plus the boarding distance multiplying the unit fare per kilometer (rounded up to 1000VND). Discount fares and the discount ratio also have to be defined. In this case, it should be clarified whether Hanoi City is to bear the loss incurred by the discounting or not. Consensus building among stakeholders will be required.

(6) Train Operation

Regarding the train operation, the Management Control Division (HQ) of the O&M organization is in charge of planning and inter-line relationships. Train operation department of Management Control Division (HQ) is in charge of the Integrated OCC. However, at the opening stage of Line-2A, the dedicated OCC for Line-2A will be used so that the integrated OCC will not be in use at that time.

In this category, not only developing the internal rules but also various implementation measures for train operation, such as estimation of operation staffs, management skill/knowledge for drivers' operation, drawing train diagrams and estimation of travel time are prepared.

(7) Rolling Stock Maintenance

Maintenance Department of the Management Control Division (HQ) of the O&M Company is in charge of planning and inter-line relationships out of the rolling stock maintenance.

In this category, not only developing the internal rules, but also various implementation measures for rolling stock maintenance, such as on the estimation of required staff number and budget, rolling stock renewal and reduction of failures are prepared.

In consideration of the fact that staff may be transferred among lines, it is best to unify the terminology, order of descriptions, explanations, etc., used for rolling stock maintenance. The internal rules for rolling stock maintenance and the technical standards are closely related to the specifications of rolling stock. Therefore each line project has to prepare its internal rules at the beginning stages of the line. PUC will receive the report regarding these internal rules from the Line-2A Project as they are prepared.

(8) Equipment maintenance

Maintenance Department of the Management Control Division (HQ) of the O&M Company is in charge of planning and the inter-line relationships for the equipment maintenance.

In this category, not only developing the internal rules, but also various implementation measures for equipment maintenance, such as on the estimation of required staff number and budget, equipment renewal and reduction of failures are learnt.

In consideration that staff may be transferred among lines, it is best to unify the terminology, order of descriptions, explanations, etc., used for equipment maintenance. The internal rules for equipment maintenance and the technical standards are closely related to the specifications of equipment. Therefore each line project has to prepare its internal rules at the beginning stages of the line. PUC will receive the report regarding these internal rules from the Line-2A Project as they are prepared.

7.4 Tasks of Experts until TC Starts Operation

(1) Support for the summarization of conditions for the smooth transferring of Line-2A for securing safety operation.

(2) Support for the development of rules among PUC entities

7.5 Preparations to be Completed by the Vietnam Side

(1) To set up the Preparation Unit for establishment of the Regulator for urban railways and the O&M organization

(2) Preparation of office

(3) Preparation of Vietnamese -English translation system for documentations

7.6 Preparation of TOR

Followings are the tentative TOR.

Table 7.6 Tentative TOR for TC

Area	Theme	Term
Common		Preparatory study (Management training course and study tour in Japan)
		Development of general project implementation plan and its target list (Work Breakdown Structure)
		The follow-up work for Line-2A operation
The Regulator for urban railways	Establishment of the Regulator for Urban railways	Coordination on the Regulator plan with MOT
		Development of the Regulator for urban railways organization and the function & powers in the Regulator for urban railways
		Study policy menus to encourage use of urban railways
	Development of the fare settlement and subsidy system	Development of fare revision system
		Establishment of subsidy system
		Studying the fare level of Line-2A at the opening
	Supervision system for train operation plan and safety	Development of draft on the submission system of train operation plan and others to ensure the level of service
		Re-confirmation with MOT on the management system for safe operation
		Development of accident report system
		Development of accident investigation system
The O&M company	Planning, management and safety	Registration of the O&M company
		Development of internal rules regarding roles and responsibilities of each division
		Development of organization rules regarding planning, management and safety
		Development of business plan

Area	Theme	Term
		Development of company charter
		Development of internal rules regarding safety improvement
		Compiling basic train operation rules
		Preparation of functional plan of office IT system
	Human Resources	Development of organization rules regarding HR management
		Development of employment rules
		Development of internal rules regarding recruiting, salary, and sanction
		Development of rules regarding the job allocation and job grading systems
		Development of staffing allocation plan
		Development of internal rules regarding social welfare and pension
		Planning on HR development after commercial operations
		Preparation of encoding office IT system
	Finance	Development of organizational rules regarding finance
		Establishment of accounting system
		Development of rules for budget and settlement
		Development of rules for procurement
		Studying the measures to maintain financial soundness
		Guidance of encoding before office IT system will be established
	Business	Development of organization rules regarding sales and non-fare businesses
		Development of general transport contract
		Development of working manual for station staff
		Development of fare revising system (common work with the regulator division)
		Development of common specification for common fare system (on timing of Line-2A)
		Identification of non-fare businesses at the initial stage
	Train operation	Development of organization rules regarding train operation
		Learning the process of preliminary study regarding operation staff numbers
		Learning the basic skill/knowledge for train drivers' management and operation
		Learning the drawing method of train diagram
		Learning the calculation method of travel time
	Rolling stock maintenance	Development of organization rules regarding rolling stock maintenance
		Learning the process of preliminary study regarding staffing requirements and maintenance budget
		Learning implementation plan of rolling stock renewal
		Learning the countermeasures against rolling stock failures
		Gathering maintenance rules on rolling stock of Line-2A

Area	Theme	Term
	Equipment maintenance	Development of organization rules regarding equipment maintenance
		Learning the process of preliminary study regarding staffing requirements and maintenance budget
		Learning implementation plan processor for asset renewals
		Learning the countermeasures against equipment failures
		Gathering maintenance rules of facilities of Line-2A

Source: JICA Study Team

7.7 Expert Configuration

(1) Since commercial operation of Line-2A will start in mid-2015, there is a need to establish the Regulator for urban railways and the O&M company early enough to enable making the preparations for the line opening. The project period for establishing the two institutes is two years from December 2012, and tentative staff configuration is based on the condition that the O&M Company starts its operation by the middle of 2014 and Line-2A starts its revenue operation in the summer of 2015.

(2) In this project, Vietnamese staff in the PUC is assumed to prepare the contents of TOR proactively, based on advice and information from the experts.

(3) The role of the experts is to provide Vietnamese staff with the information necessary for their study and to validate the appropriateness of the draft they prepare.

(4) Common language between the experts and Vietnamese staff should be English. Both sides are to prepare documentation and discusses in English, but they may exchange their ideas on a daily basis by using a Vietnamese /Japanese translator.

(5) Based on our observations, Vietnam side does not have much experience on urban railways. In addition, they also have a limited understanding of the framework of a “company” since they are basically public servants. Therefore, it is needed to input the experts as much as possible.

(6) It is desirable that the experts involved in this TC have management experience in railway companies.