Preparatory Survey on Hanoi Public Transportation Management and Operation Improvement Project (First Phase) in Socialist Republic of Vietnam
Final Report

December, 2020

Japan International Cooperation Agency

Michinori Holdings, Inc.

OS
JR(P)
20-075

Contents

Figures and Tables

1. Abstract

1.1 Background and Purpose

Hanoi, Vietnam, has a plan to construct an urban railway, but it seems that it will take some time before the operation starts. And it is expected that the route bus will play a central role in public transportation. On the other hand, the traffic sharing rate of buses (route buses, chartered buses, etc.) in Hanoi is 12%, which is extremely low for a large city with a population of 7.21 million (2015, Source: Vietnam Statistics Bureau). Compared to other major cities in Southeast Asia, Myanmar, Yangon: 35% (2013), Thailand, Bangkok: 43% (2015), Malaysia, Kuala Lumpur: 17% (2010), Singapore: 28% (2012), the traffic sharing rate of Hanoi City is low.

The main factor for this is considered to be the progress of motorization in Vietnam. From 2011 to 2016, the average annual increase rate of the number of motorcycles in Vietnam was 6.7% and the number of automobiles was 10.2%, and as a result, the utilization rate of public transportation has been sluggish. Due to the progress of such motorization, private traffic such as motorcycles and automobiles is rapidly increasing, especially in the center of Hanoi, and heavy traffic congestion is frequently occurring.

According to the "Land Transport Development Plan by 2020 and Vision by 2020" announced in March 2013, the Vietnamese government will have about 36 million motorcycles and 3.2 million to 3.5 million automobiles by 2020. Although it is trying to restrict private traffic, such as by advocating a policy of restraining it, it is unclear when it is executed.

In Hanoi, a policy is considered to to promote modal shift by combining multiple public transportations. The City People's Committee (hereinafter referred to as “HPC”) plans to continue expanding its route network, centering on suburban routes. However, as mentioned above, the bus traffic sharing rate in Hanoi is low, and it is considered necessary to solve the following issues in order to improve it.

1. Inconvenience of bus route network: The routes in Hanoi are generally radiated from the city center to the suburbs. The status of network development varies greatly from region to region and about 90% of all routes concentrated in the center. In addition, the service level in the suburbs is low. In addition, there is insufficient development of “ring roads” that connect lines that run radially from the center. Furthermore, there are improvements in the transit environment, which is less convenient for users.

2. Restrictions of bus operators: The route bus business in Hanoi has been allowed to enter for private companies since 2004, due to the trend of deregulation. As a result, not only the Hanoi public transport operator and its affiliated group companies, but also private companies are operating route buses. However, operators are not allowed to freely set operation routes, operation frequencies, fares, etc. according to the demand of bus users, and these are still managed by the Hanoi Municipal Transportation Bureau at their discretion.

3. Unsophisticated operation management system: In Hanoi city, road congestion is heavy all day long, mainly in the morning and evening, and there are differences in the skills of bus drivers, so even if the system is the same, the required time will vary. In addition, there is also a problem that the operation management system is not sufficiently maintained now so that flexible

management according to the operation situation is not possible. For example, since the operating company is decided for each route and the vehicle used is also fixed, if a delay or suspension occurs, it is not possible to operate a temporary service, using a bus of another system.

Increase in operation subsidies: Route bus fares are set at low prices as a social policy (currently, 7,000 VND (about 35 yen) flat fares in cities). Therefore, in most routes, fare revenue cannot cover operating costs. In fact, in 2015, 57% of the operating expenses of the bus business were subsidized by the Hanoi People's Committee, and the amount of subsidy is increasing year by year due to the expansion of routes.

Michinori Holdings, Inc. (hereinafter referred to as “Michinori Holdings”) has knowledge of improving bus management and operations in Japan and tries to improve the bus sharing rate by strengthening the public transportation network in Hanoi. And it provides the Hanoi public transport operator, the largest bus operator in Hanoi, with management, operation, and technical know-how of the bus business. The purpose of the research is to investigate and examine the measures that contribute to improves bus operation efficiency and passenger convenience.

1.2 Research Detail

(i) **Nation**：Socialist Republic of Vietnam

(ii) **Project**：Preparatory Survey on Hanoi Public Transportation Management and Operation Improvement Project (First Phase) in Socialist Republic of Vietnam

(iii) **Company**：Michinori Holdings, Inc.

(iv) **Scope**：Hanoi, Socialist Republic of Vietnam (Figure 1.2.1)

(v) **Purpose**：Improving bus operation in Hanoi through the utilization of Japanese technology and know-how

1. Utilize Japanese technology and know-how to improve the bus operation efficiency and service quality of Hanoi City, and improve the convenience of passengers using buses to improve the bus sharing rate in Hanoi City.
2. In order to improve the bus sharing rate, we will investigate to help manage and operate the bus business for the Hanoi public transport operator by leveraging Michinori's knowledge of improving bus management and operations in Japan.

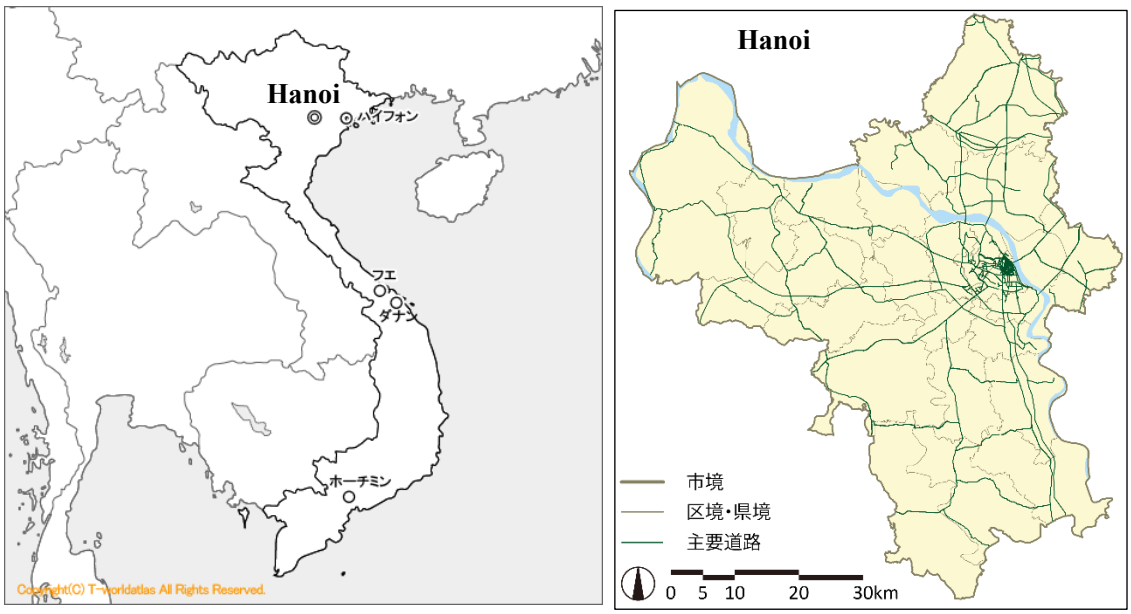


Figure 1.2.1 Scope Area

1.3 Schedule

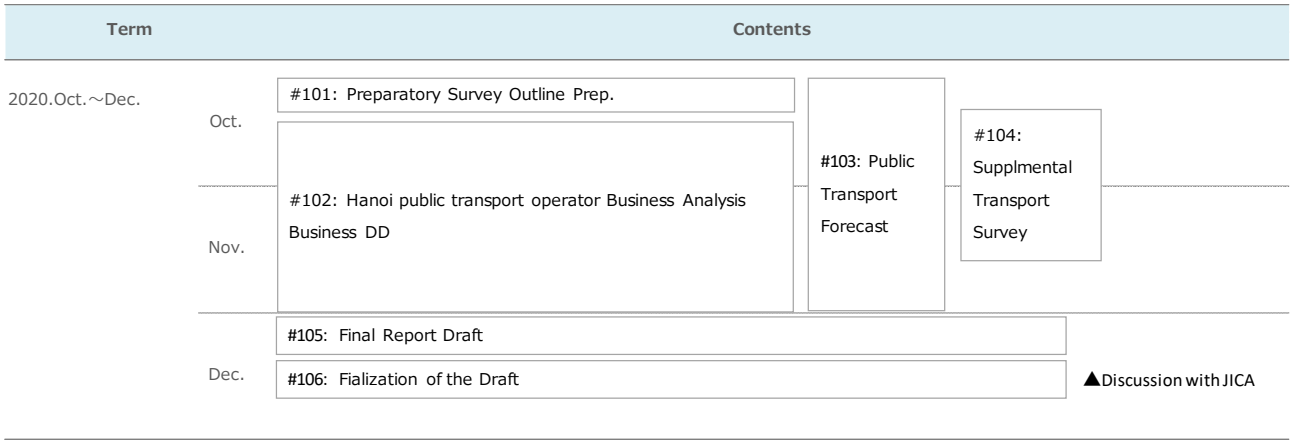
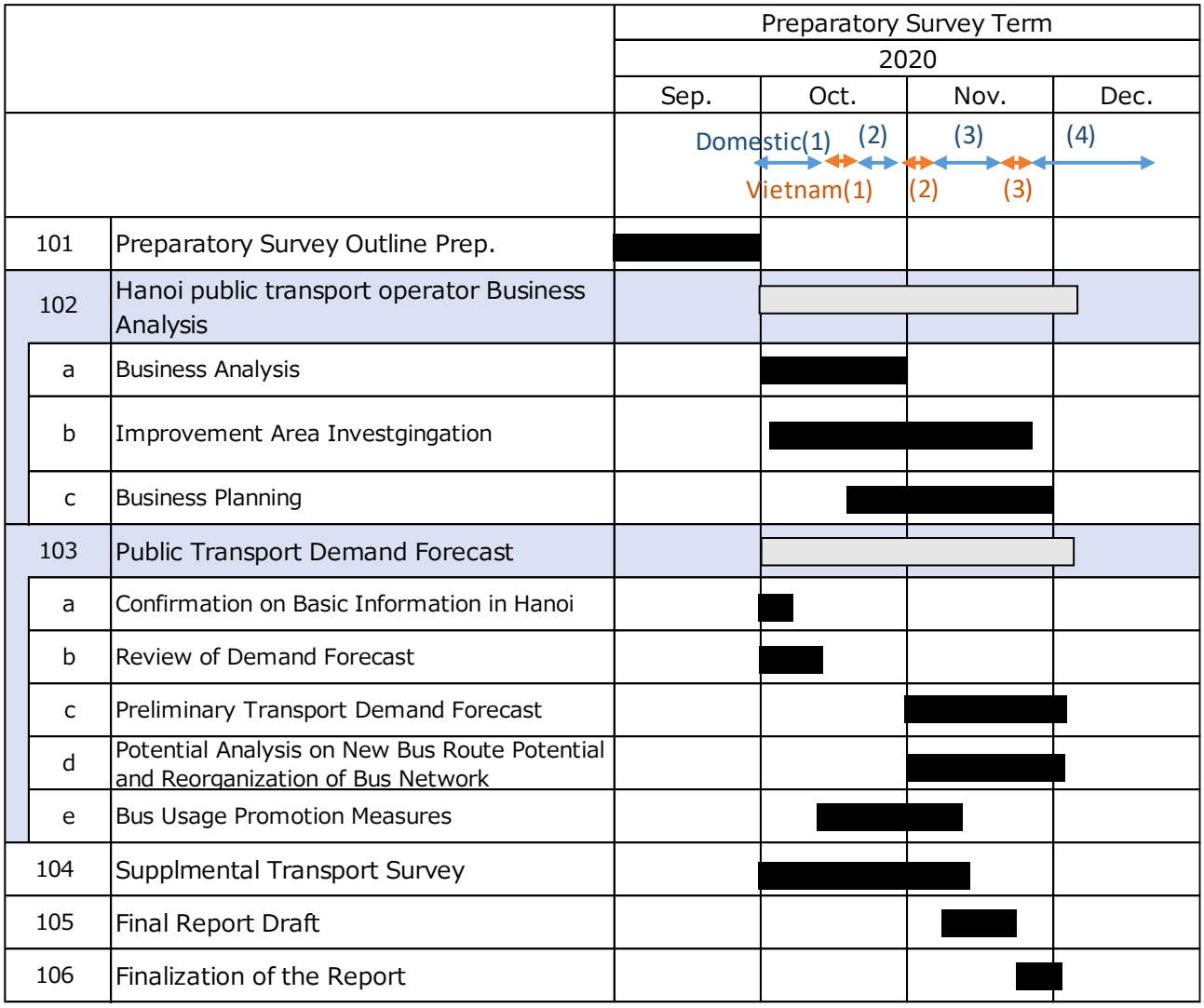


Figure 1.3.1 Framework



* Due to COVID-19, Japanese staff joined "Vietnam Session" remotely

Figure 1.3.2 Schedule

2. Overview

2.1 Scopof Research and expected results

2.1.1 Scope of Research

In this survey, Michinori will transfer the know-how of bus business management and operation improvement that we have cultivated in Japan to the Hanoi public transport operator and aims to improve the Hanoi public transport operator 's bus operation efficiency, service quality, and profitability.

Specifically, we will investigate following points: business management, sales planning, development of route activation activities, improvement of reservation system, new route planning, maintenance which includes vehicle repair cost reduction and fuel efficiency improvement, joint purchase measures such as vehicles, electronic payment systems, drive recorders, information systems, operation sharing which includes personnel system reform, sales planning, and travel which includes development of new projects, joint planning, and inbound from overseas.

Regarding the procurement of equipment and vehicles that affect to the efficiency of bus operation, we will support the selection of optimal equipment and negotiations with equipment and vehicle manufacturers.

The electric buses, which are currently used around the world, are also expcted to be introduced in Hanoi. Since we have operated electric buses in Japan, we are also sure to provide advice on the introduction of electric buses.

Though it depends on discussions with HPC and Hanoi Department of Transportation (hereinafter referred to as "DOT"), Michinori expects that the introduction of new buses due to route expansion and the introduction of electronic payment systems will be implemented within about 3 years after this project. Based on our experience in improving the management and operation of the domestic bus business, we build up the management base in about two to three years after this project, and we we are going to continue to implement PDCA cycle and aim to strengthen the Hanoi public transport operator 's business foundation, improve the bus business, service quality, and profits.

2.1.2 The Expected Result of the Project

The following two points are the expected effects of implementing this projects.

Promotion of bus use: Create a virtuous cycle of promoting bus use and allocating profits to capital investment to realize further improvement. This will promote a modal shift from private traffic to buses, which can contribute to eliminating traffic congestion, improving the environment, and reducing on-street parking of motorcycles and cars. In Vietnam, the number of fatalities due to traffic accidents is about 10,000 per year, which has become a social problem (WHO report, 2015), and we assume that the improvement of public transportation will help reduce the number of fatalities in traffic accidents by curbing private traffic volume.

Contribution to Hanoi City Policy: According to HPC, the Chairman of Hanoi People's Committee (Mayor of Hanoi) ordered public transport operators in Hanoi to (1)analysis and efficiency of each route, (2) design of route map with continuity and flexibility, and (3) introduction of advanced technology such as

IoT, and (4) staff training and education. This research project is in line with the Hnoi transportation policy.

2.2 Major Business Personnel and Contract

2.2.1 Major Business Personnel

Industrial Growth Platform, Inc. (hereinafter referred to as "IGPI") is a 100% parent company of the Company and a professional group that supports corporate revitalization and growth strategies. In addition, IGPI has a track record of some projects in Vietnam. Therefore, it will play a role of supporting the management improvement of bus companies in this project by utilizing the knowledge of Vietnam's industrial structure and public institutions.

DOT is a subordinate organization of HPC, which role is to approve urban public transportation plans and bus route plans, selects bus operators, and grants transportation-related permits.

The Hanoi Urban Transport Management and Operation Center (“TRAMOC”) is a subordinate organization of DOT that monitors public transport conditions, manages bus fares and subsidies, and manages and supervises bus operators.

2.2.2 Relaed Major Contract

The Hanoi public transport operator receives subsidies for route bus operation based on the subsidy contract concluded with DOT.

The subsidy is calculated based on the standard costs related to labor costs, fuel costs, depreciation costs, etc. specified by HPC, and is settled quarterly.

2.3 Examination status of the proposed project

2.3.1 Consistency with related legal systems (PPP infrastructure, etc.) in the partner country

It has been confirmed that Hanoi public transport operator operates bus business in accordance with the license from HPC.

2.3.2 Status of negotiations with the government of the partner country

DOT / TRAMOC, which is in charge of the bus transportation business in Hanoi, and we have built a strong relationship such as by holding the following public transportation seminars.

Based on the request of DOT, the Public Transport Seminar was held on July 12, 2019, jointly by the JICA and us, for the development of public transport in Hanoi. This seminar was successfully held and was widely covered by the local news media.

Our business support results for the Hanoi public transport operator have been highly evaluated through the previous JICA projects. Since DOT aims to reduce subsidies by reorganizing and streamlining public transportation in the city, we have receive requests for continued support for bus route operation management and quality improvement.

Regarding the relationship with TRAMOC, we have also received high elavulatiuon for our achievements in private sector collaboration projects. And we have received a request to continue our support for reorganizing the route network, improving operations, and improving bus lanes in order to increase the share of public transportation.

2.3.3 Positioning of business in the proposing corporation and status of consideration for participation

Since December 2018, with the support of JICA, we have provided support for improving the Hanoi public transport operator 's management and operations.

The achievement so far has been the establishment of a solid relationship of trust between the Hanoi public transport operator executives and us through the above business activities. At the same time, the transportation authorities such as DOT and TRAMOC understand the existence of our company and the possibility of contributing to the improvement and development of Hanoi public transportation.

In specific daily operations, we are implementing pilot projects such as improving vehicle inspections, considering the introduction of alcohol detection systems and digital tachographs. As a result, it was proved that our know-how transfer and project management ability until realization are effective for improving the Hanoi public transport operator.

2.3.4 Understanding trends of other companies

One of the largest conglomerate in Vietnam, plans to enter the passenger transportation service business in five major cities (Hanoi, Haiphong, Da Nang, Ho Chi Minh and Can Tho) from 2020. In addition, investment by companies in China, South Korea, etc. for Vietnamese companies is entering Vietnam market.

3. Existing Transport Plans of Hanoi city

3.1 Transport Plans and Policies

3.1.1 Natinal Polices and Plans

By 2020, public bus passenger transport will play a main role in urban transport system as mentioned-above national policies. Such orientation has been further clarified in the following policies.

1. Decision 280/QĐ-TTg (dated 8th March 2012)

On Approval for Project of Public Bus Transport Service Development in the period of 2012 to 2020 (the Government of Vietnam). According to this Decision, bus public transport will play key role in passenger transport systems of cities. The main points are as follows:

Planning of Bus Route Network: All provinces and central-leveled cities have to formulate the Plan in the period of 2012-2020;

Investment of Bus Fleet: Encouragement of low-floor and clean-fuel buses

Infrastructure: Bus lanes on current and new roads should be paid attention.

State Management of Bus Service:

- Establishment of Public Transport Management Center
- Application of new technology
- Promulgation of bidding regulations
- Promulgation of Economic-Technical Norms

Propaganda for the use of public transport

Policies for the support of public transport by bus:

- Incentives for the operation of new bus routes
- Subsidy for non-profitable bus routes
- Low-interest loans for investment in bus fleet, especially for clean-fuel vehicles
- Construction of bus depo and parking shall be exempt from land rents
- Use the revenue of bus advertising to support the operation of bus service

2. Decision 13/2015/QĐ-TTg (dated 5th May 2015)

On Incentive Mechanism and Policies for Bus Public Transport Development. The main points are as follows:

Planning of Bus Route Network: To prioritize allocation of adequate state budget for formulation, adjustment and implementation of the Plan

Infrastructure:

- To prioritize investors' access to preferential loans: ODA and preferential credit loans
- Cities/provinces may support interest on a loan for investors (based on local resources)

Bus Fleet:

- Exemption from import tax: only for domestically unavailable parts and components
- Exemption from registration fee: only for clean-energy vehicles
- Cities/provinces may support interest on a loan for investors (based on local resources)

Operation of Public Transport by Bus:

- Cities/provinces may provide a subsidy or support bus operators in term of operation costs (based on local resources)
- To prioritize the establishment of Public Transport Management Center

Bus Users: (based on local resources), cities/provinces may carry out the following

- Free tickets for children age below 6 and disable people
- Reduction of bus fares for persons with meritorious services to the revolution, the elderly, and students and pupils

3. Decision of 3446/QD-BGTVT (dated 4th November 2016)

On Approval for Project of Enhancement of Bus Public Passenger Transport Service to 2020. There are two main objectives, including: i) Formulation of Plan & Establishment of Bus Service Operation: 100% provinces and central-level cities, and ii) Share of Bus Public Transport: Hanoi & Hochiminh (10-15%); Hai Phong, Can Tho & Da Nang (5-10%); other provinces (1-5%).

To achieve such objectives, the following measures will be carried out:

Accessibility by Bus:

- Coverage Area of Bus Route Network: 70% in city centers of Hanoi & Hochiminh; 40% in city centers of Hai Phong, Da Nang & Can Tho;
- Connection to Airports: 100% of airports are connected to centers of cities/provinces by bus routes;
- Connection of Inter-city Bus Stations: Type-II stations and above need be connected by bus routes

Information System:

- Websites of Bus Public Transport: 100% of cities/provinces (if bus service is available)
- Installation of electronic panel or online information on vehicles/at bus stops
- Development of mobile/computer applications for bus users

Supports for Operation of Bus Public Passenger Transport:

- Bus fare subsidies to prioritized entities: 100% provinces & cities
- Introduction of priority policies (e.g., subsidy) according to local budgets
- To prioritize the support for investment of smart ticketing system

Convenience of Bus Public Passenger Transport:

- Restructuration of Bus Fleet: reduction of average vehicle age, usage of clean-energy vehicles and vehicles for disabled people, increase of vehicles with wifi system
- Traffic Control: Priority for Urban Bus and BRT, reduction of overlapping route rate, increase of operating speed of bus
- Arrangement of Bus Schedule: suitable to travel demand of citizens
- Ticketing system: Smart ticket with multi-modal connection
- Infrastructure: Increase of bus stops with shelter

Security & Safety:

- Installation of camera system at 100% bus interchanges
- Training for 100% bus drivers, conductors & management staffs in dealing with emergency cases
- Increase of bus bays

Training & Human Resources

Reinforcement of Management Activities

3.1.2 Urban Bus Transport Policies and Plans of Hanoi city

To harmonize the development of different public transport modes, the government of Hanoi city promulgated Plan No. 201/KH-UBND on "Plan of Public Passenger Transport Vehicle Development in the period from 2021 to 2030". The main purpose is to determine the number and share of each public transport mode by 2025 and 2030. Regarding the improvement of bus services, the goal is to create an environment where 80-90% of the residents in the city center can easily use the bus within 500 meters from their residence by 2030. Additionally, it is projected that share of bus is 25%, with bus fleet of 6,700 to 6,800 vehicles.

In recent years, there are two main policies regarding public bus transport in Hanoi city.

1. Resolution No. 04/2017/NQ-NDND (dated 4th July 2017)

On Approval of Project "Reinforcement of Road Vehicle Management In Order To Mitigate Traffic Congestion & Environmental Pollution in Hanoi city, period of 2017-2020 and Vision to 2030". According to this Resolution, two specific objectives are as follows:

Share of Public Transport: City center (30-35% in 2020, 50-55% in 2030); satellite towns (15% in 2020, 40% in 2030)

Transport Infrastructure: Urban lands devoted to transport in 2030 (20-26% in city center; 18-23% in satellite towns, 16-20% in district-level towns), transport-related land devoted to parking space (3-4%)

To achieve these objectives, the following administrative and economic measures will be implemented:

Administrative Measures:

- Formulation of an specific Assignment Plan in order to implement indicators of PT development
- Formulation & Implementation of Projects on Enhancement of Quality of PT
- Review & modification of Resolution No. 03/2013/NQ-HDND
- Review & re-arrangement of bus route network as well as selection of bus vehicles suitable to road conditions
- Review & re-location of bus stops, interchanges in order to connects with other transport modes

Economic Measures:

- Promulgation of priority regulations in order to attract investment in urban railways, BRT & monorail and bus lines by PPP scheme
- Review & modification subsidy policy

- Incentive policies for the usage of clean-energy or low-emission vehicles as well as travel by public transport

2. Resolution No. 07/2019/NQ-HDND (dated 10th July 2019)

On Prioritizing Mass Transit System Development; Encouraging Investment, Construction and Operation of Bus Stations and Parking Lots; Applications of High Technology on Transport System Management and Operation. The government of Hanoi city tends to encourage the development and construction of multi-modal and park-and-ride facilities on main corridors. Additionally, the application of high-technologies (e.g., ICT) in management and operation of transport systems is recommended. The prioritized measures are listed as follows;

Priorities in Term of Traffic Control:

- Arrangement of mass transit to connect city center and transport hubs
- Land preparation for investment of mass transit infrastructure
- To ensure the accessibility of passengers to stops/terminals of mass transit
- Interconnection among different types of mass transit & private transport modes
- Establishment of Public Transport Management Center

Priorities for Vehicle Replacement:

- Requirements for state-of-the-art technology and environmental protection
- When bidding/ordering or open of new bus routes, bidders with new and clean-energy vehicles will be prioritized.

Encouragement to use Mass Transit:

- Free tickets for persons with meritorious services to the revolution, the disable, the elderly, children aged below 6 & people in low-income households
- Mass transit users will be subsidized by city budget (reasonable fare)
  - 50% of monthly tickets for pupils, students and workers in industrial parks;
  - 30% of monthly group tickets
  - 100% tickets for first 15-day period when urban railway lines are put into commercial operation

Priorities for Mass Transit Development: City budget will support the following items

- 100% of toll fees, parking fees and passenger transport insurance
- 100% of import tax for domestically unavailable parts and components of vehicles
- 50% of interest loan in first 5-year period of investment in infrastructure construction and clean-energy vehicles

3.1.3 Other Related Transport Policies in Hanoi city

It will be important to create a sidewalk condition, in order to improve accessibility to bus stops. Although walkway and sidewalk are developed in urban area in Hanoi, sidewalk condition is not sufficient due to illegal parking or occupied the space by cafés/restranantes and venders.

Hanoi People's Council has encouraged the investment in parking lots and stations by a set of measures,

to solve the shortage of parking capacity (Hanoi incentivizes investment in parking lots, 22 Jul 2019);

- 10-year exemption from land-rent fee
- For underground parking projects (invested by non-state funds), maximum 30% of floor space can be used for other commercial purposes
- For parking or interchange projects (invested by non-state funds), maximum 20% of floor space can be used for other commercial purposes

3.2 Current Status of Public Transport

3.2.1 Existing Bus Routes

Public bus passenger transport plays a key role in public transport system in Hanoi city. As of 2020, there are more than 100 bus routes, 7 operators and 8 bus terminals. The share of bus is 12% and such share is quite low for the city with population of 8 millions.

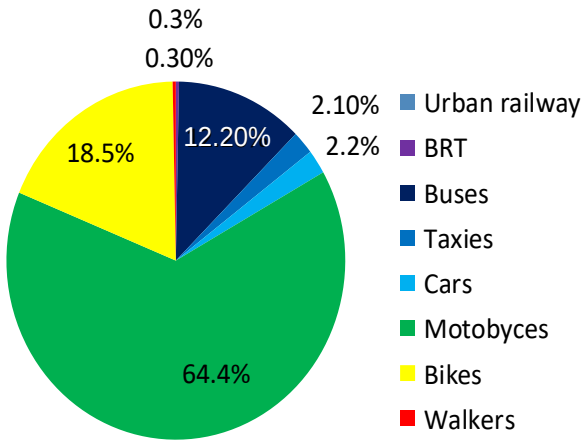


Figure 3.2.1 Modal Share in Hanoi City（Source TRAMOC, 2015）

3.2.2 Current States of Bus Operation and Bus Usage

1) Current Status of Bus Operation

In order to analyze the chracteirscies of bus operation in Hanoi city, it is divided into 6 types (refer to Figure 3.2.2).

① BRT Route: Bus route on exclusive lane

② Circular Route：Circular bus routes which are operating in Hoan Kiem District (part of Area 0）

③ Route in CBD：Bus routes in CBD (Area 0）

④ Trunk Route：Main bus routes on arterial roads to connect between CBD and Area 1-6

⑤ Route at sub-urban：bus routes on sub-urban area (there are 2 types of bus routes (1) cover sub-urban area only, and 2) connect between city center and sub-urban)

⑥ Other Type of Bus Routes: Airport Shuttle and City-tour bus

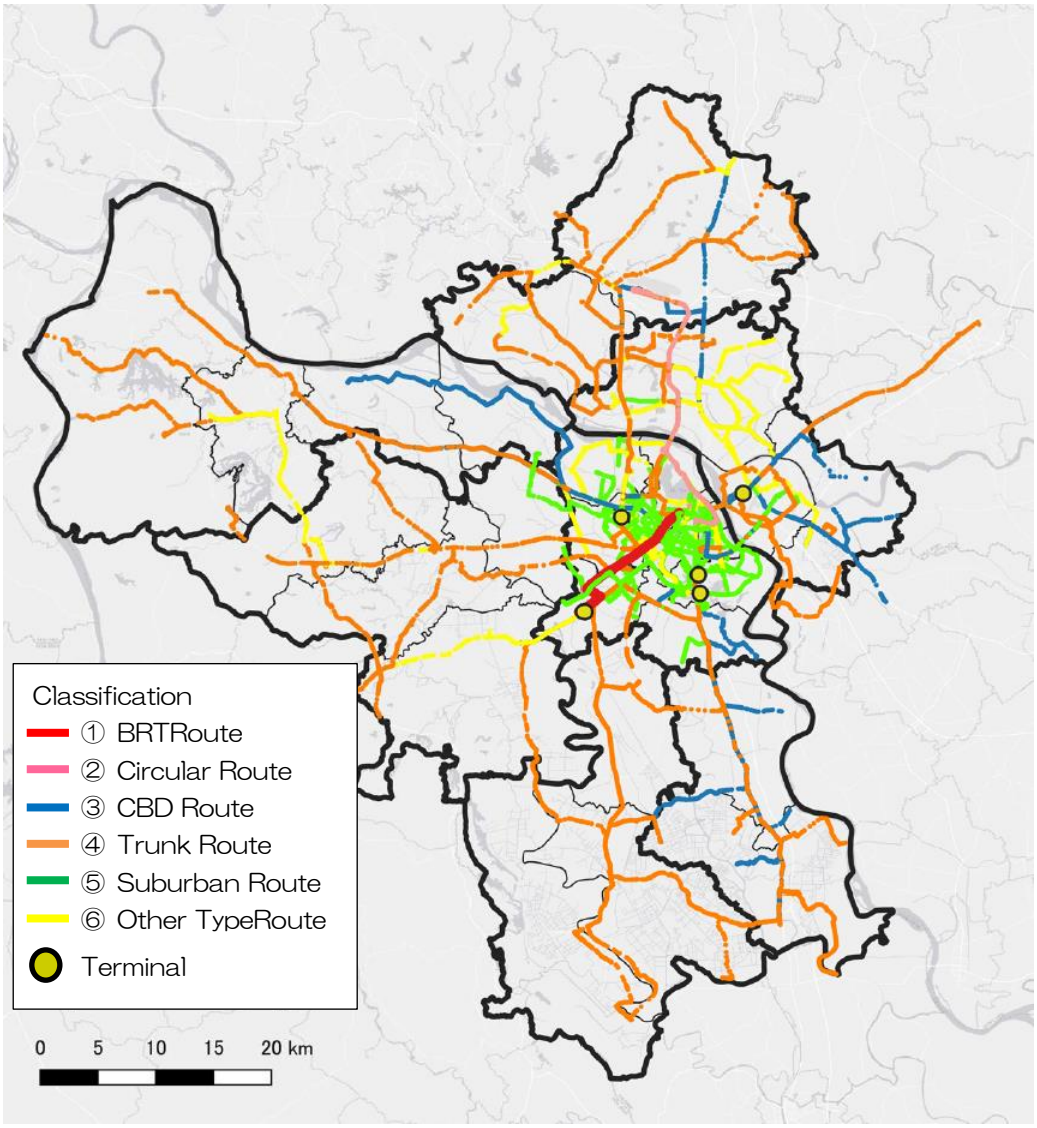


Figure 3.2.2 Bus Route Classification in Hanoi City（as of 2020）

2) Ridership Trend

From 2015 to 2019, the number of users and transport revenue are sluggish, and the number of users per operation and transport revenue per kilometer are also declined. And we understand that a more detailed analysis shall be carried out in the second phase survey.

Reason of Ridership Decrease 1: Reduce of number of University Student

The current university student generation has a smaller population than those in their 25s and 30s, and it can be expected that the number of students has been declining in recent years. Since university students account for major parts of route bus users, the decrease in the number of students has a great influence on the decrease in the number of bus users. It can be expected that the declining trend of will be stopped by implementing measures to promote the use of buses for niversity students.

Reason of Ridership Decrease 2 ： Increase of Motorcycle Usage

In Hanoi, more and more people are able to travel by motorcycle due to the increase in motorcycle owners. This is because of the increase in GDP and the penetration of vehicle dispatch services such

as Grab. The increase in motorcycles has influenced traffic congestion and exacerbated bus delays as well. As a result, it is expected that the use of buses and the shift to motorcycles are progressing.

The number of BRT users traveling on exclusive lane is on the rise, and the number of users of routes connecting residential areas and industrial parks, which have many low-income groups, has been flat. In addition to restraining private traffic such as motorcycles and automobiles by HPC, ensuring the punctuality of buses is expected to increase the number of bus users.

3.2.3 Current States of Uraban Railway Planning

To determine the future outlook for public bus transport in Hanoi city, it is necessary to understand the current status of urban railway plans and projects. According to Decision No. 519/QD-TTg on Approval for Hanoi Transport Master Plan by 2030 and a Vision to 2050, there will be eight urban railway lines with more 400 km in length (see Figure below). Currently, Line 2A and Line 3 are under construction. The construction project of Line 2A is funded by China, while ADB and France are the donor of Line 3. Construction works and pilot operation of Line 2A has been completed, but the approval for commercial operation has not been obtained due to the safety certifications.

Urban railway projects are still planning stage excluding 2 lines above mentioned, bus transport will still play a major role in public transport in Hanoi, for the time being (2020s).

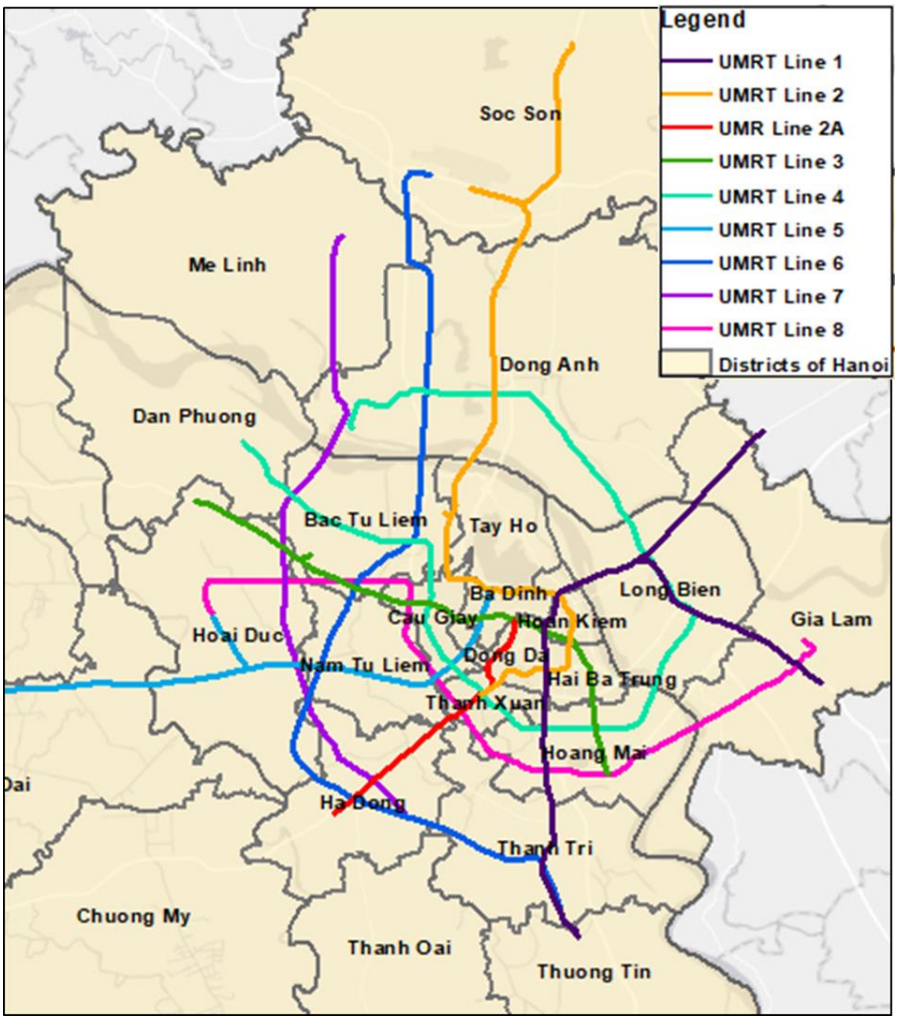


Figure 3.2.3 Urban Railway Network in Hanoi City (Plan)

3.3 Comparative Analysis among ASEAN Cities

Figure 3.3.1 shows a comparison of transport sharing rates among major cities in ASEAN countries and Hanoi and Ho Chi Minh City. Ho Chi Minh City, which has the same tendency as Hanoi City, has a very low share of public transportation, and motorcycles are overwhelmingly used. In Tokyo and Seoul, orbital public institutions such as subways play an important role, but in Shanghai and Jakarta, the share of buses is higher. The cities that Hanoi aims to share the bus share of close to 20% are Taipei and Bangkok. The data in Figure 3.3.1 is as of 2004, and the bus sharing ratio in Hanoi is currently 12%, which has been improved over the long term by the efforts of the Vietnamese and Hanoi governments. On the other hand, the number of bus users has been sluggish in recent years and there is a gap from the target value so that further efforts for public transport measures are required in the future.

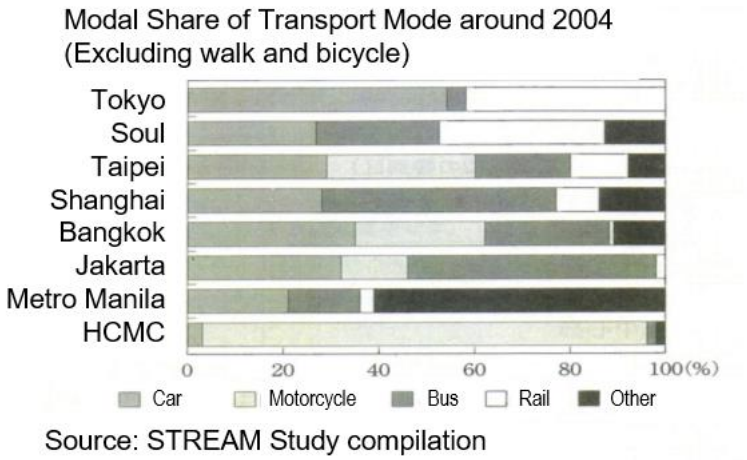


Figure 3.3.1 Comparison of Modal Share in ASEAN Major Cities

A main problem of urban transport in ASEAN cities is that motorcycle ownership and usage has increased significantly, especially in urban areas since the 2000s. A correlation among motorcycle ownership, share of public transport and GPP (Gross Provincial Product) is shown in the figure below. And, cities with lower rate of motor vehicle ownership tend to have higher share of public transport. On the other hand, cities with higher GPP (economic power) tend to have higher motor vehicle ownership. It can be seen that Hanoi city is in the midstream of economic development. Without appropriate measures for public transport services, Hanoi city may have the same tendency as other ASEAN cities.

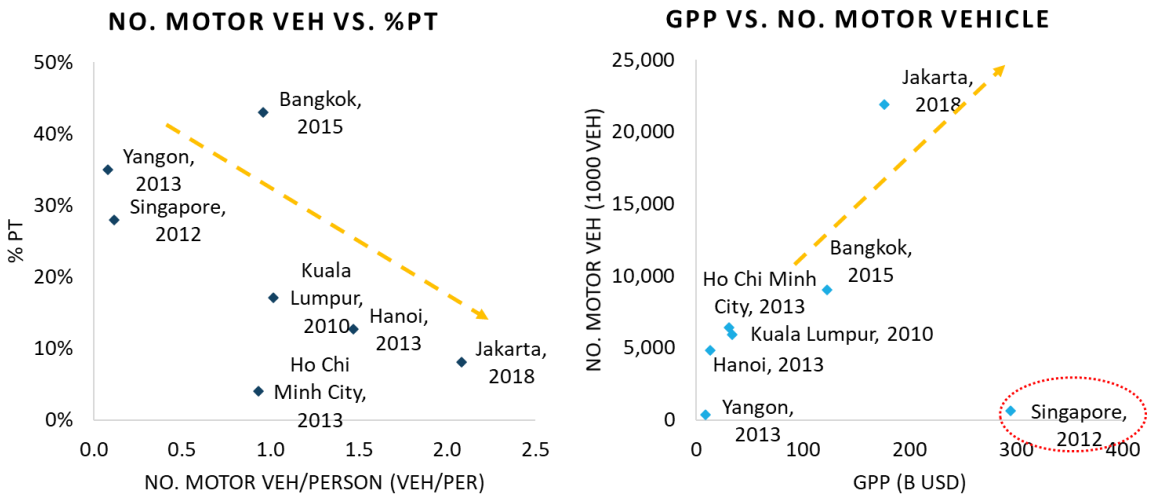


Figure 3.3.2 Motorcycle ownership and public transport share in major ASEAN cities, GPP (Gross Provincial Product)

4. Hanoi Public Transport Operator Business Analysis

4.1 Hanoi Public Transport Operator Business Analysis

4.1.1 Bus Route Business with subsidy

(i) Overview

It is a route bus business business based on the subsidy regulation Decision 1494 by Hanoi City, which corresponds to BRT routes, circulation routes, urban routes, trunk routes, and suburban routes described in Figure 3.2.3.

(ii) User base

Based on the breakdown of commuter pass income, majority of users are students and workers, so it is important to strengthen promotion for schools and industrial parks. Passengers aged 60 and over used to be accounted for 10 to 20% of passengers, but in the summer of 2019, the fare was freed by the policy of Hanoi City.

(iii) HR

Both drivers and conductors comply with the Labor Law, and drivers are managed in accordance with the Road Traffic Law.

(iv) Operation service

The main issues are the poor attitude of drivers and conductors toward passengers and the roughness of driving. The Hanoi public transport operator is rigorously dealing with the lack of confirmation of tickets by the conductor and the illegal receipt of tickets, but the number has not decreased, and they are trying to improve motivation by three-stage evaluation and awards with goods. Congestion control when getting on and off is also recognized as an issue, but in order to get as many passengers as possible during the limited stop time, some level of confusion on exit might be unavoidable.

(v) Procurement

I. Vehicle

① A renewal plan is formulated in consideration of the usage period (10 years) specified in the subsidy system. In preparation for the planned operation of new routes in the future, it will be necessary to buy new vehicles for future bidding.

② Regarding vehicle procurement, the Hanoi public transport operator purchases directly from each vehicle manufacturer and it is said that vehicles can be procured under relatively desired conditions.

③ It seems that the Hanoi public transport operator considers the introduction of CNG(Natural gas) vehicles because environmentally friendly vehicles may be given preferential treatment in future bids for route management rights. However, Vietnam's CNG vehicles often break down (overheat, etc.), and securing a stable gas supply source is an issue. Diesel vehicles will also be Euro 5 compliant after 2022.

(vi) Vehicle maintenance

Periodic inspections are carried out at each branch when the mileage reaches 4,000km (Lv1) and 12,000km (Lv2) based on the subsidy regulations. Inspection items and man-hours also comply with the regulations. Overhaul (“OH”) is carried out at the central maintenance center. This is also based on the subsidy regulations, and the mechanic is supposed to confirm the necessity of OH when traveling 300,000

km.

(vii) Electronic payment

An electronic payment system using VNPay has been introduced at the commuter pass counter and BRT ticket counter.

4.1.2 Other Bus Business without sbusidy

1) Airport Bus

(i) Overview

It operates between Noi Bai Airport and downtown Hanoi and residential areas in the western part of Hanoi. The main competitors are hotel and airline pick-up services, taxis, etc., but the balance among price, punctuality, and reliability is a differentiating factor from the competitors. And Wi-Fi capable of high-speed communication, luggage storage for suitcases, and drivers and conductors who can speak English are also considered as strengths.

2) City Tour Sightseeing Bus

(i) Overview

A 15km line goes around the main tourist spots in the city. It operates in cooperation with the Vietnam agency of Hop on / off. The level of the environment inside the car is higher by focusing on cleaning the inside of the car, than the subsidy route bus.

3) Contract Charter Bus

(i) Overview

Major revenue comes from an annual contract with major companies and government agencies. The remaining comes from spot contracts, which are used for events in Hanoi, year-end and New Year holidays, and sightseeing during the summer vacation.

4.1.3 Non-Bus Business

1) Car Dealer

It owns one dealer in Hanoi and sells mainly Toyota cars. Maintenance services in the dealer shop are generating business profits, and the services are expanding steadily. Such demands are expected to grow as the number of automobiles in Vietnam continues to increase.

2) Bus Terminal

It operates four bus terminals (three of which are owned by subsidiaries) and also operates a rental business (for kiosks and bicycle parking lots) inside the bus terminal facilities. The main revenues are bus terminal departure and arrival fees and rental revenues.

3) Maintenance Service

Currently, most of the maintenance service business is for the Hanoi public transport operator’s cars, but the demand for external maintenance services will be increased in the future as well.

4.2 Possibility of improvement by know-how on bus business management and operation by the proposing company

4.2.1 Room for improvement to promote the use of route buses

1) Improvement of route bus infrastructure

In the center of Hanoi, the number of bus users is declining due to the increase of motorcycles and private cars, which has led to worsening traffic congestion and worsening bus delays. Therefore, it is necessary to work with the city traffic authorities to implement private traffic restrictions such as entry and parking restrictions in the center. At the same time, it is necessary to encourage the construction of bus lanes, expand and consolidate routes accordingly, and consider the construction of new routes (access to hospitals, commercial facilities, industrial parks, etc.) based on travel demand.

2) Improving the bus service environment

Since, currently, paper tickets are mainly used, which is not convenient for passengers, it is considered necessary to take measures to improve convenience by introducing electronic payment in the car. In addition, it is necessary to consider improving the attitude of drivers and conductors and enhancing operation information guidance using ICT.

3) Strengthening promotion for users

It is presumed that the decrease in bus users in recent years is mainly due to the decrease in the use of university students. They need to strengthen promotion by such as launching tickes which suits more to university student lifestyle. In addition, after graduation, there is a tendency to commute by motorcycle or private car, so it is necessary to propose a lifestyle using a bus (so called mobility management activity).

5. Transport Demand Analysis

5.1 Review of Data/Information related Demand Forecast

5.1.1 Confirmation on Basic Information in Hanoi

Necessary information to calculate transport demand forecast was collected from existing survey and study reports. collected information includes population in Hanoi, traffic survey results, and city planning maps for land use planning. For the demand forecast in Hanoi, it is utilized the basic database of demand forecast in previous JICA study as shown below.

①JICA Data Collection Survey on Urban Railway Development (2013-)(METROS)

②JICA Data Collection Survey on BRT in Hanoi (2016-)(Hanoi BRT Study)

5.1.2 Review of Demand Forecast

METROS and Hanoi BRT Study make the future transport demand forecasts for 2020 and 2030. In precondition for transport demand forecast by METROS, public transportation is prioritized by 2030, and the policy such as expressways network development is not prioritized. Therefore, it was confirmed the review of precondition and result of demand forecast, and organize the data and information required for preliminary traffic demand forecasting work in this time.

Regarding the transport network required for demand forecasting, especially the bus route data, since the routes are reorganized and added every year, the bus route data was updated based on the data of the previous survey.

5.1.3 Anaysis of Socio-Economic Indicators

Socio-economic indicators are estimated based on the census data in 2009 and the data of Household interview survey in 2013;

(i) Population

Population estimates are based on population trends from 2009 to 2013, as well as future population plans of relevant authorities such as SEDP (Socioeconomic Development Five-Year Plan) and Urban Master Plan.

(ii) Working Population

Working population was estimated by the following methods;

① Estimate of labor force (people over 15 years old minus economically invalid people) based on 2013 GSO (Vietnam Bureau of Statistics) and population data of local governments

② Estimated employment by industry sector in 2013 based on 2013 GSO and local government data

(iii) The number of students

The number of students was estimated based on both future population participation by age group at different levels of education and assumptions of existing and planned schools, especially college / university locations.

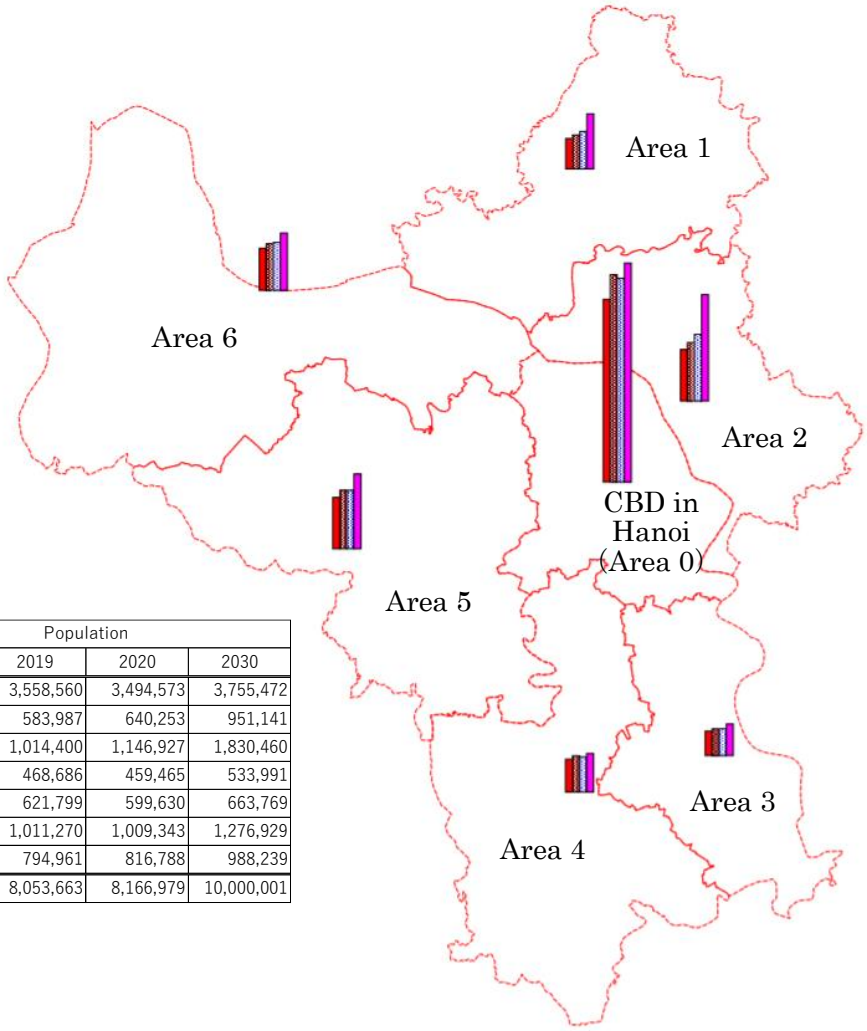
Result of estimation is as shown in Table 5.1.1.

Table 5.1.1 Result of Estimation of Socio-Enomomic Indicators

City / Province	Cluster	District Group	ID	District Name	2020							2030 (JST)						
					Population ('000)	Employment @ Homeplace (000)	Employment @ Workplace (000)	Student @ Homeplace (000)	Student @ Schoolplace (000)	Day Time Population ('000)	D-N Rate	Population ('000)	Employment @ Homeplace (000)	Employment @ Workplace (000)	Student @ Homeplace (000)	Student @ Schoolplace (000)	Day Time Population ('000)	D-N Rate
Hanoi (Old Hanoi Area)	City Centre	1	1	Ba Dinh	248	139	201	61	76	325	1.3	213	128	200	53	73	305	1.4
		1	2	Hoan Kiem	154	86	184	38	37	251	1.6	124	74	128	31	30	177	1.4
		1	3	Tay Ho	177	99	93	44	28	155	0.9	219	131	131	54	37	201	0.9
		1	6	Dong Da	395	221	254	97	135	466	1.2	277	166	177	69	102	321	1.2
		1	7	Hai Ba Trung	317	177	217	78	95	373	1.2	246	147	157	61	79	273	1.1
		Sub Total			1,291	723	949	317	370	1,569	1.2	1,079	647	793	268	321	1,277	1.2
	Fringe	2	4	Long Bien	344	193	177	84	76	319	0.9	487	292	306	121	126	506	1.0
		2	5	Cau Giay	271	152	194	67	80	327	1.2	298	179	195	74	78	318	1.1
		2	8	Hoang Mai	416	233	153	102	84	318	0.8	513	308	236	128	104	417	0.8
		2	9	Thanh Xuan	301	169	179	74	85	323	1.1	257	154	138	64	69	246	1.0
		2	17	Dong Anh	488	273	291	120	107	492	1.0	828	497	614	206	176	916	1.1
		2	18	Gia Lam	315	177	164	78	93	319	1.0	515	309	329	128	154	561	1.1
		2	19	Tu Liem	592	331	329	145	186	630	1.1	689	413	489	171	206	799	1.2
		2	20	Thanh Tri	277	155	129	68	60	243	0.9	447	268	278	111	89	434	1.0
		Sub Total			3,005	1,683	1,616	738	772	2,971	1.0	4,034	2,420	2,585	1,003	1,003	4,198	1.0
	Outer	13	16	Soc Son	387	217	207	95	101	383	1.0	580	348	369	144	180	637	1.1
Hanoi (Old Hanoi Area) Total					4,683	2,623	2,772	1,151	1,242	4,923	1.1	5,693	3,416	3,747	1,416	1,504	6,112	1.1
Hanoi (Expanded Area)	Inner (15 -20 km)	3	250	Me Linh	253	142	144	62	48	242	1.0	371	223	212	92	68	336	0.9
		3	268	Ha Dong	345	193	163	85	87	316	0.9	473	284	231	118	126	429	0.9
		3	273	Dan Phuong	172	96	77	42	36	147	0.9	207	124	94	51	48	173	0.8
		3	274	Hoai Duc	240	134	114	59	48	208	0.9	287	172	149	71	51	244	0.8
		3	278	Thanh Oai	193	108	85	47	34	156	0.8	201	121	100	50	38	168	0.8
		3	279	Thuong Tin	259	145	123	64	51	225	0.9	298	179	146	74	58	249	0.8
		Sub Total			1,463	819	706	360	303	1,294	0.9	1,838	1,103	932	457	389	1,599	0.9
	Outer (20 - 50 km)	4	269	Son Tay	157	88	88	39	52	170	1.1	204	123	101	51	73	205	1.0
		4	271	Ba Vi	304	170	155	75	58	272	0.9	376	226	184	94	67	307	0.8
		4	272	Phuc Tho	184	103	95	45	32	162	0.9	201	120	92	50	33	156	0.8
		4	275	Quoc Oai	188	105	95	46	44	175	0.9	210	126	128	52	66	226	1.1
		4	276	Thach That	232	130	124	57	56	225	1.0	354	212	202	88	106	362	1.0
		4	277	Chuong My	349	196	170	86	106	344	1.0	425	255	227	106	136	427	1.0
		4	280	Phu Xuyen	200	112	110	49	50	199	1.0	236	142	145	59	60	241	1.0
		4	281	Ung Hoa	200	112	102	49	38	179	0.9	213	128	128	53	41	201	0.9
		4	282	My Duc	206	115	116	51	45	201	1.0	250	150	146	62	55	239	1.0
		Sub Total			2,021	1,132	1,055	497	480	1,928	1.0	2,470	1,482	1,353	614	638	2,365	1.0
Hanoi (Expanded Area) Total					3,484	1,951	1,761	856	783	3,221	0.9	4,307	2,584	2,285	1,071	1,027	3,963	0.9
Hanoi City Total					8,167	4,574	4,533	2,007	2,025	8,144	1.0	10,000	6,000	6,032	2,487	2,531	10,075	1.0
Bac Ninh	Inner (- 20 km)	5	260	Tien Du	148	88	92	36	30	145	1.0	194	122	113	47	37	175	0.9
		5	261	Tu Son	191	114	107	46	56	194	1.0	247	156	140	59	68	240	1.0
		5	262	Thuan Thanh	179	107	116	43	44	189	1.1	236	149	135	57	58	223	0.9
		Sub Total			519	309	314	126	130	529	1.0	677	426	388	163	163	639	0.9
	Outer (20 - 40 km)	6	256	Bac Ninh city	224	134	145	54	73	255	1.1	330	208	225	79	99	366	1.1
		6	258	Yen Phong	171	102	107	42	42	177	1.0	194	122	106	46	33	164	0.8
		Sub Total			396	236	252	96	115	431	1.1	523	330	330	126	132	530	1.0
Bac Ninh Total					915	544	566	222	246	960	1.0	1,200	756	718	288	294	1,169	1.0
Hung Yen	Inner (- 20 km)	7	325	Van Lam	130	83	80	31	24	120	0.9	163	106	101	37	27	148	0.9
		7	326	Van Giang	109	70	65	26	16	94	0.9	131	85	86	30	20	122	0.9
		7	327	Yen My	149	95	103	35	24	146	1.0	182	119	129	41	28	179	1.0
		7	328	My Hao	106	68	77	25	18	108	1.0	133	86	101	30	20	138	1.0
		Sub Total			494	316	325	117	82	468	0.9	609	396	417	138	96	587	1.0
	Outer (20 - 40 km) [1]	7	331	Kim Dong	126	81	75	30	23	114	0.9	131	85	76	30	23	115	0.9
		8	329	An Tri	131	84	79	31	24	118	0.9	133	86	79	30	22	117	0.9
		8	330	Khoai Chau	194	124	115	46	50	188	1.0	227	148	133	52	52	213	0.9
		Sub Total			451	289	269	107	97	421	0.9	491	319	288	112	97	445	0.9
Hung Yen Total					945	605	594	224	179	889	0.9	1,100	715	705	250	192	1,032	0.9
Study Area Total					10,026	5,722	5,693	2,453	2,450	9,993	1.0	12,300	7,471	7,455	3,025	3,017	12,276	1.0

Figure 5.1.1 shows the results of population estimation by area after dividing the area of Hanoi into 7 areas.

In this figure, Hanoi city center (CBD) is set as area 0, and the measured values by the census in 2013 and 2019, and the predicted values in 2020 and 2030 are aggregated and plotted. In all areas, the population tends to increase steadily. In particular, the population in the western part of the city has tended to increase significantly in the future.



No.	Area	Population			
		2013	2019	2020	2030
1	Area0	3,132,635	3,558,560	3,494,573	3,755,472
2	Area1	520,800	583,987	640,253	951,141
3	Area2	893,000	1,014,400	1,146,927	1,830,460
4	Area3	420,700	468,686	459,465	533,991
5	Area4	556,400	621,799	599,630	663,769
6	Area5	881,200	1,011,270	1,009,343	1,276,929
7	Area6	723,800	794,961	816,788	988,239
Total		7,128,535	8,053,663	8,166,979	10,000,001

Figure 5.1.1 Population Trend by Area in Hanoi

5.2 Preliminary Transport Demand Forecast

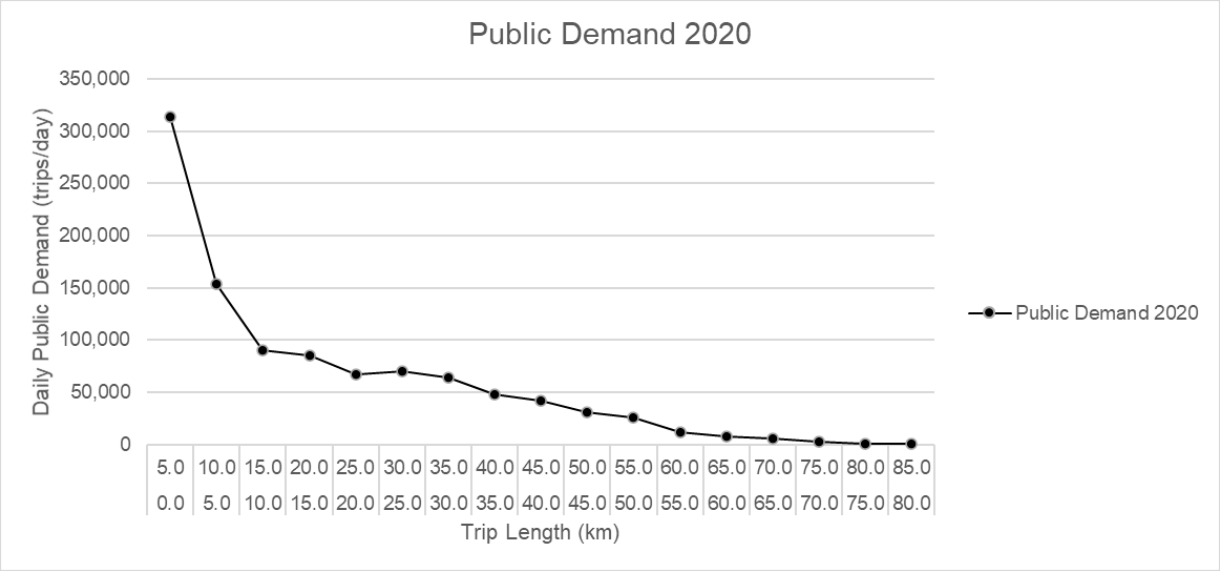
Forecasting work was carried out based on the information and data necessary for traffic demand forecasting and the review results shown in 5.1 above. Future bus demand needs were analyzed thought traffic demand in 2020 and 2030 was estimated by direction (corridor).

5.3 Potential Analysis on New Bus Route Potential and Reorganization of Bus Network from the Viewpoint of Transport Demand

It was forecasted future (2030) traffic demand. On calculating demand forecasts, review the currently planned urban development plan and reflect it in the forecast. Predict future public transport demand by direction (corridor) and use it as basic data for bus network studies. It was analyzed the potential of new bus routes and reorganization from the perspective of demand.

5.3.1 Anaylsis of Chracterisices of Bus User

The following figure shows the distribution of public transport users by travel distance range, as of 2020. Most of the users are less than 5km, and most of them are up to about 10km in the distance range.



Source: Study Team

Figure 5.3.1 Public Transport Demand by Distance Range in 2020 (Unit: Trip/day)

5.3.2 Result of Public Transport Demand Forecast

The following table and figure show the results of estimating public transport demand between areas in 2020 and 2030. Table 5.3.1 shows the changes in public transport demand in Hanoi from 2020 to 2030. Overall, public transport demand in the city will increase to 189% in 2030, compared with that in 2020. Demand from Hanoi city center (CBD) to various destinations has increased by more than 150%, and it is necessary to increase transport capacity to meet the increasing bus demand on radiant trunk roads. It should be noted that public transport demand between areas adjacent to the center (CBD) tends to increase significantly, with some areas expected to increase by more than 250%. In the future, it will be necessary not only to increase the transport capacity on radial routes from the city center, but also to develop a route network that meets the needs for movement in the outer periphery.

Table 5.3.1 Demand fluctuation of Public Transport between 2020 and 2030

		CBD	Area1	Area2	Area3	Area4	Area5	Area6	Total
			North	East	South-east	South-west	West	North-west	
CBD			121%	92%	211%	159%	176%	217%	157%
Area1	North	123%		141%	264%	262%	259%	264%	179%
Area2	East	101%	154%		262%	263%	245%	255%	173%
Area3	South-east	227%	264%	262%		258%	245%	266%	245%
Area4	South-west	154%	262%	262%	255%		241%	249%	215%
Area5	West	180%	256%	256%	246%	233%		203%	212%
Area6	North-west	198%	265%	250%	265%	242%	188%		220%
Total		154%	175%	160%	236%	215%	208%	234%	189%

Source：Study Team

Figure 5.3.2 Public Transport Demand between Area

Figure 5.3.3 Survey Area (District)

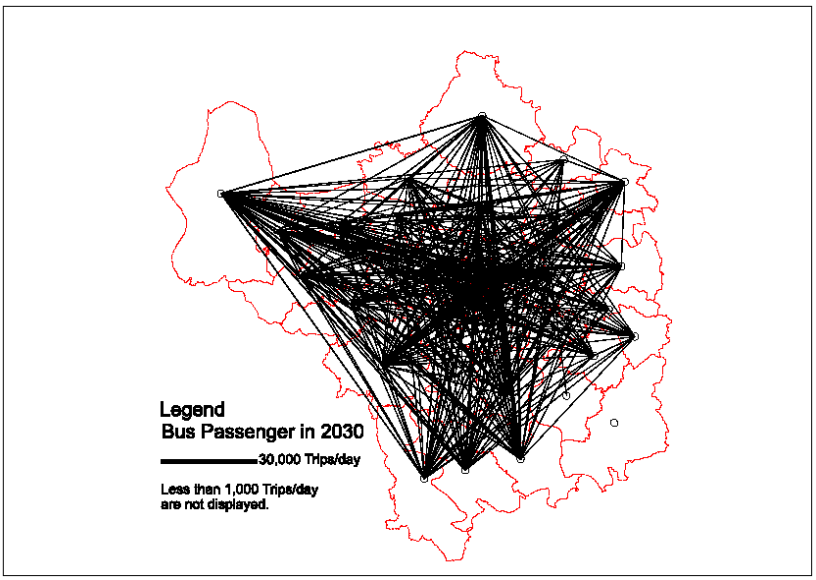


Figure 5.3.4 Public Transport User Voulme in 2030

Table 5.3.2 shows the results of an analysis of fluctuations in public bus demand between the city center area (CBD) and each area. The figures shown in the table are the amount of change when the bus demand in 2020 is 100%. In the case of 2030, (1) the case that urban railway will not developmented, (2) the case that Line 2A and 3 will be started operation, and (3) the case that all future urban railway lines formulated by Hanoi City will be started operation. These 3 cases were analyzed.

Urban railways, which will be developed as a receiver of future public transportation demand, will partially shift the demand for bus transport to railway use, but in all cases, bus demand will increase from

2020. In other words, even after the opening of the urban railway, there is a greater need for buses in the city as a whole, and bus transport will play a major role in the future after the development of the urban railway.

In particular, bus demand in the southeastern, western, and northwestern regions is showing steady growth regardless of urban railway development. It is required to attract passengers by strengthening bus transport capacity and improving services in these areas.

Table 5.3.2 Public Bus Demand fluctuation Between CBD and Each Zone

Area	2030		
	(1) the case that urban railway will not developmented	(2) the case that Line 2A and 3 will be started operation	(3) the case that all future urban railway lines formulated by Hanoi City will be start operation
North	172%	138%	122%
East	180%	170%	97%
South-east	201%	199%	182%
South-west	116%	115%	114%
West	193%	183%	219%
North-west	201%	195%	179%
Total	174%	165%	144%

Source：Study Team

6. Supplmental Transport Survey and Bus Usage Promotion Measures

6.1 Conduct of Supplemental Trasnport Survey

As a supplementary traffic survey, a bus user interview was conducted for the following purposes:

- To collect relevant data for traffic demand forecast
- To collect relevant data for bus operation plans
- To figure out current issues of bus service as well as requests of bus users

The survey method, items and sample are as follows:

- Method: face-to-face interview by surveyors at major bus interchanges and terminals
- Survey items: personal information, trip information, evaluation of current bus services.
- Sample size: 1,500 samples

The overall schedule of survey implementation is shown in the table below.

Table 6.1.1 Implementation Schedule of Supplemental Trasnport Survey

Work	Content		Time											
			01-08 Oct	9-Oct	10-Oct	11-Oct	12-Oct	13-Oct	14-Oct	15-Oct	16-Oct	17-Oct	18-Oct to 30-Oct	31-Oct to 08-OCt
Preparation works	Questionaire; survey plan; mobilizing surveyors													
Survey training	Training surveyors for carrying the interview surveys													
Field Survey	Area 1	(BI) Long Biên (200)												
		(BT) Gia Lâm (90)												
		(BI) Trần Khánh Dư (50)												
		(BT) Kim Mã (100)												
	Area 2	(BI) Cầu Giấy (200)												
		(BI) Hoàng Quốc Việt (30)												
		(BT) Nam Thăng Long (50)												
		(BT) Mỹ Đình (250)												
		(BI) Nhổn (50)												
	Area 3	(BT) Giáp Bát (250)												
		(BT) Nước Ngầm (100)												
		(BT) Yên Nghĩa (100)												
	Area 4	(BT) Sơn Tây (30)												
Data Input and Processing	Encoding the survey data, and supervising database													
	Data Analysis & Dicussion													
Survey Report	Making Report & Discussion													

6.2 Result of Supplemental Trasnport Survey

Personal Attributes: Of the 1,519 samples, 817 respondents are male (46.2%) and 702 respondents are female (53.8%). Additionally, it was found that majority of bus users are young people. Specifically, 55.3% of bus users have the ages of 13 to 22.

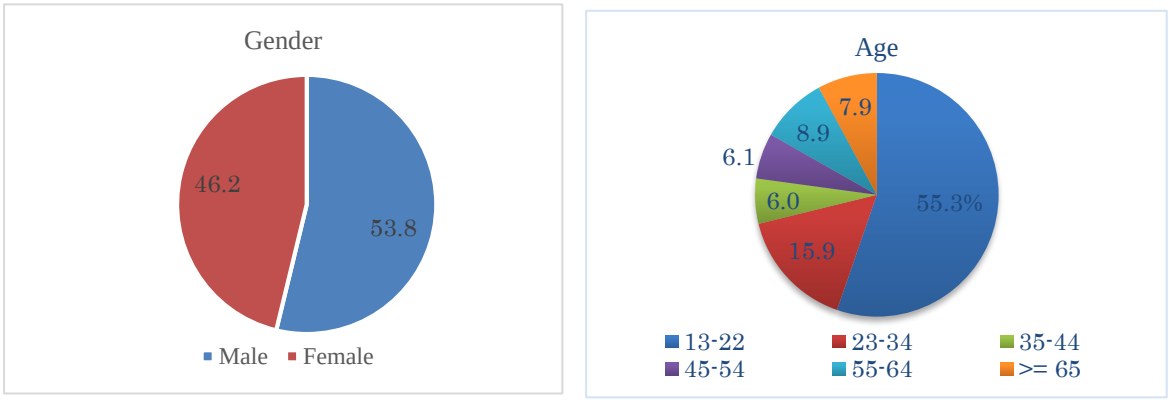


Figure 6.2.1 Share of Bus Users by Gender and Age

Occupation and Income: With respect to occupation, 846 out of 1,519 samples are pupils and students. In term of income, nearly a half of respondent have no income (accounting for 48.7% of total samples).

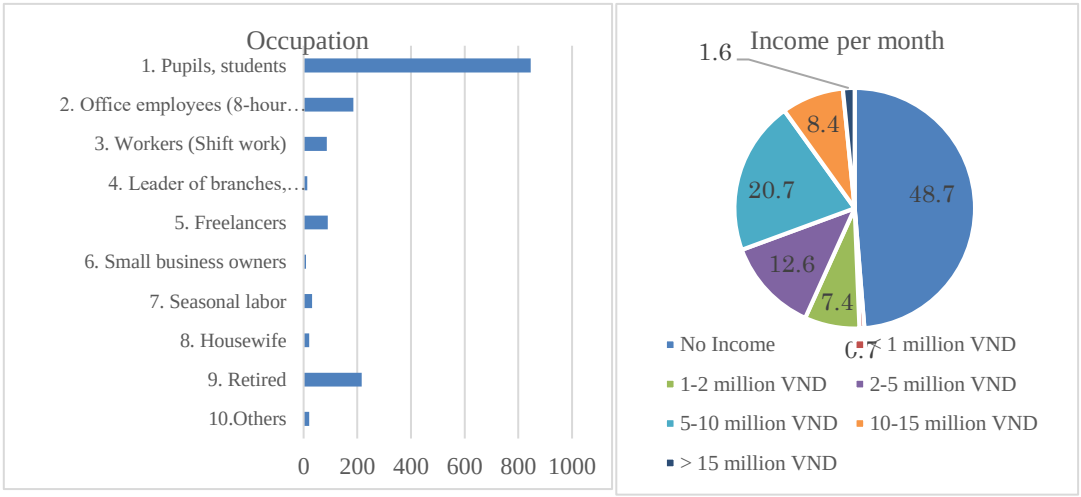


Figure 6.2.2 Occupation and Income of Bus Users

Frequency of bus use and transfer: 40.9% of bus users answered that they use bus service for daily travel. In respect to "Transfer", 52% of them need use two routes from the origin to the destination, and 45% of respondents only use a single route to complete their trips.

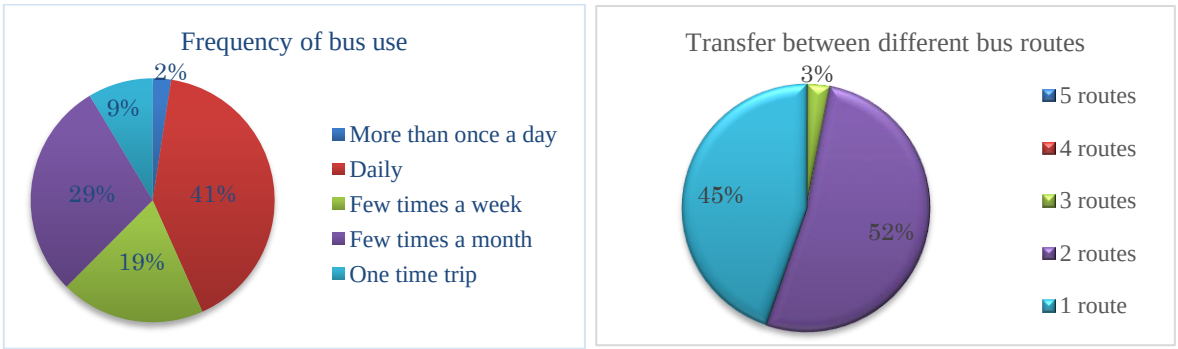


Figure 6.2.3 Share of Bus Users by Frequency of Use and Transfer

Payment Method and Type of Tickets: Payment by monthly pass is nearly two times as large as that of payment by cash, 63% in comparison with 37%, respectively. The (priority) multiple-line monthly ticket accounts for 72% of total monthly ticket, followed by (non-priority) multiple-line monthly (16.7%), free bus card *8.4%), and others. It should be noted that many bus user are using multiple ticket in Hanoi.

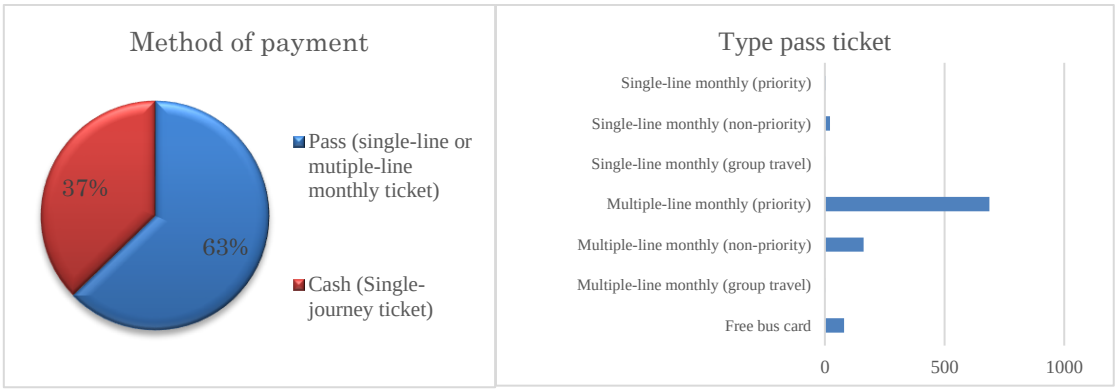


Figure 6.2.4 Share of Payment Method and Types of Pass

Access mode: Majority of bus users walk from their homes to the bus stop (boarding point)

No	Type	Value
1	Residence	1,214
2	Office/Bank	20
3	Public administrative offices	8
4	Factory/Warehouse	9
5	School/University	192
6	Medical/Welfare	30
7	Religious/Social	1
8	Wholesale/Retail Shop	6
9	Restaurant/Entertainment	4
10	Park/Green Space	5
11	Field/Garden/Forest	1
12	Others	29
Total		1,519

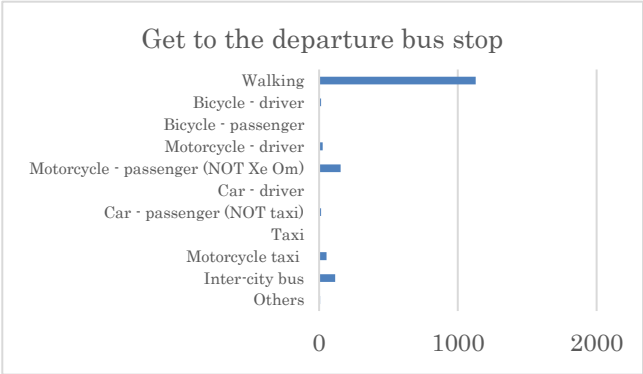


Figure 6.2.5 Share of Access Modes

Egress Mode: Bus users mostly walk from the bus stop (alighting point) to their homes.

No	Destination	Value
1	Residence	889
2	Office/Bank	89
3	Public administrative offices	22
4	Factory/Warehouse	22
5	School/University	315
6	Medical/Welfare	53
7	Religious/Social	3
8	Wholesale/Retail Shop	13
9	Restaurant/Entertainment	32
10	Park/Green Space	11
11	Field/Garden/Forest	2
12	Others	68
Total		1,519

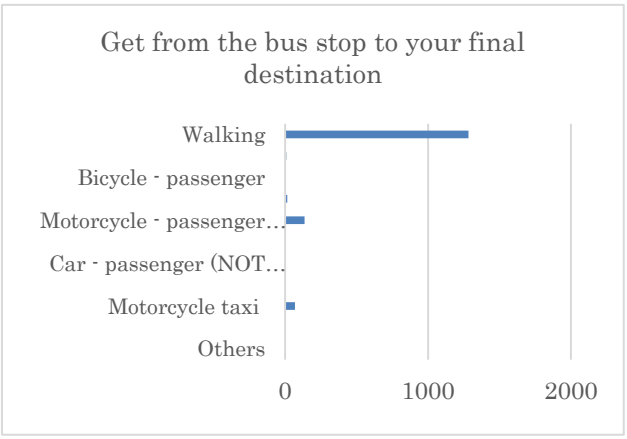


Figure 6.2.6 Share of Egress Modes

Bus Users' Opinions on Public Transport

Satisfaction with Frequently-Used Bus Routes (Up to 3 Routes): Most of bus users have two frequently used bus routes and they are highly satisfied wit

No	Number routes	Value
1	1 route	511
2	2 routes	616
3	≥ 3 routes	392
Total		1,519

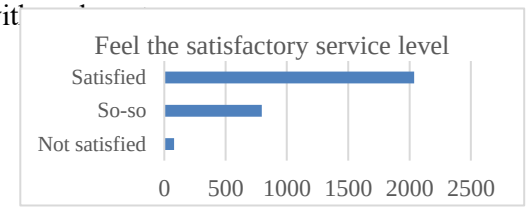


Figure 6.2.7 Frequently-Used Bus Routes

Satisfaction with Bus Speed and Punctuality: 75% of bus users answered that average bus speed is so-so. In term of "punctuality of bus service", percentage of "neutral" is highest, accounting for 59%.

Table 6.2.1 Satisfaction with Bus Speed and Punctuality

No	Bus speed	Value	percentage (%)
5	Very fast	2	0.1
4	Fast	237	15.6
3	So-so	1153	75.9
2	Slow	125	8.2
1	Very slow	2	0.1
Total		1,519	100

No	Punctuality of bus service	Value	Percentage (%)
1	Very unpunctual	27	1.78
2	Unpunctual	244	16.06
3	Neutral	897	59.05
4	Punctual	346	22.78
5	Very punctual	5	0.33
Total		1,519	100

Reasons for Bus Delays and Necessity of Bus Lanes: The percentage of "Congestion" is highest, accounting for 94% of total options. Additionally, 48.6% of bus users pointed out the necessity for prioritized/exclusive bus lane.

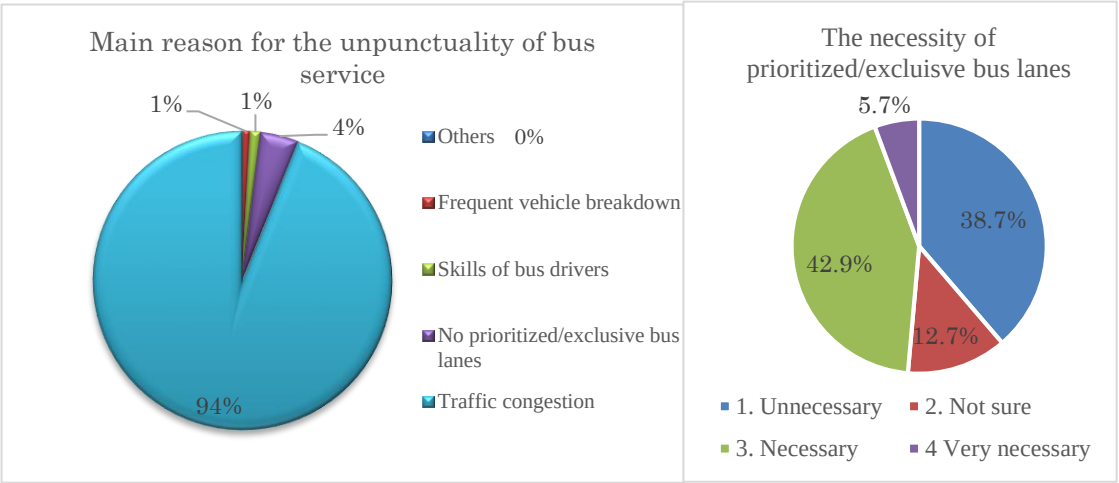


Figure 6.2.8 Reasons for Bus Delay and Necessity of Bus Lanes

Evaluation of Frequently-Used Bus Stops: Bus users are highly satisfied with content and method of information provision as well as sidewalk space for boarding and alighting. Streetlights in the evening and coverage of bus shelter are so-so, but bus users are unsatisfied with number of seats at bus stops with shelter.

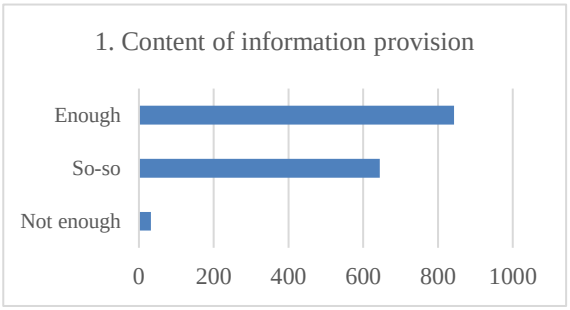
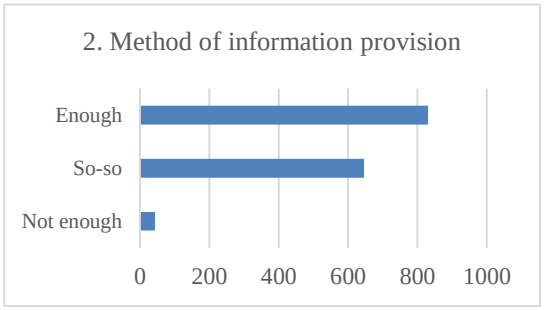
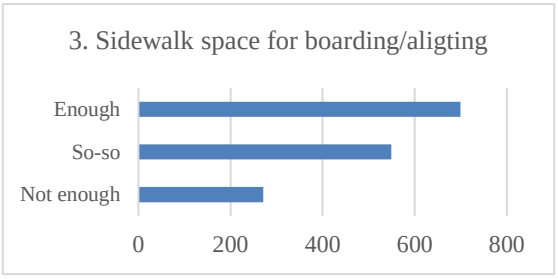
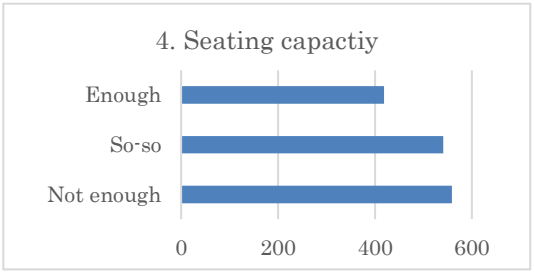
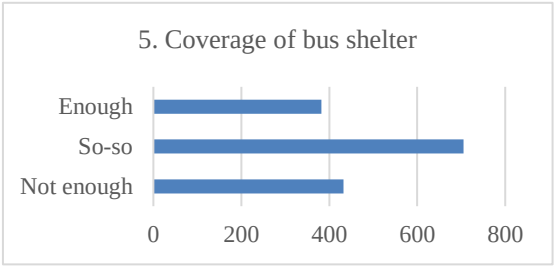
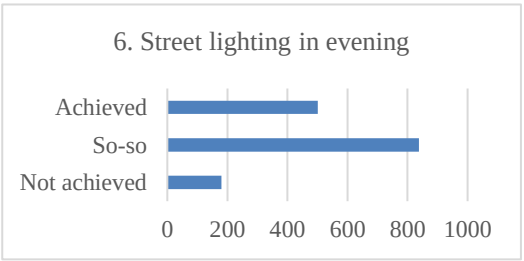
Question	Result
For the bus stops which you often get on/get off, please assess following aspects: 1. Content of information provision 2. Method of information provision 3. Sidewalk space for boarding/aligting 4. Seating capactiy 5. Coverage of bus shelter 6. Street lighting in evening	1. Enough | 2. So-so | 3. Not enough
	
	
	

Figure 6.2.9 Evaluation of Bus Stop

Evaluation of Frequently-Used Bus Terminals/Interchanges: Bus users are satisfied with method and content of information provision, sidewalk space for boarding/alighting, and street lighting in the evening. However, transport authorities should pay attention to the following items: i) seating capacity, ii) toilet and iii) parking for motorbikes/bicycles.

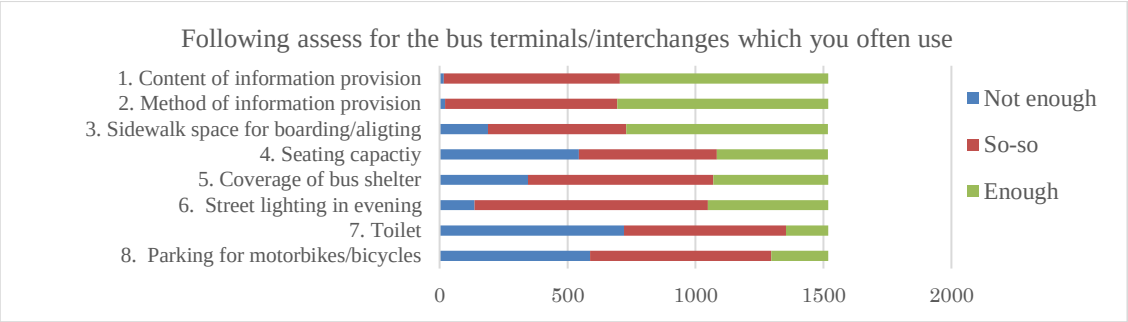


Figure 6.2.10 Evaluation of Bus Terminals and Interchanges

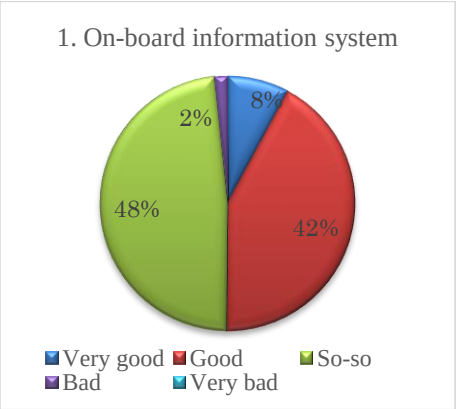
Method of Buying a Monthly Pass and Satisfaction with Online Method: 97.3 of monthly-pass users buy a pass by offline method such as at a kiosk or ticket counter.

Table 6.2.2 Method of Buying a Monthly Pass

Buy a monthly bus pass			
	Method	Value	%
1	Off-line (at ticket counters/kiosk)	917	97.3
2	Online (on Tim Buyt)	12	1.3
3	Both ways	13	1.4
Total		942	100

Assess convenience of online method			
	Method	Value	%
1	Inconvenient	1	4.2
2	So-so	6	25.0
3	Convenient	17	70.8
Total		24	100

Evaluation of Bus Vehicles: Generally speaking, bus users are satisfied with quality of bus vehicles. For all five aspects, shares of "Very good" and "Good" account for more than 50% of total samples.



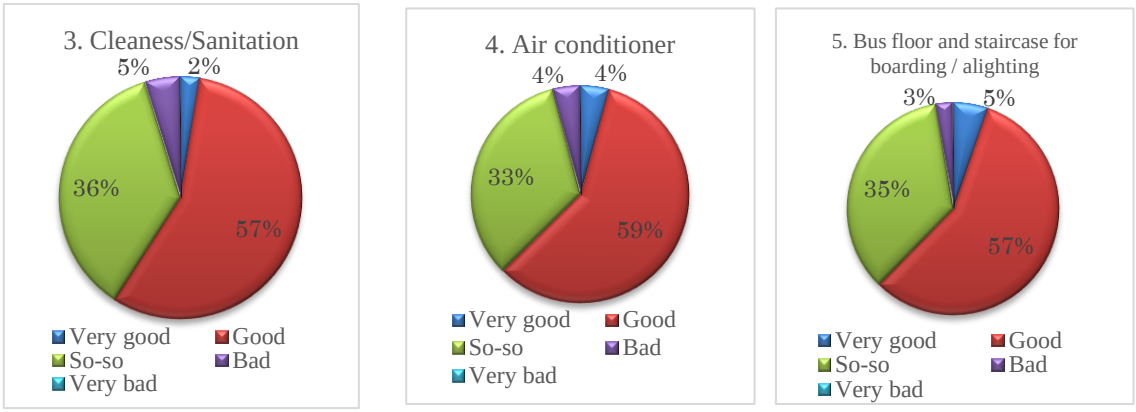


Figure 6.2.11 Evaluation of Bus Vehicles

Method of Searching for Bus Information: The most preferred way is smart-phone app. Additionally, 57.2 of respondents answered that they know the website and smart-phone app of "TIM BUYT". Bus users are highly satisfied with the usefulness of "TIM BUYT".

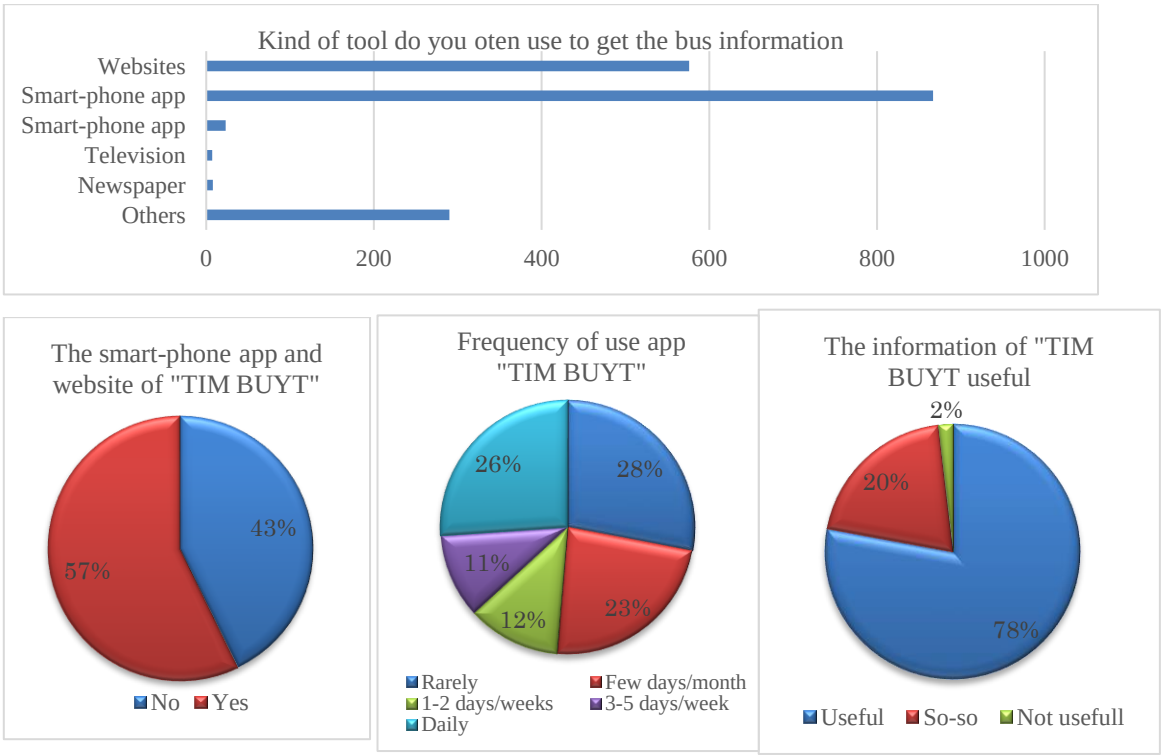
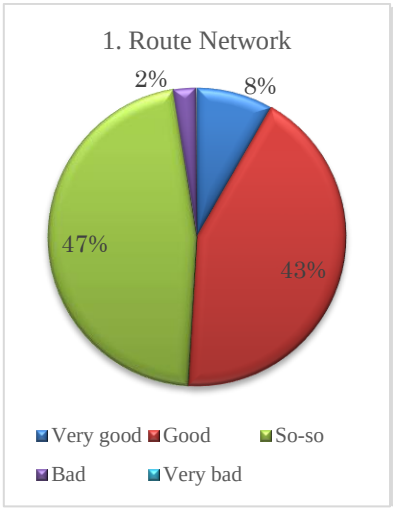
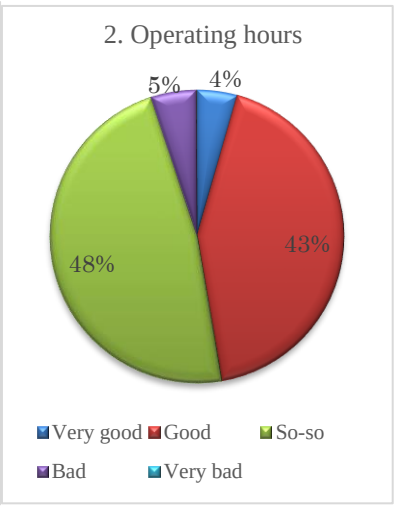
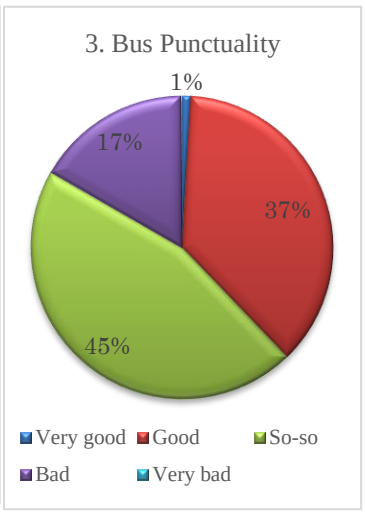


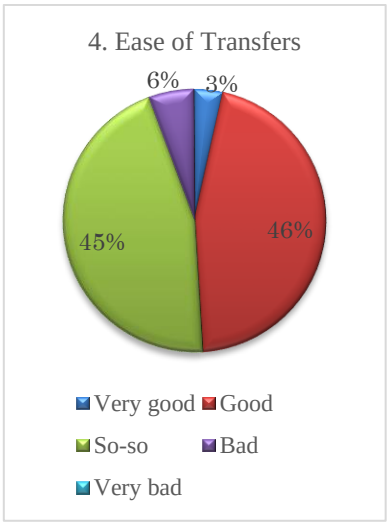
Figure 6.2.12 Way to Search for Bus Information

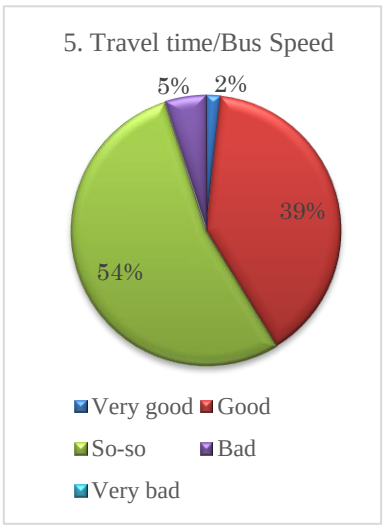
General Evaluation of Bus Service: On the one hand, the shares of "Good" is largest for the following aspects, including: i) easy of transfer, ii) information system, iii) on-board security, and iv) attitude of drivers. On the other hand, the share of "Bad" is significantly high in two categories: punctuality and quality of bus stops.

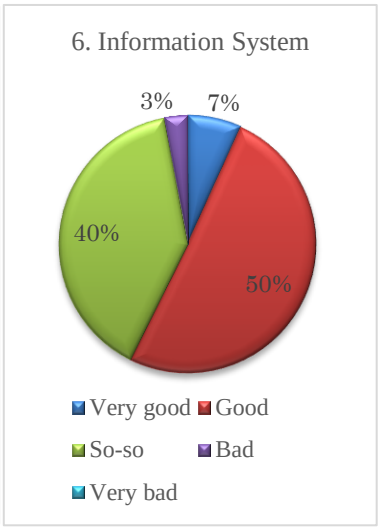

1. Route Network
2%
8%
47%
43%
Very good
Good
So-so
Bad
Very bad

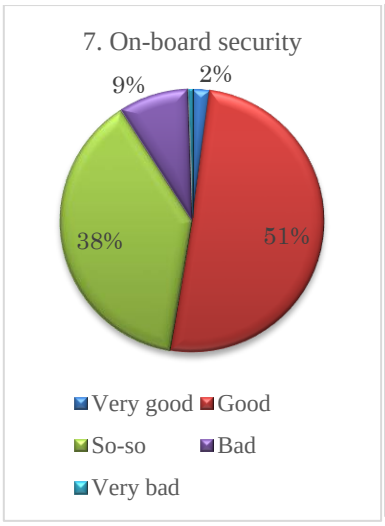

2. Operating hours
5%
4%
48%
43%
Very good
Good
So-so
Bad
Very bad

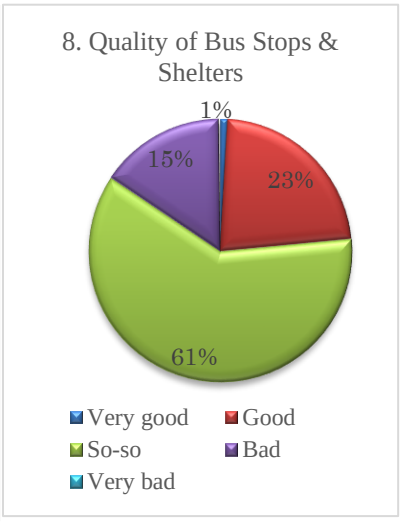

3. Bus Punctuality
1%
17%
37%
45%
Very good
Good
So-so
Bad
Very bad

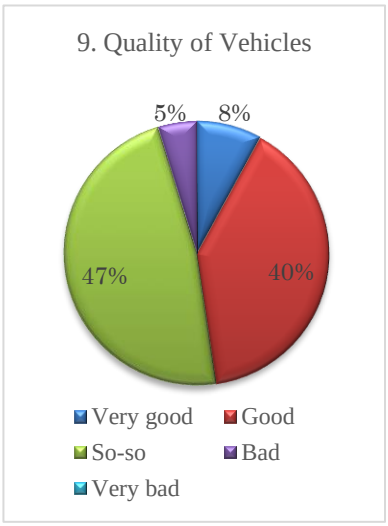

4. Ease of Transfers
6%
3%
45%
46%
Very good
Good
So-so
Bad
Very bad


5. Travel time/Bus Speed
5%
2%
54%
39%
Very good
Good
So-so
Bad
Very bad


6. Information System
3%
7%
40%
50%
Very good
Good
So-so
Bad
Very bad


7. On-board security
9%
2%
38%
51%
Very good
Good
So-so
Bad
Very bad


8. Quality of Bus Stops & Shelters
1%
15%
23%
61%
Very good
Good
So-so
Bad
Very bad


9. Quality of Vehicles
5%
8%
47%
40%
Very good
Good
So-so
Bad
Very bad

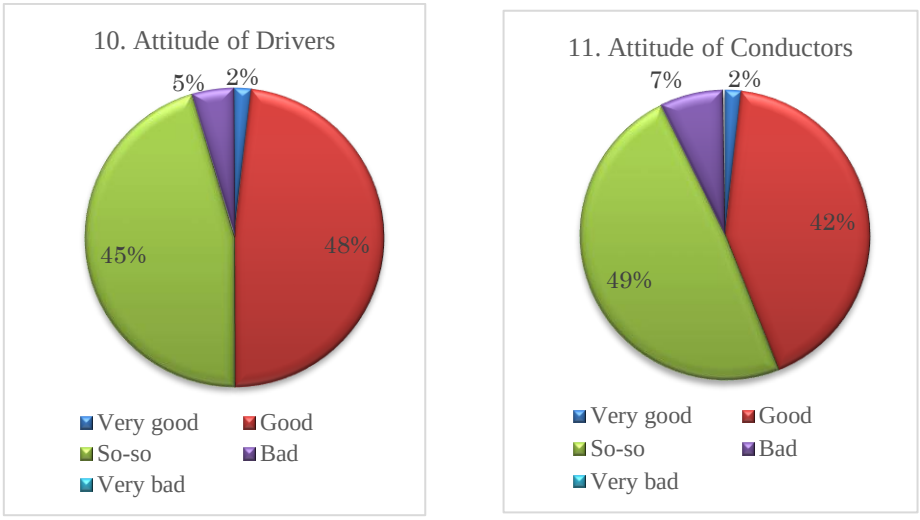


Figure 6.2.13 General Evaluation of Bus Service

Three most important aspects of bus services: Among eleven items, bus punctuality is ranked as the first position, followed by travel time/bus speed, and quality of vehicles.

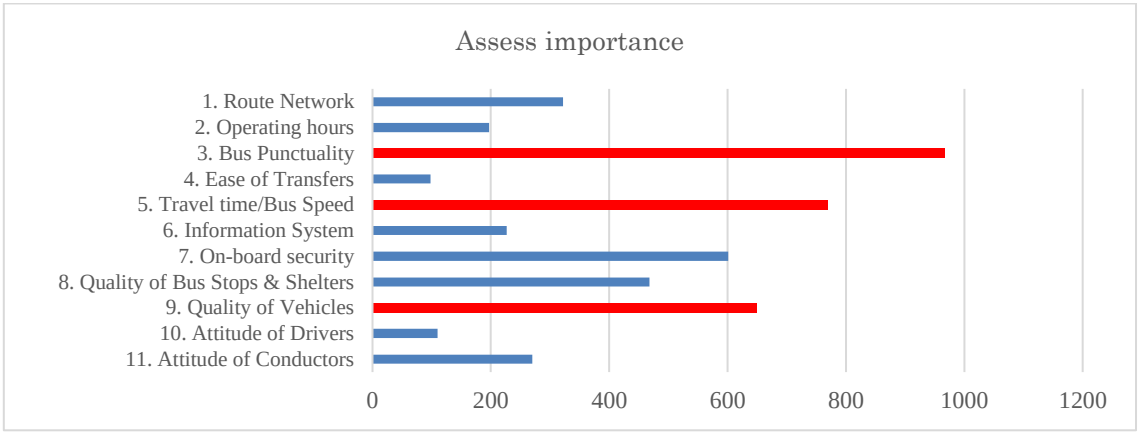


Figure 6.2.14 Most important aspects of bus service

Willingness to pay for the improvement of bus service: 72% of respondents answered that they will pay an additional fare if most important aspects of bus service are improved.

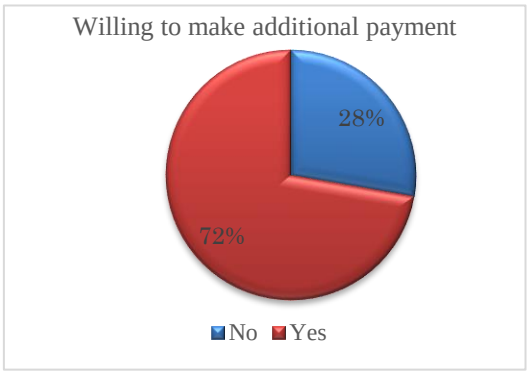


Figure 6.2.15 Willingness to pay for the improvement of bus service

6.3 Examination of Bus Usage Promotion Measure

In Vietnam, where motorcycles are the main means of transportation, modal shift initiatives such as mobility management (a measure to promote public transportation awareness and use) are necessary to foster awareness of public transportation use. Furthermore, since there is a high needs for MaaS (Mobility as a Service) initiatives that have been promoted around the world in recent years, the following examinations on mobility management, MaaS utilization, and investigate the situation of communication infrastructure development in Hanoi.

6.3.1 Mobility Management（MM）

Mobility management (hereinafter referred to as “MM”) is the core of activities to promote the use of public transport, and is a relatively new transport measure that has been started in Japan since 2000’s.

Since 2015, JICA public transport project has started its efforts targeting buses and railways. In order to maximize the effects of public transport improvement, it is essential to promote the use of public transport for residents, schools, companies, etc. in the areas along the railway lines. In this survey, it was examined MM activities with the theme of promoting the use of buses in Hanoi.

1) Outline of Mobility Management Activitity

MM, a transport measure that aims to break away from excessive dependence on cars and use public transport and bicycles "wisely", focuses on communication measures that apply psychological knowledge, and in some cases financial incentives and legal regulations. In combination with, it encourages people to voluntarily change their behavior. It is expected to be a method that will lead to alleviation of traffic congestion in urban areas and improvement of air pollution by curbing the use of cars. As shown in Figure 6.3.1, MM has three activities: (1) motivation, (2) provision of alternative information, and (3) request for formulation of an action plan.

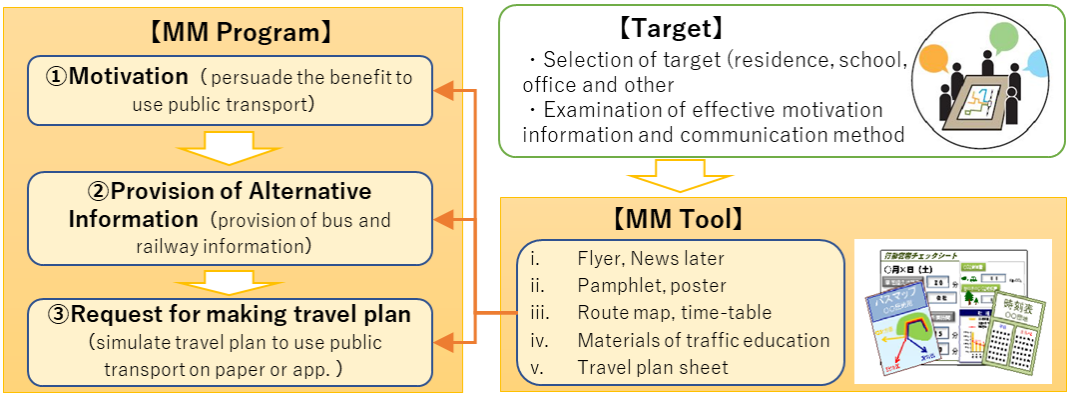


Figure 6.3.1 MM Programme and MM Tool

2) Project of Public Transport Improvement and Mobility Management

Public transport improvement projects can be broadly divided into three stages: (1) planning stage, (2) timing of public transport improvement / new project construction, and (3) operation. Table 6.3.1 summarizes the effective MM activities at each stage and the tools and methods required to implement the activities. Since MM works not only with transport companies but also with government and academic

experts to work with various facilities such as schools and companies, it is necessary to consult and request cooperation with related organizations and departments through Hanoi public transport operator in Hanoi City.

Table 6.3.1 Required MM Method and Tools on each Stage

Stage	MM Activity	Tool / Method
Planning Stage	◆ Setting of target modal share ◆ Confirm the contents on public transport project ◆ Conduct the survey to grasp the attitude and behavior of public transport usage ◆ Plan of MM measures and formulate implementation scheme ◆ Organize the seminar / workshop for relevant organizations on urban transport sector	◘ Interview survey for citizen ◘ Questionnaire Survey related travel attitude and behavior ◘ Activity daily survey ◘ Others survey（related to travel behavior）
Timing of Public Transport Improvement / New Project Construction	◆ MM Workshop for relevant agencies ◆ Survey to make MM tool ◆ Making MM action plan ◆ Develop MM implementation structure and make responsibility of participants ◆ Pilot activation of MM	◘ Questionnaire Survey related travel attitude and behavior ◘ Route map and time-table ◘ Flyer and pamphlets ◘ Use MaaS App.
Operation（after start the updated/renewal operation of public transport)	◆ MM activity by group（residence, school and office） ◆ Car free day, bus day (free of charge) and other events ◆ Effect measure	◘ TFP, travel plan advice ◘ PR with Mass media ◘ Provide incentive using MaaS App.

6.3.2 MaaS（Mobility as a Service）

MaaS (Mobility as a Service) has been attracting attention as a concept of a service that seamlessly connects movements other than private transport such as private cars and motorcycles by utilizing ICT (Information and Communication Technology).

It is one of the useful measures because it can be expected to promote the use of buses by providing Door-to Door services centered on bus transport. Since the situation surrounding ICT has changed in Hanoi in recent years, the related matters are summarized below.

1) Urban Transport Issues in Hanoi and Applicability of MaaS

In general, interconnection and interoperation of fare systems of different public transport modes have not been solved yet. With respect to Normal Bus, paper-based tickets have been used (single-journey and monthly tickets). In 2014, IC card was introduced on Bus Line 6 (Giap Bat – Cau Gie) by the support of JICA. However, the use of IC card on this bus line was terminated due to some technical and financial issues. Many motorcycles are parked on the sidewalk and it is difficult to walk. The operation speed of bus is lower than that of motorcycle and car, leading to people taking more time when they travelling by bus. As a result, bus ridership has been gradually decreased in recent years.

Although the need for medium-distance travel is increasing due to the expansion of urban areas and the opening of shopping complex in the suburbs, the public transport network in the suburbs is weak.

To deal with the above-mentioned issues, passengers may need several IC cards when they use different public transport modes in Hanoi city. A emerged issue is how to set up an interoperable Card-based or ABT-based (Accounrt-based ticket) system in Hanoi city. This system will facilitate the travel of public transport passengers. It is necessary to promote a standard of card-based or app-based fare system.

As a response by MaaS, the following can be mentioned as equivalent to MaaS levels 1 and 2.

- Building a platform for GPS data / apps
- Reflect GPS data (traffic jam information, etc.) in the service app

- Accumulate user information obtained from service apps in the administrative database

The following are equivalent to MaaS Level 3

- No matter what public transportation you choose(Rail / BRT / Bus), the fare to your destination will be the same
- Build a platform for business collaboration

The following are equivalent to MaaS Level 4

- Easy-to-walk sidewalk maintenance (including parking restrictions)
- Traffic congestion measures in urban areas（Promoting a modal shift from private to public transport）
- Measures for traffic vulnerable people,mainly in the suburbs（Establishment of transportation mode and legislation that meet needs）

2) Situation of Communication Infrastructure Development

As of 2018, Vietnam has more than 60 communication service providers (Internet, telephone, etc.) including Viettel, VNPT, FPT, mobile phone subscribers are about 130 million, and Internet users account for 70% of the population. 47% of households use the internet.

In addition, 95% of the population uses 4G mobile networks. In Hanoi, 5G lines are scheduled to be introduced in 2020 (5G introduction plan by Viettel).

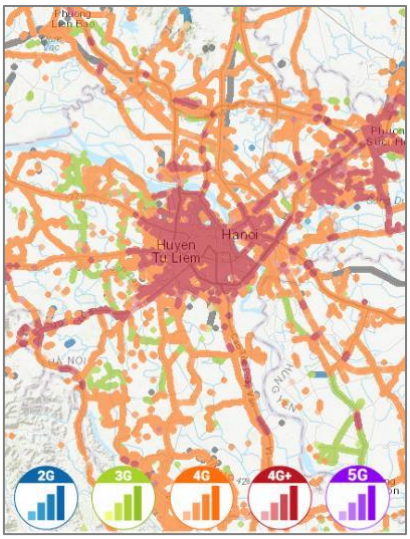


Figure 6.3.2 Broadband Network in Hanoi（3G-4G,Viettel）

3) Current States of Various Application Development

Bus service applications (Timbuyt) and parking lot use applications (Ipaking) are provided to citizens, and vehicle dispatch applications (Grab) are also widely used.

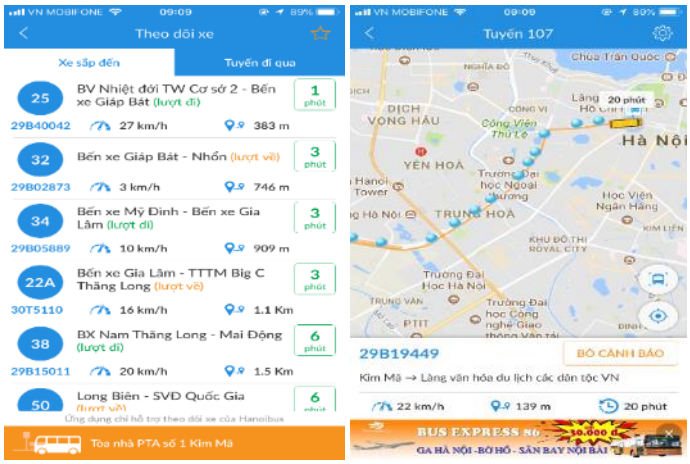


Figure 6.3.3 Application for Bus Service（Timbuyt）

Figure 6.3.4 Application for Parking lot Use（Ipaking）

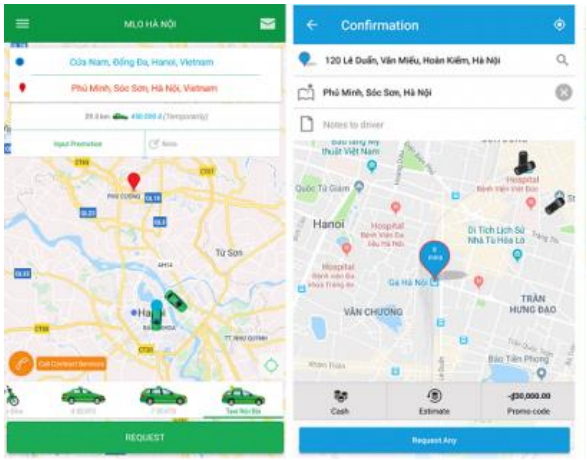


Figure 6.3.5 Vehicle Dispatch Application （Grab）

7. Summary of preparatory survey results and points for the second phase survey

As a result of reviewing and compiling related documents on the transportation policies of Vietnam and Hanoi, especially the public transportation policy, we understand that it will provide high quality public transportation to the people and citizens in recent years. And in the future, it can be said that buses will play a leading role in public transportation in urban transportation policy. In the operation of public transportation business, the government's policy on public transportation is indispensable, and in this respect, we figured out that the Hanoi has a basis for growth.

From the current state of public transportation and the results of traffic demand analysis, we confirmed that there is a certain level of bus demand in Hanoi, and that public transportation demand is on the rise in the future. On the other hand, from the recent number of bus users, operation and income and expenditure status, and comparison with cities in ASEAN countries, there is a concern that the number of bus users will be sluggish in recent years and the use of motorcycles will increase.

In addition, We believe that it is possible to increase the number of bus users by implementing promotion measures such as the construction of a route network based on future population growth and movement flow, urban development and railway development, and the use of new technologies and measures that have been rapidly developing in recent years, such as the promotion of MM measures and MaaS. Regarding MM, it is possible to implement measures in combination with the bus operation improvement project in Hanoi, according to the precedent examples of us and examples of efforts in public transportation projects of JICA. Regarding MaaS, there is a possibility to improve operation highly so that it is likely to be installed in the near future. Therefore, we have confirmed that there is a foundation that can provide our know-how.

We understand that the route bus business can be expected to continue to grow due to new route construction and service improvement. On top of that, we were able to understand the room for improvement related to vehicle maintenance, procurement, and operation service quality. Furthermore, since we understand about the future development potential of other bus businesses such as chartered buses, we would like to provide support to make a business plan. In this way, we have confirmed that we can implement measures such as technology / know-how transfer, management capacity improvement, human resource development, etc. to Hanoi public transportation companies, so we will proceed with management support through the second phase survey.