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How should it do to Reduce Traffic Congestion?

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Abstract— *Following the general development trend, from several decades, many big countries in the world such as China, India, Brazil ... have entered the industrialization. Some developing countries also shifted strongly from agriculture to industry. Accompanying that process is the explosion of urbanization across the planet, including Vietnam. Urbanization is indispensable in the process of industrialization and modernization. On the positive side, urbanization facilitates rapid industrial development. However, one of the outstanding sides is the problem with transport systems in large cities, especially for those cities that lack the necessary preparation. Traffic jams have long been regarded as 'everyday things' in Vietnam. The government has also proposed many solutions to this situation, but so far there is no way out for the problem of people traveling, especially in cities with high population densities like Hanoi and Saigon. Gòn. The road system is not enough, the situation of encroaching on roads, sidewalks to trade in markets; the number of vehicles participating in traffic during rush hour rush hours; degraded roads ... These are the causes leading to traffic congestion, but the main and most fundamental reason is due to the lack of awareness of road users.*

Keywords— *Traffic congestion, urban environment, traffic jam.*

I. INTRODUCTION

For many years, the media and experts have warned about the risk of traffic congestion in Vietnam's major cities. Unfortunately, we do not have a consensus on basic solutions but just follow the situation. The authorities as well as the society did not pay appropriate attention, let the time pass. Now it becomes a real accident and has reached its peak, a worry and an obsession in the lives and activities of people in Hanoi and Ho Chi Minh City every time they leave the house. According to calculations by Ho Chi Minh City Polytechnic University, this city alone has to suffer more than VND 13,000 billion annually, not to mention health and ecological environment. More serious is the loss of people. According to the report of the National Traffic Safety Committee, in 2007, there were 13,989 road traffic accidents, killing 12,800 people. Particularly TP. Ho Chi Minh City has 1,381 cases, 1,092 deaths, Hanoi has 832 cases, 491 deaths. Meanwhile, the country continued to increase 13.3% of cars and 16.6% of motorcycles compared to 2006. Traffic jams and traffic accidents in our country have been discussed for many years. However, from the past thinking to the way of doing has still taken the appearance of the movement and weighed more formally than solving radical problems.

In 2007, road traffic accidents decreased by 77, but the death toll increased to 411 (up 3.23% compared to 2006) and traffic congestion and traffic congestion became more and more serious. On the other hand, it is clear that the authorities do not have high consensus in evaluating and proposing corrective measures. So far, there has not been a complete macro strategic plan, combining both long-term solutions and situational measures to improve traffic congestion and traffic congestion in the two largest cities. water, at the same time ensure sustainable industrial development, stable socio-economic growth in the city. Ho Chi Minh City and Hanoi during the period of industrialization and modernization of the country. According to the Economist, sales of cars and trucks increased by 55% in 2015, though it was still low[1]. Traffic congestion is a common problem for urban areas around the world, including in cities with modern transport systems. In Vietnam, according to the National Traffic Safety Committee, TC annually causes damage of 30,000 billion VND, equivalent to 1.34 billion USD[2]. In the United States, the country with the most modern transportation system in the world, TC has caused damage estimated at 124 billion USD[3]. Therefore, governments of all countries always put the issue of TC as a top concern, directing scientists, ministries, and departments to focus on researching and understanding the nature of the TC problem to gradually overcome[4]. Most countries have their own ideas about the concept and classification of TC[5]. Approaching the TC issue from the different perspectives of countries around the world helps Vietnamese experts to better understand and come up with a consensus on how to understand this issue. Since then, in the management of traffic safety and control, to curb traffic congestion, traffic police and other departments have the basis to perform the work, properly assess the level of traffic safety to implement the task; doing well the reporting, statistics, building databases on TC; create integration in the context of international cooperation with other countries. Compared with neighboring countries, the level of congestion in big cities in Vietnam is less serious. About 40 million motorbikes in Vietnam[6], when traveling on the street can scare any pedestrians, causing a stir when wriggling from big streets to small alleys[7]. Only 9% of the land in central Hanoi is used to build main and secondary roads, compared to 32% in Manhattan (New York, USA). The World Bank (WB) in 2011 once calculated that, if the number of cars reached a moderate level as in Malaysia, then the entire capital of Hanoi would be paralyzed and unable to move[8].

In the US, commuters lose an average of one week (working time) each year because of traffic jams, according to Texas Transportation headquarters. While there are more flexible ways to get around, people still choose to use the car for convenience, comfort and privacy. Most technologies promise to reduce traffic congestion with a solution called costing to avoid traffic congestion, where cities pay a fee to get into certain parts of the city during the time period. Certain times every day. In theory, if the congestion fee is high enough, some drivers will be able to cancel their trip or use the bus or train. And in fact, it seems to be useful: Singapore,

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London and Stockholm have reduced the amount of vehicles and air pollution in the city center thanks to the cost-avoidance cost estimate[9]. Another way to reduce the amount of traffic congestion when there is a flexible working schedule for workers, this helps them to move to the workplace during off-peak hours, avoiding peak hours. Those who have to travel during rush hour can share the car. Employers can also allow more employees to work remotely (working from home) to reduce the number of vehicles traveling on the road at the same time. On the other hand, this mindset continues, planners know that more and more drivers and vehicles are moving every day, but they are still reluctant to encourage the rise of private vehicles when public transport plus is a lot better for both humans and the environment[10]. For this reason, the US government has decided to set aside $ 7 billion to help increase the productivity of public transportation systems and upgrade them with highly efficient technologies [11]. But environmentalists still complain that the fund is too little compared to the $ 50 billion spent on building bridges and roads.

Fig. 1. Traffic congress in Ho Chi Minh City

II. TRAFFIC CONGESTION IN VIETNAM

In fact, in the inner urban roads, the occurrence of traffic accidents has decreased but it is not a small number, and traffic congestion is like meals. Sometimes mobilizing traffic police forces at intersections during rush hour, it also takes a lot of time to be able to circulate such a large amount of vehicles. It can be said that traffic safety is considered a painful issue of society. In the middle of the capital - the face of the country, the situation of traffic safety is a problem that has not been solved for a long time. Relevant levels of industry that identify this issue cannot be solved overnight. That alone is enough to see the difficult and difficult nature of it. In Hanoi, the "black spots" of traffic jams are the intersection of So, Vong, Dai Co Viet-Le Duan intersection and other small roads such as the intersection of Mo market, Truong Chinh street, Tay Son road, Pham Ngoc Thach[12]. According to the statistics of the National Traffic Safety Committee, there were 19,852 road traffic accidents in 2004, killing 11,319 people and injuring more than 20,000 others. The number of traffic accidents is determined mainly on "black spots". By the end of 2003, there were only 675,000 cars and 11,400,000 motorbikes[8]; The number of motor vehicles is only 5% of that of Europe, but the annual number of road traffic accidents is equal to 26% of the whole of Europe. About 40,000 traffic accidents occur every year on European roads, killing 42,000 and injuring about 17,000 others. In Africa, combined from 42 countries, with about 10 million cars, each year the number of people killed by road traffic accidents up to 35,000 people and injured 300,000 others. It can be clearly seen that our road traffic situation is still inadequate.

In 2002 the state enacted a ban on the import of motor vehicles, which over time proved its negative side, limiting the development of society. As mentioned above, the number of our vehicles only accounts for 5% compared to Europe, but the number of accidents is 26% compared to that of Europe. This proves our recognition of the wrong situation. As we know we want to realize the situation must go from the phenomenon to the nature. The nature of the phenomenon is abundant and non-stop, so the deep inner nature must be thoroughly investigated in order to accurately grasp and avoid unfortunate mistakes[11]. The proposed laws like the above have proved that: seeing the phenomenon but not necessarily seeing the nature. There is a fact that we need to be brave to recognize is our road traffic system. Under the influence of the rule of developing mushroom-like buildings close to the sides of the streets whose width is not commensurate with it, full of shops, service shops, crowded visitors, people more roads, yet the road is too narrow. Typically in Pham Ngoc Thach Street. Overall, our infrastructure is poor[13]. In Hanoi, the area reserved for transport accounts for only 4%, to achieve the area equal to 20% as in developed countries we need more efforts[14]. It is a fact that the state is expanding its infrastructure, for example at the intersection of the Department, whether this reality leads to an inevitable possibility in the future that there will be no traffic congestion. We have the right to hope, but we must admit that doing so requires a great investment of capital. It can be said that this is a necessary and sufficient condition for the possibility of no traffic jam, limiting accidents to become a reality in the future. So. There is a need for proper attention of the state with a lot of reasonable investment policies on road transport infrastructure. Above is the situation of road traffic in Hanoi. The big question is, what is the cause of this situation?

Fig. 2. Traffic congress in Hanoi city

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According to traffic experts, after many years of implementing the plan to reduce the population to the suburbs, the central satellite cities of Ho Chi Minh City form hundreds of apartment and building projects ... but the transport infrastructure seems to left open. This makes the situation of traffic jams more serious at the gateway to the city center during rush hour. Typically, the East includes District 2 and District 9, a series of real estate projects, commercial centers, administrative ... formed, attracting hundreds of thousands of people to come here to find shelter. Meanwhile, the transport infrastructure to connect smoothly is almost left open[1]. Every day thousands of vehicles must move step by step on Highway 13, Thu Duc district to Binh Trieu bridge connecting Thu Duc district with Binh Thanh district to enter the city center. Also on the Hanoi highway through District 2, Thu Duc traffic jam happened "like rice meal" because residents came here to buy apartments and houses too much. And the South, including districts 4, 7, Nha Be, Can Gio and part of district 8, Binh Chanh district, real estate projects, industrial parks, schools ... also sprouted up like "mushrooms", but the traffic direction About the center of Saigon, almost concentrate on Nguyen Huu Tho street toward District 4, making this road often congestion. Particularly in the Northwest, including a part of Tan Binh, Tan Phu, District 12 and Hoc Mon, every day hundreds of thousands of people circulate to work, purchase and sale centers ... causing Truong Chinh and Cong Hoa roads to overload. Even the Hoang Hoa Tham overpass and the Cha Ca Mausoleum flyover put into operation for more than a year have not solved this problem.

Fig 3. Crowed situation in Ho Chi Minh City

The first reason is the low sense of compliance with the Traffic Law by drivers of motorized vehicles (both motorized and rudimentary). According to the statistics of Ho Chi Minh City Traffic Safety Board, up to 90% of traffic accidents occur due to poor people's awareness, failing to obey the laws causing unfortunate consequences. Traffic congestion occurs in most countries in the world. However, those countries are different from ours in that when there is a traffic jam, the driver of the vehicle still strictly abides by the Traffic Law, does not wriggle, walks on the sidewalk, honk loudly, and stays in our country, in contrast to everyone, goes "everywhere to go", not following any rules. Most of the people on the road intentionally overtook the red lights, climbing sidewalks, encroaching lanes ... not only cause jams and easy accidents, but also ugly the face of urban traffic in Vietnam. Meanwhile, the majority of drivers of all classes on the Road Traffic Law, are licensed to drive.

The second reason is the weak transport infrastructure, the increase of individual vehicles in traffic. So far, Ho Chi Minh City transport infrastructure only meets about 30% of the city's transport development plan. Infrastructure, roads, bridges are narrow and degraded. The construction process was slow and stagnant. While the population is concentrated, the increasing number of personal vehicles has become a "burden" for transport infrastructure.

The third cause comes from the weakness of public passenger transport. Ho Chi Minh City wants to reduce traffic congestion, reduce personal vehicles, it must set the goal of developing the network of public passenger transport to the top. Ho Chi Minh City aims to 2020, the market of public passenger transport (VTHKCC) throughout the city to assume 15-20% of the needs of the people moving. By 2025, it will reach 20.5-26.6% and by 2030, this ratio will increase to 29.3-36.8%. However, until now, public passenger transport in Ho Chi Minh City has only met about 9% of the travel needs of the people - the distance is quite far from the goal. Ho Chi Minh City buses only met 9.5% of people's travel needs in 2018. Worth mentioning, in recent years, Ho Chi Minh City has focused a lot of investment in buses from infrastructure to policies to support new car loan interest and waiting stations ... But over the years, the number of bus passengers tends to reduction. Compared to the end of 2017, the bus network in Ho Chi Minh City is currently down 7 routes (5 subsidy routes including: 37, 40, 60, 95, 149 and two non-subsidized routes, including 12 and 49).

The fourth reason is unreasonable lane-keeping, lane-keeping, lane-taking, traffic coordination, signal lights at intersections are not good. Most of the streets in our country are narrow but have two-way traffic, some roads have stipulated that cars can only travel one way but allow buses to operate in two directions, but buses have up to 45 seats. Sitting, parking regulations for this vehicle facing each other, near the intersection ... should cause traffic jams.

The fifth most important cause of traffic congestion is the encroachment of sidewalks and roadways for trading and business of a large number of retailers, mainly street vendors, food and drink vendors. This situation exists in hundreds of roads in Ho Chi Minh City, most in districts 1, 3, 5, Go Vap, Binh Thanh. The roads are "occupied" by pedestrians often forming knots leading to traffic jams, difficult people to travel.

The sixth reason is that the penalty level is not enough for deterrence, the handling force is not strict, the punishment is low, the law is not strict. The fines for violations of the Traffic Law are still low, not enough to deter the operators of vehicles when traveling on the streets. Many serious violations such as using alcohol, beer still driving, passing a red light, carrying an overload ... the penalty is not high, the driver still intentionally recidivism.

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III. SOLUTIONS

This solution supports the people of Ho Chi Minh City to view live images from 685 traffic cameras in the city, including the cameras on the arterial highway Ho Chi Minh City - Long Thanh - Dau Giay. Besides, users can also check the visual map of traffic flow to choose the appropriate travel route. In addition, the information warns the area congestion, repair; the channeling routes need to restrict traffic ... will also be constantly updated to the people. To make the service more convenient and easy to use immediately, the Department of Transport has cooperated with Zalo to support more chatbot features. When you want to know quickly about traffic information in the neighborhood, or need to see camera images on a certain route, people just need to send a message "I want to see the camera + the street name", the chatbot will return the results. Fast, accurate. In addition, people also have other options such as looking up syntax or clicking on the built-in function bar, depending on the situation of use. In case the user has difficulty in looking up or sending the wrong message, the chatbot will automatically advise the people to use the service in the most smooth way. For those who have been or are currently living in Ho Chi Minh City, it is not strange for traffic jams in the most populous city in the country. Jams can occur at any time, not just during rush hours. Most roads in the city are crowded with cars and motorbikes, in addition to construction sites, "blocks" sprouting up constantly, making traffic congestion more likely. The "Ho Chi Minh City Transport Information" channel is expected to become a timely and useful information channel for people on the traffic situation in the city, helping people to be more active in traveling. This will help solve traffic congestion, contributing to the development of the city's transport system. Asian cities (Hanoi, Saigon, Bangkok, Jakarta, Taipei, Seoul, Tokyo ...) have the same characteristics as very high population density, land use functions such as residential, business, production, administration, mixed services, in which the main functions are concentrated in the city center or in the core city (Strong center, high density urban structure). This "Asian specific" urban structure is different from the American urban structure (low density, distributed functions, multi-core). It creates a large concentration of travel demand that facilitates the development and operation of public transport, non-motorized transport (bicycles and walking). But it also puts great pressure on road infrastructure and car parks. Road and parking density per capita in Asian cities (including Tokyo and Seoul) is only 1/5 ~ 1/10 of US urban areas. Therefore, Asian cities are not "suitable" for developing cars like the US. While car ownership in the US is 600-700 cars per 1,000 people, Asian cities are very good at 200-250 cars per 1,000 people (like Tokyo, Seoul and Taipei). With this amount of ownership, all cars are dumped on the road at once, it is cramped, let alone move. As incomes rise, car ownership increases, which is the rule, but in Hanoi and Saigon the growth rate of cars is relatively higher than income in Bangkok, Kuala Lumpur and more than Seoul, Tokyo. The car ownership level in Hanoi / Saigon is currently 60-70 cars / 1000 people. Meanwhile, Vietnam's road system is much worse than the aforementioned cities. In addition to the number of motorbikes owned by more than 600 cars per 1,000 people, the current road system is overloaded, constantly congested and increasingly aggravated when middle-class and older families, everyone needs to buy a car. First car to travel when there is work. This is a natural need, so it is difficult to regulate with tax and fee policies, unless there are administrative measures (such as requiring parking before registering the car).

The travel demand of urban people is the "real and basic" demand, arising from the requirements of production, business and education activities. The demand for travel is constantly increasing in both absolute quantity, density (per km2) and quality (people increasingly require faster, comfortable and safer travel.). The process of strong urbanization, the influx of people from the provinces to Hanoi / Saigon has made the travel demand boom, far beyond the ability of the current infrastructure system, which is already limited, but The pace of expansion is like a “cow turtle” !. Thus, the "imbalance" of supply-demand of transport in developing Asian cities such as Hanoi and Saigon has both "endogenous" and "foreign" factors. Motorcycles developed massively, at a dizzying pace (for example, Hanoi increased from 150 vehicles per 1,000 people in 1995 to over 600 vehicles per 1,000 people in 2007, four times in 12 years) to a world record of having can be considered as "natural" resistance of the body to heal itself. Of course, this remedy only works to cope, hold on and obviously the disease cannot be completely cured. The most effective dose must target the "endogenous" nature (that is, the characteristic of urban structure) first. It is the development of public transport (GTCC), fast, large transport capacity, convenience, safety and comfort. The process of urbanization is happening strongly, which can be detrimental to the development of public transportation (newly built scattered urban areas, low population density). Therefore, there must be urban planning, land use in close association with transport in a direction beneficial to the development of public transport. The question is how to develop public transportation? Among the existing technologies such as regular buses, large rapid-transit buses (Bus Rapid Transit-BRT), light-rail trains (LRTs), large high-speed electric trains (both floating and underground, MRT) choose which one , when, combine these methods with each other and with motorcycles, bicycles like? The successful lessons of Taipei and Guangzhou can be found, the two cities have an urban structure, population density and land use type which can be said to be very similar to Hanoi and Saigon. Since 1980, Taipei has a dense network of buses covering more than 300 bus routes, each serving more than 50% of total travel needs. But the rapid expansion of motorbikes made the share of buses fall to less than 20% in the early 1990s. Cars also flourished from 1985 onwards. In response, Taipei was determined to develop a drastic metro network (MRT). The first route opened from 1996 to 2000 with 5 routes in operation (a total of 90km). During this period, they reformed the bus network (opening new routes, new vehicles, building priority lanes for buses), in 1999, connecting the bus network to the subway network through

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electronic tickets. create favorable conditions for people to travel. Currently, the total market share of public transport is 50% (30% for buses, 20% for electric trains). Although they have successfully controlled the development of personal vehicles (the current level is 400 motorbikes / 1000 people, 240 cars / 1000 people), the use of motorbikes is still quite high (30%). 20%. To continue the conversion from motorbikes and cars to public transport, the city continues to invest in expanding the metro network, in combination with tight management of parking lots, and motorbike and car parking fee by the hour.

Guangzhou also developed a fiercely public transportation even more than Taipei. In the 1990s, they had more than 400 bus routes, serving more than 30% of travel needs. Motorbikes also thrived in the period 1990-2000 (increased from 70 to nearly 200 vehicles per 1000 people). In response, they had to upgrade and expand the bus network to more than 500 routes (with more than 8000 vehicles), increasing the fare subsidies. Not enough, they also developed a strong MRT network, the first line opened in 1997 (when GDP / capita = 2300 USD. In 2005 there were 5 routes and in 2009 there were 8 routes (240 km). Seeing the quality of bus services go down due to traffic jams, they decided to build a number of express bus transport corridors (BRT) to upgrade bus services.In 2010, the first corridor was extended. 23km, with a capacity of 0.8 million passengers / day As a result, in 2005 the total share of public transport reached nearly 70% (nearly 20% for motorbikes, nearly 10% for cars). Motorbike manufacturers, they set out a 16-year roadmap (1991-2007) to restrict and ban motorcycles from moving in the city. 6% left, their strategy is to take GTCC is the focus, priority number 1. The MRT system will be the "backbone", the bus system will play a major transport role, personal motorized traffic will be a secondary, their slogan is "every year, a small change, 3 years will have a big change, 10 years will have a leap. " It is expected that by 2020 there will be 600 km of MRT and 200 km of BRT and GTCC will meet over 80% of travel needs.

"Remedy" to treat traffic congestion in Hanoi and Saigon must at least study Taipei, so strive to be like Guangzhou. In order to do so, leaders need to have strong, systematic, visionary, and not fragmented or go into the details. It's simple to say but why is it so difficult?. In foreign countries, transport infrastructure often has to go ahead of urban development, but we do the opposite and grant investment licenses to build houses before building bridges. And bridges are too slow. In addition, the satellite urban in Ho Chi Minh City is also not developed synchronously, only worry about housing development but "forgot" to develop surrounding facilities such as schools, hospitals, accompanying professional services to create businesses jobs and service for the residents there. “Many housing development projects have fully planned these facilities, but when they are sold, they will withdraw without investing. Consequently, residents living in satellite cities but jobs, entertainment ... they have to find the inner city and contribute to traffic jams and congestion. It is necessary to study that both situational and immediate solutions and basic and long-term solutions can be used at the same time. In the planning of large cities, it is possible to think of reducing the population to the surrounding satellite cities and tens of kilometers from the "mother" city. Each satellite city has tens of thousands of people with the same modern infrastructure and facilities, but more than the "mother" city, with proper incentives to encourage production facilities and cultural facilities. , education, families voluntarily move from "mother" cities to satellite cities. This is the "macro planning", large scale, great difficulty, big price, big funding, but also great benefits. Clearly, traffic congestion in Vietnam's major cities, especially Hanoi and Saigon, has become a serious illness that weakens many "bodies - societies" that have not taken anything well. of our country. The applied solutions, although quite expensive, are not really effective. Curing this disease requires special medicine, "" Eastern medicine - Western medicine "to cure the root. Here the core issue is to set and solve the problem of "urban development planning". Of course, this is a difficult, very difficult problem, but not without a correct solution. The key to the development issue is: "Honest and good leadership". Or to be more specific, it is required that the managers of the country must have enough "mind" and "reach" to learn, draw lessons learned about the planning and management of other in the world have similar conditions as Vietnam.

IV. Conclusion

Increased traffic pressure on the roads in this area because the airport capacity will be increased to about 50 million passengers / year. Therefore, the city will focus on speeding up and deploying many solutions from the organization of management and operation, closely coordinating with the relevant units for quick information, quick settlement of incidents and accidents. The traffic aims to reduce congestion in the airport area. The locality will also enhance public passenger transportation activities at the airport area, arrange taxi and contract vehicle operations accordingly, arrange delivery time to limit truck traffic.

References

[1] T. P. L. Le and T. A. Trinh, “Encouraging public transport use to reduce traffic congestion and air pollutant: A case study of Ho Chi Minh City, Vietnam,” in *Procedia Engineering*, 2016.

[2] D. T. Nguyen and Y. Kajita, “Traffic Congestion and Impact on the Environment in Vietnam: Development of Public Transport System - Experience from Actual Operation of Bus in Hanoi,” *J. Civ. Environ. Eng.*, 2018.

[3] N. G. Polson and V. O. Sokolov, “Deep learning for short-term traffic flow prediction,” *Transp. Res. Part C Emerg. Technol.*, 2017.

[4] Q. Hoang and T. Okamura, “Analyzing behavioral intentions in new residential developments of motorcycle dependent cities: The case of Ho Chi Minh City, Vietnam,” *Case Studies on Transport Policy*, 2018.

[5] D. T. Nguyen and Y. Kajita, “Traffic Congestion and Impact on the Environment in Vietnam,” *J. Civ. Environ. Eng.*, 2018.

[6] M. Akbari and J. L. Hopkins, “An investigation into anywhere working as a system for accelerating the transition of Ho Chi Minh city into a more livable city,” *J. Clean. Prod.*, 2019.

[7] M. T. Vu, V. P. Nguyen, V. B. Nguyen, and T. A. Nguyen, “Methods for designing signalized double-intersections with mixed traffic in Vietnam,” in *Procedia Engineering*, 2016.

[8] H. Zhang, “Using Accessibility to Evaluate the Benefits of A Bus Rapid Transit Line:A Case Study in Hanoi,” *Univ. Twente Fac. Geo-Information Earth Obs. (ITC), Enschede.*, 2014.

[9] A. CANNELL, “Moving swiftly along: bus rapid transit systems,” *Traffic Technol. Int.*, 2005.

[10] C. P. Green, J. S. Heywood, and M. Navarro, "Traffic accidents and the London congestion charge," *J. Public Econ.*, 2016.
[11] T. M. Tung, "Sustainabilization of Hanoi mobility approached from new residential areas: Will it be a city without motorbike?," *J. Sci. Technol. Civ. Eng. - NUCE*, 2019.
[12] N. Q. Nguyen, M. Zuidgeest, and M. Brussel, "Development of an integrated GIS-based land use and transport model for studying land-use relocation in Hanoi , Vietnam," in *Proceedings of the CODATU XIII conference*, 2011.
[13] X. P. Nguyen, "The bus transportation issue and people satisfaction with public transport in Ho Chi Minh city," *J. Mech. Eng. Res. Dev.*, 2019.
[14] S. Ng Wei, L. Schipper, and C. Huizenga, "Sustainable Transport Development in Three Medium-Sized Asian Cities," *Transp. Res. Board 86th Annu. Meet. Res. Board*, 2007.

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