Socialist Republic of Viet Nam
Ho Chi Minh City Department of Transport
Ho Chi Minh City Management and Operations Center for Public Transport
Ho Chi Minh City Department of Science and Technology

Collaboration Program with the Private Sector for Disseminating Japanese Technology for Ho Chi Minh City Public Transport Bus ICT System in Vietnam

Final Report

(Summary)

September, 2016

Japan International Cooperation Agency

NEC Corporation

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Chapter 1 Background and Outline

1.1 Background and Purpose of this Program

1.1.1 Background

In Japanese Development strategy to Vietnam, it is stated that “For achieving sustainable economic growth, Vietnam should deal with increasing demand for transportation and rapid urbanization. Further, it requires improvement of transport network that contributes to smooth and safe distribution of goods as well as human mobility.” Under this strategy, the Mass Rapid Transit (MRT) Line 1 in Ho Chi Minh City (HCMC) is being implemented by Japan International Cooperation Agency (JICA). At the date of MRT’s starting commercial operation in 2020, it is important to work as the public transport network with strong linkage with the existing bus system.

The existing bus system, however, has some issues such as an increase subsidy cost due to decline in ridership. The continuity of stable operation becomes a question from financial viewpoint. Reportedly, it is indispensable to improve financial efficiency by rearranging the operating routes. In response to this situation, some new devices such as a conductor-less fare box and a smartcard have been implemented as models of cost-cutter. A conductor-less fare box system, however, needs more time for a fare collection than a conductor system. It significantly affects punctuality of the operation. Some drivers receive passengers on slow-speed operation to keep a time-table. It becomes a safety issue.

In view of the above situation, it can be said that it is difficult to resolve the development issue without the stabilization of bus operation. In other words, the financial improvement of bus system with keeping its safety aspect is indispensable to resolve the development issue: “smooth and safe human mobility in HCMC.”

1.1.2 Purpose

This program has been conducted to introduce NEC’s Information and Communication Technology (ICT) system which has a potential to resolve the issues described in the previous sub-section above.

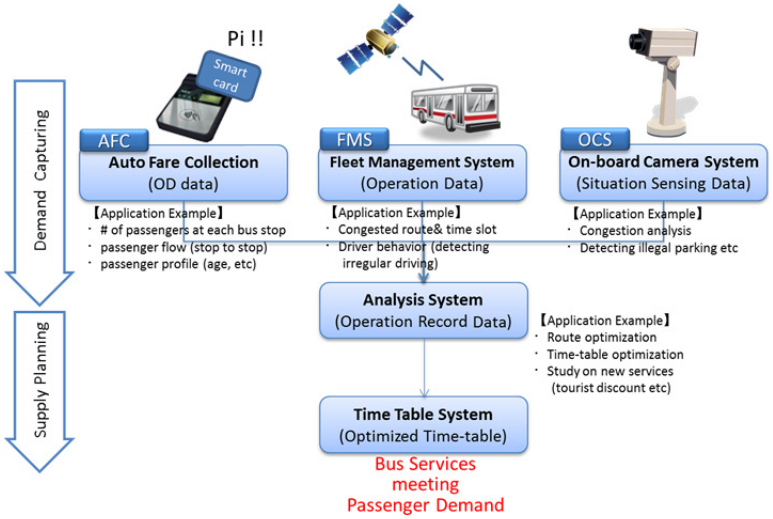


Figure 1.1 NEC Group Bus ICT System

1.2 Implementation Process and Organization

In order to establish a fiduciary relation with Vietnamese side, this program have been performed on a fact basis. Firstly, our team spent much time for filed-surveys and document review to extract issues on existing bus, and then reviewed them with stakeholders to share the same point of view. After that, our ICT system were introduced via case studies similar to HCMC's issues. At the end, business models have been examined to see its feasibility.

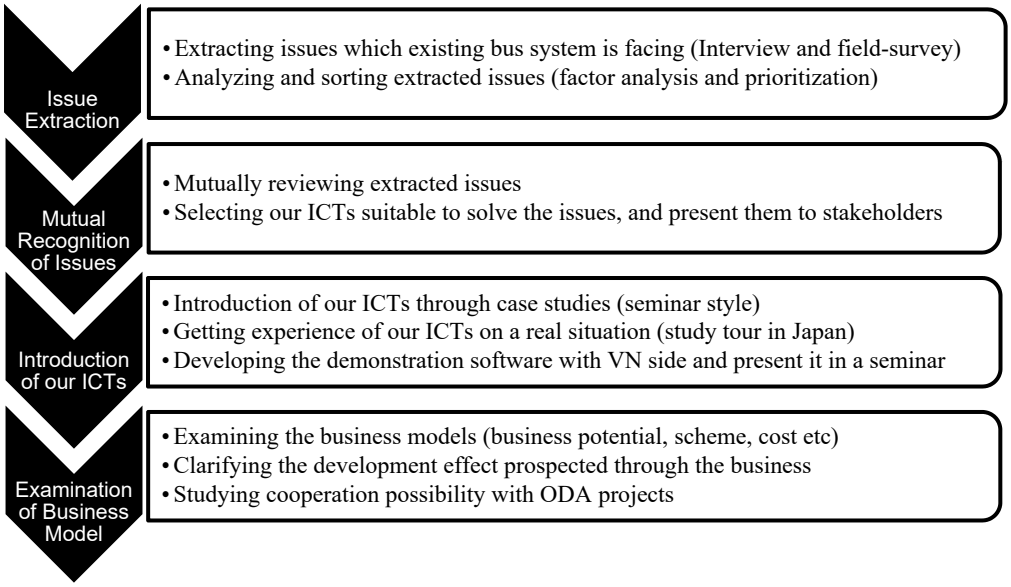


Figure 1.2 Implementation Process

The organizations involved in this program are as follows.

Japanese Side:

- NEC Corporation
- NEC Nexsolutions, Ltd.
- NEC Laboratories Singapore
- NEC Vietnam Co. Ltd.
- ABeam Consulting Ltd.

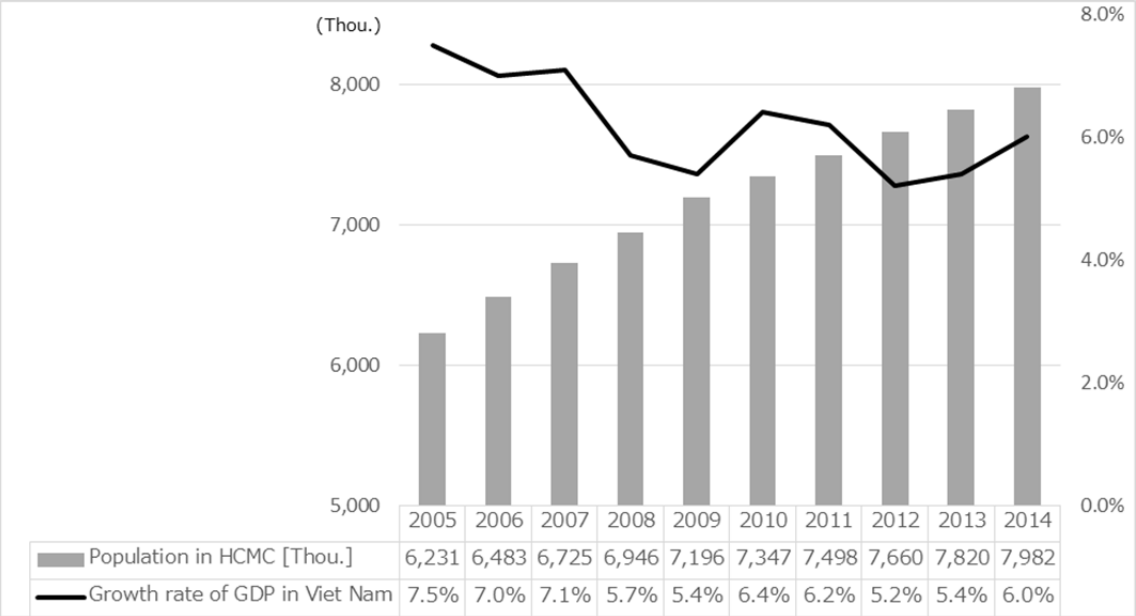
Vietnamese Side (Ho Chi Minh City):

- Department of Transport (DoT)
- Management and Operations Center for Public Transport (MoCPT)
- Department of Science Technology (DoST)

Chapter 2 Current Situation and Issues in Viet Nam

2.1 Overall Issues of Vietnamese Transport Sector

The Vietnamese GDP annual growth rates for the most recent decade maintain 5% or more. With a steady economic growth, the population of HCMC, the biggest commercial city of the country, has been rapidly increasing (Figure 2.1). Thanks to increase the income based on an economic growth and in population, the registration number of motorcycles in HCMC reached 7.43 million in 2015 (by simple calculation, people more than 90% of the total population in the city possess a motorcycle each). It shows an approximately 2 million increase in comparison with 2011[1]. Due to this situation, a traffic congestion by increase in private traffic volume such as motorcycles becomes an issue of HCMC. In responding to this issue, the construction of urban transport system such as MRT and BRT (Bus Rapid Transit) is being conducted as a key for the transport network expansion.



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Population in HCMC [Thou.]	6,231	6,483	6,725	6,946	7,196	7,347	7,498	7,660	7,820	7,982
Growth rate of GDP in Viet Nam	7.5%	7.0%	7.1%	5.7%	5.4%	6.4%	6.2%	5.2%	5.4%	6.0%

Figure 2.1 Changes in Population and the GDP Growth Rate of Ho Chi Minh City
Source: Data of General Statistics Office of Vietnam

2.2 Key Issues of Transport Sector in Ho Chi Minh City

2.2.1 Development Issues of the Transport Sector in Ho Chi Minh City

It was reported that the modal share of the bus at 2002 covered just 4%[2]. It was an extremely low level than one of other Asian cities such as Bangkok. The Vietnamese government set, a specific agenda for a modal share of HCMC to improve such a situation, and struggles with implementation of public transport network and improvement of the existing bus service. (Figure 2.2)

[1] Thanh Nien News (January 6, 2016)
http://www.thanhniennews.com/society/ho-chi-minh-city-now-has-74-million-motorbikes-and-counting-57787.html
[2] JICA HAUTRANS Final Report (2002)

The detailed improvement measures are specified in the Decision No. 280/QD-TTg "approval of the public bus development project from 2012 through 2020". It mentions the introduction of the new technology for the operation management of the public bus.

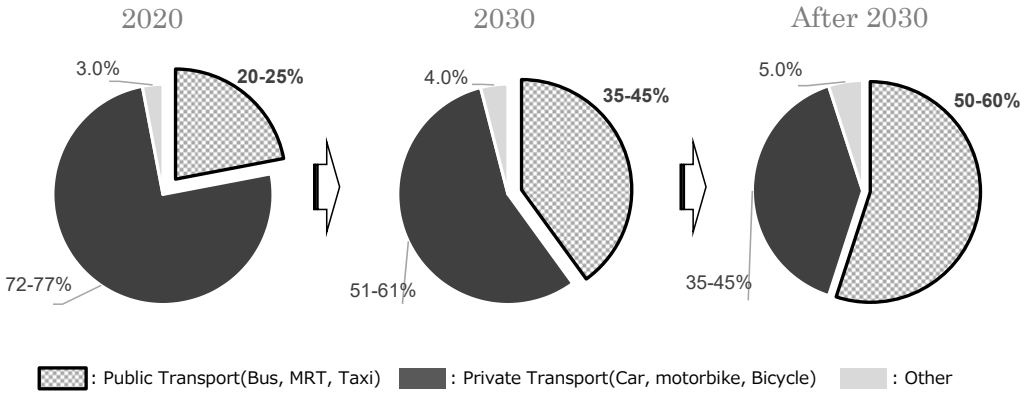


Figure 2.2 Target of Modal Share in HCMC

Source: Decision No.568/QD-TTg dated April 08, 2013 of the Prime Minister approving the adjustment for the transportation development planning of Ho Chi Minh in 2020 and the vision to 2030)

2.2.2 Outline of Public Transport Network Improvement

As articles of public transport network implementation in HCMC, several projects towards the starting of MRT and BRT are being conducted. As MRT's, 6 routes radially expended from the central are planned (2 lines are currently under construction), and the first route is going to open in 2019. As BRT's, 6 routes are planned by the World Bank, and the first one is going to open in 2019.

2.2.3 Current Situation of Existing Bus System

As of 2014, the number of existing bus vehicles in HCMC was approximately 2 times of the one of Tokyo metropolitan. From the view point of capacity, it is enough to maintain a certain level of transport modal share (Table). The fare price is set at 5,000VND to 6,000VND (20 to 30 JPY)[3] for a general passenger. It can be said that HCMC offers a certain scale of bus network at affordable price level.

Table Public Bus Market Scale in HCMC and Tokyo

	HCMC (*1)	Tokyo(*2)
Number of vehicles	2,794	1,452
Number of routes	137	129
Route total distance	3,438 km	1,072 km
Average route distance	23.7 km	8.3 km
Annual ridership(million people *3)	366	214

Source*1: Document from MOCPT (as of 2014: reporting result of all bus companies' operation)
*2: Bureau of Transportation, Tokyo Metropolitan HP (as of April 1, 2015)
*3: FY2014 data both cities

[3] It represents approximately 0.1% of 3-year-experienced general works' monthly salary.

Despite of a certain scale of bus services and a steady growth in the population of HCMC, the ridership of existing bus tends to decrease since 2014.[4] (Figure 2.3) In our interview on this point, MOCPT mentioned that deterioration of vehicle and degradation in operation management including crew services may influence of decreasing ridership. It suggests that it is necessary to perform "qualitative improvement of the bus service" to achieve the modal share target.

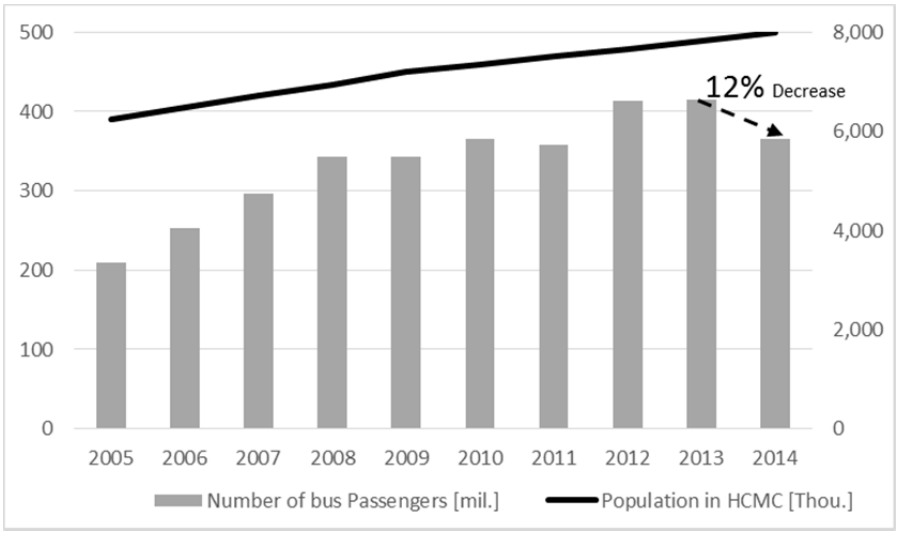


Figure 2.3 Changes in the Existing Bus Users of HCMC
Source: Data of General Statistics Office of Vietnam

In addition to a decrease the revenue due to a decrease in ridership, other several factors such as: extension of route length[5]; increase of the number of routes; remarkable rise of personnel expenses; and cost-increase due to price rises, are affecting the amount of subsidy for the bus companies. The subsidy amount in 2013 finally reached 139.1 billion VND.

From the situation above, it is important to struggle with assuring with the long-term sustainability of transport network thorough financial renovation based on a increase in ridership to be consequently achieved after a qualitative improvement for rising customer satisfaction. Although "a qualitative improvement for rising customer satisfaction" may vary depending on each passenger's willingness, it should be, at least as a urgent target, "passenger can go to its his/her destination at his/her desirable time, within his/her allowable travel time and at a certain service level" in considering the original function of bus system.

[4] Reportedly, it again fell to 320 million in 2015. It is a decreasing in consecutive two years.
Nikkei Asian Review (April, 4, 2016) http://asia.nikkei.com/Business/Trends/First-bus-ads-for-Ho-Chi-Minh-City
[5] According to MOCPT document, it was extended 3,438km and approximately 1.8 times for 1,846km of 2002 in 2014.

Chapter 3 Activities' Contents and Results

3.1 Issue Extraction

Our team conducted an issue extraction to see the situation of existing bus operation as follows, and summarized the extracted issues as shown in figure 3.1.

3.1.1 Interview to the Stakeholders

In order to collect the stakeholders' perspectives to bus operation, we conducted several interviews as shown below.

- Public bus-related organization of HCMC (DOT, MOCPT, DOST, and UCCI)
- Bus Companies (Saigon Bus and 19/5 Cooperative Transport)
- Passengers (frequent users and non-frequent users)
- The transport-related Japanese companies involved in Vietnamese transport projects

3.1.2 Field Survey

For obtaining deep-insight on the bus operation, our team took test-rides on Route 1, Route 3 and Route 33 arriving at and departing from the central bus terminal (Ben Thanh Market) of the HCMC. It was performed several times in order to neutralize the difference in vehicle ages and operation types: conventional and conductor-less.

3.1.3 Bibliographic Survey

For further understanding, we reviewed the following documents:

- Legal documents (Decrees, HCMC people committee's Decisions, penalty rules for bus companies);
- Document provided by MOCPT (report of present conditions of the existing bus, Contract sample of MOCPT and bus company, Report of current situation);
- Survey reports related to public transport issued by the official agencies such as JICA; and
- News articles

3.2 Mutual Recognition of Issues

Our team reviewed, mutually with DOT and MOCPT, the issues on existing bus operation extracted through the activities listed in the previous section 3.1 and its factors. As a result of considering priority and importance on those factors, it has been decided with DOT and MOCPT to focus on the following two points for introducing out ICT system. (Figure 3.1: highlighted part)

- Due to a problem derived from unbalance between passenger's demand and fleet management (supply), passengers are forced to wait bus for long-time or not able to take a bus service.
- Although education programs have been developed, it is not able to get drivers' understanding on safety issues effectively due to a penetration problem.

Issue	Ideal situation of bus transport				Collected Information		Factors
					Current Issues	Current Efforts (Plan)	
Alleviation of Congestion (Increase of bus in modal share -> providing bus service to be chosen by people)	I	Users can go to their destination at their desired time and within their allowable travel time	1	Covering their destination	●Bus route does not cover their destination and home(start point).	Bus routes are developed by: ●DOT/MOCPT's planning ●bus companies' proposals (although the number of routes have been increased)	●Mismatching between bus-routes(supplies) and passenger needs(demands).
			2	Space for passenger in bus can be expected when they want to use a bus	● Often necessary to wait for long time due to full-loading and/or lack of vehicles ● Limited operation hours (finish at 19:00 - 20:00)	[Punctuality] ● Supervising by MOCPT at field ● Checking/Reporting by bus companies ● Considered the traffic congestion for timetable at some level (Not quantitative endorsement, explanation of validity of plan become difficult level. Unpunctuality is imposed penalties to the bus companies, but the unpunctuality due to the traffic congestion is excluded for the penalties.) [Availability] ●Broadcasting real-time operating information (current position of bus and estimated time to the destination is displayed, but it is deviate with actual situation because estimated time is based on the fixed travel time.)	●Mismatching between bus demands and passenger needs on the number of fleet
					●Hard to forecast the waiting time at bus stop during peak-hour		●Inadequacy of optimizing time table considering traffic congestion ●Bus operation is directly affected by traffic-congestion
			3	Operating to the destination within their allowable travel time	●Hard to forecast the duration to the destination		
	II	Bus is available at a certain service level	1	Operating on a condition securing traffic safety is secured	Inadequacy of driving manners ● When arriving/leaving at the bus stop e.g. non-stopping completely at bus stop ● During driving e.g. over-speeding, acceleration/stopping, calling on the phone, eating, giving/receiving fares/tickets in case of one-man bus	[Framework] ● Penalties on the violation to the bus companies/drivers	●Mechanism to prioritize punctuality rather than safety because it has penalties of decrease in income ●Because conductor-less bus become mechanism of necessity fare collection time, the punctuality has been prioritized further.
						[Training] ●mandatory training to drivers by MOT (for starting to work as drivers) ●Periodical training to drivers by bus companies	●inadequacy of driver's comprehension (depending on individuals)
						[Monitoring] ●Supervising by MOCPT ●Supervising by bus companies through GPS and CCTV	● Inadequacy of supervision (due to the limitation of man-power)
			2	Operating on a condition securing safety in a bus	●Occurrence of crime such as pickpocket	-	● Criminals are come out of prison soon (recidivist)
						●Supervising by MOCPT ●Supervising by bus companies through CCTV	●Limitation of man-power for supervision ●Limitation of man-power for supervision utilizing CCTV

Figure 3.1 The Present Situations and Factors of the Existing Bus of HCMC

3.3 Introduction of our ICT System

3.3.1 Seminar on Bus ICT System of NEC Group

We held a seminar for the parties involved in public bus transport services to demonstrate the usefulness of our ICT system for the issue of the existing bus of HCMC.

- Time/Place : November 25, 2015 8:00 – 12:00 / Meeting room in DOT
- Participant : 32 people (including Mr. Le Hoang Minh, vice-director of DOT)
- Contents :

#	Major Topics	Presenters
1	Issues of HCMC bus and its factors	ABeam Consulting
2	Case Study: Optimization in frequency of bus services (Japan)	NEC Nexsolutions
3	Case Study: Optimization in interval of bus services (Singapore)	NEC Lab. Singapore
4	Case Study: Optimization in bus driver training (Singapore)	NEC Lab. Singapore
5	Case Study: Subject recognition at bus stations (Japan)	NEC Nexsolutions
6	The Way Forward: Smart Transport	NEC Corporation

3.3.2 Study Tour in Japan

We conducted the study tour in Japan (5 days) for obtaining Vietnamese side's better understanding on our ICT system on a real-situation. In this tour, all participants were able to experience how to use transport-smartcards at range of services. We understand that all participants obtained deep-insight on our ICT system through this tour.

1) Participants：

	Name	Department	Position
1	Mr. Le Hoang Minh	DOT	Vice Director
2	Mr. Nguyen Duc Tri	MOCPT	Deputy Director
3	Ms. Nguyen Nht Thanh Tam	HCMC People Committee	Officer
4	Mr. Pham Quoc Phuong	DOST (Technology GIS Center)	Director
5	Mr. Trinh Tuan Hung	DOT	Officer

2) Contents：

【Visit】

- NEC Group
- Ministry of Land, Infrastructure, Transport and Tourism
- Bus Operator
- Railway Operator
- Companies related to Smartcard

【Test ride】

- Toei Bus
- Yamanote line (MRT) and YURIKAMOME (LRT)

Ride on Bus using smartcard

Visit to NEC showroom

Shopping using smartcard

Ride on MRT using smartcard

(Picture of Study Tour in Japan)

3.3.3 Final Seminar

As the end of this program, the final seminar at DOT was held in order to report the result of our activities.

- Time/Place : May 24, 2016, 8:30 – 12:00 / Meeting room in DOT
- Participant : 26 people (including Mr. Le Hoang Minh, vice-director of DOT)
- Contents :

#	Major Topics	Presenters
1	The results of this Program	ABeam Consulting
2	Demonstration: Passenger-Trend-Analysis System	NEC Nexsolutions
3	The Way Forward: Interoperability of Smartcard	ABeam Consulting
4	Case Study: Command Center (Singapore)	NEC Lab. Singapore

In order to demonstrate that our ICT system is able to be adopted to HCMC's situation, graphical explanation of our Analysis system has been performed using the demonstration software developed in this program. The system image is shown in figure 3.2. In the seminar, the software were able to suggest that: there may be some space to improve the efficiency of fleet management; and the number of buses a day could reduce 161 to 112 in terms of cost reduction.

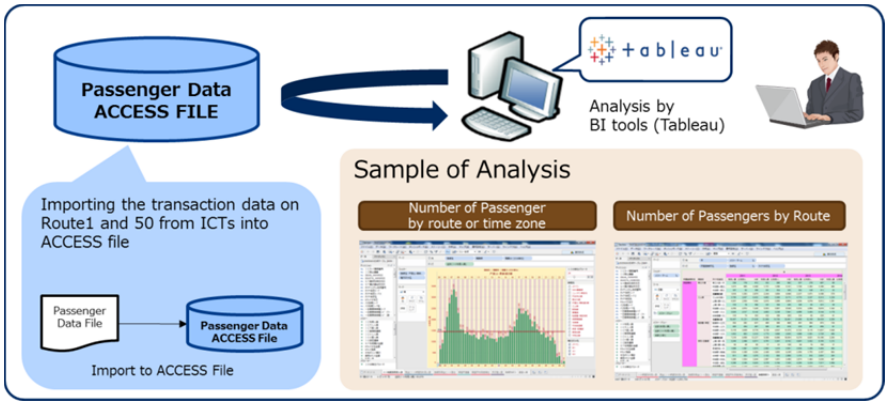


Figure 3.2 Image of System

We understand that the possibility of localization of our ICT system were successfully demonstrated through this program.

(Picture of Final Seminar)

Chapter 4 Outline of Business Plan and Expected Effects

4.1 Outline of Business Plan

This program has been conducted to introduce our Information and Communication Technology (ICT) system which has a potential to resolve the issues of HCMC bus operation. We understand that our target has been successfully achieved through the activities performed in this program.

During this program, we found that the on-board systems such as smartcard system have been already being studied by Vietnamese side themselves. Apart from that, their high needs were identified on our “passenger-trend-analysis” and “fixed-headway-operation” respectively. In particular, the Vietnamese side is interested in integration of each system as Japanese operators do. Due to MOCPT’s human resources constraints, it is better to implement those systems as a whole packaged system built-in a command-center. In order to minimize implementation cost, the interface with the systems to be introduced by local vendors such as GPSs (Global Positioning Systems), smartcards and on-board cameras is considered a primary condition.

As for the business scheme, we will look into the service-provider type such as BOO (Built-Operate-Own), since it is being applied for the smartcard procurement of HCMC bus.

4.2 Expected Effects

The command center with “passenger-trend-analysis” and “fixed-headway-operation” would provide MOCPT with various information which could be utilized for the improvement of bus operation. It contributes an increase in passenger’s convenience. As a result, HCMC bus, in synergy with MRTs and BRTs, will work as a transport network to be chosen by HCMC citizen. Finally, it is expected to lead to a reduction of traffic congestion in HCMC.

However, providing only a good public transport network is just an additional choice. Incentive programs are essential in ensuring the modal shit. In other words, it is indispensable to encourage people to use public transport. Soft measures for private transport such as an imposing tax, road restrictions etc must be taken into account in parallel with the improvement of public transport.

4.3 The Way Forward

With Vietnamese side’s kind support, this program has been successfully completed within the scheduled time period. It was a great opportunity for us to introduce NEC’s ICT system to the parties related to the public transport in HCMC. Under our brand message of "Orchestrating a brighter world", we will continue to support HCMC’s sustainable economic growth.