

2021

ANNUAL REPORT

**Status Quo of Transport Infrastructure,
Policy Issues, and Development Needs in
Vietnam**



**Vietnam-Korea Transport Infrastructure
Cooperation Center (VKTrans)**

Contents

1	Diagnosis of Transport and Logistics Infrastructure in Vietnam	6
1.1	Major Socio-Economic Indicators in Vietnam	6
1.2	Statistical Indicators related to Transport and Logistics infrastructure in Vietnam	9
1.2.1	Road Transport	9
1.2.2	Railway Transport	10
1.2.3	Inland Waterway Transport (IWT).....	11
1.2.4	Maritime Transport.....	12
1.2.5	Aviation.....	13
1.2.6	Passenger and freight traffic	14
1.2.7	Other logistics indicators	15
1.2.8	Impact of COVID-19.....	17
1.3	Statistical Indicators related to Transport and Logistics in five cities.....	18
1.3.1	Road network	18
1.3.2	Vehicle.....	18
1.3.3	Public transport	19
2	Diagnosis of Major Transport Infrastructure Policy in Vietnam	21
2.1	Transport and logistics policy to prepare for the Post-COVID 19	21
2.2	Transport and logistics infrastructure policy to respond to the 4 th industrial revolution	27
2.3	Transport and logistics infrastructure policy to respond to environment and climate Change	29
2.3.1	Climate Change Impacts (CCI).....	29
2.3.2	Road planning	30
2.3.3	Railway planning	30
2.3.4	IWT planning	31
2.3.5	Seaport planning	31
2.3.6	Aviation planning.....	32
2.4	Changes and amendments to law and systems related to transport and logistics in Vietnam.....	32
2.5	Identify on-going and/or planned projects in transport and logistics and its financing plans	32
3	Investigation of On-going and Required Transport and Logistics Infrastructure Projects in Vietnam	35

3.1	Mid- and long-term transport and logistics projects	35
3.1.1	Expressway projects	35
3.1.2	Railway projects	37
3.1.3	Inland waterway project	39
3.1.4	Seaport projects	41
3.1.5	Airport system plan for the period 2021-2030 with a vision to 2050	42
3.2	On-going transport and logistics projects sponsored by major international parties (MDB, JICA, KOICA, etc.)	49
3.2.1	Cooperation schemes	49
3.2.2	On-going project list by JICA	49
3.2.3	On-going project list by ADB.....	50
3.2.4	On-going project list by World Bank	51
3.3	Necessary and/or required transport and logistics projects based on development needs of Vietnam	52
3.3.1	Priority projects in road	52
3.3.2	Priority projects in railway	54
3.3.3	Priority project in IWT.....	56
3.3.4	Priority project in aviation.....	57
4	Vietnam NewsBrief 1	0

ABBREVIATION

MPI	Ministry of Planning and Investment
MOT	Ministry of Transport

LIST OF TABLES

Table 1-1. Vietnam facts, 2021	6
Table 1-2. Transport development funding, 2011-2020	8
Table 1-3. Transport maintenance funding, 2011-2020	9
Table 1-4. Road lengths as the end of 2020	9
Table 1-5. Vietnam’s Expressway system in 2020	10
Table 1-6. Inland waterway network by infrastructure classification, at the end of 2020	11
Table 1-7. Inland waterway registered fleet, at the end of 2020	12
Table 1-8. Profile of major terminals in class 1 ports	12
Table 1-9. Road network in five cities, 6/2022	18
Table 1-10. Register vehicles in five cities, 2021	18
Table 1-11. Public transport indicator	19
Table 2-1. Policy measures to respond to the 4 th Industrial revolution	28
Table 2-2. Priority projects during the period 2021-2030	32
Table 2-3. Project package in the period 2021-2030	34
Table 3-1. List of expressway project, 2021-2030 and a vision towards 2050	35
Table 3-2. List of railway projects	38
Table 3-3. List of IWT projects	39
Table 3-4. List of seaport projects	41
Table 3-5. List of airport project	43
Table 3-6. Ongoing airports improvement projects	44
Table 3-7. Expressway priority project by 2025	52
Table 3-8. Expressway priority project by 2030	53
Table 3-9. Expressway investment plan	54
Table 3-10. Priority project for 2021-2030 in railway	54
Table 3-11. Priority project for 2021-2030 in maritime	56
Table 3-12. Priority project for 2021-2030 in aviation	57

LIST OF FIGURES

Figure 1-1: Regional classification and main urban center.....	6
Figure 1-2: Growth rate of some Socio-economic indicators.....	7
Figure 1-3. Passenger traffic (million persons)	14
Figure 1-4. Freight traffic (thousand. tons.....	15
Figure 1-5. Logistics project distribution	16
Figure 1-6. Logistics project QoQ by region.....	16
Figure 2-1. Possible post-COVD 19 trends in transport.....	22
Figure 2-2. The government policy measures over January to September 2020.....	23
Figure 2-3. Changes in mobility during COVID-19	26
Figure 2-4. Recent trends in international and domestic flights and policy stringency index	27
Figure 3-1. Cumulative commitments from ADB.....	51

1 Diagnosis of Transport and Logistics Infrastructure in Vietnam

1.1 Major Socio-Economic Indicators in Vietnam

The data is based on statistics provided by the General Statistics Office of Vietnam or those published by other agencies under the MOT, MPI, other ministers and official agencies.

Population

Viet Nam is administratively divided into three regions (northern, central, and southern) and six socio-economic sub-regions. Urban centers are assigned a key role in the development of socio-economic regions. They are classified into six categories based on standardized criteria.¹

The population in 2021 was 98.5 million, or a growth rate of 0.95%, compared with 97.6 million in 2020. Urban population accounted for 37.12% of total population

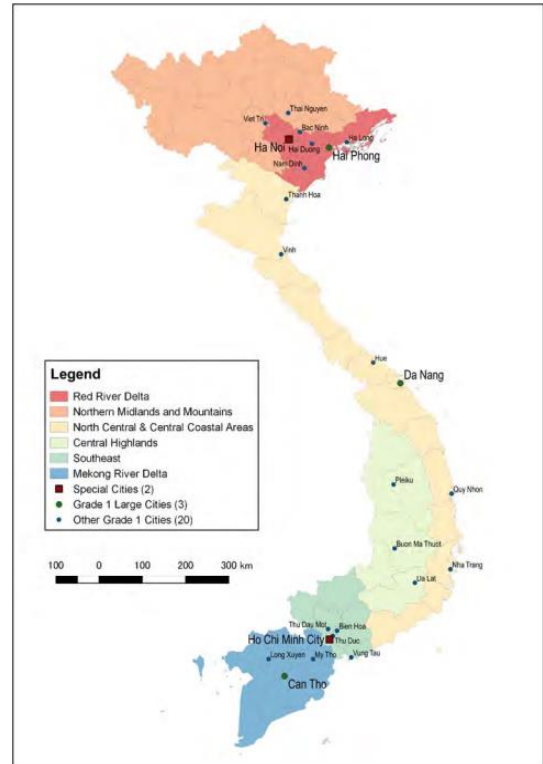
Table 1-1. Vietnam facts, 2021

Indicator	Figure
Surface area	329,241 km ²
Population	98.5 mln. Person (2021)
Population density	297 person/km ²
Percentage of urban pop.	37.12%
GDP	\$ 366.1 bill.
GDP per capita (2021)	\$ 3,717
	Agriculture: 12.56%
	Industrial: 34.47%
	Service: 41.21%
GDP sub-sector	Others: 8.76%
Economic growth rate	2.56% (2021)

Source: General Statistic Office, 2022, data available at <https://www.gso.gov.vn/en/population/>

Economy

The GDP growth rate in 2021 reached 2.56% compared to 2020 due to seriously affects of the COVID-19 pandemic, especially in the quarter III/2021, many provinces had to implement prolonged social distancing measures to prevent the pandemic.



Source: JICA, 2020

Figure 1-1: Regional classification and main urban center

¹ Criteria for categorize urban type: the socio-economic, population number and density, non-agricultural workforce, and urban infrastructure

GDP per capita at current prices was always higher than the previous year. In 2021, this figure reached 3,717 USD per person, an increase of 165 USD compared to that in 2020. GDP at current prices in 2021 was 8,479.7 trillion VND (equivalent to 366.1 billion USD); this figure in 2020 was 8,044.4 trillion VND (equivalent to 346.6 billion USD).

Regarding GDP structure in 2021, the agriculture, forestry and fishery sector accounted for 12.56%, reducing by 0.1 percentage points compared to that in 2020; the industry and construction sector shared 37.47, increasing by 0.73 percentage points; the service sector accounted for 41.21%, declining by 0.62 percentage points; the taxes less subsidies on products made up 8.76%, grew down by 0.01 percentage points.

The total export and import turnover of goods reached 669.01 billion USD in 2021, an increase of 22.7% compared to 2020, the trade surplus reached 3.32 billion USD, much lower than the trade surplus of 19.8 billion USD in 2020. In 2021, the total import-export turnover of goods and services compared to GDP reached 186.5%, an increase of 23.2 percentage points compared to the proportion of the previous year.

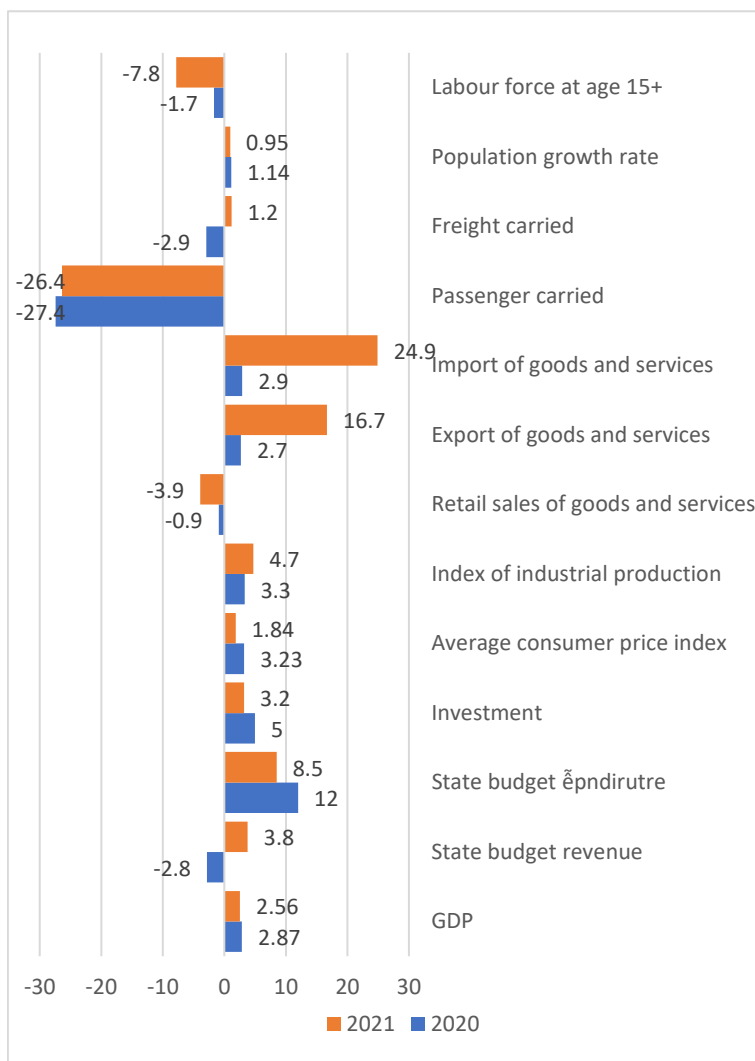


Figure 1-2: Growth rate of some Socio-economic indicators

Finance and investment

In 2021, the realized social investment capital at current prices increased by 3.2% compared to that in the previous year. Although this was the lowest growth in many years², it was a positive result in the context of complicated development of the Covid-19 pandemic both in the country and the world. The foreign direct investment (FDI) attraction recovered, the newly registered capital and the additional registered capital increased again, showing that the foreign investors continued to believe in Viet Nam's investment environment.

² The growth rate of investment capital for the whole society in the period 2017-2021 were 13.5%, 11.0%, 10.1%, and 3.2%, respectively

The total foreign investment capital into Vietnam as of December 31st, 2021 including newly registered capital, adjusted registered capital and value of capital contribution and share purchase by foreign investors reached 38.9 billion USD, grew by 25.2% over the last year. Of which, there are 1,818 newly licensed projects with registered capital of 18.9 billion USD, down 30.3% in number of projects and up by 24.3% in registered capital over the previous year; 1,097 turns of licensed projects from previous years registered to adjust investment capital, increasing by 12.8 billion USD, up 76%; 3,924 registrations for capital contribution and share purchase with a total value of capital contribution of 7.1 billion USD, down 16.7%. Realized foreign direct investment in Vietnam in 2021 is estimated at 19.7 billion USD, down 1.2% over the previous year.

In terms of outward foreign direct investment of Viet Nam in 2021, there were 69 newly licensed projects with the total capital of Viet Nam side of 418.2 million USD; there were 22 turns of adjusted investment projects with a total adjusting capital of a decrease by 776 million USD. Overall, outward foreign direct investment of Viet Nam (including newly licensed and increasing adjusted) decreased by 357.9 million USD.

Budget in the transportation sector

The transport sector has received VND 980 trillion for investment in the period 2011-2020, focusing on infrastructure and equipment. This amount is equivalent to 2.2% of the aggregated yearly GDP during the same period. The largest subsector recipient was road (VND 573 trillion), followed by maritime transport (VND 202 trillion), air transport (VND 90 trillion), and IWT (VND 73 trillion). Railway merely received VND 39 trillion or only 7% of the road subsector. Funding from the state account, consisting of the state budget, ODA, and government bond, accounted for 48%. The non-state account from infrastructure/ terminal operators' investment and new ones from the private sector, local governments, etc. had a higher share of 52%. Those investments expect returns from various forms of user charges such as toll fees, terminal fees, and fares. Thus, it can be said that the user-pay principle has worked well for transport sector development except for railway

Table 1-2. Transport development funding, 2011-2020

Subsector	State account	Non-state account	Total funding	GDP share
Road	386,551	186,530	573,081	1.27
Railway	37,950	1,468	39,418	0.09
IWT	13,157	60,000	73,157	0.16
Seaport	28,387	173,360	201,747	0.45
Airport	5,893	84,480	90,373	0.20
Others	2,408	0	2,408	0,01
Total transport sector	474,345	505,838	980,183	2,18

Source: MOT, cited from JICA (2021)

During the same period, the government disbursed a maintenance fund of VND115 trillion. The average disbursement ratio per request from the five subsectors is 50%. Since road and railway received less than half of their requested budgets, considerable maintenance backlogs have likely happened. The

other three subsectors requested comparatively modest budgets, and the government fulfilled all. Their infrastructure/terminal operators may cover the remaining maintenance costs by their resources from various user charges (Table I.2).

Table 1-3. Transport maintenance funding, 2011-2020

Subsector	Amount disbursed	Amount requested	Disbursed /Requested
Road	72,926	158,004	46%
Railway	22,572	1,468	42%
IWT	6,311	6,311	100%
Seaport	7,620	7,620	100%
Airport	5,151	5,151	100%
Total transport sector	114,580	230,463	50%

Source: MOT, cited from JICA (2021)

1.2 Statistical Indicators related to Transport and Logistics infrastructure in Vietnam

1.2.1 Road Transport

Statistics from the Directorate for Road of Vietnam and relevant projects have provided information on the road network of Vietnam as of the end of 2020, as shown in Table 1-4. The first expressway operated in 2010 and increased significantly to 1,411 km at the end of 2020. As a result, the total road length has increased by approximately 19%, with annual growth rate of 1.5%. By road type, urban roads were the most extended, followed by national highways.

Table 1-4. Road lengths as the end of 2020

Subsector	Length (km) as end of 2020	Length (km) as end of 2008	Annual Growth rate (%)
Expressways (including sections under construction)	1,411	0	
National Highways	25,151	17,228	3.2%
Provincial Roads	28,142	23,520	1.5%
Specialized Roads	8,045	6,434	1.9%
Urban roads	26,953	8,492	10.1%
District roads	57,032	49,823	1.1%
Commune roads	159,082	151,187	0.4%
Total	305,204	256,684	1.5%

Source: Directorate for Road of Vietnam, 2021

The breakdown of expressway development was 903km in the northern region, 193km in the Central and Central Highlands Regions, and 315km in the southern region. Twenty-nine out of 63 provinces and municipalities have expressways.

In terms of development expenditure per unit kilometer, the southern region spent the highest at 294.53 billion VND/km, or about 1.6 times higher than 186.13 billion VND/km for the Northern region.

Table 1-5. Vietnam's Expressway system in 2020

Subsector	Length (km)	State budget Capital Investment (bil. VND)	Other capital investment (bil. VND)	Capital investment per Length (bil. VND/km)
Northern Region	903	74,400	93,678	186.13
Central Region + Central Highlands	193	20,630		106.89
Southern Region	315	77,778	15,000	294.53
Total	1,411	172,808	108,678	199.49

Source: JICA, 2021

According to Vietnam Register, at the end of 2021 Vietnam has more than 4.5 million registered automobiles. Of which, the number of passenger cars is 2.7 million (59.4%), followed by trucks with 1.5 million (33%) and intercity buses with 0.17 million (3.9%), and others (3.7%). The number of motorbike and moped is more than 73 million.

1.2.2 Railway Transport

The national railway network has a total length of 3,143 km (2021) and has 277 stations, of which 2,703 km is the length of the main line and 612 km are station tracks and branch tracks. The seven main lines are as follows:

- (a) Hanoi – HCMC line: A 1726km-long, single track, 1000-mm gauge line, running along the North–South corridor and connecting major cities and industrial zones, including Hanoi, Nam Dinh, Thanh Hoa, Vinh, Hue, Da Nang, Nha Trang, Quy Nhon, Bien Hoa, and Ho Chi Minh City. It plays a vital role in the socio-economic development of the North–South corridor.
- (b) Gia Lam–Hai Phong Line: A 102km-long, single track, and 1000-mm gauge line that passes through four cities and provinces, namely Hanoi, Hung Yen, Hai Duong, and Hai Phong, and is an important railway in the economic development triangle of Hanoi–Hai Phong–Quang Ninh in the Northern Focal Economic Zone.
- (c) Yen Vien–Lao Cai Line: A 296km long, single track, 1000-mm gauge line that runs along the Red River and passes through five provinces and cities, including Hanoi, Vinh Phuc, Phu Tho, Yen Bai, and Lao Cai. It is one of the two key development lines of the railway sector.
- (d) Hanoi–Dong Dang Line: A 167km-long, dual gauge line that passes through the four provinces of Hanoi, Bac Ninh, Bac Giang, and Lang Son. It connects with the Nanning–Pingxiang railway of China.
- (e) Dong Anh–Quan Trieu Line: This line is 55km-long with dual gauge. The section from the Yen Vien Station to Luu Xa Station has both of meter gauge (1,000mm) and standard gauge (1,435mm), while the section between Luu Xa Station and Quan Trieu station uses only meter gauge (1,000mm). The Dong Anh–Quan Trieu Line runs through Hanoi and Thai Nguyen province.
- (f) Kep - Ha Long–Cai Lan Line: A 128km-long, 1435mm single track line that passes through Bac Giang and Quang Ninh provinces. (g) Kep–Luu Xa Line: This line is a 56km-long, single line of 1435-mm gauge. The route goes through the two provinces of Bac Giang and Thai Nguyen. The route has a good view but has now stopped working.

Among the railway lines, Hanoi–HCMC Line and Yen Vien–Lao Cai Line show high operating conditions of 82% and 79% of their line capacity, respectively, while the rest have operating status of less than 50% of their line capacity.

1.2.3 Inland Waterway Transport (IWT)

Vietnam has approximately 26,500 km of navigable waterways managed by either GoV or provincial government.³ The two main managed waterway systems are very favorably located from the viewpoint of production and distributions:

- The northern region IWT system, carrying 57% of Vietnam’s total IWT traffic, is in the Red River Delta area. It centers on the metro Hanoi economic growth hub, and connects with Haiphong, the region’s most important seaport.
- The southern region system, carrying 37 percent of the total IWT traffic task, is centered on the Mekong Delta and is adjacent to the growth hub of Ho Chi Minh City (HCMC). It connects with the major seaports of HCMC and Cai Mep Thi Vai and the sea-river port of Can Tho.

Table 1-6. Inland waterway network by infrastructure classification, at the end of 2020

Class	Vessel size capability (DWT)	National IWT (km)	Provincial IWT (km)	National IWT (%)	Provincial IWT (%)
Special		522.7	70.6	7.3%	0.4%
Class I	601-1,000	897.0	228.1	12.6^	1.2%
Class II	301-600	918.3	276.5	12.9%	1.4%
Class III	101-300	3,632.2	509.1	51.0%	2.6%
Class IV	51-100	947.1	2,106.7	13.3%	10.9%
Class V	10-50	208.2	7,028.8	2.9%	36.3%
Class VI	Less than 10		6,071.9		31.3%
Unclassified			3,089.0		15.9%

Source: Vietnam Inland Waterways Administration, 2021

Vietnam has more than enough ports and landing stages but the terminal infrastructure and equipment of most are rudimentary, and good road connections are often lacking. At the end of 2020, Vietnam had about 8,479 ports and landing stages of which 6,777 were licensed by VIWA and 1,702 were unlicensed.

At the end 2020, Vietnam has more than 171,000 inland vessels, with the proportion of larger and more specialized vessels increasing. Around 97.2 percent of vessels are dry cargo barges. Their average size is 104 DWT. For oil tankers it is 396 DWT and container vessels 1,016 DWT (Table 1-7). The averages mask a range of sizes, particularly for dry cargo vessels which include tens of thousands of very small barges in the 5-20 DWT range. Over the 2016-2020 period, the total fleet decreased by 3.8 percent, but its total capacity increased by 29 percent because average size increased in all vessel classes. Government policies to encourage fleet improvements seem to be yielding positive results.

³ A further 26,500 km of waterways are navigable by small craft but are commercially insignificant and not actively managed

Table 1-7. Inland waterway registered fleet, at the end of 2020

Class	Number of vessels	Vessel DWT total	Average DWT/vessel	Vessel power total (HP)	Average HP/vessel
Dry cargo	166,903	17,296,571	103.63	9,702,985	58.14
Oil tanker	2,501	989,329	395.57	468,212	187.21
Container vessels	612	622,133	1,016.56	391,272	639.33
Other	1,654	101,498	61.37	162,512	98.25

Source: Vietnam Inland Waterways Administration, 2021

1.2.4 Maritime Transport

At the end of 2020, Vietnam has total 45 classified ports which are rated into: (i) Class 1, which number 14, are primary ports with high traffic and serving larger vessels operating on foreign and long domestic inter-regional routes; (ii) 18 Class 2 ports, which are functioning as secondary feeder ports with medium traffic and smaller hinterlands; (iii) 13 Class 3 are crude oil ports which are oil tanks adjacent to oil derrick at sea. Table 1-8 provides more details about Class 1 ports and the size of their terminals or berths

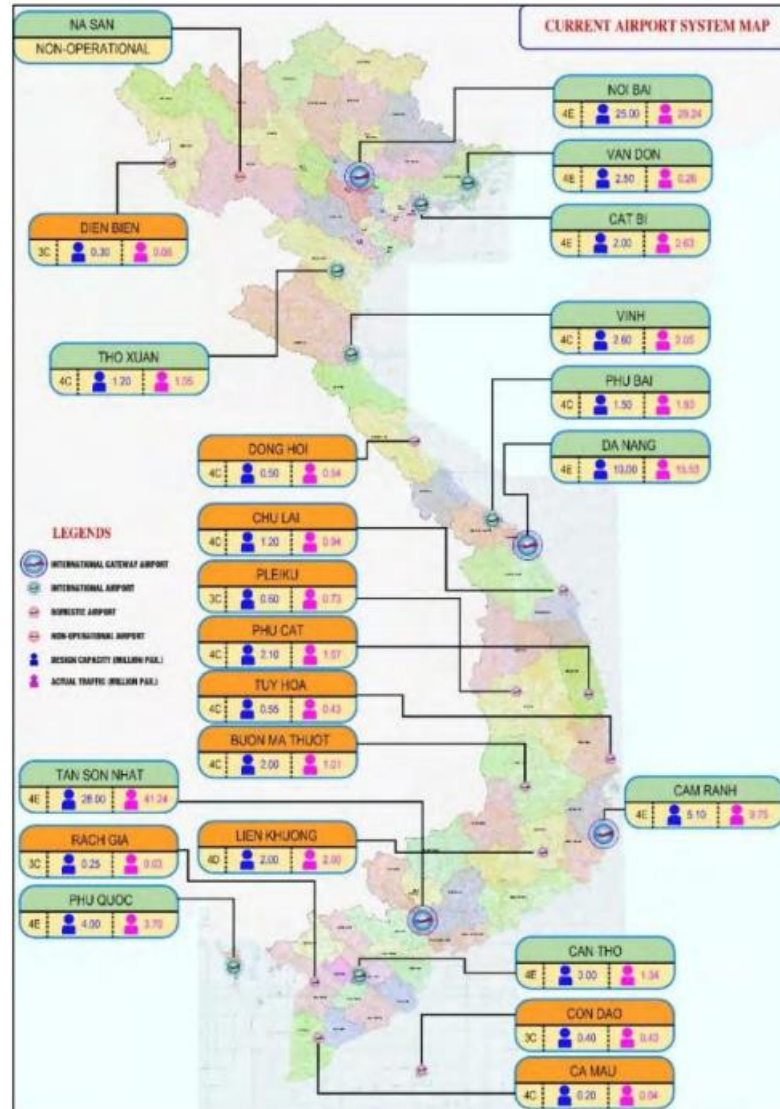
Table 1-8. Profile of major terminals in class 1 ports

Class	Design capacity (million tons)	Largest vessel received (DWT)	Container handling capacity (million TEUs/year)
Class 1A ports			
- Hai Phong port	80.9	160,000	2
- Khanh Hoa port	19.4	3,000	2
- Vung Tau port	112.0	2,000	2
Class 1 ports			
- Quang Ninh port	63.0	20,000	1
- Nghi Son port	33.1	2,000	2
- Nghe An port	2.3	3,000	2
- Ha Tinh port	35.3	1,000	2
- Thua Thien Hue port	2.1	3,000	2
- Da Nang port	8.2	5,000	2
- Dung Quat port	17.2	6,000	1
- Quy Nhon port	9.1	5,000	2
- Can Tho port	9.4	6,000	1
- HCMC port	105.3	2,000	2
- Dong Nai port	11.8	5,000	2

Source: Maritime Authority, 2021

1.2.5 Aviation

There are 22 airports listed in the AD section of Aeronautical Information Publication of Vietnam.



Source: CAAV, 2021

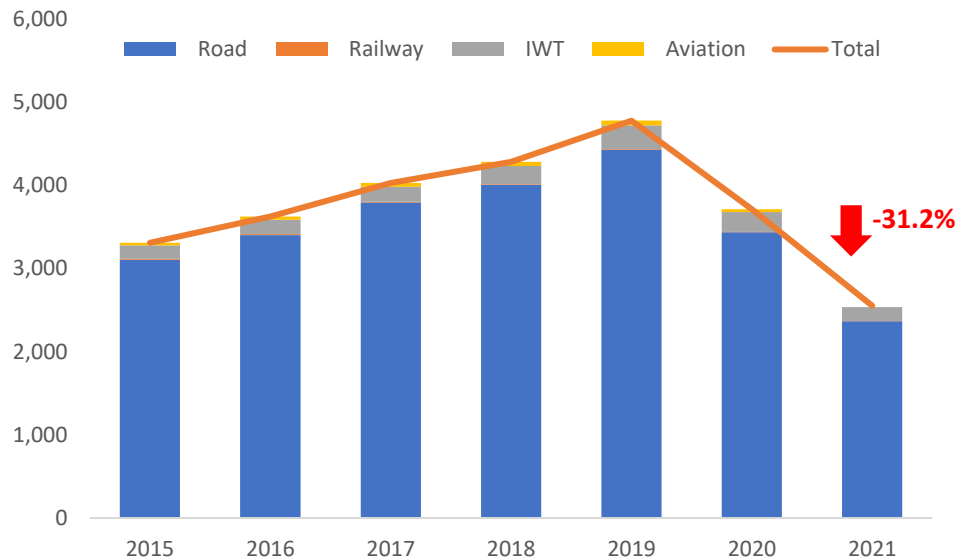
Among the 10 domestic airports, Dong Hoi and Lien Khuong Airport operated international flight routes. The international flight operations of Dong Hoi Airport started on 11 August 2017 with a route connection to Chiang Mai City (Thailand), operated by Jetstar Pacific Airlines with an A320 fleet. By 1 January 2019, the international flight operations closed due to the small number of passengers that averaged about 80 passengers per flight. Lien Khuong Airport has several international flights. In 2019, Lien Khuong Airport operated flights to Bangkok (Thailand), Korea, and Malaysia. In 2020, international flights to the Lien Khuong airport were temporarily suspended due to the COVID-19 pandemic.

1.2.6 Passenger and freight traffic

Figure 1-3 and Figure 1-44 show an overview of the passenger and freight transport demand. Notably, freight has still kept a slight growth rate despite of COVID-19 pandemic, while growth in passenger traffic is negative.

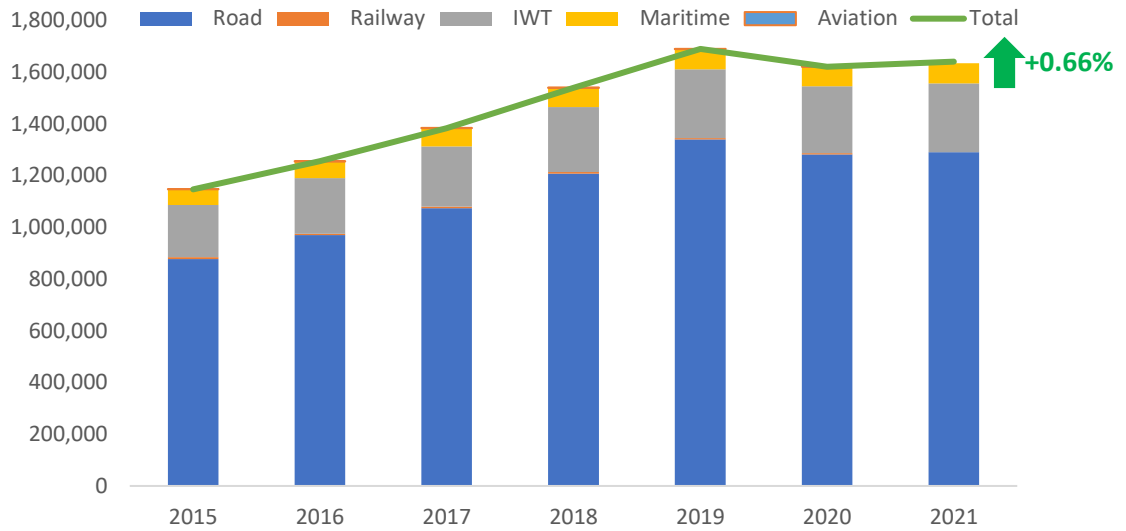
Among transportation modes, the role of road is dominant. Rail has, in fact, a stagnant role while aviation is gaining ground.

In the case of freight, Vietnam is reliant on three primary modes, i.e., trucking, IWT, and shipping. In ton basis, IWT plays a bigger role than shipping, but in terms of ton-km, they handle almost the same amount of freight. This indicates that while both modes play equally important roles, IWT plays a bigger role in shorter distances, while maritime is more important role in longer distances. Rail has, so far, a limited role despite being in the market for over a century.



Source: General Statistic Office, 2022

Figure 1-3. Passenger traffic (million persons)

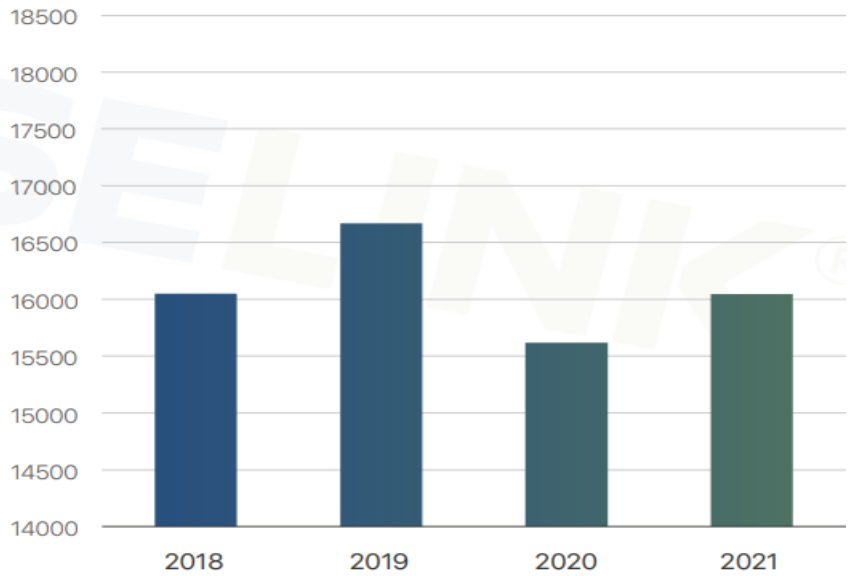


Source: General Statistic Office, 2021

Figure 1-4. Freight traffic (thousand. tons.)

1.2.7 Other logistics indicators

Revenue from warehousing and support activities for transportation in Vietnam has grown quite well, reaching more than 16 billion USD in 2021. The next years are expected to grow from 5%-7%. Especially in 2021, Vietnam ranked in the top 10 logistics indexes of emerging markets (ranked 8th). This shows that the efforts of the Government and the whole people to deal with the epidemic have brought a bright result for logistics and warehousing activities. Combined with production capacity, competitive labor cost, convenient supply network and the improvement of high-technology, this will help Vietnam's logistics industry continue to develop strengths in coming years.



Source: Statista website

Figure 1-5. Revenue from warehousing and support activities for transportation

According to the data of newly issued FDI projects in the first 3 months of 2022, logistics projects are mainly located in the South with 86% of the projects concentrated in this area. Logistics projects in the Northern region at the time of Q1/2022 have a decrease compared to the same period in 2021 (only equal to 25% of Q1/2021 in terms of both number and scale of projects). Meanwhile in the South in the first quarter of this year, the number of projects increased slightly over the same period and the total spending of logistics projects also increased by 48% over the same period of last year. In the first 3 months, the southern provinces are still the localities that attract many logistics projects after the Covid-19 epidemic has been basically controlled and production - daily activities come into new normal.

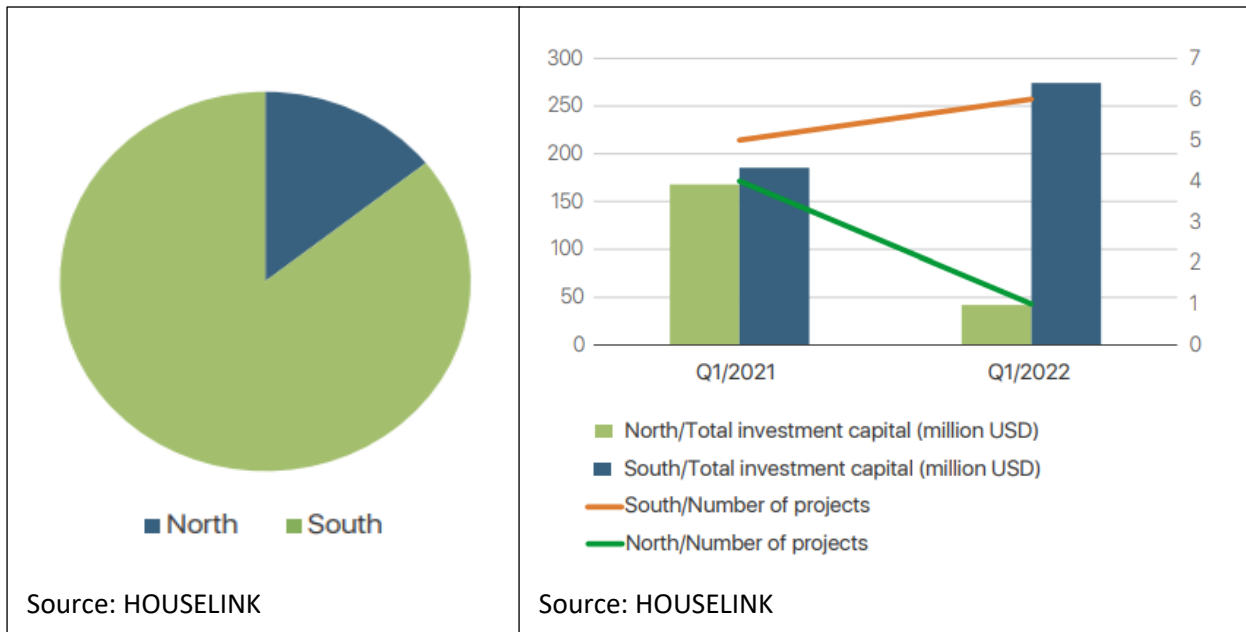


Figure 1-6. Logistics project distribution

Figure 1-7. Logistics project QoQ by region

1.2.8 Impact of COVID-19

As of 10 June 2020, Vietnam reacted with COVID-19 pandemic by closing domestic travel in 15 days, closing all borders for international transport. In urban transport, almost big cities postponed the operation of public transport. Local government asked people to stay at home.

The following trends can be discerned:

Public transport is on the path toward recovery in some cities. On 10 June 2020, public transport ridership was close to the January 2020 in Hanoi, Ho Chi Minh city

Demand for driving is increasing. The demand for driving is increasing more rapidly than demand for public transport but with some exception, where these modes remain well below pre-COVID-19 levels.

Restrictions on driving have led to temporary reductions in congestion in affected cities. Congestion levels have not yet returned to the levels seen before the COVID-19 outbreak but, as the economy starts to recover, this is likely to be the case.

Car sales reduce. In parallel with the decline in private driving during the lockdown phase, automotive sales have collapsed. Where restrictions have been lifted, sales are returning, in some cases toward earlier levels. Light-duty vehicle sales are reported at 64,100 units in the first 4 months of 2020, down 36% year-on-year⁴. Motorcycles sales fell by 71% in April 2020.⁵

Air Travel reduce.

The International Air Transport Association (IATA) reports drastic demand decreases across several global indicators. In March 2020, global passenger traffic, measured in total revenue passenger kilometers (RPKs), was 52.9% lower than in March 2019; capacity (available seat kilometers) was 36.2% lower; and the load factor was 21.4% lower.⁶ Given that the PRC was the first epicenter of the pandemic, airlines in Asia and the Pacific were initially more severely affected than the other global airlines. In early April 2020, there were 80% fewer flights globally than in April 2019.⁷ Most signs point toward a slow recovery in the coming months and possibly years.

The IATA expects overall passenger volumes to fall by about 50% in 2020.⁸ The recovery of passenger volumes will depend on a range of factors including progress and timing of containment of the virus in countries, reopening of international borders, availability of a vaccine, and restored consumer confidence. Even when the strict bans on entry and visa applications are removed, quarantine requirements are likely to discourage passengers from making leisure or business trips in the short term.

Road safety

Fewer people are traveling on roads because of the travel restrictions imposed to control the spread of COVID-19. Lower traffic on the roads is resulting in fewer road crashes. In Vietnam, as pandemic restrictions, the road accident cases in the country saw a year-on-year fall of nearly 14%.

⁴ N.Thuy. 2020. Vietnam takes new tax step to stimulate car market. Hanoi Times

⁵ Motorcycles data. 2020. Vietnam: Motorcycles sales fell down 71% in April.

⁶ IATA. 2020. Passenger Demand Plunges in March as Travel Restrictions Take Hold. Press Release No. 36. 29 April.

⁷ IATA. 2020. COVID-19 Puts Over Half of 2020 Passenger Revenues at Risk. Press Release No. 29. 14 April.

⁸ IATA. 2020. Recovery in Air Travel Expected to Lag Economic Activity. IATA Economics' Chart of the Week. 15 May

Impact on the economy

Initial assessment suggests the transport sector is particularly vulnerable in economies where it makes a significant contribution to GDP and employment. As estimated by ADB (2020), transport service-related GDP falls 7.01-14.17%, and transport service employment falls 6.87%-13.86%

1.3 Statistical Indicators related to Transport and Logistics in five cities

1.3.1 Road network

Urban transport in five cities is dominated by roads including limited expressway. The road network of Hanoi is comprised of inter-provincial transport routes and national highway that have a fan-shaped radial layout. These include urban roads such as ring roads, urban trunk roads, and city roads. As a result, Hanoi has a very dense network of different types of intersections.

The urban road network in HCMC has been expanded and significantly renovated. An urban ring road system in the downtown area has been gradually formed and the city government has put the completion of such ring roads on their priority. Work is also being done in the East-West highway with the Thu Thiem Tunnel, the Ring Road Binh Lon – Tan Son, a part of the east RingRoad and Phu My Bridge, North-south road, Thu Thiem Bridge, highway 1A ring road and overpass system, and other important intersections. As a result, the connectivity and capacity of the urban transportation system has significantly been changed over the years and the city will continue to invest in the development of transport system.

Table 1-9. Road network in five cities, 6/2022

City	Total	Express way	National highway	Provincial road	Commune roads	Urban road	Other
Ha Noi	23,439.61	148.35	276.52	865.95	21,106.26	1,042.53	-
Hải Phòng	6,232.87	35.5	117.27	221.5	4,525.1	515.9	817.6
Đà Nẵng	1,517.34	37.96	120.98	68.71	110.74	1,134.93	43.9
Hồ Chí Minh	4,734.56	-	101.38	143.57	1,885.01	1,593.87	659.83
Cần Thơ	2,466	24.17	137	160.1	1,944	201	
Total 5 cities	38,390.38	245.98	753.15	1,459.83	29,571.11	4,488.23	1,521.33

Source: Statistics compiled by the Department of Transport, 06/2022

1.3.2 Vehicle

Table 1-10 shows the vehicle data at the city level. The proportion of vehicle can be summarized as follows:

- (i) The share of motorcycle accounted for 90-95% of the total registered vehicles
- (ii) The share of registered passenger cars comprised of 56-71% of total automobile vehicles.
- (iii) The number of trucks accounted for 24-37% of total automobile vehicles

Table 1-10. Register vehicles in five cities, 2021

City	Total	Automobile				MC	
		Sub-total	Passenger car	Intercity bus	Truck		Other
Ha Noi		834,561	590,388	30,298	196,709	17,166	
Hai Phong		157,467	87,881	4,518	46,647	18,421	
Da Nang	1,069,623	99,490	60,628	4,867	26,233	4,736	970,133
Ho Chi Minh	8,507,742	683,964	411,383	33,845	194,027	44,709	7,823,778
Can Tho	1,021,518	50,774	28,937	1,938	18,536	1,363	970,744

Source: DOTs, 2022; Vietnam Register, 2022

1.3.3 Public transport

Fixed-route public transport services in five cities are provided by buses, except for Hanoi within one UMRT line and one BRT line. There is also a well-developed taxi system as well as informal motorcycle taxi service (se om) transporting passengers via motorcycles.

The cities have invested in the development of the bus system, which includes a bus route network, bus fleet, bus stations, bus parking lots, bus stops, and bus shelters. The city also has subsidized three-fourth of their operating bus routes. Profitable routes are generally connected with main origins and destinations with large and stable passenger volumes. Hence such routes have not been covered by the subsidy policy. The quality of public transport services is still low, and the cities are facing many challenges to develop this type of service.

Table 1-11. Public transport indicator

Policy	2018	2019	2020	2021
Bus route (Network length - km)				
Ha Noi	123 (4,156.17)	127 (4,437.57)	126 (4,639.87)	143 (4,979.32)
Hai Phong	10 (272)	8 (224)	8 (236)	8 (236)
Da Nang	5 (92.35)	12 (216)	12 (246.82)	12 (222.14)
Ho Chi Minh	98	97 (2,082)	90 (1,936)	91 (1,984)
Can Tho	4 (584.5)	4 (584.5)	12 (569.4)	13 (569.4)
Vehicle				
Ha Noi	1,915	1,952	1,934	2,134
Hai Phong	84	70	69	66
Da Nang	61	166	151	147
Ho Chi Minh	2239	2056	2002	1994
Can Tho	54	55	49	87
Public transport ridership (mil. pax)				
Ha Noi	453.6	482.6	368.5	202.7
Hai Phong	2.69	2.53	1.61	0.908
Da Nang	3.24	3.99	2.58	1.15
Ho Chi Minh	194.15	166.73	96.21	40.91



Can Tho	1.46	1.37	0.44	0.44
---------	------	------	------	------

Source: DOTs, 2021

2 Diagnosis of Major Transport Infrastructure Policy in Vietnam

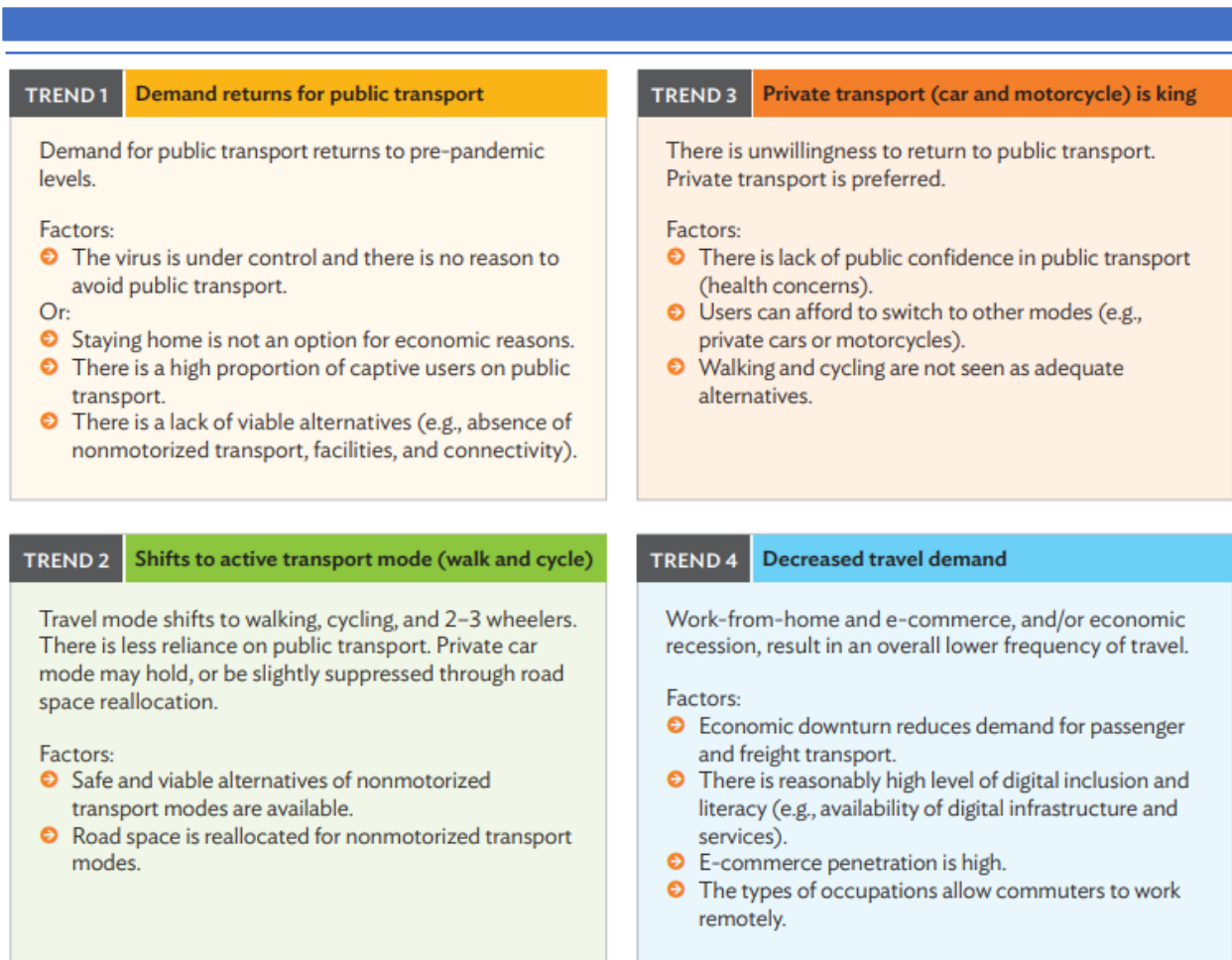
2.1 Transport and logistics policy to prepare for the Post-COVID 19

Since the beginning of the outbreak, Vietnam has had slightly more than 17,000 cases. Strict measures have been introduced to swiftly contain outbreaks, the latest one is currently in many provinces and cities in Vietnam, including Bac Giang, Bac Ninh, Ho Chi Minh City, Da Nang and Hanoi. Mobile apps are available (installed for around 60 percent of population) to provide alerts on positive cases and potential exposures in big cities. H1 2021 GDP growth is estimated at 5.6 percent, higher than that in H1 2020 (at 1.8 percent) thanks to domestic demand and trade performance. Vietnam plans to buy 150 million vaccine doses to vaccinate 75 million people in 2021. As of the end of June 30, 3,776,970 people received their first shot, and about 193,041 received their second shot.

Vietnam has experienced so far 4 COVID-19 waves. Swift and strict temporary containment measures have been successful, allowing for a normalization of most economic activities, although international tourist travel continues to be banned. The current (fourth) outbreak is mostly localized in Bac Giang, Bac Ninh, Ho Chi Minh city, Hanoi and Danang. The authorities have introduced stronger containment measures, including raising quarantine time from 14 days to 21 days, moving schools to online learning, closing religious and tourism sites, closing down karaoke venues and bars and some non-essential services in affected provinces and cities. Ho Chi Minh City is still under social distancing since May 31st 2021 and some other town and cities recently have been in lockdown.

Realize that successive lockdowns have caused a collapse in country demand and supply of goods and services and these lockdowns are being felt at all levels, from individual job security to the global economy and trade, Vietnamese government expect to enter a stage of coexistence with the virus. A pattern of intermittent easing and tightening of restrictions have been applied, to keep new infections under control while balancing a rebooted economy.

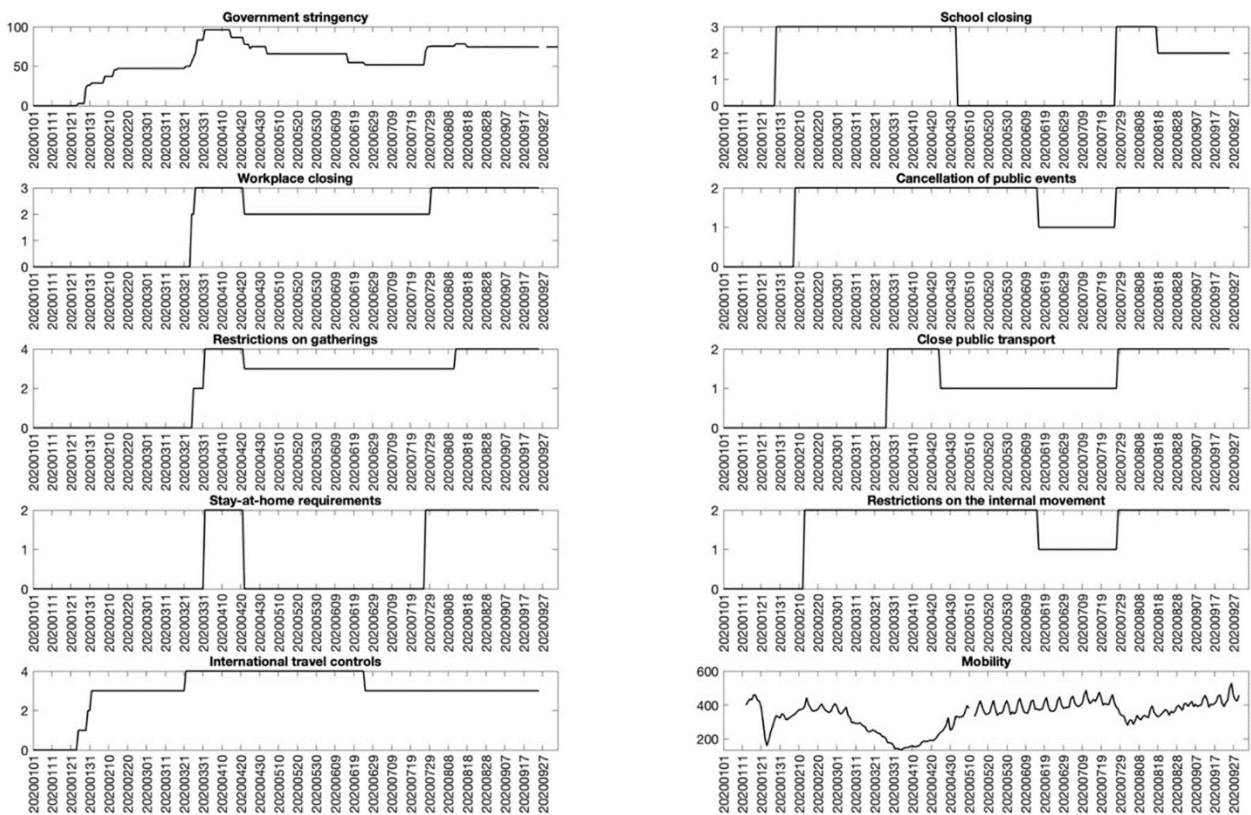
Figure 2-1 describes four trends that could characterize the development of the transport sector post COVID-19. The actual scenario is likely to be a combination of the four trends and will differ between and possibly within economies. For example, demand for public transit is gradually recovering, albeit at a slower pace compared with driving private vehicles. Precautionary protective measures are in place to assure and enhance public transit users' confidence. Economic slowdown, sustained remote working, e-learning, and e-commerce are contributing to reduced travel demand.



Source: ADB, 2020

Figure 2-1. Possible post-COVID 19 trends in transport

Figure 2-2 presents different government policy measures on a daily basis over the period of January 2020 to September 2020. The stringency index and containment and closure policies are obtained from the Coronavirus Resource Centre website of the Oxford COVID-19 Government Response Tracker (OxCGRT) database. The Apple’s mobility indexes on driving and walking users in Ha Noi, Vietnam’s capital city and Ho Chi Minh city, the country’s economic and business centre, are summed up to be the aggregate mobility index.



Source: <https://doi.org/10.1371/journal.pone.0248703.g002>

Figure 2-2. The government policy measures over January to September 2020

Economic Stimulus for the Transport Sector

Government is taking measures to support transport-related industries. This includes support to the aviation sector, automotive, and public transport and transport infrastructure. For example, the Vietnamese government takes new tax steps to facilitate automobile market. Specifically, the Vietnamese government removes import tariffs for auto parts and accessories, which are currently cannot be manufactured domestically. The decision, set to take effect from July 10, 2020, is part of the government’s Decree No. 57 dated May 25, 2020 on amending and supplementing a number of articles of the Decree No.125 on export duty schedule, preferential import duty schedule and lists of commodities and their flat tax rates, compound tariff and “out-of-quota” tariff rate, aiming to increase the localization rate and enhance the competitiveness of Vietnam’s automobile industry.

Fiscal measures in 2020

The government introduced a fiscal support package with expected value of VND 291.7 trillion (3.6 percent of GDP) to support the economy in 2020. Measures include deferring payment of VAT and CIT tax obligations and land rental fees by 5 months, deferring PIT payment to year-end (the estimated amount of payments deferred is VND 180 trillion, or 2.4 percent of GDP). More than 37 percent (VND 66.2 trillion) of the total tax and land rental deferral package was disbursed as of December 31, 2020.

Other measures executed included: cutting registration tax by 50 percent and deferring excise tax on domestically produced cars; lowering land rental by 15 percent, reducing by 30 percent the

environmental protection tax on jet-fuel from August to December, 2020; cutting or exempting various fees and charges, cutting the CIT rate for small and micro firms by 30 percent, and raising PIT deduction ahead of the plan. Moreover, the government implemented the following measures: tax exemptions for medical equipment; lower business registration fee, effectively from February 25, 2020 (one-year exemption of business registration tax for newly established household businesses; first 3-year exemption of business registration tax for SMEs); streamlined tax and custom audit and inspection at firms; and allowing firms and workers to defer (up to 3 months) contributions to the pension fund and survivorship fund without interest penalty (total delayed contribution is estimated at VND 9.5 trillion or 0.1 percent of GDP). The government also approved a cash transfer package worth VND 36 trillion (0.5 percent of GDP) for affected workers and households with monthly cash transfers provided for no more than 3 months, from April to June 2020. More than 13 percent of the population is estimated to benefit from this program. The Ministry of Finance estimated that approximately VND 12.8 trillion (nearly 36 percent of total package value) was disbursed as of December 31, 2020 to the beneficiaries under this Resolution. Coverage of the cash transfer program was expanded to also cover the teachers of private schools.

The government targeted 100 percent disbursement of public investment capital in 2020 with total value of VND 686 trillion or nearly 9 percent of GDP (of which VND 225 trillion was carried over from 2019). Disbursement of public investment in 2020 was estimated to reach 83 percent of the budget plan, the highest disbursement rate over the last five years.

Fiscal measures in 2021

Given Covid-19 has continued to heavily weigh on business and production, in particular on the tourism and transport sectors, the government introduced the second fiscal package in early 2021 which continued allowing tax deferral and land rental payment for businesses and household with total value of VND 115 trillion. In which, VAT for firms is proposed to be deferred for 5 months with total value of VND 68.8 trillion; CIT deferral would be allowed for 3 months in Q1-2 with total value of VND 40.5 trillion; deferral of PIT and VAT for households, and land rental payment are expected to reach VND 1.3 and 4.4 trillion, respectively. Reduction of the environmental protection tax on jet fuel by 30 percent is to be continuously implemented until the end this year. Moreover, about 30 various types of fees and charges have been cut by 10-50 percent till end of 2021 (mostly in the field of transportation and infrastructure development such as road use fees, aviation service fees, construction project appraisal fees, etc) with estimated revenue reduction by 1 trillion. Government is considering to introduce the third package with total value of VND 26 trillion to support affected workers and enterprises.

Vietnam set up a Covid-19 Vaccine Fund run by the government in late May, which is an extra budgetary and non-profit fund to raise foreign and domestic donations and other financing sources for purchasing vaccines, doing research and producing vaccines. More than VND 7.8 trillion has been raised for this Fund by end of June, 2021. The authorities have estimated that Vietnam may need VND 25.2 trillion (USD 1.1 billion) to purchase 150 million vaccine doses for 75 percent of its population in 2021.

Freight and Logistics

The freight and logistics sector – for dry goods as well as for food – are facing huge challenges but also opportunities to become more sustainable. The moment internal and external borders closed, governments needed to take fast measures to ensure that key daily goods such as food and other necessities could be made available to residents in locked-down areas. Domestically, it was truck drivers who became some of the first people to be frequently tested for coronavirus, and with their health tracking mobile phone apps, and negative test certificate were able to continue to bring freight to locked down areas. The impact of COVID-19 on international freight has not been so easy. Air freight has been significantly reduced due to heavy impacts on the business models of airlines that make use of both passenger freight and cargo freight to balance their business models.

Cross-border freight movement has been seriously affected. The cross-border posts in Moc Bai (Vietnam) and Bavet (Cambodia) reported the long queues of trucks with international freight and the difficult surveillance of foreign truck drivers. To avoid such problems, many shippers preferred shipping services to ply between Mekong River ports and Phnom Penh Port because seafarers work only within port compounds, unlike scattered truck drivers that pass through cross-border posts. With the current pandemic or if a similar situation happens in the future, the shipping preference may continue, and the international railway project between HCMC and Phnom Penh may be facilitated, i.e., few railway crews to carry a number of cargoes.

The COVID-19 may continue to influence the transport industry for a couple of years more. From a viewpoint of transport development strategy, the current experience should not be treated as a one-shot deal. The strategy has a vision that Vietnam's transport system will be enough resilient against disasters and pandemics. To cope with COVID-19 and other infectious diseases, passenger facilities, such as airport terminals, ferry terminals, railway stations, and bus terminals, must be carefully managed through (i) cleaning and disinfection, (ii) physical distancing, and (iii) staff protection. The airport strategy introduced the latest institutional arrangement at the airports to protect and facilitate international travelers. Increasing tracking and tracing capability will surely support pandemic prevention and management. A business contingency plan (BCP) is another potent tool to cope with transport infrastructure and service under both pandemics and disasters. Therefore, all transport modes should improve tracking and tracing capability and prepare BCPs.

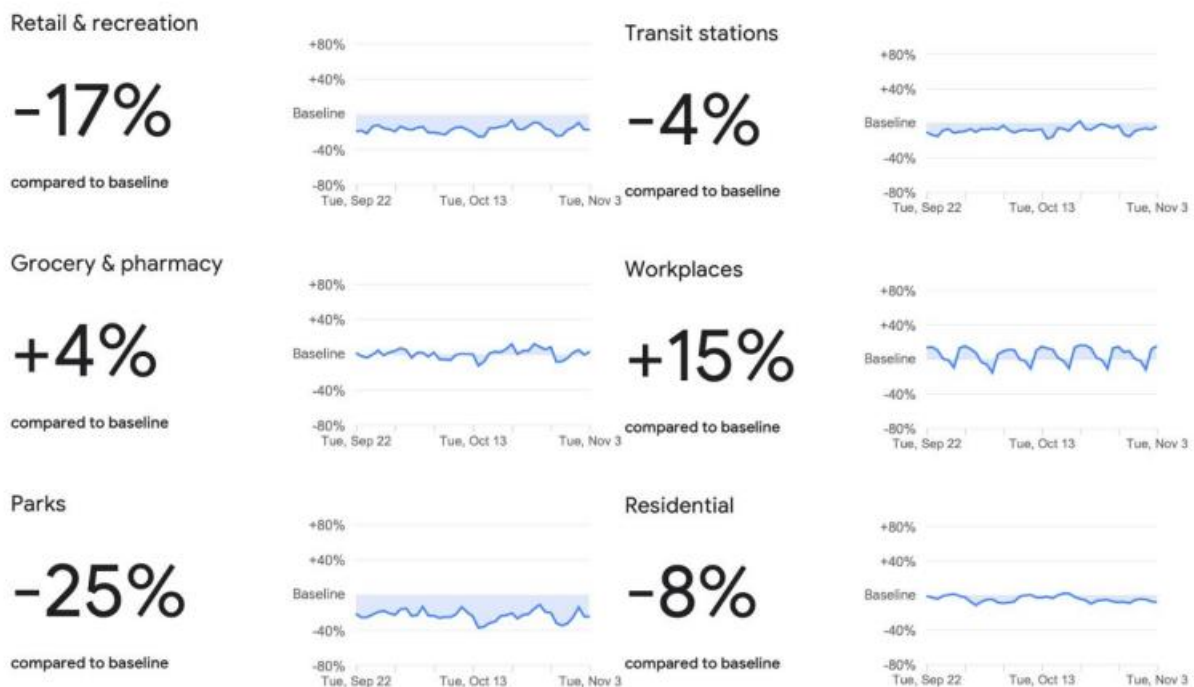
Public transport

In March 30, 2020 Vietnamese government suspend public transportation services across the country to limit the spread of the coronavirus disease (COVID-19) within Vietnam's borders. The projected date of public-transportation reopening was not immediately reported. Notably, government has also called for state officials to work from their homes and for a cap on the use of private vehicles for transportation.

Government had previously introduced additional domestic restrictions effective from Saturday, March 28, to Wednesday, April 15, to prevent further spread of COVID-19. All cultural, sports, and entertainment activities are prohibited, while religious activities of over 20 people are temporarily suspended. Most businesses are to halt services, except for those selling essential goods and services. Authorities announced that domestic flights will be significantly reduced over the coming days.

The Vietnamese government has also suspended entry to all foreigners who were previously granted travel visas from Sunday, March 22. Travelers who were granted visas for diplomatic or official purposes are exempt from the new restriction. Individuals who are deemed experts, business managers, or highly skilled workers will still be allowed to enter the country but must have a medical certificate showing they tested negative for the virus and will be quarantined upon arrival. A 30-day suspension on issuing new visas that went into effect on Wednesday, March 18, remains in place. All international flights into Vietnam have also been suspended as of March 22.

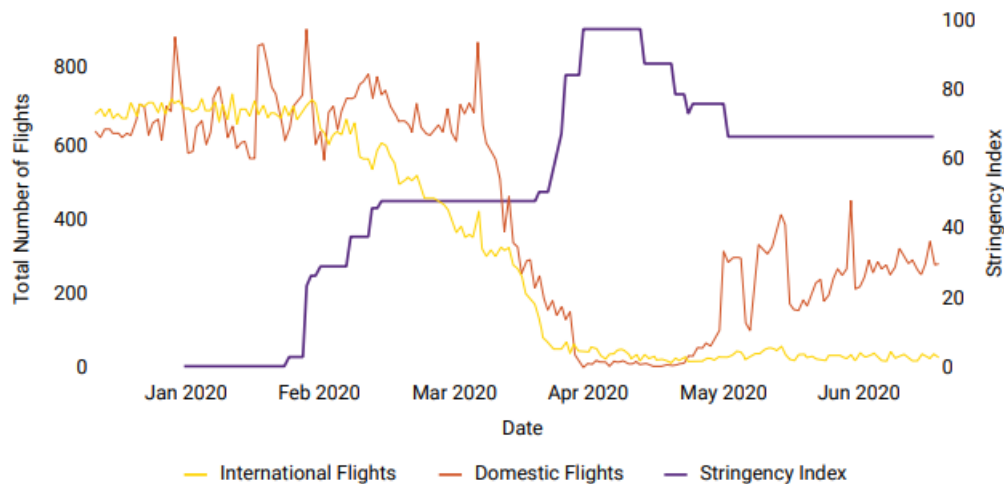
The Vietnamese government took immediate action, quarantining people presenting Covid-19 symptoms, applying lockdowns in areas with known infectious clusters, suspending face-to-face teaching in schools and universities, sanitising high-use areas, and recommending frequent hand washing and mask wearing in public places.⁹ On 1 April, the government mandated nationwide lockdowns. People at high risk of spreading the virus were moved to hospitals or quarantine centres. Going out was allowed only for absolute necessities such as food shopping. Physical distancing requirements (2 m) applied while outdoors, and masks had to be worn. All gatherings were prohibited, and all but essential services (grocery stores, pharmacies, and fuel stations) were shut. Regular hand washing was highly recommended.



Source: Google. COVID-19 Community Mobility Reports

Figure 2-3. Changes in mobility during COVID-19

⁹ Nguyen et al., 2021. Factors affecting the growth of e-shopping over the COVID-19 era in Hanoi, Vietnam. *Sustainability*. 2021;13 doi: 10.3390/su13169205



Source: COVID-19 observatory

Figure 2-4. Recent trends in international and domestic flights and policy stringency index

2.2 Transport and logistics infrastructure policy to respond to the 4th industrial revolution

Realizing the benefits of the 4th Industrial revolution (4th IR), Vietnamese Party and Government have issued a series of policies and program to actively participate in the 4th IR, including Resolution No. 23-NQ/TW dated March 22, 2018 of the Politburo on the orientation to formulate a national industrial development policy towards the year 2030, with a vision towards the year 2045; Resolution No. 52-NQ/TW dated September 27, 2019 of the Politburo on some undertakings and policies to actively participate in the Fourth Industrial Revolution; Resolution No. 50/NQ-CP dated April 17, 2020 promulgating the Government's Action Program to implement the Resolution No. 52-NQ/TW dated September 27, 2019 of the Politburo on some undertakings and policies to actively participate in the Fourth Industrial Revolution (hereinafter referred to as Resolution No. 50/NQ-CP); issues Decision No. 749/QD-TTg dated June 3, 2020 approving "the national digital transformation program to 2025, with a vision towards the year 2030" (hereinafter referred to as Decision No. 749 / QD-TTg); and Decision No. 2289/QD-TTg dated December 31, 2020 on the fourth Industrial Revolution towards 2030. In the strategy, the Vietnamese Government is keen on transforming into a digital economy, which will reach 30% of GDP by 2030. The Prime Minister assigned the Ministry of Transport to be in charge of monitoring all activities relating to transportation subsectors, including road, railway, IWT, maritime, and aviation.

When IT solutions can work with adequate transport investments such as infrastructure, facilities, equipment and transport vehicles/fleets, transport service providers enable more valuable services to meet customers' satisfaction. The Transport development strategy has a vision that Vietnam will provide high-quality transport services to boost economic competitive edge. In this regard, the following innovative operations and services for Vietnam are discusses in the relevant subsector strategies:

- (i) Automated container terminals and multilevel container warehouses by using state-of-the-art AI technology;
- (ii) An integrated RIS (river information system) to support various IWT operations; and
- (iii) Cold chain services of air cargo

Table 2-1. Policy measures to respond to the 4th Industrial revolution

Sector	Policy measures	Description	Content
IWT	Smart IWT operation/management	The IWT Asset Management System (AMS) operates and manages the IWT system, which is linked with monitoring posts equipped with camera surveillance patrolling boats, by continuously monitoring the changes in the configuration of IWT infrastructure. If the needs of the maintenance works are identified, AMS automatically processes and prepares the necessary documents to activate a long-term maintenance dredging contract. After a complete inspection, a closing contract is similarly processed.	Asset Management System (AMS) River Information System (RIS)
Maritime	Introduction of smart port	Smart port is a port concept that uses automation and innovative technologies including AI, Big Data, IoT, and blockchain to improve its performance. Its purpose is to meet the needs of port users by providing higher work efficiency, transparency, safety, and security. The major features of an evolved smart port include: (i) the combination of technology and the collection/distribution of data and information to manage operations inside and outside a port; (ii) information sharing with operators, the port community, and all stakeholders; and (iii) integration with the surrounding smart port territory (city, region, country) and with smart transport infrastructures (roads, rail, inland waterways).	Digitization of ports AI terminal
Aviation	Cold-chain services of air cargo	Air cargo terminal must provide speedy and correct services. Increasing air cargo demand requires a multiple air cargo terminal where warehouse operation, loading/unloading operation, cargo transportation operation, and storage operation are done or managed using state-of-the-art IT support. It is suggested that a cold chain facility at the air	

Sector	Policy measures	Description	Content
		cargo terminal be placed in enough space. Instead, air forwarders have enough and specific facilities to provide customer-oriented services like inventory control and quick delivery. That will reduce the burden of the air cargo terminal. Temperature control is necessary for warehouse facilities and vehicles, and a cold chain cannot be completed unless both are available.	
	IATA fast travel initiative and one ID	In the Fast Travel initiative, the self-service passenger processing facilities are the key to improving passenger experiences at airports. Fast Travel focuses on six components	Self/Automated check-in; Bags ready to go; Document check; Flight re-booking; Self-boarding; Bags recovery

Source: Subsector planning report and JICA, 2021

2.3 Transport and logistics infrastructure policy to respond to environment and climate Change

Climate-smart and eco-friendly economic practices are closely related to spatial and connectivity arrangements (urban planning and resilience, circular economy, urban public transport). Besides awareness and prediction improvements, adaptation to climate change essentially concerns the limitation of GHG emissions and the construction of “grey” or “green” (eco-systems-based) infrastructure-based solutions. This stimulates further economic activities: accessibility and quality of public transport water and waste management, replacement works, insurance, expertise, and maintenance services (included those provided by land tenants). Turning green and smart, a more controlled urbanization enables more sustainable utilization of natural resources, improves natural conservation, and significantly contributes to national economic growth. Raw materials saving industries require a performing freight transport system, including more flexible (re-routing for logistics) and disaster-resilient supply chains.

2.3.1 Climate Change Impacts (CCI)

(a) **Overall:** Severe CCIs could become effective much earlier than expected, and climate warming could also modify labour productivity. CCIs might confirm at the moment when the economic growth rate begins to slow down. Whenever severe impacts will be tangible, the perception of climate change risks by authorities, enterprises, and the population should increasingly influence collective and individual economic choices - and therefore impact the demography and socio-economy of regions.

(b) **Urban Areas:** High economic growth should exacerbate several urban issues: access to safe water resources, urban heat islands, disaster-resilient land use, need for ecosocial housing for urban poor presently settling in vulnerable areas like riverbanks³³, etc. From an urban resilience perspective, it is recommended to elaborate solutions based on inter-provincial or intra-regional concertation (planning

policies and regulations, planning and project prioritizations). Efforts and plans to further structure urban economic hubs that are less “climatic vulnerable” should include scenarios to welcome activities and populations from areas severely affected by CClIs.

(c) **Coastal Areas:** Prevention of anthropogenic severe adverse effects altering coastal areas’ resilience to climate risks should be a priority to ensure sustainable economic growth and urban development. Integrated management (coastal zones, water resources, eco-systems) and promotion of eco-system services should help those struggling with coastal erosion, floods, and landslides and protecting marine biodiversity. In some areas to be economically highly interdependent (Hai Phong and Quang Ninh or Thua Thien Hue, Danang and Quang Nam, etc.), integrated approaches should be both inter-provincial and consistent with each other. Some parts of the resources generated during the high economic growth period (through fiscal mechanisms or not), could be specifically allocated to the protection of coastal areas.

(d) **Mountainous Areas:** From 2050, and alongside CClIs nationwide become effective, the importance of mountainous areas and highlands might become economically increasingly strategic. Compared with coastal areas, they might be considered as “safer”, although prone to droughts, flash floods and landslides (and earthquakes). At that time, Central Highlands might be expected to contribute much more significantly than today to national food self-sufficiency and even to welcome relocated activities from areas severely affected by CClIs. But in mountainous areas, anthropogenic adverse effects can cumulate with climatic risks: mass tourism, water consuming agriculture (maize, coffee), afforestation and mining, hydropower plant, air pollution/heat waves (traffic concentration) in valleys connecting to border economic areas or tourism spots, etc. Therefore, the resilience of mountainous areas to climate change could gradually become vital, and leading possibly to further structural economic changes from the mid-2030s.

2.3.2 Road planning

Road infrastructure will be developed in an integrated manner to provide effectively connection with other modes, international gateways (Asian Road Network), urban transport systems, especially in big cities. A focus on modern science and technology, traffic accident reduction, and SEA (environmental protection and climate change adaptation) should be concerned. Vision to 2030 and 2050 are:

- (to 2030) To connect to economic and political centers, key economic regions, seaports and international gateway airports for expressway network to be 2,079km by 2023, 3,021km by 2025, and 5,165km by 2030 in length, and to undergo step-wise upgrade for national highways.
- (to 2030) To upgrade road pavements, strengthen traffic safety system, resolve missing links, renovate the infrastructure such as bridges and widening.
- (to 2050) To provide a modern manner with smooth connection and reasonable development among modes of transport, and to ensure convenience, safety, and reasonable costs.

2.3.3 Railway planning

Key components of “Strategy to 2020 with a vision to 2030” and “Strategy to 2020 with a vision to 2050” are listed: (NSP focuses on 2021-2030 while the period 2031-2050 is more on development orientation)

- (to 2030) To increase the shares of railway transport, to link railway stations with cargo hubs, big seaports, ICD and other modes. To transport high cargo volume for long- and medium-distance, and passenger for long-distance, inter-provincial and mass transit in big cities, and to meet socio- economic development requirements.
- (to 2030) To concentrate state resources on and make the best use of ODA investment and private investment, and to focus the maintenance of existing and newly built infrastructure facilities.
- (to 2050) To be in line with the strategy for national socio-economic development, and to be associated with urban development, security, SEA, and contribute to minimizing traffic congestion and accidents and promoting development of remote areas.
- (to 2050) To effectively exploiting existing railroads, and researching in new modern railways linked with major seaports in each region and with other modes of transport.

2.3.4 IWT planning

Vietnam prioritized and promoted the development of IWT and river-sea transportation, especially in the Mekong and Red River Delta regions due to its cost-effectiveness and ease of demand for heavy truck on road. IWT sector visions for 2021 to 2030 and to 2050 are summarized:

- (to 2030) To increase the passenger and freight throughputs with a focus on container handling, and to improve the connectivity with other transport modes such as seaport, rail and road to ensure the smoothness of transport.
- (to 2030) To strengthen IWT management and operation, to upgrade synchronous technique of main routes, to modernize major and specialized ports, and to develop inland waterway ports in association with ICDs.
- (to 2030) To invest in information technology system to ensure traffic safety.
- (to 2050) To improve the responsiveness and adaptability to climate change and sea level rise for navigation channels and ports, and to change freight transport model from road to IWT for GHGs emission reduction.
- (to 2050) To increase the share of IWT freight transport on major national and international transport corridors, and to modernize ICDs and major ports in key economic regions linked with the logistics system.
- (to 2050) To complete water transport routes to reach remote areas by extending IWT routes, and to promote the role of IWT ports in the national logistics infrastructure network.

2.3.5 Seaport planning

NSP maritime plan serves as the foundation to direct the investment orientations to satisfy the import-export demand, promoting socio-economic development. To 2030 (approved in 2014) and 2050 visions are listed:

- (to 2030) To create proper development, maintenance, upgrade to ensure uniformity across the network with focus on ports which handle ships from 100,000 DWT (dead-weight tons) (8,000 TEU container ships).

- (to 2030) To promote comprehensive development between ports and ensure uninterrupted connection with national traffic network, dry port systems, goods distribution and logistics centers in the region.
- (to 2030) To focus on international gateway ports in Hai Phong, Ba Ria - Vung Tau, key economic zones.
- (to 2050) To inherit the achievements of past 20-year efforts, upgrade and convert functions to ensure integrated and efficient operation of the seaport system.
- (to 2050) To develop seaports and port clusters, which play an important role in promoting logistics services.
- (to 2050) To develop seaport infrastructure in association with regional and local economic development in order to create a driving force for development of economic zones, coastal industry.

2.3.6 Aviation planning

Vision of airport and airfield network plan is divided into 2 periods: 2021-2030 and vision to 2050.

- (to 2030) to consider Plan 236 approved in 2018 to develop 28 airports by 2030.
- (to 2030) to provide good connections within 100km and 200km radius in plain and mountainous areas with other modes, local traffic infrastructure, especially in big cities.
- (to 2030) to ensure effective air connection between domestic and regional and international aviation. - (to 2050) to utilize airport evaluation and reassessment criteria for rating outputs covering all 63 provinces.
- (to 2050) to access all airports within 100km and to aim 2 major cities' airport work as international hubs. - (to 2050) to use airport rating criteria to evaluate if a new airport is require

2.4 Changes and amendments to law and systems related to transport and logistics in Vietnam

Nothing changes between 2020 and 2021 regarding the law and systems

2.5 Identify on-going and/or planned projects in transport and logistics and its financing plans

In order to realized the transport development strategies, a series of development projects are identified in the sub-sectoral plannings.

Table 2-2. Priority projects during the period 2021-2030

Transport development strategy	Priority projects in 2021-2030
To develop a fast and comfortable passenger transport system by the combination of air, high-speed rail, and expressway services	<p>(Aviation) More airport capacity to meet domestic demand.</p> <p>(Expressway) Provision of a wider expressway network to serve most of provincial capitals.</p> <p>(HSR) Starting partial operation on the North-South route (until 2032)</p>

Transport development strategy	Priority projects in 2021-2030
To provide economic bulk transport and efficient multimodal transport services	(Railway) Provision of direct freight rail service to Lach Huyen and Cai Mep terminals (IWT) Investment in bigger and modern IWT fleet including VR-SB together with IWT-ICDs and replacement of bottleneck bridges (Maritime Transport) Seaport expansion to meet domestic demand. Introduction of RORO shipping service
To connect Vietnam with the neighboring countries and in the global markets	(Maritime transport) Expansion of Lach Huyen and Cai Mep terminals. Development of Lien Chieu Port. Preparation of a new regional hub port at Tran De. (Aviation) Expansion of Noi Bai Airport. Construction of Long Thanh airport. More airport facilities at other 12 international airport (Railway) Preparation of new rail connection with Lao PDR and Cambodia in addition to the existing Chinese links (Road) Development of many expressways to the borders: 4 with Chinese border, 2 with Lao borders and 5 with Cambodia borders
To deserve safety enhancement, environment protection and climate change impact	(Railway) Rehabilitation of existing outdated assets including bridges, viaducts, tunnels, level crossings, curves, etc., (IWT) Safety management and training (Maritime Transport) Search and rescue, Navigational aids (All) Encourage less CO2 emissions by modal shift and technology innovation
To offer more valuable transport services by means of it solutions and others	(IWT) River information system (RIS) (Maritime Transport) AI terminal and automated port operation (Aviation) Air cargo village, Cold-chain service
To address COVID-19 and other pandemics and disasters prevention and management in transport services	(Aviation) Fast travel initiative with 'One ID' (Aviation, Railway, Road) Terminal operation with high sanitary level (All) Increasing tracking and tracing capability in both passenger and cargo services (All) Preparation of BCPs

The project package during the period 2021-2030 is summarized in Table I.5. Total investment amounts to VND 2,376 trillion or equivalent to 2.6% of the aggregated GDP during the same period. The table indicates that all subsectors will mobilize more investment fund in comparison with the previous investment in the last decade. Railway investment budget, VND 698 trillion, is 18 times larger than the

actual funding in the last decade, i.e., VND 39 trillion. The railway subsector needs capacity development for project.

Table 2-3. Project package in the period 2021-2030

No	Subsector	Main improvement	VND trillion
1	Road	<ul style="list-style-type: none"> • Additional expressways (4,139 km) • New or improving national highways (1,605 km) • Upgrading existing railway lines (Hanoi – HCMC, Hanoi – Haiphong, Hanoi – Lao Cai, Hanoi – Dong Dang, Hanoi – Thai Nguyen, 2,318 km in total) • Completion of Yen Vien – Pha Lai – Ha Long – Cai Lan Line 	933.7
2	Rail	<ul style="list-style-type: none"> • Rail connection to Lach Huyen, Vung Tau (60%) • Hanoi Eastern Ring-railway (25%) • New railway lines to Laos, Cambodia and Mekong (10% for project preparation only) • HSR priority sections (up to 2032) • Improvement of Waterways 	697.5
3	IWT	<ul style="list-style-type: none"> • Improvement of Riverports • Removal and replacement of Low-clearance bridges • Development of IWT-ICDs • Gateway ports: Expansion of Lach Huyen and Cai Mep terminals, Construction of Lien Chieu, Preparation of Tran De 	220.5
4	Maritime	<ul style="list-style-type: none"> • Improvement of Other ports, Port access channels, ATN • Conversion to RORO terminals • New construction (Long Thanh, Phan Thiet, Sa Pa, Lai Chau, Na San, Quang Tri) 	403.1
5	Aviation	<ul style="list-style-type: none"> • Capacity expansion of existing airports 	
Total investment			2,375.5
Per GDP (2021-2030)*			2.6%

Note*: Aggregated yearly GDP between 2021 and 2030 at year 2019 constant price or VND 89,190 trillion Source: JICA, 2021

3 Investigation of On-going and Required Transport and Logistics Infrastructure Projects in Vietnam

3.1 Mid- and long-term transport and logistics projects

3.1.1 Expressway projects

According to the road transport network planning, spatial development orientations for the national road network plan are as follows:

- (i) formulation of North-South national corridors;
- (ii) a radial road pattern in the central point of Hanoi City in the north;
- (iii) East-West corridors in the central;
- (iv) combination of north–south and east–west corridors in the south; and
- (v) application of radial and circular road patterns to two special cities (i.e., Hanoi and Ho Chi Minh Cities).

Based on such orientations, the proposed were expressway and national highway network. However, a plan has a list of projects of national significance and projects with prioritized investment in the period of 2021–2030. In accordance with the orientations from the Document of 13th National Party Congress, all proposed projects are expressways.

For passenger transport, the first main target for the year 2050 is to enable a one-day return trip for Vietnamese nationals from one point to anywhere in the country. Expansion of the expressway network to serve most provincial capitals is necessary to achieve this target; hence, the connections of expressways to provincial capitals will be reviewed. Additionally, JICA team proposed improving the international connectivity of transport networks to ensure robust trade and people flows. Following this, expressways connecting to border gates will be considered. Based on this orientation, a list of expressway projects in both periods of 2021–2030 and 2031–2050 is finalized.

Table 3-1 shows the summarized list of expressway projects.

Table 3-1. List of expressway project, 2021-2030 and a vision towards 2050

Project group	Code and name of projects	Cost (Billion VND)
North-South expressway in the East	E1: Hwu Nghi Quan – Chi Lang	6,087
	E2: Cao Bo – Mai Son	2,608
	E3: Ninh Binh (Mai Son)–Thanh Hoa (NH45)	10,960
	E4-1: Thanh Hoa – Vinh (Thanh Hoa (NH45) – Nghi Son section)	7,433
	E4-2: Thanh Hoa – Vinh (Nghi Son – Dien Chau section)	8,643
	E4-3: Thanh Hoa – Vinh (Dien Chau – Bai Vot)	8,643
	E4-4: Thanh Hoa – Vinh (Bai Vot – Ham Nghi)	7,403
	E5: Ha Tinh – Vung Ang	10,186
	E6: Vung Ang – Cam Lo (Quang Tri)	32,902
E7: Quang Tri (Cam Lo) – Hue (La Son)	17,044	
E8: Hue (La Son) – Da Nang (Tuy Loan)	11,409	

Project group	Code and name of projects	Cost (Billion VND)
	E9: Quang Ngai – Quy Nhon	33,109
	E10: Quy Nhon – Nha Trang	34,590
	E11: Nha Trang – Phan Thiet (Trang Trang – Cam Lam section)	5,013
	E12: Nha Trang – Phan Thiet (Cam Lam – Vinh Hao section)	15,731
	E13: Nha Trang – Phan Thiet (Vinh Hao – Phan Thiet section)	17,421
	E14: Phan Thiet – Dau Giay	17,113
	E15: Long Thanh – Nhon Trach – Ben Luc	N/A
	E16: Trung Luong – My Thuan	8,816
	E17: My Thuan Bridge No. 2	1,210
	E18: My Thuan – Can Tho	3,976
	E19: Can Tho – Ca Mau	34,316
North-South Expressway in the west	E20-1: Doan Hung – Hoa Lac – Khe Co (Doan Hung – Hoa Lac – Che Ben section)	9,860
	E20-2: Doan Hung – Hoa Lac – Khe Co (Cho Ben – Khe Co section)	103,802
	E21-1: Ngoc Hoi – Chon Thanh – Rach Gia (Ngoc Hoi – Chon Thanh section)	68,112
	E21-2: Ngoc Hoi – Chon Thanh – Rach Gia (Chon Thanh – Duc Hoa section)	6,800
	E21-3: Ngoc Hoi – Chon Thanh – Rach Gia (Duc Hoa – Thanh Hoa)	4,350
	E21-4: Ngoc Hoi – Chon Thanh – Rach Gia (Thanh Hoa – Tan Thanh section)	2,610
	E21-5: Ngoc Hoi – Chon Thanh – Rach Gia (Tan Thanh – My An section)	3,480
	E21-6: Ngoc Hoi – Chon Thanh – Rach Gia (My An – Cao Lanh section)	4,524
Expressway in Northern region	E22-1: Ha Noi – Thai Nguyen – Bac Kan – Cao Bang (Cho Moi – Bac Kan section)	2,243
	E22-2: Ha Noi – Thai Nguyen – Bac Kan – Cao Bang (Bac Kan – Cao Bang section)	6,988
	E23-1: Hoa Binh – Son La – Dien Bien (Hoa Binh – Son La (Moc Chau) section)	21,577
	E23-2: Hoa Binh – Son La – Dien Bien (Son La (Moc Chau)-Son La section)	8,360
	E23-3: Hoa Binh – Son La – Dien Bien (Son La – Dien Bien section)	29,844
	E24: Noi Bai – Bac Ninh – Ha Long (Bac Ninh – Ha Long section)	21,537
	E25: Ninh Binh – Hai Phong – Quang Ninh (Ninh Binh – Hai Phong section)	21,221
	E26: Hai Phong – Ha Long – Van Don – Mong Cai (Van Don – Mong Cai section)	12,669
	E27-1: Tien Yen – Lang Son – Cao Bang (Tien Yen (Quang Ninh) – Lang Son section)	6,631
	E27-2: Tien Yen – Lang Son – Cao Bang (Dong Dang (Lang Son) – Tra Linh (Cao Bang) section)	12,546
	E28: Doan Hung (Phu Tho) – Tuyen Quang	3,113
	E29: Cho Ben (Hoa Binh) – Yen My (Hung Yen)	2,710
	E30: Connection road from Noi Bai – Lao Cai Expressway to Ha Giang	7,800

Project group	Code and name of projects	Cost (Billion VND)
	E31: Bao Ha – Lai Chau	9,778
	E32: Tuyen Quang – Ha Giang	9,778
	E33: Hung Yen – Thai Binh	10,841
	E34: Nam Dinh – Phu Ly (Ha Nam)	8,518
Expressway in Central Region	E35-1: Vinh – Thanh Thuy (Cao Lo – Vinh section)	3,185
	E35-2: Vinh – Thanh Thuy (Vinh – Thanh Thuy section)	10,350
	E36: Cam Lo – Lao Bao	11,146
	E37-1: Quy Nhon – Pleiku – Le Thanh (Quy Nhon – Pleiku section)	25,478
	E37-2: Quy Nhon – Pleiku – Le Thanh (Pleiku – Le Thanh section)	7,962
	E38: Da Nang – Ngoc Hoi – Bo Y	57,644
	E39: Quang Nam – Quang Ngai	31,848
	E40: Phu Yen – Dak Lak	70,065
	E41: Lien Khuong – Buon Ma Thuot	36,625
	E42: Khanh Hoa – Buon Me Thuot	22,583
	E43: Nha Trang – Da Lat	18,293
	E44: Vung Ang – Cha Lo	36,623
Expressway in Southern Region	E45: Dau Giay – Lien Khuong – Da Lat	40,306
	E46: Bien Hoa – Vung Tau	18,805
	E47-1: HCMC – Chon Thanh – Hoa Lu (HCMC – Thu Dau Mot – Chon Thanh section)	21,200
	E47-2: HCMC – Chon Thanh – Hoa Lu (Chon Thanh – Hoa Lu section)	3,550
	E48: HCMC – Moc Bai	13,600
	E49-1: Soc Trang – Can Tho – Chau Doc (Chau Doc – Can Tho section)	24,100
	E49-2: Soc Trang – Can Tho – Chau Doc (Can Tho – Soc Trang section)	9,800
	E50: Ha Tien – Rach Gia – Bac Lieu	60,000
	E51: Go Dau – Xa Mat	10,350
	E52: Nha Be (HCMC) – My Tho (Tien Giang) – Ben Tre – Tra Vinh	16,560
	E53: Hong Ngu – Tra Vinh	11,378
	E54: Soc Trang – Trang De	7,477
Ring roads	E55: Ring road No. 4 in Hanoi	31,210
	E56: Ring road No. 5 in Ha Noi	36,000
	E57: Ring Road No. 3 in HCMC	55,879
	E58: Ring road No. 4 in HCMC	33,281
Total		1,419,709

Source: Road planning and JICA, 2021

3.1.2 Railway projects

According to Decision No. 318/QĐ-TTg, “Approval of the Strategy for Development of Transportation Services to 2020, and Orientation toward 2030,” dated 4 March 2014, the government of Vietnam has the policy to prioritize and promote the development of railway transportation, mainly for medium- and long-distance (from 300km and above) transport of cargos as well as intercity transport of passengers on main transport corridors. Additionally, the Document of 13th National Party Congress indicated that the

railway sector would receive adequate attention and construction of some sections of the high-speed railway will be by 2030. However, the capacity of the existing railway is unable to compete with other transport modes due to deteriorating facilities and limited line capacity under a single-track operation.

To meet the previously mentioned target, a long list of candidate railway projects compiled into four groups were proposed as follows:

(a) Upgrade and Improvements of Existing Railway Lines. The projects will enhance the capacity and safety of railway transport through reinforcement of core railway lines, removal of bottlenecks, and improvement of operational safety.

(b) Construction of New Normal Railway Lines. The projects will improve the connectivity and accessibility of the national railway network.

(c) Construction of High-Speed Railway. The projects will improve the capacity and accessibility of railway passenger transport through the formulation of a high-quality north–south backbone line.

(d) Replacement of Old Railway Bridges. The projects will improve the operations of the existing railway lines in terms of safety and efficiency.

Table 3-2 shows the summary list of railway projects.

Table 3-2. List of railway projects

Project group	Code and name of projects	Cost (Billion VND)
Upgrade and improvement of existing railway lines	R1: Upgrading North-South railway	107,222
	R2: Upgrading Hanoi – Hai Phong railway	3,900
	R3: Upgrading Ha Noi – Lao Cai railway	2,500
	R4: Connecting Lao Cai station and Ha Khau Bac station	614
	R5: Upgrading Ha Noi – Dong Dang railway	1,872
	R6: Upgrading Ha Noi – Thai Nguyen railway	660
	R7: Upgrading railway station	2,400
	R8: Railway overpasses	3,050
	R9: Railway connecting to seaports	923
Construction of new normal railway lines	R10: Yen Vien – Pha Lai – Ha Long – Cai Lan railway	6,000
	R11: Mao Khe – Du Nghia station (connecting Yen Vien – Cai Lan railway to Hai Phong)	12,900
	R12: Railway connecting to Lach Huyen port (Dinh Vu, Lach Huyen)	35,500
	R13: Bien Hoa – Vung Tau railway	56,883
	R14: Ngoc Hoi – Lac Dao railway (Ha Noi Eastern ring-railway)	40,000
	R15: Thu Thiem – Long Thanh light railway	6,600
	R16: Tan Ap – Mu Gia – Vung Ang railway	17,352
	R17: HCMC – Can Tho railway	157,254
Construction of HSR	R18: Di An – Loc Ninh railway	20,938
	R19: Ha Noi – Vinh section	273,237
	R20: Nha Trang – HCMC section	288,361
	R21: Vinh – Da Nang section	313,597

Project group	Code and name of projects	Cost (Billion VND)
	R22: Da Nang – Nha Trang section	459,048
	R23: Replacing old railway bridges	
Total		1,810,811

Source: Railway planning and JICA, 2021

3.1.3 Inland waterway project

According to Decision No. 318/QĐ-TTg, the government of Vietnam has a policy to prioritize and promote the development of inland waterway and river-sea transportation, mainly for the transport of industrial products to large seaports and industrial and service centers, especially in the Mekong and Red River Delta Regions. The inland waterway is more cost-effective means of transport for industrial products, such as construction materials, and it will ease the demand for heavy trucks on road facilities. Additionally, greenhouse gas (GHG) emissions could be reduced. According to the Updated Nationally Determined Contribution in 2020 (VN-NDC 2020), changing the freight transport model from road to the inland waterway is a committed measure to reduce GHG emissions.

To meet the previously mentioned target, a long list of candidate IWT projects compiled into six groups, as follows, were proposed in the IWT planning and JICA (2021).

(a) Waterway Improvements. The projects will enhance the capacity and connectivity of the waterway transport network by reinforcing core waterway transport corridors, removing bottlenecks, and developing river-sea transport routes via estuaries.

(b) Waterway Maintenance. The projects will maintain the capacity and smooth traffic on the existing waterway routes.

(c) Improvement of River Ports. The projects will improve the capacity of river ports in the aspects of accessibility of large-sized vessels, upgrade of loading system, modernization, and efficiency in port operation.

(d) Development of Inland Container Depot for Inland Waterway (IWT-ICDs). The projects will improve the connectivity of IWT transport with other transport modes and industrial centers.

(e) Replacement of Low-Clearance Bridges. The projects will enhance the capacity and connectivity of waterway transport routes.

(f) Traffic Safety Improvement. The projects will ensure traffic safety and enhance the reliability of inland waterway navigation.

The NSP for IWT plans as many as 25 IWT-ICDs that are, in principle, suitable for private investment.

Table 3-3. List of IWT projects

Project group	Code and name of projects	Cost (Billion VND)
Waterway	W02: Construction of the canal linking Day river and Ninh Co river	1,800
improvements	W03: Quang Ninh – Ninh Binh route over Luoc river – Phase I	7,200

Project group	Code and name of projects	Cost (Billion VND)
	W04: Waterway transport route of Hoa Binh – Son La – Lai Chau	300
	W05: Viet Tri – Yen Bai – Lao Cai route (Viet Tri – Yen Bai section)	1,500
	W06: Sea-river transport route via Tra Ly estuary	3,500
	W07: Waterway transport route of Day estuary – Ninh Binh – Phu Ly	2,500
	W08: Hai Phong – Ha Noi waterway transport route via	2,200
	W09: Viet Tri – Lao Cai route (Yen Bai – Lao Cai section)	15,000
	W11: Ninh Binh – Thanh Hoa waterway route	450
	W13: Ma river (section from Bong junction to Vinh Ninh junction)	80
	W14: Upgrade to Len river in Thanh Hoa province	120
	W15: Waterway transport route over Lam river	120
	W16: Ho Do – Cua Sot waterway transport route (Ha Tinh Province)	60
	W17: Upgrade of Giang river – phase 2 (Quang Binh province)	250
	W18: Huong river route from Thuan An estuary to Tuan junction (Thua Thien Hue province)	200
	W19: Co Co – Truong Giang river route from Han – Cau Dai confluence to Ky Ha port (Quang Nam – Da Nang)	350
	W20: Cho Gao canal	1,500
	W21: Cho Dem – Ben Luc waterway transport route	200
	W22: Development of logistics and waterway corridors in the south	5,800
	W23: Improvement of Rach Gia – Ca Mau route	1,800
	W24: Upgrade of Muong Khai – Doc Phu Hien canal	2,300
	W25: Waterway route on Sai Gon river (Ben Suc – Ben Cui section)	450
	W26: Waterway route on Ham Luong river from confluence of Tien River to Ham Luong estuary	500
	W29: Upgrade of Sai Gon – Ca Mau route (Can Tho – Ca Mau section)	1,700
	W30: Upgrade of Rach Soi – Hau Giang canal	1,550
	W31: Rach Gia bypass route	2,500
	W28: Dredging Sai Gon – Kien Luong route (Section from Lo Vap – Sa Dec to Kien Luong)	1,660
Waterway maintenance	W32: Improvement of river ports in the north (phases I & II)	150,000
Improvement of river ports	W33: Improvement of river ports in the central (phase I & II)	12,500
	W34: Improvement of river ports in the south (phase I & II)	87,500
	W35: Development of IWT-ICD in the north (phase I)	4,473
Development of IWT-ICD	W36: Development of IWT-ICD in the south (phase I)	7,868
	W01: Clearance lifting for Duong bridges	2,300
	W10: Upgrade of low-clearance bridges in the north	6,000
	W27: Upgrade of low-clearance bridges in the south	15,700
Traffic safety improvement	W12: Strengthening IWT signaling system for waterway transport routes in the Central region	300
	W37: Traffic safety management and training	3,000
Total		345,231

Source: IWT planning and JICA, 2021

3.1.4 Seaport projects

According to Resolution No. 36-NQ/TW, “Strategy for Sustainable Development of Vietnam Ocean Economy by 2030, Vision to 2050,” dated 22 October 2018, the central point of a maritime economy is the development and improvement of seaports and maritime transport services. Vietnam is experiencing high growth of shipping traffic due to the demands of national industrialization and modernization as well as the positive effects of free trade agreements, leading to much pressure on the ports and shipping subsector. Generally, ports in Vietnam are mainly upstream of rivers, resulting in limited seaside accessibility and vessel entry due to the allowable size. Construction of the Cai Mep International Container Terminal in the south and Lach Huyen port in the north partially solved these issues. The system of seaports and maritime transport services needs further improvement on its capacity, connectivity, sea-side accessibility, and safety.

A long list of candidate seaport projects grouped into five was proposed, as follows, from seaport planning and JICA (2021)

(a) Upgrade or Expansion of Existing Ports. The projects will enhance the capacity of existing ports by constructing new berths and enhance productivity.

(b) Construction of New Ports and ICD. The projects will improve the capacity and connectivity of the national system in general and of a certain region.

(c) Improvement or Upgrade of Channels to Ports. The projects will improve seaside accessibility to existing seaports via the improvement of the port access channels.

(d) Ship Building & Procurement. The projects will improve the capacity of maritime search and rescue as well as resupply to remote islands.

(e) Navigation Facilities/System. The projects will ensure traffic safety and enhance the reliability of maritime navigation.

JICA (2021) added one project, the P32 for RORO shipping network, to seaport planning.

Table 3-4. List of seaport projects

Project group	Code and name of projects	Cost (Billion VND)
Upgrade or expansion of existing ports	P1: Development of berths No. 3,4,5,6 and roads to those berths in Lach Huyen seaport	13,971
	P2: Expansion of berths in Nghi Son port, Thanh Hoa province	7,600
	P3: Seaport development projects	138,043
	P32: RoRo network development projects	7,800
	P3: Development of breakwaters and channel to Lien Chieu port for vessels of 100,000 tons	10,910
Construction of new ports and ICD	P4: Development of berths and logistic centers in Ca Mep Ha Port	23,000
	P5: Development of Tran De port	32,000
	P30: ICD development projects	6,500
	P6: Dredging of navigation channels in Cam Pha area and Hon Net transshipment area	150

Project group	Code and name of projects	Cost (Billion VND)
	P7: Upgrade of the Hon Gai – Cai Lan navigation channel and the return zone	200
	P8: Expansion of Lach Huyen – Hai Phong navigation channel	76
	P9: Improvement and upgrad of Diem Diem navigation channel	200
	P10: Upgrade of navigation channel to Cua Lo port	636
	P11: Improvement and upgrade of channel to Cua Lo port	1,018
	P12: Improvement of channel to Vung Ang port	280
	P13: Upgrade of Han La navigation channel	68
	P14: Construction of sand dyke for Cua Gianh Channel	566
	P15: Upgrade of sand dyke for Cau Viet Channel	400
	P16: Upgrade of Da Nang Channel for vessels of 50,000 DWT	100
	P17: Development of a channel to Tho Quang port, Da Nang	82
	P18: Upgrade of Quy Nhon channel for vessels of 50,000 DWT	421
	P19: Upgrade of Ba Ngoi channel for vessels of 50,000 DWT	156
	P20: Dredging of Phan Thiet navigation channel	28
	P21: Upgrade of Cai Mep – Thi Vai channel	1,400
	P22: Upgrade of Sai Gon – Vung Tau channel	290
	P23: Upgrade of Soai Rap channel	500
	P24: Upgrade of navigation channel on Dua River	162
	P25: Navigation channel to Hau river	2,225
	P26: Dredging of navigation channel through Tran De estuary	151
	P27: Dredging of navigation channel to Tien river	300
	P33: Ship procurement for search and rescue	424
	P34: Ship procurement for resupply activities in the South	250
	P35: Ship procurement for resupply activities in the North	134
Navigation facilities/system	P28: Vessel management system (VTS) for Hon Gai – Cai Lan channel	110
	P29: Vessel management system (VTS) for large ships entering Hau river	110
	P36: Cospas Sarsat Satellite station	109
	P37: Construction of lighthouses (1)	140
	P38: Construction of lighthouses (2)	550
	P39: Development of navigation channel management stations	48
	P40: Development of Coastal Information station	117
Total		251,225

Source: Seaport planning and JICA, 2021

3.1.5 Airport system plan for the period 2021-2030 with a vision to 2050

According to Decision No. 236/QĐ-TTg, “Approval of Adjusted Plan for Development of Air Transport by 2020 and Orientation Towards 2030,” dated 23rd February 2018, there will be 28 airports by 2030, of which 15 are domestic and 13 are international. Additionally, the projected growth rates of air passenger and cargo transports are 8% and 12% per year, respectively, in 2020–2030. While the slowdown in the global economy and negative impacts of the COVID-19 pandemic significantly reduce

air travel demand in short and medium terms, high growth in air travel in Vietnam is expected and would continue up to the long term.

To meet the growth of air travel demand, airport facilities need further improvement in terms of capacity, the efficiency of operation, and safety, a long list of candidate air transportation projects grouped into two was proposed, as follows:

(a) Capacity Expansion of Existing Airports. The projects aim to enhance the capacity of existing airports through the construction of new terminals, expansion of airport aprons, and construction of additional runways and taxiways.

(b) Construction of New Airports. The projects aim to expand the catchment areas of the national airport network in general and develop new flight routes in particular.

Table 3-5. List of airport project

Project group	Code and name of projects	Cost (Billion VND)
Capacity expansion of existing airports	A1: Construction of terminal T3 and expansion of apron in Noi Bai International airport	96,599
	A2: Construction of taxiway, expansion of terminal and apron in Van Don international airport	5,280
	A3: Construction of taxiway, expansion of terminal and apron in Cat Bi international airport	10,568
	A4: Construction of new terminal and expansion of apron in Tho Xuan International airport	8,887
	A5: Construction of new terminal and expansion of apron in Vinh International airport	14,942
	A6: Construction of new terminal and expansion of apron in Phu Bai International airport	16,578
	A7: Construction of new terminal and expansion of apron in Tho Xuan International airport	19,505
	A8: Construction of new terminal and expansion of apron in Chu Lai International airport	10,579
	A9: Construction of new terminal and expansion of apron in Cam Ranh International airport	23,760
	A11: Construction of new terminal and taxiway, expansion of apron in Tan Son Nhat International airport	12,223
	A12: Construction of new terminal and taxiway, expansion of apron in Can Tho International airport	7,462
	A13: Construction of new terminal and runway, expansion of apron in Phu Quoc International airport	9,595
	A14: Construction of new terminal and taxiway, expansion of apron in Phu Quoc International airport	4,591
	A16: Extension of runway, construction of new terminal and expansion of apron in Dien Bien airport	3,100
A20: Extension of runway, construction of new terminal and expansion of apron in Pleiku airport	3,583	
A21: Construction of new terminal and expansion of apron in Phu Cat airport	2,864	
A22: Construction of new terminal and expansion of apron in Tuy Hoa airport	1,385	
A23: Construction of taxiway and new terminal, expansion of apron in Buon Ma	3,814	

Project group	Code and name of projects	Cost (Billion VND)
Construction of new airports	Thuot airport	
	A25: Construction of new terminal and expansion of apron in Dong Hoi airport	2,804
	A26: Extension of runway and expansion of apron in expansion of apron in Rach Gia airport	4,454
	A27: Construction of new terminal, expansion of apron and extension of runway in Ca Mau airport	3,117
	A28: Construction of new terminal and expansion of apron in Con Dao airport	1,605
	A15: Construction of Lai Chau airport	4,350
	A17: Construction of Sa Pa airport	
	A18: Construction of Na San airport	
	A19: Construction of Quang Tri airport	
	A24: Construction of Phan Thiet airport	
A29: Construction of Cao Bang airport		
Total		403,132

Source: JICA, 2021

Decision No.2729/QD-BGTVT of the Ministry of Transport dated 19 December 2018 approved the investment for operating airports 2018–2025.

Besides those previously introduced projects for the major gateway airports, the list of ongoing and future expected investment projects is in Table 3-6.

Table 3-6. Ongoing airports improvement projects

No	Airport	Expected investment (Billion VND)	Period	Remarks
1	Noi Bai international airport			
1.1	Implementation of a feasibility study on the construction project of the runway No. 3	50	2020-2021	Not implemented yet
1.2	Improvement and upgrade of the runway 1B, the connecting taxiways, the synchronous equipment system	1,500	2018-2020	Ongoing
1.3	Improvement and upgrade of the runway 1A, the connecting taxiways, the synchronous equipment system	850	2018-2020	Ongoing
1.4	Expansion of the passenger terminal T2 with a capacity of 15 million passengers per yea	3,000	2018-2020	Ongoing
1.5	Expansion of the passenger terminal T2 with a capacity of 15 million passengers per yea	4,900	2020-2025	Not implemented yet
1.6	Construction of a cargo terminal with an expected capacity of 200,000 tons of cargo/year with an apron system in front of the synchronous cargo terminal	400	2025-2027	Not implemented yet
1.7	Construction project of a hangar	200	2018-2025	N/A
2	Tan Son Nhat International airport			

No	Airport	Expected investment (Billion VND)	Period	Remarks
2.1	Improvement and upgrade of the runways 25L/07R, the connecting taxiways, the synchronous equipment system	700	2024-2026	Not implemented yet
2.2	Improvement and upgrade of the runways 25R/07L, the connecting taxiways, the synchronous equipment system	975	2018-2020	Ongoing
2.3	Construction of a parallel taxi system and the connecting taxiways with the synchronous equipment	1,538	2018-2021	Ongoing
2.4	Expansion of the passenger terminal T1 (including VIP service area)	400	2018-2019	Ongoing
2.5	Construction of the passenger terminal T3	7,350	2018-2023	Ongoing
2.6	Construction of a car parking in front of the passenger terminal T2	500	2020-2025	Not implemented yet
2.7	Construction of a cargo terminal, the logistics area	300	2024-2026	Not implemented yet
2.8	Construction of a hangar and the front synchronous apron	700	2019-2023	Ongoing
3	Da Nang International airport			
3.1	Improvement and upgrade of the taxiways C4 and C5	30	2018-2019	Finished
3.2	Supply and installation of the ILS CAT I system for the runway 17R/35L at the end 17R and the CAT I lighting system for the runway 17R/35L	110	2019-2020	N/A
3.3	Improvement of the runway 17R/35L	650	2021-2922	Not implemented yet
3.4	Improvement and upgrade of the connecting taxiway system	530	2020-2021	N/A
3.5	Upgrade and renovation of the apron No.4	215	2018-2019	Finished
3.6	Construction of a passenger terminal with a capacity of 10mppa with a synchronous technical infrastructure system (car parking, connected traffic, etc)	4,890	2019-2023	Not implemented yet
3.7	Construction of a cargo terminal with the synchronous technical infrastructure	350	2018-2021	N/A
4	Cam Ranh international airport			
4.1	Renovation and upgrade of the runway No. 1	650	2019-2021	N/A
4.2	Improvement and upgrade of the parallel taxiways and the connecting taxiways	510	2019-2021	N/A
4.3	Expansion of the passenger terminal T1 or constructing the passenger terminal T3 with a capacity of 5 million passengers/year	3,500	2019-2023	N/A
4.4	Expansion of the apron	200	2019-2020	Ongoing
4.5	Upgrade of the apron in front of the international	350	2018-2019	Ongoing

No	Airport	Expected investment (Billion VND)	Period	Remarks
	terminal			
4.6	Construction of a cargo terminal, a cargo warehouse with a capacity of 200,000 tons/year and the synchronous infrastructure system	300	2018-2020	N/A
5	Cat Bi international airport			
5.1	Repair and construction of the parallel taxiways N and the connecting taxiways	1,018	2018-2021	Not implemented yet
5.2	Renovation of the apron in front of the old terminal	150	2018-2019	Constructing
5.3	Construction of the passenger terminal T2 with a capacity of 5 million passengers/year and the synchronous infrastructure	2,500	2018-2020	Ongoing
5.4	Expansion of the apron in front of the new passenger terminal and the cargo terminal	1,340	2018-2020	Ongoing
5.5	Construction of the cargo terminal with a capacity of 250 thousand tons/year and the synchronous infrastructure	390	2018-2020	Ongoing
5.6	Construction of a hangar and a apron in front of the hangar	400	2024-2026	Not implemented yet
6	Phu Bai International Airport			
6.1	Renovation, upgrade, and extension of the existing runway from 2700m to 3048 m	1,000	2019-2021	N/A
6.2	Upgrade and construction of the parallel taxiways and the connecting taxiways	630	2019-2021	N/A
6.3	Installation of the ILS/DME CAT 1 system at the end 27	45	2019-2021	N/A
6.4	Construction of a passenger terminal with capacity of 5 mppa and the synchronous infrastructure	2,700	2018-2021	Constructing
6.5	Construction of the apron (additional 8 parking positions of code C, E)	510,0	2018-2021	Ongoing
6.6	Construction of a cargo terminal	300	2024-2026	Not implemented yet
6.7	Construction of a hangar and a apron in front of the hangar	200	2019-2021	N/A
7	Chu Lai International airport			
7.1	Upgrade and extension of the existing runway into the parallel taxiways and the synchronous equipment system	850	2019-2022	Not implemented yet
7.2	Construction of a new runway, the connecting taxiways, and the synchronous equipment system	2,300	2019-2022	Not implemented yet
7.3	Construction of the passenger terminal T2 with a capacity of 5mppa	2,700	2019-2022	Not implemented yet
7.4	Construction of the apron	390	2019-2022	Not implemented yet
7.5	Construction of a cargo terminal and the	350	2023-2026	Not implemented yet

No	Airport	Expected investment (Billion VND)	Period	Remarks
	synchronous technical infrastructure			
8	Phu Quoc International airport			
8.1	Upgrade of the runway	650	2020-2022	N/A
8.2	Construction of the passenger terminal T2 with a capacity of 6mppa and the ancillary works	2,950	2019-2022	N/A
9	Vinh International airport			
9.1	Renovation and upgrade of the existing runways	400	2024-2026	Not implemented yet
9.2	Construction of a new runway with a size of 3000x45m, a parallel taxiway and the synchronous equipment system	1,700	2024-2026	Not implemented yet
9.3	Improvement and expansion of an apron to increase the total number of parking positions to nine	300	2017-2019	Design
9.4	Construction of the passenger terminal with a capacity of 5 mppa and the synchronous infrastructure	2,500	2018-2021	Ongoing
9.5	Construction of an apron in front of the new passenger terminal (7 code C, 2 code E)	1,000	2018-2021	Making FS
10	Can Tho international airport			
10.1	Upgrade and improvement of the runways and taxiways	660	2020-2022	Not implemented yet
10.2	Construction of the parallel taxiways and the connecting taxiways	1,200	2024-2026	Not implemented yet
10.3	Expansion of the apron (2 positions of code E)	360	2018	Finished
11	Dien Bien International airport			
11.1	Investment in the construction of the airside (the runway of 2400x45 m, the connecting taxiways, etc)	2,500	2021-2023	Under Pre-FS
11.2	Expansion of the apron (3 positions of code C, D)	100	2024-2026	Not implemented yet
11.3	Construction of the passenger terminal with a capacity of 2 mppa and the synchronous auxiliary works	800	2024-2026	Not implemented yet
11.4	Construction of the cargo terminal and the synchronous infrastructure works	50	2025-2027	Not implemented yet
12	Dong Hoi airport			
12.1	Construction of the parallel taxiways, the connecting taxiways	800	2024-2026	Not implemented yet
12.2	Construction of the passenger terminal with a capacity of 3 mppa and the synchronous auxiliary works	1,500	2019-2021	Ongoing
12.3	Expansion of the apron in sync with the passenger terminal	300	2019-2021	Ongoing
12.4	Construction of the cargo terminal	100	2024-2026	Not implemented yet

No	Airport	Expected investment (Billion VND)	Period	Remarks
13	Pleiku airport			
13.1	Extension of the runway to 3000m	500	2025-2027	Not implemented yet
13.2	Construction of the passenger terminal with a capacity of 4 mppa	2,500	2025-2026	Not implemented yet
14	Phu Cat airport			
14.1	Improvement of the runways, the taxiways, the apron	900	2020-2022	Not implemented yet
14.2	Construction of the passenger terminal with a capacity of 5 mppa and the synchronous technical infrastructure	2,700	2025-2027	Not implemented yet
14.3	Construction of the cargo terminal	50	2025-2027	Not implemented yet
15	Tuy Hoa airport			
15.1	Improvement, upgrade and extension of the runways, the airside systems	300	2019-2025	Not implemented yet
15.2	Expansion of the apron	80	2019-2020	Under FS by ACV
15.3	Construction of the passenger terminal with a capacity of 3mppa and the synchronous infrastructure	1,500	2020-2025	Under FS by ACV
16	Buon Me Thuot airport			
16.1	Improvement and upgrade of the airside system	500	2020-2022	Not implemented yet
16.2	Renovation and organization of the passenger terminal process to reach 2 mppa	50	2019-2021	Not implemented yet
s	Expansion of the apron (02 positions of code C)	100	2019-2021	Not implemented yet
17	Lien Khuong Airport			
17.1	Improvement and upgrade of the airside system	810	2018-2021	Not implemented yet
17.2	Construction of the passenger terminal with a capacity of 5mppa	2,700	2020-2023	Not implemented yet
17.3	Expansion of the apron (05 positions of code C)	195	2017-2019	Finished
18	Con Dao airport			
18.1	Renovation and upgrade of the runways and the taxiways	1,500	2020-2022	Not implemented yet
18.2	Construction of the passenger terminal with a capacity of 2mppa and the synchronous technical infrastructure	800	2019-2021	Not implemented yet
18.3	Expansion of the apron (8 positions)	400	2018-2025	Not implemented yet
19	Tho Xuan International airport			
19.1	Construction of terminal with a capacity of 2mppa and the synchronous infrastructure	800	2025-2027	Not implemented yet
	Expansion of the apron	100	2020–2025	Under FS by ACV

Source: JICA, 2021

3.2 On-going transport and logistics projects sponsored by major international parties (MDB, JICA, KOICA, etc.)

3.2.1 Cooperation schemes

- Technical cooperation:

Technical Cooperation is an all embracing term used to describe donors' practical assistance to developing countries. Depending on the specific project, technical assistance can include the dispatch of JICA experts, the training of local officials for 'capacity development', the supply of equipment or financial assistance.

- ODA loan

In many developing countries, economic and social infrastructure such as electricity, gas, transportation and communications services is underdeveloped. ODA loans support developing countries by providing low-interest, long-term and concessional funds to finance their development efforts.

- ODA grants

ODA Grants are types of financial assistance in which funds are granted to a developing country to support construction works or services such as procuring equipment and materials that are necessary for economic and social development. Since ODA Grants are financial assistance with no obligation for repayment, it targets mainly developing countries with low income levels. Assistance is given to development projects that are essential in developing countries' nation building, including: construction of hospitals or schools and increasing access to safe water supply to satisfy basic human needs; improvement of irrigation systems to promote development of communities and agricultural productivity; construction of roads and bridges to build socio-economic foundations; building facilities to promote environmental conservation; and developing human resources. In recent years, assistance has also been provided for peace building, developing business environments, disaster prevention and reconstruction after disasters, and measures to cope with climate change. Where necessary, technical guidance for operation and maintenance, etc. (soft components) is also provided, so that the facilities and other systems financed by ODA Grants are sustainably managed.

3.2.2 On-going project list by JICA

Since the resumption of Japan's Official Development Assistance (ODA) to Vietnam in 1992, the Government of Japan has actively worked to support human resources training and reform of policies and mechanisms through technical cooperation as well as construction of transport infrastructure, electricity supply, etc. through financial cooperation (including ODA Loans and Grant Aid) with an aim of making contribution to Vietnam's socio-economic development. Since the commencement of ODA provision, the prominent feature of Japanese ODA has been seen as the close combination of technical cooperation and financial assistance ensuring the comprehensive support and sustainability of development projects.

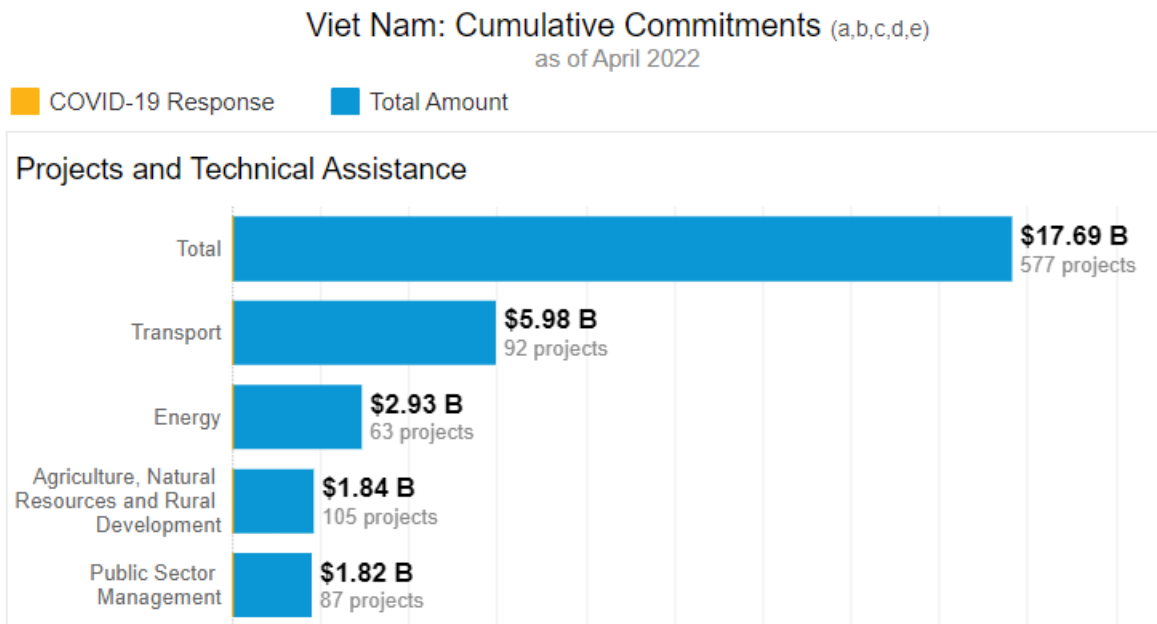
On-going project list by JICA:

- (Nationwide) Project to support for planning and implementation of the Nationally Determined Contributions in Vietnam (SPI-NDC) – Technical cooperation
- (Nationwide) Maritime security and safety capacity improvement project – ODA Loan
- (Some provinces) Project for Strengthening the Urban Railway Training Capacity for Railway College – Technical cooperation
- (Some provinces) Project for Strengthening the Capacity to Cope with and Minimize Damages Caused by Flash Floods and Landslides for the Northern Mountainous Region - Technical cooperation
- (Some provinces) North-South expressway construction (Da Nang - Quang Ngai) – ODA Loan
- (Some provinces) North-South expressway construction (Ben Luc - Long Thanh) – ODA Loan

3.2.3 On-going project list by ADB

As of December 2019, the proposed Southeast Asia Transport Project Preparatory Facility Phase 2, a regional transaction technical assistance facility (TA Facility), provided project preparation support and capacity building for a series of ensuing investment projects in the transport sector in Southeast Asian developing member countries (DMCs), including Indonesia, Myanmar, Philippines, Thailand, Timor-Leste, and Vietnam. In Vietnam, ADB supported Ho Chi Minh City Urban Mass Rapid Transit Line 2 Project (Viet Nam).

In 2021, ADB committed a USD 58 million loan to upgrade transport and water resource infrastructure and improve access to reliable weather and climate data in Binh Dinh and Quang Nam Provinces in the South-Central Coastal region of Vietnam.



Source: ADB website

Note: ^a Grants and TA include ADB-administered cofinancing. ^b Includes loans, grants, equity investments, TA, and private sector programs. ^c Using primary sector in the reporting of commitments. ^d From 2020, financing for TA projects with regional coverage is distributed to their specific DMCs where breakdown is available. ^e Numbers may

not sum precisely because of rounding. ^f ADB-financed commitments from private sector programs of which \$5.62 billion is short term (with maturity of less than 365 days).

Figure 3-1. Cumulative commitments from ADB

For 2022-2024, ADB's sovereign pipeline for Vietnam, includes 19 projects with an estimated amount of 3.37 billion. ADB continues to help Viet Nam emerge from the COVID-19 pandemic, enhance transportation and urban development, improve rural connectivity, and reduce pockets of poverty in remote areas of ethnic minorities. ADB will support improved access to quality education and health security, climate change adaptation and environmental sustainability, and better integration into the regional and global economy.

3.2.4 On-going project list by World Bank

On-going project list by World Bank:

- Vietnam regional resilient transport corridor project – 253 million USD (pipeline)
- Mekong Resilient regional connectivity project – 250 million USD (pipeline)
- Vinh Long city urban development and enhanced climate resilience project – 300 million USD
- First resilient infrastructure development project – 147.52 million USD (pipeline)
- Ho Chi Minh green transport development project (Active)
- Vinh Long city urban development and enhanced climate resilience project in Vinh Long province – 146.4 million USD (active)
- Southern Waterways Logistics Corridors Project – 108 million USD (pipeline)
- Vietnam – dynamic cities integrated development project – 194.36 million USD (active)

In addition, past capital investment projects in IWT infrastructures heavily depended on ODA finance, especially World Bank financing with small proportionate state finance. Two large project packages, WB5 in the South and WB6 in the North, have been implemented. Both packages consist of component projects in a few prioritized IWT corridors or routes, mainly targeted to improve navigational capacity and safety. Selected projects are consistent for achieving these objectives, including major bottleneck solving ones on the top of the list.

Financing for WB5 was approved in 2007 and for WB6 in 2008, and it was originally planned to close in 2013 and 2014, respectively. Due to the prolonged financing process, detailed design works, global economic climate change, high-rate inflation, etc., the projects became inefficient because of the prolonged implementation period, substantial cost overrun, and reduced scope of work. Several extensions of the project period and amendments of the project component were necessary before completion. Although a large part of the project package has been completed and put into operation, major bottleneck solving projects were forced to be implemented by different financing schemes.

In relation to WB5, the Cho Gao Canal Phase II project supposedly carried out in 2016–2017 was suspended, being financially infeasible under the build, operate, and transfer (BOT) format. The government is now in the process of new World Bank financing for the "Southern Region Waterways Logistics Corridor" project, of which the core project is Cho Gao Canal Phase II. As for WB6, Day-Ninh Co River Connecting Canal (DNC) Project gets additional funds before closing the package, thanks to the

successful accomplishment of other component projects with a considerable amount of cost savings. The DNC project already started its construction stage and will be completed in 2022.

3.3 Necessary and/or required transport and logistics projects based on development needs of Vietnam

3.3.1 Priority projects in road

Although the road infrastructure has been improved to enhance quality to adapt to the market, it has not met the traffic requirements of society and the country's development. Limited capacity in urban, suburban areas, and industrial development zones (majorly near the port) are emerging issues and long-term challenge. If the number of cars and motorbikes continues increasing, the road system will not be able to provide good service. Moreover, problems of road investment management need to be overcome.

Table 3-7. Expressway priority project by 2025

No	Region/area	Expressway/section	Expected investment (Billion VND)		Cost (VND bill.)	Fund requirement 2021-2025		Funding method
			Completed	Carried over		SB	Non-SB	
1	North/South	Eastern North-South	375	397	152,837	36,296	28,994	PPP/SB
		Expressway: remaining sections*						
2	North	Cho Moi – Bac Kan	31		2,243	2,019		SB
		Ha noi RR4*		98	31,210	7,646	7,959	PPP
		Connecting Ha Giang with NB-LC		81	7,800	5,460		ODA
		Hoa Binh – Moc Chau**		83	21,577	2,913	3,560	PPP
		Dong Dang – Tra Linh**		75	12,546	1,844	1,920	PPP
3	Central coasts and central highlands	Hoa Lien – Tuy Loan	12		2,100	1,890		SB
		Dau Giay – Tan Phu	60		6,900	1,170	5,040	PPP
		Tan Phu – Bao Loc**	67		18,797	8,289	8,628	PPP
		Buon Me Thuot – Van Phong		105	22,583	1,788		PPP
4	Southern	Bien Hoa – Vung Tau	54		18,805	6,030	10,895	PPP
		Chon Thanh – Duc Hoa	84		6,800	4,760		SB
		HCMC RR3 + Tan Van – Nhon Trach, TP1B		9	8,064	4,804	2,453	PPP
		+ Tan Van – Nhon		17	15,754	11,285	2,894	PPP

No	Region/area	Expressway/section	Expected investment (Billion VND)	Cost (VND bill.)	Fund requirement 2021-2025		Funding method
5	Mekong Delta	Trach, TP2A+2B + Binh Chuan – Highway 22*	19	14,980	7,627	5,855	PPP
		+ Highway 22 – Ben Luc*	29	17,081	7,533	7,840	PPP
		HCMC-Chon Thanh**	55	21,200	6,975	7,865	PPP
		HCMC – Moc Bai**	65	13,600	4,665	4,855	PPP
		Chau Doc – Can Tho*	116	24,100	4,283		PPP
		Soc Trang – Tran De	37	7,477	958		PPP
		My An – Cao Lanh	26	4,524	3,407		ODA
		An Huu – Cao Lanh	30	5,998	2,351	2,227	PPP
		Cao Lanh – Lo Te	29	2,050	287	1,312	PPP
		Lo Te – Rach Soi	51	2,200	308	1,408	PPP
Subtotal			871***	1,176	134,587	103,925	
Grand total						203,925	

Note: (*) Nationally important projects, (**) Implemented by provinces, (***) Including Huu Nghi - Lang Son 43 km, HCMC RR3:Tan Van – Nhon Trach 1A 9 km

By 2030, Vietnam will have about 5,165 km of expressways (including 3,021 km to be completed by 2025, 1,068 km as projects in the 2021 - 2025 period carried over to after 2025 and 1,076 km to be completed in 2026 – 2030).

Table 3-8. Expressway priority project by 2030

No	Region	Route/Section	Length (km)	Cost (VND bil.)	Funding
1	North	Moc Chau – Son La	105	8,360	State budget
2	North	Phu Tho – Cho Ben	58	9,860	State budget
3		Hanoi RR5*, **	200	36,000	PPP
	Central coasts and central highlands	Vinh – Thanh Thuy	65	10,350	State budget
		Quy Nhon – Pleiku*,**	160	25,478	PPP
		Bao Loc – Lien Khuong**	74	14,609	PPP
		HCMC RR4*,**	105	33,281	PPP
		Go Dau – Xa Mat	65	10,350	PPP
		Ha Tien – Rach Gia***	100	30,000	PPP
		Hong Ngu – Tra Vinh**	107	5,380	PPP
		Soc Trang – Tran De***	37		
Total 2026-2030			1,076		

Notes: (*) Nationally important projects, (**) Implemented by provinces, (***) Cost and funding resources are not mentioned in the NSP

Total funding requirement is 2,676,187 billion VND for 2021-2030. Solutions for fund mobilization could be state budget envelopes, PPP framework, foreign investors (focusing on ODA) and concessional loans, and from the private sector. These loans will gradually become more commercial in nature, so mobilization of financial resources for infrastructure development in general and transport infrastructure in particular needs to be adjusted accordingly.

Table 3-9. Expressway investment plan

No	Item	2021-2025	2026-2030	Total planned
1	Expressway (billion VND)	441,226	183,668	2,020,221
2	National highway (billion VND)	50,000	80,000	655,966
Total billion VND		491,226	263,668	2,676,187

3.3.2 Priority projects in railway

The volumes of nationwide freight and passenger transport in 2030 are estimated to be 11.8-15.7 mil. ton/year and 22.2-50.5 mil. passenger/year.

Selection criteria of railway project include:

- Economic efficiency,
- Social / environmental efficiency,
- Feasibility, and it will focus on upgrade of existing railway lines, improvement of operational capacity, enhancement of train operation safety, and new lines development.

Based on that, the priority list for railway development for 2021-2030 are categorized into 3 groups: Upgrade of existing line, Development of new lines for conventional rail, and North-South HSR.

Funding source can allocate State Budget with the priority to ODA loans, concessional loans from governments and international donors, Government/corporate bonds, corporate bonds. Moreover, PPP scheme to ensure the reliability of risk sharing can increase private sector participation.

Table 3-10. Priority project for 2021-2030 in railway

Code and name of projects		By 2030		2031-2050	
		Length (km)	Cost (VND bil.)	Length (km)	Cost (VND bil.)
Upgrade and improvement of existing railway lines					
	Upgrading North-South railway	1,726	38,407	1,726	66,415
	Upgrading Hanoi – Hai Phong railway	96	1,500	96	2,400
	Upgrading Ha Noi – Lao Cai railway	285	2,500	285	0
	Connecting Lao Cai station and Ha Khau Bac station				
	Upgrading Ha Noi – Dong Dang railway	156	1,872	156	0
	Upgrading Ha Noi – Thai Nguyen railway	55	660	54.6	0
	Kep – Chi Linh	38	380	38	0
Construction of new normal railway lines					
B1	Main corridor	188	23,504	2,588	636,505
	Yen Vien – Pha Lai – Ha Long – Cai Lan railway	129	6,000	129	0

Code and name of projects	By 2030		2031-2050	
	Length (km)	Cost (VND bil.)	Length (km)	Cost (VND bil.)
Lao Cai – Ha Noi – Hai Phong			380	158,842
Bien Hoa – Vung Tau railway		5,688	84	51,195
Ha Noi – Dong Dang			156	65,209
Bausite line (Đắk Nông - Chơn Thành section, connected with railway to Thi Vai terminal)			67	5,648
Di An – Loc Ninh			128	20,938
HCMC – My Tho- Can Tho railway		100	174	157,154
Vung Ang – Tan Ap – Mu Gia		1,735	103	15,617
Thap Cham – Da Lat			84	12,248
Dong Ha – Lao Bao – cang My Thuy			114	16,632
Tuy Hoa – Buon Me Thuot			169	14,247
Dak Nong – Binh Thuan			121	10,200
Tay Nguyen (Da Nang – Kon Tum – Dak Lak – Binh Phuoc)			550	46,365
Nam Dinh – Thai Binh – Hai Phong – Quang Ninh			120	10,116
Ha Long – Mong Cai			150	22,083
Hanoi hub area: develop new eastern ring section (Ngọc Hồi - Lạc Đạo - Yên Viên - Bắc Hồng)	59	9,980	59	30,020
B2 New lines to terminals, industrial parks, economic zones, mines	40	35,500	217	56,867
North Central Coast port clusters: Nghi Son; renovate railway to Cua Lo	39.7	35,500	39.7	0
North Central Coast port clusters: Nghi Sơn; renovate railway to Cửa Lò...			42	2,602
Middle Central Coast port clusters: Chân Mây, Liên Chiểu, Dung Quất...			30	16,579
South Central Coast port clusters: Quy Nhơn (Nhơn Hội - Nhơn Bình), Vân Phong, Phan Thiết; renovate railway from Ngã Ba station - Cam Ranh terminal (former Ba Ngòi terminal)			55	30,395
Nam Dinh – Thanh Long and Ninh Co Economic Zone			50	7,291
Construction of HSR				
Ha Noi – Vinh section	281	273,237	281	N/A
Nha Trang – HCMC section	370	288,361	370	N/A
Vinh – Da Nang section			422	313,597
Da Nang – Nha Trang			479	459,048
Total	3,234	665,920	6,712	1,534,832

Domestic resources are still limited, while the need for capital to renovate and make breakthrough investment in railway infrastructure is huge. Moreover, it will take a lot of time to regain market share

for railway after long time losing market share to road and aviation. Investment in railway is still low, not on par with its potentials and advantages. Considering the limited State Budget, the railway sector is not appealing to non-SB fund and PPP scheme, among others, due to its slow cost recovery, long construction period, huge funding requirement, and various risks.

3.3.3 Priority project in IWT

With highly promising growth of IWT sector, both freight and passenger throughputs have been increased gradually. IWT has a great potential, and it is necessary to extend the route with good connection with other modes, and ensure the smoothness along corridors. IWT passenger are estimated to reach 397 mil. passengers in 2030, while cargo will be 715 mil. tons in 2030.

Vietnamese government prioritizes the development of ICDs connecting by IWT, road and have a commitment to increase of IWT freight share and mitigate the problem of road congestion and railway insufficiency.

IWT development including channels, ports should follow an integrated manner by corridors as input for integration into the national master plan. Selection criteria of IWT projects in Vietnam include:

- Possibility of container transport routes as a condition to IWT berth in ICDs (dry ports), logistic centers, adequate bridge clearance, etc. to strengthen carriage capacity and multi-modal function.
- Potentials for river-sea waterways, coastal shipping, routes connecting to islands and international routes.
- Connectivity with other modes such as roads, seaports, or existing railway facilities to ensure economic efficiency, while connection with air transport is mainly considered as tourism purpose.
- Investment mechanism including state budget, ODA, World Bank or private sector to invest in the project to renovate and upgrade IWT infrastructure.

Based on that, the priority list for IWT development for 2021-2030 is follows:

Table 3-11. Priority project for 2021-2030 in maritime

No	Project name	Expected investment (Billion VND)	Expected funding
1	Northern region		
1.1	W01: Clearance lifting for Duong bridges	2,300	State budget
1.2	W02: Construction of the canal linking Day river and Ninh Co river	1,800	State budget
1.3	W03: Quang Ninh – Ninh Binh route over Luoc river – Phase	7,200	
1.4	W04: Waterway transport route of Hoa Binh – Son La – Lai Chau	300	
1.5	W05: Viet Tri – Yen Bai – Lao Cai route (Viet Tri – Yen Bai section)	1,500	
1.6	W06: Sea-river transport route via Tra Ly estuary	3,500	
1.7	Project to renovate and upgrade new waterway transport	500	

No	Project name	Expected investment (Billion VND)	Expected funding
	routes in the North		
1.8	Improve and upgrade insufficient-clearance bridges (phase 1)	600	
2	Central coast region		
2.1	IWT route of Ninh Binh – Thanh Hoa	450	
2.2	Upgrade waterways on Giang river (phase 2)	300	
3	Southern region		
3.1	Cho Gao river route project	1,500	

3.3.4 Priority project in aviation

The total land area of the 28 airports by 2030, which will be in line with the needs for development, upgrade and expansion of the airports, but there are needs for land acquisition, resettlement and relocation of military flight activities away from 3 major airports. According to NSP recommendation, a number of airports can serve all provinces and cities, it is not necessary to add new airports as requested by the provinces and cities. Location identification of 2nd International Airport in HMA is also a big issue in NSP.

Funding sources for plan implementation include various investment sources such as: ODA loans, State's budget, commercial loans from financial institutions, private sectors in the form of PPP (Van Don airport is successful).

Table 3-12. Priority project for 2021-2030 in aviation

No	Project name	Req. Fund (Billion VND)	Development items
I	Period 2021-2024	276,381	
1	Noi Bai International airport	96,599	Improvement
2	Long Thanh International airport	109,000	Improvement
3	Tan Son Nhat International airport	12,233	Improvement
4	Chu Lai International airport	10,579	Improvement
5	Cam Ranh International airport	23,760	Improvement
6	Da Nang international airport	19,505	Improvement
7	Con Dao airport	1,605	Improvement
8	Dien Bien airport	3,100	Improvement
II	Period 2025-2030	126,725	
1	Van Don international airport	5,280	Improvement
2	Cat Bi International airport	10,568	Improvement
	Tho Xuan International airport	8,887	Improvement
	Vinh International airport	14,942	Improvement
	Phu Bai International airport	16,578	Improvement
	Can Tho International airport	7,426	Improvement
	Phu Quoc International airport	9,595	Improvement

No	Project name	Req. Fund (Billion VND)	Development items
	Lien Khuong International airport	4,591	Improvement
	Lai Chau Airport	4,350	New
	Na San Airport	5,688	New
	Sa Pa Airport	4,200	New
	Quang Tri Airport	4,350	New
	Pleiku Airport	4,583	Improvement
	Phu Cat Airport	2,864	Improvement
	Tuy Hoa Airport	1,385	Improvement
	Buon Me Thuot Airport	3,814	Improvement
	Phan Thiet Airport	7,714	Improvement
	Dong Hoi Airport	2,804	Improvement
	Rach Gia Airport	4,454	Improvement
	Ca Mau Airport	3,117	Improvement
III	Period 2030-2050	596,352	
1	Cao Bang Airport	-	New
*	Other airport	-	Improvement

4 Vietnam NewsBrief 1

Transport and logistics development orientation 1

Mekong Delta Region

The Mekong Delta accounts for 12.3% of Vietnam's total surface area, and approximately 19.2% of the national population (some 17.59 million people). The region accounts for 19.8% of Vietnam's GDP, with a slightly lower monthly average income per capita (VND 2,778,000) compared to the national average (VND 3,098,000), due to lower rates of growth in industrialisation as the Mekong Delta remains primarily agrarian. The region has a slightly lower poverty rate than Vietnam as a whole (5.2% compared to 5.8%; 2016)¹⁰.

The region plays a key role in production and export of agricultural and fishery products. It accounted for 55.3% of Vietnam's paddy rice production in 2017 and provided more than 95% of Vietnam's rice exports over the last decade¹¹. It also produces around 70% of Vietnam's fruit¹². The delta is also a major contributor to Vietnam's fisheries industry, accounting for 60% of fish exports. The fishing and aquaculture industries in the region employ over 2.8 million people.

The Mekong Delta plays a role as a tourist attraction centre, providing services such as ecotourism and sightseeing with a variety of river tours in the delta and to Cambodia, and resort tourism on the island of Phu Quoc. Revenues from tourism reached USD 300 million in 2014.

Due to the socio-economic importance and potential of the Mekong Delta, it is crucial the connectivity is improved. Improving connectivity related to the transport of cargo and passengers (e.g. tourism). For the transport of cargo it is crucial to develop a sustainable, reliable and efficient transport and logistics chain that connects the Mekong Delta internally and with national and international markets. A reliable and efficient transport and logistics sector improved will make the Mekong Delta more competitive and could attract more trade which stimulates the socio-economic development of the delta.

In the Mekong Delta the main modes of transport are roads, navigation (inland and maritime) and air. To improve connectivity in the Mekong Delta, in recent years, Ministry of Transport (MOT) invested in a number of large infrastructure projects. Most of the investment capital focused on the road sector (nearly 80% of the investments). For inland waterways and maritime travel 1% and 13% of the investment capital was used, respectively. For waterways, the biggest investments for the previous years are the An Thoi Seaport project (investment is VND 189 billion) and the Quan Chanh Bo canal project (investment of VND 9,781 billion).

Main logistics chains

Numerous commodities are transported between the Mekong Delta and HCMC region and national and international markets. Construction materials and fertilisers are mainly being transported into the Mekong Delta while cement, agriculture, aquaculture and horticulture products are transported in opposite direction.

For four commodities (rice, shrimp, pangasius fish, and fruit), export turnover from the Mekong Delta reached 8.43 billion USD in 2020 (73.34% of national exports). The production of major commodities is distributed over the delta as shown in Figure 2.

¹⁰ General Statistics Office of Vietnam, https://www.gso.gov.vn/Default_en.aspx?tabid=766.

¹¹ WWF (2016), 'Mekong River in the economy'.

¹² GIZ (2015), 'The Mekong Delta - an emerging investment destination in Vietnam'.

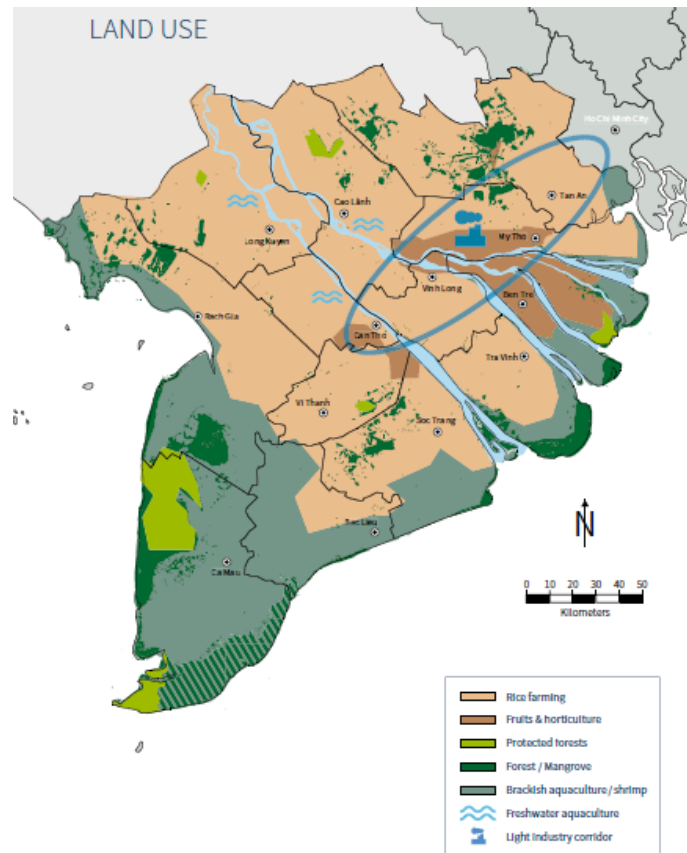


Figure 2. Distribution of main commodities over the Mekong Delta¹³

The transport of rice is an important aspect of the logistics chain. In the Mekong Delta rice is transported as bulk by truck and IWT. There is no containerisation of rice for export. About 95% of Vietnam’s rice exports originate in the Mekong Delta.



Dr.-Ing. Le Thu Huyen is a Senior Transport Specialist, Lecturer in the section of Transport Planning and Management, and the Director of the Consulting Center for Transport Development at the University of Transport and Communications in Vietnam. She has been the Deputy Research Team Leader of the Human Behavior Branch (Forum of Vietnam Traffic Safety), in National Traffic Safety Committee, since 2014. She is also the member of Eastern Asia Society for Transportation Studies.

Dr. Huyen has devoted 90 percent of her practice in the field of Transport Engineering for the last fifteen years. She has extensive experience in traffic safety, urban traffic planning and management, as well as logistics and supply chain management. Her recent activities include giving lectures in the professional fields; doing research; providing consultant service to government, enterprises, etc.

¹³ Source: *The Mekong Delta: an Emerging investment Destination in Vietnam* (VCCI, 2015).

Transport and logistics development orientation 2 Mekong Delta Region

Despite the large quantities of agriculture and aquaculture commodities produced in the Mekong Delta, the use of containers is limited. The main reasons that containerisation are not developing in the Mekong Delta are:

- **Lack of port facilities:** The ports in the Mekong Delta are scattered, small-scale and mainly multi-purpose ports that are not dedicated to container transport.
- **Lack of consolidated cargo:** At present most containers are transported by truck, causing congestion, environmental and safety problems. Despite the large quantities of cargo, frequent barge services do not exist, primary because the cargo is scattered across the Mekong Delta. The lack of consolidated cargo makes the operation of a frequent container barge service between the Mekong Delta and HCMC and CMTV areas uneconomical. To develop frequent barge service, it is crucial to consolidate cargo at certain locations.
- **Containerisation, for the export, mainly takes place in the HCMC / CMTV region:** At present most cargo is transported in bulk by road or small IWT vessels to ports and ICDs in the HCMC / CMTV region where it is containerised for export. Other value-added services also take place in the HCMC / CMTV region.
- **Small operators:** There are a large number of small logistics operators operating in the Mekong Delta. Not having the cargo consolidated makes it not interesting for larger companies to invest in dedicated container vessels, operate frequent barge services and port handling equipment. Increase of transport capacities (larger vessels) and develop of multimodal transport (containers) is essential for lowering the transportation costs.
- **Road network improvements:** During the last decade the road network between HCMC and the Mekong Delta has improved significantly. Road transport has become very competitive with inland navigation, primarily because the capacities of the IWT vessels is limited. The scattered nature of cargo in the Mekong Delta and the large density of roads makes the use of road network more financially viable.
- **Lack of connectivity:** The connectivity between different modes of transport is lacking making it impossible to develop a reliable and efficient intermodal / multimodal transport system.
- **Limitations of the fleet and infrastructure:** The IWT fleet in the Mekong Delta have small capacities and are not competitive with road transport. To become more competitive, the capacity of the vessels need to increase. However, existing vessels with larger capacities can only operate on the main rivers. Shorter connections between Can Tho area and HCMC / CMTV area exists but have limitations in waterways, allowing only smaller vessels to navigate there, see Figure 3.

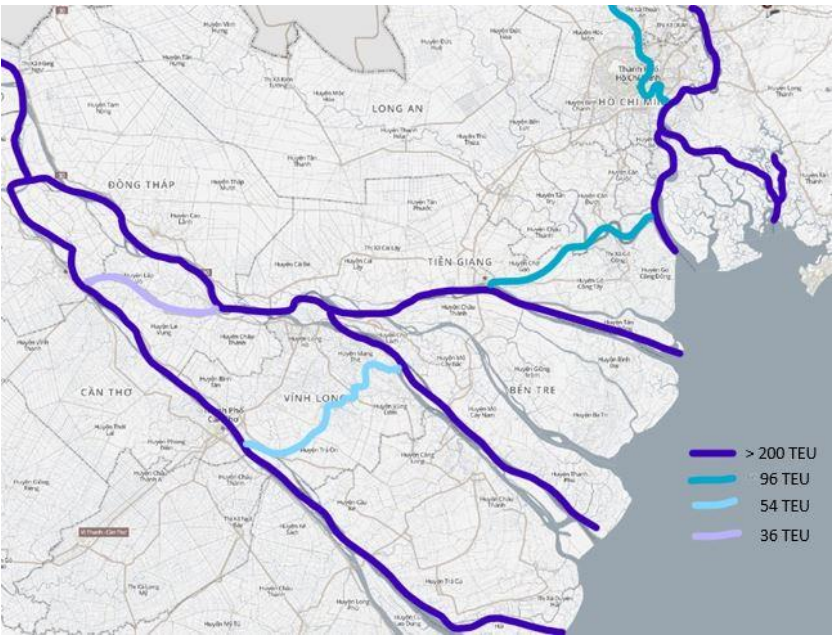


Figure 3. Maximum TEU capacity on the inland waterway network¹⁴

Strategic orientations for transport and logistics

For the development of the alternative plan scenarios, different strategic orientations for transport and logistics in MKD are defined as follows.

(i) Expressway network development

It is still crucial that the provinces in the Mekong Delta are well-connected together as well as with Cambodia and the HCMC region. Good and fast connectivity will stimulate local markets, tourism development, interest of investors to invest in the Mekong Delta as well as access to qualified human resources.

The existing national and provincial roads connect the different cities and economic zones and ports with the expressway network. An expressway can also directly connect with an industrial zone or part area. The expressway network is only used by fast traffic and by-passes cities and villages. This will improve the environmental and safety conditions within those cities and villages.

To further improve the connectivity in the whole Mekong Delta, existing national highways and / or provincial roads need to be upgraded and connected with the network of expressways. It is crucial that the whole network is maintained.

(ii) IWT development

To develop IWT, it is crucial to develop intermodal transportation hubs where cargo is consolidated and containerised (ICD development).

From the intermodal transportation hubs, cargo will be transported by IWT vessels to the HCMC region or Cambodia and vice versa. From the HCMC region, cargo can be transported to other areas.

Handling equipment at ports needs to be modernized to become efficient, decreasing the handling costs. Option is to combine these intermodal transportation hubs with the development of food processing and logistics services.

¹⁴ Source: MOT 2017.



Dr.-Ing. Le Thu Huyen is a Senior Transport Specialist, Lecturer in the section of Transport Planning and Management, and the Director of the Consulting Center for Transport Development at the University of Transport and Communications in Vietnam. She has been the Deputy Research Team Leader of the Human Behavior Branch (Forum of Vietnam Traffic Safety), in National Traffic Safety Committee, since 2014. She is also the member of Eastern Asia Society for Transportation Studies.

Dr. Huyen has devoted 90 percent of her practice in the field of Transport Engineering for the last fifteen years. She has extensive experience in traffic safety, urban traffic planning and management, as well as logistics and supply chain management. Her recent activities include giving lectures in the professional fields; doing research; providing consultant service to government, enterprises, etc.

6 Vietnam NewsBrief 3

A comparative study on travel mode share, emission, and safety in five Vietnamese Cities 1

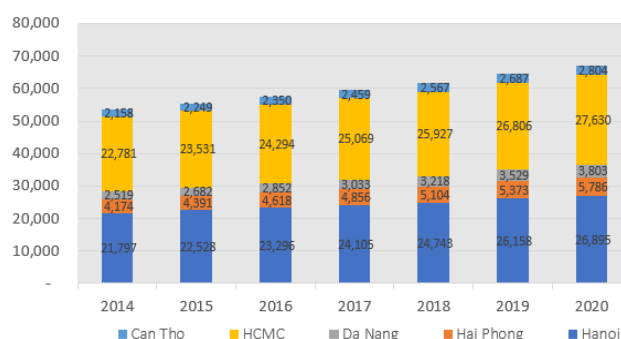
Key findings

Motorcycles dominate current transport activities in Vietnamese cities; however, historical data show that bikes and public transport were popular as recently as 30 years ago. Because the transport infrastructure in Vietnamese cities makes it unsafe for cycling and inconvenient for public transport, many cyclists and public transport users switch to private motorized vehicles, particularly motorcycles, as soon as they can afford to make the change. The preference for motorcycles in Vietnamese cities has resulted in an increased risk of road traffic accidents and a degradation of air quality. Reducing the share of motorcycles on Vietnamese roads by improving public transport would be expected not only to improve public safety but also to have a positive impact on the environment and public health. However, efforts to improve the public transport have not yet been properly integrated into the local government system in every city. As the result, each city has different outcomes in mitigating the motorcycle-related challenges. This study examines travel behaviors in five major Vietnamese cities—Hanoi, Hai Phong, Da Nang, Ho Chi Minh City (HCMC), and Can Tho—and compares the impact of improved public transport on mode choice, emissions, and traffic safety. It is found that improving public transport would result in an 21.11 percent reduction in transport emissions by 2030 in Hanoi, as well as reductions of 12.5 percent in Hai Phong, 17.37 percent in Da Nang, 9.75 percent in HCMC, and 15.21 percent in Can Tho. The differences in these percentages are due to the heterogeneous modal shifts among cities. The provision of improved public transport is also shown to reduce the risk of road traffic accidents. The risk of a traffic fatality in Hanoi decreases by 49.6 percent, while in Hai Phong, the reduction is 43.8 percent; the risk in Can Tho, Da Nang and HCMC decreases by 18.7 percent, 19.8 percent, and 26.3 percent, respectively. As public transport investment is beginning to be adapted to the city context, our results indicate that investment capital on improving the public transport system would partly contribute on reducing emissions and traffic accidents in Vietnamese cities.

Mobility, environment and safety indicators in period 2014-2020 in five major Vietnamese cities

- Travel demand and mode share

Based on the converted data, the total daily travel demand in the five cities for the base year 2014 was estimated to be 53,428 trips/day (excluding walking trips). Travel demand increased to 66,917 trips/day in 2020 (Figure 2).



Source: Study team

Figure 1. Number of trips in the five cities, 2014-2020

In general, travel demand increases are a function of increases in population and increases in trip rates. Here, average travel demand increased by 2.5 percent annually, while the average population growth rate was approximately 1.9 percent, and the average growth rate of the trip rate was approximately 2.94 percent. The estimated mode shares are shown in Table 3 and can be summarized as follows:

- (i) The share of trips made by motorcycle accounted for 85-87 percent of the total demand between 2014 and 2020.
- (ii) The share of “car” trips comprised 5-9 percent of total demand; the number of trips made by car increased by 200 percent between 2014 and 2020.
- (iii) The number of trips made by bus decreased and the modal share dropped from 3.6 percent, on average, in 2014 to 2.7 percent in 2020. Modal share was highest in Hanoi, with 10.3 percent in 2014, but fell to 8.6 percent in 2020. Similarly, bus share in HCMC decreased from 6.1 percent to 4.7 percent.
- (iv) The number of trips made by bike decreased by 97 percent between 2014 and 2020; the share of trips made by bike accounted for 4.6 percent and 2.9 percent of the total demand in 2014 and 2020, respectively.

Average trip lengths and travel times differ by travel mode. Based on the survey data, in Hanoi, bikes are used mainly within a 2 km distance; motorcycles are mostly used within a 10 km distance, with an average trip length of 5 km and an average travel time of 19 minutes; the average trip length and average travel time for cars are 9.1 km and 30 minutes, respectively; taxis are used in a similar way as cars, although taxi travel is longer than that of cars; buses are used for relatively longer distances, with an average trip length of 12 km and an average travel time of 41 minutes. In HCMC, if intra-zonal trips are taken into account, the respective average trip lengths by bike, motorcycle and car are 1.9 km, 3.3 km and 6.8 km; when intra-zonal trips are excluded, the average trip lengths are considerably longer, at 5.3 km, 6.7 km and 9.7 km, respectively. In Can Tho, trips by motorcycle or private car, as well as by taxi, typically have an average trip time of less than 20 minutes; trips by bus are longer, with up to 45 percent of the trips by bus having a travel time of 50 to 60 minutes. Because data on trip length and travel time in Hai Phong and Da Nang were not available, the data for Can Tho are used for reference.

Table 1. Modal share summarized for the five cities between 2014 and 2020 (Unit: %)

2014		Hanoi	Hai Phong	Da Nang	HCMC	Can Tho
Private	Bike	4.8	7.8	2.6	4.3	3.2
	MC	72.6	79.5	88.9	82.0	85.0
	PC	6.0	2.5	1.8	3.4	3.1
Para-transit	MC taxi	2.9	9.1	4.2	3.4	7.6
	Taxi	3.4	0.6	1.1	0.7	0.3
	Bus	10.3	0.5	0.4	6.1	0.6
PT	BRT	-	-	-	-	-
	Metro	-	-	-	-	-
2020		Hanoi	Hai Phong	Da Nang	HCMC	Can Tho
Private	Bike	3.5	2.8	1.9	4.3	1.9
	MC	72.6	79.4	85.9	80.7	85.9
	PC	6.9	7.3	7.5	3.4	7.5
Para-transit	MC taxi	2.9	7.3	2.5	3.4	2.5
	Taxi	6.4	2.7	0.8	3.6	0.4
	Bus	8.6	0.1	0.2	4.7	0.1
PT	BRT	0.2	-	-	-	-
	Metro	-	-	-	-	-



Dr. An Minh Ngoc is lecturer at the University of Transport and Communications and Associate Researcher at Kochi University of Technology. She gained her doctorate from TU Darmstadt, Germany, in 2015. Her majors are transport planning and traffic management.



Prof. Hiroaki Nishiuchi is an Associate Professor at Kochi University of Technology. He received his doctor of Engineering degree from the University of Tokyo in 2009. His research interests include traffic engineering and transportation planning



Nguyen Van Truong is a lecturer at the University of Transport and Communication and researcher at Tokyo Metropolitan University. His research interest includes travel behavior, transport engineering, and transport policy.



Dr.-Ing. Le Thu Huyen is a lecturer in University of Transport and Communications, Vietnam. She gained her doctorate from TU Darmstadt, Germany, in 2009. She specializes in traffic engineering, traffic safety and logistics with many contributions in scientific research and projects in related fields.

7 Vietnam NewsBrief 4

A comparative study on travel mode share, emission, and safety in five Vietnamese Cities 2

As there are no mandatory tests for motorcycles, e-motorcycles, e-bikes and regular bikes, only data on the number of motorcycles, e-motorcycles, bikes and e-bikes that had, at some point, been registered are available (from the Police Bureau). In order to analyze the percentage of motorcycles still in use versus the overall number of registered motorcycles, a dataset from MOT (2020) at the country level was used (Table 5). Between 2014 and 2018, the survival rate of motorcycles was 70.2 percent. This percentage was applied to the five cities to estimate the actual number of motorcycles circulating (i.e., in use) in each of the cities.

Table 2. Survival rate of motorcycle

Year	Registered MC	MC in circulation	Survival rate
2010	31,452,503	21,473,102	68.3%
2011	33,925,839	23,998,149	70.7%
2012	36,102,943	26,605,882	73.7%
2013	38,643,091	28,588,284	74.0%
2014	41,212,965	30,631,124	74.3%
2015	44,281,628	32,355,606	73.1%
2016	47,786,134	34,132,976	71.4%
2017	54,944,575	36,619,551	66.6%
2018	59,245,062	38,932,977	65.7%

Source: MOT, 2020

▪ Emissions

Emissions associated with transport have become a major source of pollution in urban areas. In this study, the approach described in Section 2.1 was used to assess the emissions levels for each transportation mode in each of the cities.

Total transport-related GHG emissions in Hanoi were 3,875 thousand tCO_{2e} in 2014. By 2020, these emissions increased by 35 percent (Table 6). The major GHG emission source is passenger motorcycles, which account for 53 percent of the total. Motorcycles also account for 68.3 percent of PM_{2.5} emissions and 83.5 percent of NO_x emissions.

Table 3. WTW approach for GHG emissions in five cities, 2014-2020

	Hanoi		Hai Phong		Da Nang		HCMC		Can Tho	
	WTWCO ₂	Growth rate 2014-2020 (%)	WTWCO ₂	Growth rate 2014-2020 (%)	WTWCO ₂	Growth rate 2014-2020 (%)	WTWCO ₂	Growth rate 2014-2020 (%)	WTWCO ₂	Growth rate 2014-2020 (%)
MC	2073	4.1	193	9.7	171	7.4	2,484	3.7	2,484	3.7
MC taxi	185	7.1	70	6.5	21	3.9	285	5.8	285	5.8
PC	667	7.4	25	26.7	13	38.0	468	4.7	468	4.7
Taxi	841	13.9	16	40.3	23	5.8	225	38.5	225	38.5
Bus	109	10	7	3.9	8	8.5	189	2.5	189	2.5

Total transport-related GHG emissions in Hai Phong were 312 thousand tCO_{2e} in 2014, with an increase of 53.7 percent by 2020. Motorcycles contribute 62 percent of these total emissions. In terms of PM_{2.5}, motorcycles contribute 64.6 percent, and in terms of NO_x, motorcycles make up 71 percent.

Total transport related GHG emissions in Da Nang were 236 thousand tCO_{2e} in 2014. By 2020, the emissions increase by 43.9 percent. Again, the major GHG emission source is motorcycles, at 72 percent. In terms of PM_{2.5}, motorcycles account for 76.3 percent of the total, and in terms of NO_x, motorcycles account for 86.8 percent.

In HCMC, total transport-related GHG emissions were 3,651 thousand tCO_{2e} in 2014, increasing by 38.3 percent by 2020. Motorcycles contribute 68 percent of the total. In terms of PM_{2.5}, motorcycles contribute 70.4 percent, and in terms of NO_x, motorcycles contribute 84.7 percent.

Finally, in Can Tho, total transport-related GHG emissions were 181 thousand tCO_{2e} in 2014. These emissions increase by 27.5 percent by 2020. Once again, the major GHG emission source and local pollutants are motorcycles with 69 percent WTWCO₂, 71.1 percent PM_{2.5} and 78.5 percent NO_x, respectively.

- **Safety**

Traffic fatalities are strongly associated with motorcycle travel in Vietnamese cities. Table 4 shows the number of traffic fatalities in the five cities targeted in this study for the years 2014 to 2019. In 2019, of the 7,590 fatality cases at the national level, 1,386 were in the five cities.

Table 4. Traffic fatality in five cities, 2014-2020

	Hanoi	Hai Phong	Da Nang	HCMC	Can Tho
2014	609	92	98	725	81
2015	579	87	93	689	77
2016	594	89	88	804	81
2017	585	89	69	717	101
2018	544	85	56	694	110
2019	508	78	54	641	105

NTSC, 2019b



Dr. An Minh Ngoc is lecturer at the University of Transport and Communications and Associate Researcher at Kochi University of Technology. She gained her doctorate from TU Darmstadt, Germany, in 2015. Her majors are transport planning and traffic management.



Prof. Hiroaki Nishiuchi is an Associate Professor at Kochi University of Technology. He received his doctor of Engineering degree from the University of Tokyo in 2009. His research interests include traffic engineering and transportation planning



Nguyen Van Truong is a lecturer at the University of Transport and Communication and researcher at Tokyo Metropolitan University. His research interest includes travel behavior, transport engineering, and transport policy.



Dr.-Ing. Le Thu Huyen is a lecturer in University of Transport and Communications, Vietnam. She gained her doctorate from TU Darmstadt, Germany, in 2009. She specializes in traffic engineering, traffic safety and logistics with many contributions in scientific research and projects in related fields.

8 Vietnam NewsBrief 5

A comparative study on travel mode share, emission, and safety in five Vietnamese Cities 3

Policy Interventions and the Development of Scenarios

In Vietnam, sustainable transport policies are guided by law, national strategies and action plans in four key categories: 1) Sustainable Development, 2) Green Growth, 3) Climate Change and 4) Environmental Protection. Based on these national strategies and action plans, five key orientations of sustainable transport development are summarized in Table 4. In the updated Nationally Determined Contribution (NDC) under the Paris Agreement submitted in 2020, Vietnam committed to an 9% reduction in GHG emissions against a baseline projection by 2030 with domestic resources and this reduction can be increased by up to 27% with international support (GOV, 2020). One of the measures identified in the NDC is a shift from private to public transport in transportation.

Table 4. Key orientations of sustainable transport development

Regulation	Orientation
1 Law on environmental protection	<ul style="list-style-type: none"> ▪ Promulgation of incentive policies for the development of public transport ▪ Promulgation of incentive policies for transport vehicles using renewable energy, vehicles with low fuel consumption or low emission ▪ Promulgation of roadmap for termination of fossil-fueled vehicles and vehicles causing environmental pollution
2 Green growth strategy	<ul style="list-style-type: none"> ▪ Shifting share of fuel usage in transport sector (towards low-emission fuel) ▪ Reasonable and effective development of transport network and system ▪ Investment in public transport
3 Sustainable Development Strategy	<ul style="list-style-type: none"> ▪ Control of emissions from transport vehicles ▪ Reduction of traffic accidents and fatalities ▪ Development of public transport, transport infrastructure and system in consideration of climate change, the disabled, women, children and the elderly
4 Climate Change Strategy	<ul style="list-style-type: none"> ▪ Development of public transport and control of private vehicles ▪ Usage of low-emission fuel and transport vehicles
5 Environmental Protection Strategy	<ul style="list-style-type: none"> ▪ Control of environmental pollution by transport activities ▪ Control of emissions of motorcycles ▪ Implementing a roadmap for applying emission standards to motorized road vehicles ▪ Encouraging clean-energy and renewable-energy transport vehicles

Mode share under public transport system scenario

Parameters of generalized travel cost function and mode share were estimated with the logistic models. The transportation modes were categorized into eight groups: bike, motorcycle, motorcycle taxi, private car, taxi, bus, BRT, and metro in Hanoi and Hochiminh City, while the other cities were explained by six transportation modes with the absence of BRT and metro. Table 5 summarize the share of travel modes in the five cities in 2030 for the public transport improvement scenario.

Table 5. Estimated share of travel modes under improvement, 2030

	BC	MC	MC taxi	Car	Taxi	PT
Hanoi	1.5	60.9	1.8	5.4	5.4	25.0
Hai Phong	6.8	74.6	4.9	7.3	2.7	3.7
Da Nang	1.8	81.5	3.9	5.3	2.5	5.0
HCMC	4.3	70.3	3.8	3.4	7.0	11.2
Can Tho	1.8	77.8	3.9	6.3	3.2	7.0

Hanoi and HCMC differ from the other cities included in the study in terms of population, urban size, availability of transport infrastructure, and travel mode share. In 2014, in Hanoi, 6.4 percent of the total trips were made by bus, as compared to 4.4 percent in HCMC and 0.5 percent in other cities. This results in substantial differences in the impacts of public transport investment and service quality, including investment of BRT and metro lines, on travel mode shares across the five cities. As shown in Table 5, improving public transport in Hanoi is likely to increase the modal share of public transport to 25 percent in 2030, as compared to 11.2 percent in 2030 in HCMC. The modal share of buses in the remaining cities is in the range of 3.7-7 percent by 2030.



Dr. An Minh Ngoc is lecturer at the University of Transport and Communications and Associate Researcher at Kochi University of Technology. She gained her doctorate from TU Darmstadt, Germany, in 2015. Her majors are transport planning and traffic management.



Prof. Hiroaki Nishiuchi is an Associate Professor at Kochi University of Technology. He received his doctor of Engineering degree from the University of Tokyo in 2009. His research interests include traffic engineering and transportation planning



Nguyen Van Truong is a lecturer at the University of Transport and Communication and researcher at Tokyo Metropolitan University. His research interest includes travel behavior, transport engineering, and transport policy.



Dr.-Ing. Le Thu Huyen is a lecturer in University of Transport and Communications, Vietnam. She gained her doctorate from TU Darmstadt, Germany, in 2009. She specializes in traffic engineering, traffic safety and logistics with many contributions in scientific research and projects in related fields.

9 Vietnam NewsBrief 6

A comparative study on travel mode share, emission, and safety in five Vietnamese Cities 4

- Emissions

The changes in emissions in the five cities are indicated in Figure 2. As shown, improving public transport would result in a reduction of 21.11% of transport emissions by 2030 in Hanoi, 12.5% in Hai Phong, 17.37% in Da Nang, 9.75% in HCMC, and 15.21% in Can Tho. The differences here are due to the heterogeneous modal variation across cities. Among the cities, Hanoi has the largest shift from private vehicles to public transport. Thus, the reduction in emissions is relatively large.

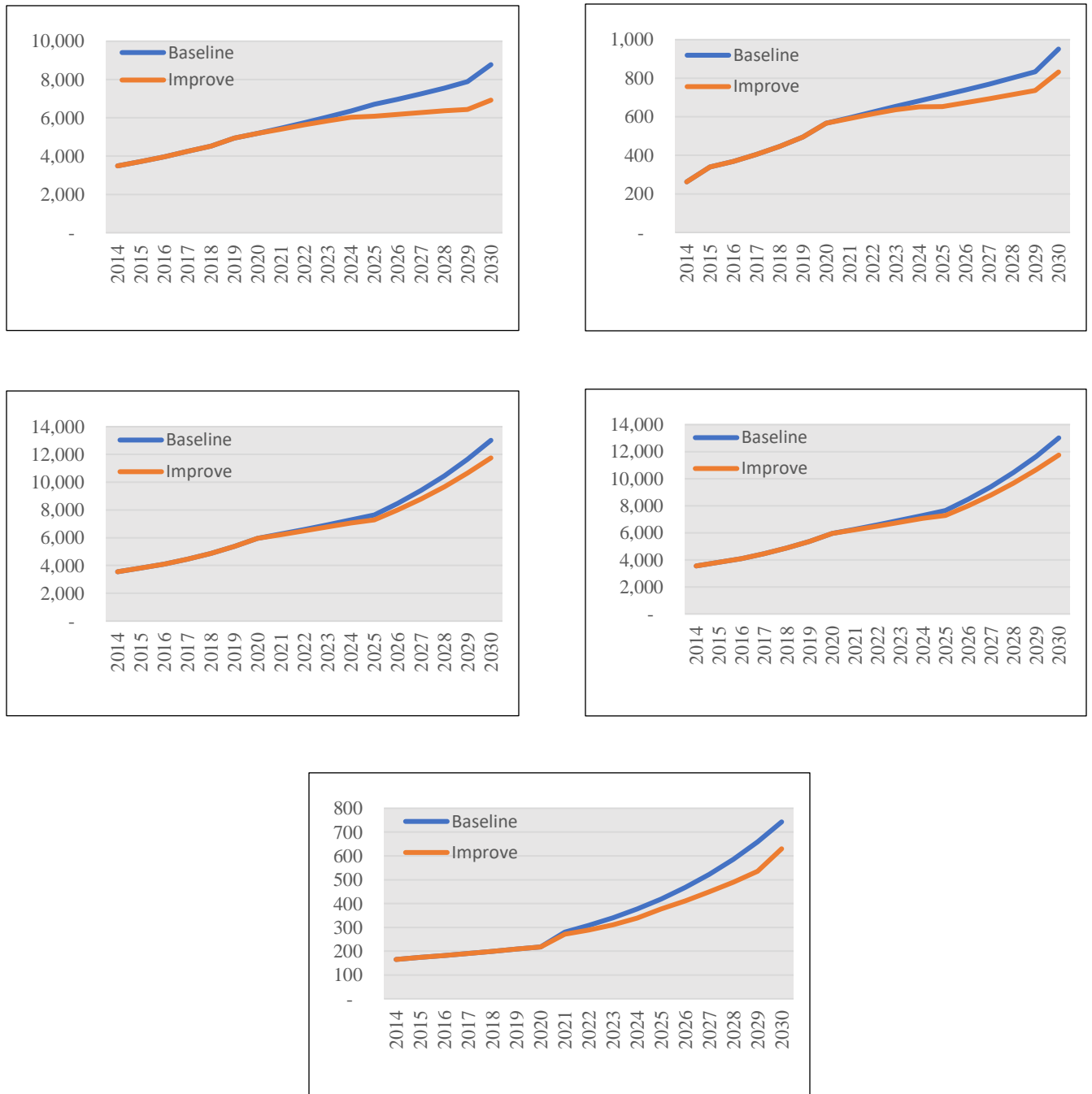


Figure 2. Scenarios of GHG Emissions in five cities, 2014-2030, WTW approach

- **Safety**

Total fatalities due to road crashes were assumed to be associated with number of motorcycles and cars. Using country level data, a model for projecting fatal crashes was constructed. Table 17 gives the projected fatalities based on increases in the number of motorcycles and cars. The model shows that if the other variables are held constant, a 1 percent motorcycle rate increase will increase the traffic fatality rate by 1.047. The results of the model were applied to calculate the fatality rate at the city level.

Table 6. Regression coefficients for fatality rate during the period 1990-2019

Variable	Value	P-value
Constant (b ₁)	4.791	0.00
Motorcycle per 1,000 inhabitants (b ₂)	1.047	0.00
Car per 1,000 inhabitants (b ₂)	-0.875	0.00
Adjusted R ²	.976	
Standard error	0.078	
F	521.598	0.000

Figure 3 shows the percentage change from the existing situation in the five cities. As per the estimates, there is a significant decrease in the total number of traffic fatalities with the improvement scenario. Provision of public transport and improvement of service quality is likely to result in an increase in the passenger-km traveled by bus and decrease the passenger-km traveled by motorcycle. Furthermore, the provision of improved bus infrastructure is likely to reduce conflict between buses and other road users, such as bikes, motorcycles and cars. The risk to road users in Hanoi decreases by 49.6 percent by 2030, while in Hai Phong, it decreases by 43.8 percent. The risks in Can Tho, Da Nang and HCMC decrease by 18.7 percent, 19.8 percent, and 26.3 percent, respectively.

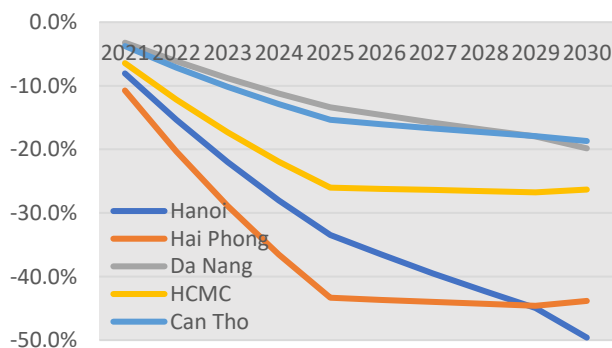


Figure 3. Percentage change in road fatalities in the five cities



Dr. An Minh Ngoc is lecturer at the University of Transport and Communications and Associate Researcher at Kochi University of Technology. She gained her doctorate from TU Darmstadt, Germany, in 2015. Her majors are transport planning and traffic management.



Prof. Hiroaki Nishiuchi is an Associate Professor at Kochi University of Technology. He received his doctor of Engineering degree from the University of Tokyo in 2009. His research interests include traffic engineering and transportation planning



Nguyen Van Truong is a lecturer at the University of Transport and Communication and researcher at Tokyo Metropolitan University. His research interest includes travel behavior, transport engineering, and transport policy.



Dr.-Ing. Le Thu Huyen is a lecturer in University of Transport and Communications, Vietnam. She gained her doctorate from TU Darmstadt, Germany, in 2009. She specializes in traffic engineering, traffic safety and logistics with many contributions in scientific research and projects in related fields.