

Chapter 5

Urban Planning and Transport Modes

5-1. Urban planning and development in Hanoi and HCMC

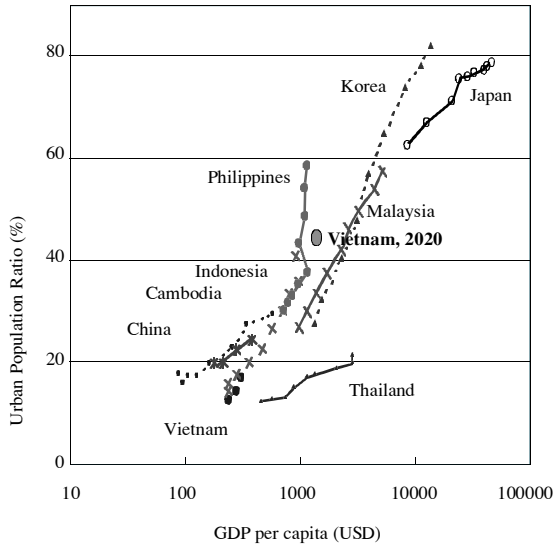
Urbanization trend and impacts

Vietnam currently has a relatively low rate of urbanization, at 24% in 2000 and 30% in 2005, but is likely to undergo continued rapid urbanization as experienced in other fast-growing developing countries. Vietnam's urbanization is expected to continue until the urbanization rate reaches 70-80%. This implies that Vietnam will face long-lasting challenges associated with urbanization in the coming decades. It is estimated that urban population of about 23 million in 2005 will double to nearly 47 million by 2030 and continue to grow subsequently.

Urbanization will be particularly significant in the two largest cities of Hanoi and HCMC. In both cities, urban development master plans were recently updated with technical assistance from the Japan International Cooperation Agency (JICA). The Study on the Urban Transport Master Plan and Feasibility Study in Ho Chi Minh Metropolitan Area (HOUTRANS) was completed in 2004, and the Hanoi Integrated Development and Environment Programme (HAIDEP) was completed in 2007. This chapter relies heavily on the data and analyses of these master plans.

Vietnam's urbanization is driven by strong economic growth propelled by industrialization, foreign trade, and investment. With the recent accession of Vietnam to WTO and continued Asian dynamism as background, Vietnam's urbanization is expected to basically follow the path taken by other industrializing or industrialized Asian countries, such as Japan, Korea, Malaysia, and China (Fig.5-1).

Fig. 5-1 Urbanization Trend in Asian Countries



Source: HOUTRANS household interview survey.

Impacts of urbanization are extensive and include both positive and negative sides. On the one hand, as national income grows, ownership of cars and motorcycles rises which produce diverse service industries and changes in people's lifestyle. Information access and people's mobility improve, employment opportunities expand, and overall quality of life is enhanced. On the other hand, rapid urbanization exerts severe pressure on existing infrastructure and people's living and working conditions, as traffic congestion worsens, agricultural land is encroached upon, and environment deteriorates. The key policy objective should therefore be to find an effective way of maximizing the benefits of urbanization while minimizing its negative consequences.

Urbanization in and around Hanoi and HCMC is proceeding at much higher rates than expected a decade ago, and these cities are starting to form greater metropolitan areas. It is expected that they will become mega cities sprawling beyond the current administrative boundaries, with

a population of about 5 million²⁰ for Hanoi and about 10 million for HCMC by 2020. The two cities will continue to play the leading role in economic development, attracting investments and human resources for further industrial growth and employment. The average urban household income is likely to increase from the current level of US\$1,350 -1,460 to US\$5,000 -6,000 by 2020 (Tab. 5-1). This will accelerate ownership of various durable goods. In particular, it is predicted that about 20% of households in Hanoi and HCMC will own cars by 2020.

Tab. 5-1 Selected Indicators of Urban Growth in Hanoi and HCMC

		<i>Hanoi</i>		<i>HCMC</i>	
		<i>2005</i>	<i>2020</i>	<i>2005</i>	<i>2020</i>
Area (km ²)		921	921	2,095	2,095
Population	Total (x1000)	3,183	4,500	6,240	10,000
	Urban (%)	62.5	87.8	83.9	100
GRDP per capita	VND million	20	90	22	75
	US\$	1,350	6,000	1,460	5,000
No. of vehicles (x1000)	Motorcycles	1,385	1,986	2,040	3,362
	4-wheeled	161	384	158	434
	Total	1,546	2,370	2,198	3,796

Source: HAIDEP study team, 2006.

Note: GRDP stands for gross regional domestic product.

Urban master plan orientation

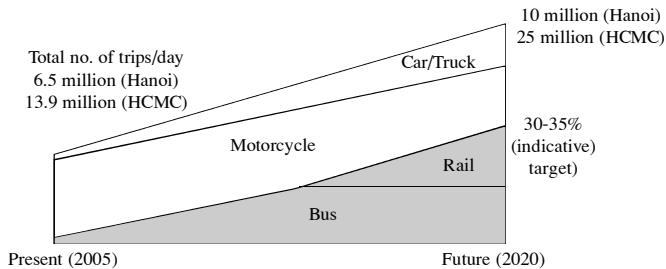
A large population with an increasingly high average income demands better infrastructure services in many fields including transportation, water supply, sanitation, telecommunications, education, health, and recreation, all of which contribute to improved living conditions. In the future, Greater Hanoi and Greater HCMC are certain to have an urban structure

²⁰ Including the population of 500,000 in urban areas in adjoining provinces which will be integrated into Hanoi.

different from today's centripetal structure. As the urban area expands, subcenters will emerge to provide services and employment. While business and commercial activities will remain in the city center, residents will move to outer areas for better living environment. Although both cities are trying to check growth and create a mechanism for managing future development, controlling urban development is not an easy undertaking.

Both Hanoi and HCMC recently updated urban master plans in response to rapidly changing socio-economic environment. Both cities plan to provide public transport services that can cover about 45-50% of total trip demand by 2020 (Fig. 5-2)²¹. The bus system alone is incapable of providing required public transport services, because road space is insufficient to accommodate a large fleet of buses²². For this reason, both cities are determined to build an urban mass rapid transit (UMRT) network, composed of urban rail and rapid bus transit, as the backbone of public transport. This policy direction is basically correct and is an effective way for Hanoi and HCMC to solve urban transport problems in the future.

Fig. 5-2 Planning Target for 2020



Source: HOUTRANS household interview survey (2002).

²¹ This is an ambitious policy target. In projecting modal share, we must also take into account the possibility that this target is not reached in time.

²² Up to now, public bus systems have been unsuccessful in providing competitive services except for limited market segments such as regular "to work" and "to school" trips over relatively long distance using much discounted monthly pass.

In order to realize this scenario, a large amount of capital investment is necessary. According to HOUTRANS and HAIDEP studies, each city requires a total of about US\$14 billion to satisfy its transport needs by 2020 (Tab.5-2). Main areas of investments are as follows:

(a) *Road development*--this includes an early completion of missing links, improvement of bottlenecks, as well as the construction of a substantial length of primary and secondary roads, especially in urbanizing areas. Flyovers, interchanges at critical intersections, and bridges across the rivers must be built. For efficiency, roads must be developed as an effective network, rather than unconnected local improvements. HAIDEP proposed a total of 600 kilometers of main roads to be developed for Greater Hanoi by 2020 while HOUTRANS proposed a total of 750 kilometers of main roads including 46 kilometers of urban expressways for Greater HCMC.

(b) *UMRT network*--this comprises of urban rail and bus rapid transit (BRT) along major corridors to add transport carrying capacity and improve accessibility of and mobility in the central business district (CBD). HAIDEP proposed four UMRT lines with a total length of about 200 kilometers in Hanoi, while HOUTRANS proposed four UMRT lines with a total length of about 140 kilometers excluding BRT in HCMC.

(c) *Improving traffic management*--this includes various minor improvements of roads as well as implementation of traffic management measures and safety facilities such as traffic signals and signs, pedestrian bridges, parking facilities, etc, to ensure a safe and smooth flow of vehicular and pedestrian traffic.

(d) *Bus and other public transport services*--even when UMRT becomes operational, buses will remain the most important public transport mode, providing services in non-UMRT corridors and feeder services to UMRT. Other supplementary public transport, such as taxi, motorcycle taxi, and factory and school buses, are also expected to play specific roles.

**Tab. 5-2 Required Investments in Urban Transport Sector
in Hanoi and HCMC, 2005 to 2020**

	<i>Investment cost (US\$ million)</i>	
	<i>Hanoi</i>	<i>HCMC</i>
Urban roads	7,993	10,090
Traffic management	444	520
Public transport	5,130	3,455
Total	13,567	14,065

Sources: HOUTRANS and HAIDEP.

5-2. Future demand for urban transport

Travel demand in Hanoi and HCMC has increased rapidly and is expected to increase further in the future (Tab. 5-3). Changes are expected not only in transport volume but also in the composition of transport modes. Both cities have experienced a significant shift from walking and bicycles to motorcycles over the last decade, and a further shift from motorcycles to cars is very likely as experienced in other cities in the world. However, whether there will also be a shift to public transport is less certain because it largely depends on government's policy intervention. In particular, the large share of public transport in Hanoi and HCMC projected for the future will not be realized unless a high-quality public transport system is created as proposed in the HAIDEP and HOUTRANS plans.

A transport modal analysis by HAIDEP and HOUTRANS shows that motorcycles will account for a relatively high percentage of travel in Hanoi (30%) and HCMC (35%) even in 2020. It must be stressed that these figures on future demand are subject to the availability of UMRT and the management of cars. Without an effective UMRT system, the share of private transport would be higher. Similarly, in the absence of proper control measures on the use of private cars and motorcycles, the share of public transport would be lower. In order to achieve the projected high share of public transport in Hanoi (50%) and HCMC (45%) by 2020,

it is necessary to develop the UMRT network and to control car use through demand management measures such as high fees for parking and other pricing schemes.

Tab. 5-3 Travel Demand in Hanoi and HCMC

City	Mode		Number of trips (000/day)			Share (%)		
			1995 ¹⁾	2005 ²⁾	2020	1995	2005	2020
Hanoi	Bicycle		2,257	1,598	452	73.2	24.6	4
	Motorcycle		632	4,075	3,390	20.5	62.7	30
	Car and taxi		7	226	1,808	0.2	3.5	16
	Public transport	UMRT	-	-	4,294	-	-	38
		Bus, etc.	165	547	1,356	5.4	8.4	12
	Truck and other		21	57	-	0.7	0.8	-
	Total		3,082	6,503	11,300	100.0	100.0	100
HCMC	Bicycle		2,633	1,988	106	32.0	13.6	0.4
	Motorcycle		5,267	10,806	8,606	64.0	77.9	35
	Car and taxi		82	212	4,709	1.0	1.6	19
	Public transport	UMRT	-	-	4,551	-	-	18
		Bus, etc.	247	782 ³⁾	6,792	3.0	5.9	27
	Truck and other		-	132	-	-	1.0	-
	Total		8,229	13,920	24,764	100.0	100.0	100.0

Sources: DFID-MVA (1996, HCMC), HOUTRANS (2004), and HAIDEP (2007).

1) 1996 for HCMC.

2) 2002 for HCMC.

3) Including bus, lambro, motorcycle taxi, cyclo, private bus and ferry.

5-3. Factors influencing motorcycle use

Extremely high presence of motorcycles in urban areas such as Hanoi and HCMC is not seen anywhere else in the world. Their extraordinary popularity seems to be related to history as well as collective psyche. However, there are a number of factors which are certain to have influenced the use of motorcycles in Hanoi and HCMC. Apart from robust income growth which enables continued purchase of consumer durables, the following factors can be pointed out.

(a) *Compact urban areas with narrow access roads*--urban areas of Hanoi and HCMC are compact and densely developed with complex access roads which are too narrow for cars but wide enough for bicycles and motorcycles. Besides the limited coverage of main roads, distance from residence to a main road, where public transport is available, is usually too far to be reached on foot. Moreover, land use is highly mixed, so much so that basic urban services can be obtained in relatively short distance.

(b) *Lack of public transport services*--the lack of attractive alternative transport services has also contributed to the high use of private transport. Trams which once were popular have been removed, the quality of bus services has been low, cyclos have become obstacles on main roads, and informal services such as lambro and motorcycle taxi have limited capacity. In the past, the government paid little attention to the development of attractive public transport services. This led to the high ownership of motorcycles (Tab.5-4).

Tab. 5-4 Ownership of Motorcycles in Hanoi and HCMC

(% of households)

		<i>Hanoi 2005</i>	<i>HCMC 2002</i>
Bicycle only		8.5	5.8
Motorcycle	One	33.9	37.5
	Two or more	52.0	53.7
Car		2.1	1.7
None		3.0	1.3
Total		100.0	100.0

Sources: HAIDEP (2005) and HOUTRANS (2002).

(c) *Affordability and convenience of owning motorcycles*--people's long-lasting habit of riding bicycles and the unique urban structure mentioned above made transition to motorcycles

smooth and convenient. Income growth and increasing affordability also contributed to a quick shift from bicycles to motorcycles which are supplied with a wide price range.

(d) *Weak regulation on the use of motorcycles*--the way Vietnamese people use motorcycles is extraordinary and can hardly be observed anywhere else in the world. Excessive freedom given to drivers such as overloading, driving without helmets, reckless driving, on-road parking without fees or with minimum fees, etc. may have also encouraged the use of motorcycles at the risk of traffic accidents²³.

(e) *Motorcycles being more than a simple transport mode*--motorcycles in Vietnam are not simply a transport mode but also an object to inspire the spirit and cater to people's broader needs. Motorcycles are a means of recreation, a fashion item, and a communication tool. Motorcycles are so much in tune not only with the physical structure of urban areas but also with the life and activities of the people.

5-4. Motorcycles in urban planning

While motorcycles are inseparable from Vietnam's urban system, they have not been incorporated adequately into urban planning and development. In the minds of planners, motorcycles were considered a transitional or supplementary mode and did not receive as much serious attention as the so-called main modes of transport such as cars and urban rail. In addition, the conventional methodology of urban and transport planning fails to provide reliable data, adequate analytical methods, or practical planning guidelines for motorcycles. In reality, motorcycles have been a political target of criticism and control rather than something to be supported and promoted.

²³ Regulations concerning these behaviors are quite strictly enforced in other cities in Asia. In many large cities in China, motorcycle use is basically banned, while bicycles and buses are promoted.

In contrast, international transport experts generally agree that motorcycles and bicycles contribute to equity in mobility and service access in developing countries, and generate positive impacts on urban development. Vietnamese cities offer unique and interesting cases where motorcycles already play such a dominant role in transport. Since motorcycles will continue to exist on Vietnamese roads in the foreseeable future, there is an acute need to define their proper role in the context of the entire transport system, including their merits and demerits, and reflect this in industrial and urban development policies.

Positive roles

The negative effects of a large number of motorcycles, as currently operated on Vietnamese roads, are well known and analyzed in detail in this master plan (chapters 1, 6, 7, 8). However, the positive effects of motorcycles must also be recognized clearly.

As mentioned above, motorcycles fit Vietnam's urban structure and people's lifestyle. At present, motorcycle use on the one hand and urban and transport development in Hanoi and HCMC on the other are complementary in many ways, and urban residents can hardly stop using motorcycles without sacrificing convenience. Contributions of motorcycles can be summarized as follows.

(a) *Motorcycles enhance mobility and accessibility*—thanks to high ownership of motorcycles, average trip rates (number of trips made by a person per day) in Hanoi and HCMC are relatively high compared with other Asian cities²⁴. Moreover, motorcycles can negotiate traffic congestion far more easily than cars and buses, which cuts travel time for each trip. The average travel time of a trip is 22 minutes in Hanoi and 18 minutes in HCMC (Tab. 5-5). Trip length is longer but travel speed is higher in HCMC than in Hanoi, probably because of better

²⁴ Trip rates, including walking, in Hanoi and HCMC are 2.7 and 3.0 respectively, which are higher than in Manila (2.2), Jakarta (1.7), Kuala Lumpur (2.5), Bangkok (2.3), Chengdu (2.6), or Tokyo (2.3).

roads, better traffic management and better driving behavior in HCMC.

Tab. 5-5 Average Travel Time of Motorcycle Users

<i>Travel purpose</i>	<i>Hanoi</i>			<i>HCMC</i>		
	<i>Length (km)</i>	<i>Time (min)</i>	<i>Speed (kph)</i>	<i>Length (km)</i>	<i>Time (min)</i>	<i>Speed (kph)</i>
To work	5.0	21.2	13.4	5.6	20.0	17.3
To school	4.5	20.8	12.4	4.7	16.4	16.4
Private	4.0	20.7	11.4	4.8	16.5	17.8
Business	4.6	26.4	12.1	5.3	28.2	16.2
All trips	4.8	21.9	12.5	5.1	18.2	17.3

Sources: HAIDEP (2005) and HOUTRANS (2002).

(b) *Motorcycles are space-efficient*--road space required by different types of vehicle can be measured and compared by equivalent passenger car unit (PCU), which is a number of passenger cars that can occupy the space used by the vehicle in question. The PCU value of a motorcycle depends on actual traffic situation and varies from 0.25 to 0.5. When motorcycle traffic is dominant, its PCU is low. However, if traffic is more mixed in vehicle type, friction between motorcycles and other vehicles increases, resulting in a higher PCU of a motorcycle. This implies that the PCU of a motorcycle is low today but will increase in the future when there are more traffic modes on road. Space efficiency of motorcycles, cars, and buses under the current condition is compared (Tab. 5-6). The number of passengers of motorcycles per PCU is 5.4 and those of car and bus are 2.0 and 7.2, respectively. This clearly shows the efficiency of motorcycle especially against car and even against bus when its load factor is low.

(c) *Motorcycles are cost-efficient*--the cost of operating motorcycles is also compared with cars and buses (Tab. 5-6). At the speed of 20kph, motorcycles cost VND435 per passenger-km, while cars and buses cost VND1,573 and VND284, respectively. When the cost of maintaining pavement and other facilities, such as parking lots and terminals, are considered, the advantage of motorcycles further increases.

Tab. 5-6 Space and Cost Efficiency of Motorcycles, Cars, and Buses under Current Traffic Conditions in Hanoi

		<i>Motorcycle</i>	<i>Car</i>	<i>Bus</i>
Space efficiency	PCU ¹⁾	0.25-0.5	1.0	2.5
	No. of persons/vehicle ³⁾	1.36	2.02	17.9
	No. of persons/PCU	2.7-5.4	2.0	7.2
Cost efficiency (VOC ²⁾ at 20 kph)	VND/vehicle-km	582	3,178	5,078
	VND/passenger-km	435	1,573	284

Source: Calculation using HAIDEP data.

1) PCU = Equivalent passenger car unit

2) VOC = Vehicle operating cost

3) Actual figures obtained from the survey conducted by HAIDEP

Traffic simulations

Impact of motorcycles on the current overall urban traffic was assessed by converting the number of trips to PCU-km for motorcycles, cars, and buses. In terms of number of trips, motorcycles meet 84% of current total demand, while cars (including taxis) cover 5% and buses cover 11%. However, in terms of PCU-km, motorcycles' share is 71% while cars (including taxis) and buses shares are 17% and 12%, respectively. This means that car travel, although still at a low level, occupies relatively large space on the road for the same amount of trips (Tab. 5-7).

Tab. 5-7 Impact on Road Traffic in Hanoi, 2005

<i>Mode</i>	<i>Trip demand</i>		<i>Average trip length (km)</i>	<i>Average occupancy (persons per vehicle)</i>	<i>PCU</i>	<i>PCU-km/day</i>	
	<i>Thousands of trips per day</i>	<i>%</i>				<i>Million</i>	<i>%</i>
Motorcycle	4,075	84	4.9	1.36	0.25	3,649	71
Car and taxi	226	5	7.9	2.02	1.0	847	17
Bus	547	11	8.2	17.92	2.5	627	12
All trips	4,848	100	-	-	-	5,123	100

Source: HAIDEP (2007).

Note: PCU-km/day refers to demand in terms of vehicle-kms, which indicates space requirement on the road. Different types of vehicles are converted into passenger car unit for comparing their space use efficiency.

To see the efficiency of motorcycles in the overall urban traffic, calculations are made for Hanoi with alternative traffic mixes of motorcycles, cars, and buses. The exercise was structured to answer the following questions: (i) if buses meet more demand, what will be the overall traffic efficiency?; (ii) if car traffic increases, to what extent will the traffic situation worsen?; and (iii) how does a change in the share of motorcycle affect overall traffic efficiency? The main findings are as follows (Tab. 5-8).

(a) The current traffic mix dominated by motorcycles gives the least impact on overall road traffic with a space use of 5.1 million PCU-kms per day. If the bus load factor improves from 18 to 30 passengers per bus, traffic situation will further improve with a total space use of 4.9 million PCU-kms per day.

(b) All other scenarios give a worse situation than the existing condition. Even if bus traffic increases, total space load rises because of an increase in motorcycle PCU²⁵. A mix of large vehicles and motorcycles generally leads to an inefficient use of road space. The advantage of bus is offset by this effect.

²⁵ As the percentage share of motorcycle traffic falls, the PCU of motorcycle rises due to increased conflict with other traffic. The assumed PCU of a motorcycle is as follows: 0.25 when motorcycle traffic share is 80% or above, 0.3 for 70%, 0.4 for 60% and 0.5 for 50% or below.

road users, they are efficient. However, when they are mixed with other vehicles, their advantages decrease significantly unless they are effectively managed. As to car traffic, its increase poses a serious threat to the traffic situation in the future. It must be properly regulated before the situation becomes unmanageable as observed in other large cities in the region.

5-5. Concerns and drawbacks

While motorcycle users currently enjoy a high level of mobility and accessibility which are also economically and financially advantageous to the society, the situation is gradually changing. For one thing, traffic is becoming more mixed. Moreover, as urban areas expand, longer travel is required for those residing in outer areas. According to the recent surveys by HAIDEP (2005) and HOUTRANS (2002) in the two cities, the use of motorcycles is becoming a serious concern of the residents under the heightened awareness of safety and travel distances. The surveys' findings are as follows:

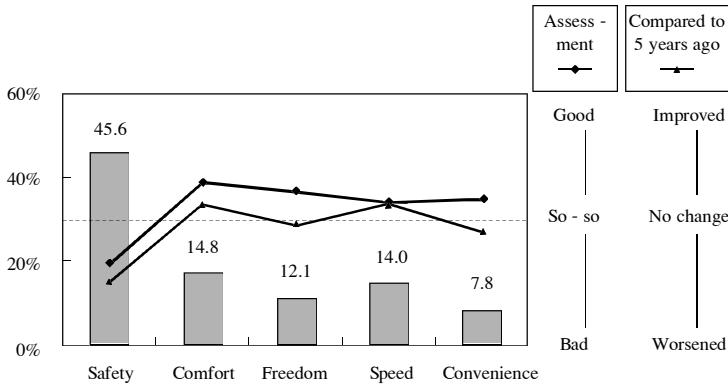
(a) The main reason for choosing motorcycle as the preferred traffic mode is convenience. As many as 60% of the respondents in Hanoi and 64% of the respondents in HCMC say that they use motorcycles for convenience. Other main reasons include no other choice, faster travel time, and comfort.

(b) Urban people are generally satisfied with their travel conditions. In Hanoi, 52% of the motorcycle users find travel conditions to be good, while 42% think they are so-so. In HCMC, the corresponding figures are 20% and 65%, respectively. HCMC people are less satisfied with the travel conditions. These responses are surprisingly favorable in comparison with the large cities in the region. However, subjective perception can turn much worse when congestion and conflict among motorcycles and other vehicles visibly increase. This situation is already beginning to occur, and people's perception may become very negative quickly.

(c) Safety is now the number one concern among motorcycle users. The surveys clearly show that almost half of motorcycle users worry about their safety on the road, although they still use motorcycles for convenience and freedom (Figure 5.3).

(d) Travel distance is also becoming a concern. Surveys results indicate that those who travel by motorcycle for 30 minutes or longer feel uncomfortable. This may be one of the reasons for the success of the bus transport capacity expansion policy implemented in 2002 in Hanoi and HCMC.

Fig. 5-3 People's Assessment of Motorcycles in HCMC



Source: HOUTRANS household interview survey (2002).

Another important fact is that motorcycles cannot serve everybody. Although the majority of the adult population can take advantage of the motorcycle, there are groups who cannot, including children, the elderly, and the physically-challenged. Moreover, motorcycles should not be used when drivers are tired, sleepy or drunk. Although they can still ride motorcycles as passengers, riding on a motorcycle requires alertness and balance. Passengers in a car or a bus (when not over-crowded) can rest and even sleep, but motorcycle passengers will risk their lives if they do so.

While the majority of residents in Hanoi and HCMC use motorcycles, 95% of the respondents the HOUTRANS survey in HCMC thought that the city should become more oriented toward public transport. As many as 90% of the respondents support more regulation on urban transport such as stricter control on the ownership and use of motorcycles, provided that it does not impose excessive financial burden on users²⁶.

5-6. The future role of motorcycles

The future role of motorcycles in Vietnam's urban areas will not be the same as before due to newly emerging factors. Among them, an increase in car traffic and planned urban rail are the two critically important factors. From the viewpoint of road space efficiency, the former is a negative factor which will seriously aggravate congestion while the latter is a positive factor which will greatly reduce congestion. The policy should aim at properly regulating the expansion of car use while building an urban rail system as soon as the budget allows. However, to be efficient an urban rail system requires feeders, in which motorcycles can play a very important role.

Car traffic inevitably increases as income and car ownership rise. It is expected that about 20% of the households in Hanoi and HCMC will own a car by 2020. As car traffic increases, conflicts in traffic flow will escalate. Traffic congestion will become more serious, traffic accidents will rise, and urban environment is likely to deteriorate if no regulatory measures are taken and if no UMRT is available. This is highly predictable from the experiences of other cities such as Bangkok, Manila and Jakarta. If this worst scenario happens, motorcycles will become an unpleasant private mode for people who are unable to own a car but do not want to

²⁶ In the consumer interview survey conducted by the Vietnam Development Forum (VDF) during March 5-18, 2007 in Hanoi, HCMC and Can Tho (1,981 valid answers), 62% of respondents supported motorcycle control with a roadmap, while 21% wanted no control and 17% favored immediate control. A separate VDF on-line survey during the same period (7,763 hits) gave the following results: control with a roadmap (45%), no control (29%) and immediate control (26%).

use low quality public transport. The current advantages of motorcycles such as convenience and comfort will disappear and disadvantages such as traffic accidents and air pollution will increase. Clearly, this situation must be avoided.

On the other hand, policy orientation of Hanoi and HCMC authorities, as stated in HOUTRANS and HAIDEP, is to realize public transport-based urban areas, in which UMRT will be the backbone that provides fast, high quality services along major corridors as well as to, from and within the central business district. Buses will cover secondary corridors in most of the urban areas in a way that is closely integrated with UMRT. Cars and motorcycles must play the role of not only door-to-door transport, which is their unique advantage, but also effective feeders to the public transport system. Along major corridors, priority should be given to public transport and cars, while on secondary and local roads, motorcycles and bicycles should be prioritized, including the provision of roadside parking for them. In the central business district, the UMRT network should be configured in such a way that people can easily access an UMRT station within a reasonably short walking time, while the use of both cars and motorcycles must be strictly regulated through physical controls and congestion pricing to ensure smooth and comfortable traffic flows.

Under this desirable scenario, motorcycles will continue to perform a significant role particularly for short to medium distances and for private travels, in an environment which is well organized for safety and amenity. The benefits of motorcycle use will be further enhanced if it is closely integrated with other transport modes, especially UMRT and buses. Since physical structure in the existing urban areas in Hanoi and HCMC, such as dense population and narrow lanes, is likely to remain basically unchanged in the future, motorcycles can continue to provide various transport services there. They will remain an important but complementary transport mode which contributes to socio-economic activities of urban residents, the urban transport system, and overall urban development.

5-7. Policy recommendations

Motorcycles and bicycles have played critical roles in providing mobility and accessibility to Vietnamese people. In the future, motorcycles will remain and can play better roles in urban transportation when they are properly integrated into the overall urban transport policy framework. To realize this, the most important pre-condition is to raise the awareness and understanding of the good use of motorcycles among all people, including users, law enforcers, and leaders. Without this, no policy measures will work.

Actions should be taken in the following three directions.

Short-term measures

(a) *Regulated use of limited road space*: this requires establishing clear rules and guidelines, and informing them to users and enforcing them strictly (see chapter 6 for motorcycle riding rules).

(b) *Expansion of time-based parking fee*: Long stay parking on roads and sidewalks in urban centers with minimal fee benefits users at the sacrifice of all others. Road space is not a garage for motorcycles and other vehicles. Time-based parking fee promotes an efficient use of road space, and collected fees can contribute to further improvement of traffic management facilities. By combining traffic control with a proper parking system, which reflects the function of roads and roadside situations at each location, overall efficiency of traffic flow and accessibility to roadside activities can be improved.

Long-term measure

Proper design of rail stations and terminals: as urban areas grow, travel distance beyond 30 minutes cannot be served by motorcycles due to increasing discomfort. As Hanoi and HCMC expand, a high quality mass transit system must provide core services as recommended in HOUTRANS and HAIDEP. As

noted above, motorcycles and bicycles should play important roles in providing feeder services through the park-and-ride system. Cars can also do this through the kiss-and-ride system. Motorcycle traffic should be directed away from main corridors and toward local services in catchment areas of mass transit lines. To realize this concept, interchange areas such as stations and terminals must be properly designed for smooth connection of feeder and line haul services.

Traffic Management in Hanoi's Ancient Quarter

Traffic situation in the Ancient Quarter of Hanoi should be improved by implementing the following measures with close cooperation of local communities.

(a) *Car and truck regulation*: ban the use of cars and trucks within the designated areas of the Ancient Quarter, except those directly owned and used by residents or those delivering goods. Permitted cars and trucks can operate during certain hours only. They should be issued official stickers which must be displayed clearly.

(b) *Other restrictions*: the speed limit of all vehicles should be 15 kph or 20 kph within the Ancient Quarter, on-road parking of cars and trucks are banned except in designated areas and time, and motorcycle parking should also be limited to designated space with time-based parking fees.

(c) After the completion of the UMRT Line, which will serve the Ancient Quarters with underground stations, the use of cars, trucks and motorcycles should be restricted more extensively and the entire Ancient Quarter should become an area for pedestrians and non-motorized vehicles, except for the minimum use of vehicles by residents and commercial establishments.