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Assessment of the Investment in the Eastern North-South Expressway through Practical Operation of the South-West Expressway Cluster

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ABSTRACT

The formation of the Eastern North-South Expressway system will greatly change the face of the country, meeting the increasing requirements of socio-economic development. In parallel with the development of transport infrastructure to meet the requirements of the economic development and the increasing number of vehicles, including the quantities and load of vehicles, etc., have made a premise to promote the overall economic growth of the country. Through exploitation practices (record keeping, traffic organization, road protection, maintenance and cost management activities) and statistics of the authorities, from the perspective of traffic safety, the authors found that some sections of the expressway level - II have not met the goals of socio-economic efficiency, including the efficiency of investment activities through the exploitation process. There have been still many shortcomings, causing public disapproval. Through the research process, the authors discovered the following reasons: First issue to be mentioned is the low speed in operation while the risk of traffic accidents is high, causing damages to people and properties; The causes for long-term consequences is the lack of good investment attraction and investment planning (the impractical issues in phases 1 and 2) and the lack of social criticism. They are also followed by the lack of professionalism from the design perspective, leading to traffic unsafety during exploitation, creating many negative consequences for society. On the other hand, the investment cost in phase 2 will be extremely high, resulting in low investment efficiency.

Keywords: North-South Expressway, Investment, Expressway, Investment Efficiency, Traffic Insecurity.

I. INTRODUCTION

By definition, an expressway is a specialized road used for long-distance transportation, allowing cars to run at high speed, with separate directions in two directions, without crossing at the same level with other roads. In which, each direction must have at least 1 lane for traffic and 1 lane for emergency stopping, etc. [1]

Expressway investment plays a pivotal role in the development and growth of a country's transportation infrastructure. It refers to the allocation of financial resources towards the construction, expansion, and maintenance of expressways, which are high-speed, controlled-access roadways designed to enhance connectivity and facilitate efficient movement of people and goods.

One of the primary benefits of expressway investment is the significant reduction in travel time. Expressways are built with the purpose of allowing vehicles to travel at higher speeds, often with limited access points, which leads to reduced congestion and shorter travel durations. This time-saving aspect is crucial for economic development as it enhances productivity, boosts trade, and encourages tourism. Additionally, the reduced travel time results in lower fuel consumption and emissions, promoting environmental sustainability.

Expressway investment also contributes to improved safety on the roads. These highways are designed with advanced features such as multiple lanes, dedicated interchanges, and separated traffic flows, which minimize the risk of accidents and collisions. Furthermore, expressways often incorporate intelligent transportation systems (ITS) that provide real-time traffic information, aiding drivers in making informed decisions and avoiding congested areas. The enhanced safety and efficiency of expressways lead to fewer accidents, reduced loss of life, and lower healthcare costs associated with road accidents.

Furthermore, expressway investment has a positive impact on regional development and connectivity. By connecting different cities, regions, and economic hubs, expressways promote economic integration and facilitate the movement of people, goods, and services. This improved connectivity attracts investments, encourages industrial growth, and generates employment opportunities in previously underserved areas. Moreover, expressways facilitate seamless transportation between urban centers and remote areas, fostering balanced regional development and reducing spatial disparities.

Expressway investment also plays a crucial role in fostering international trade and economic competitiveness. Efficient transportation networks, including well-connected expressways, are vital for trade and logistics operations. Expressways provide seamless connectivity between production centers, ports, and airports, enabling the efficient movement of goods and reducing transportation costs. This makes countries more attractive to foreign investors and enhances their competitiveness in the global market.

In addition to the economic benefits, expressway investment also brings social benefits. It improves the overall quality of life by reducing traffic congestion and associated stress. The availability of well-designed and well-maintained expressways offers convenience and comfort to travelers, enhancing their travel experience. Moreover, expressways often include rest areas, service stations, and other amenities, providing travelers with necessary facilities and promoting tourism.

However, it is essential to ensure that expressway investment is accompanied by proper planning, environmental considerations, and maintenance. Careful planning should involve comprehensive feasibility studies, traffic projections, and environmental impact assessments to minimize negative effects on local communities and ecosystems. Additionally, regular maintenance and upgrades are crucial to preserve the efficiency and safety of expressways and to prevent deterioration.

In conclusion, expressway investment plays a vital role in the development of a country's transportation infrastructure. It brings numerous benefits, including

reduced travel time, improved safety, enhanced regional connectivity, economic growth, and increased competitiveness. By investing in expressways, countries can foster sustainable development, improve the overall quality of life, and create a solid foundation for economic progress. However, it is important to ensure responsible planning, environmental considerations, and regular maintenance to maximize the positive impacts of expressway investment.

According to current design standards, the expressway is divided into 3 levels: 1) Special class: Design speed km/h > 100; 2) Class I: Design speed km/h > 80; and 3) Class II: Design speed km/h 60 ÷ 80.

For example, some sections of the North-South Expressway in the east are designed as follows [2]: Section Cao Bo (Nam Dinh) - Bai Vot Ha Tinh, Nha Trang (Khanh Hoa) - Phan Thiet (Binh Thuan), Vinh Hao - Phan Thiet (Binh Thuan) has a scale of 04 lanes designed according to highway standards of grade II. There is no emergency lane, roadbed width = 17m, emergency stops are arranged at a distance of 04 ÷ 05 km/point. Design speed km/h/60/80.

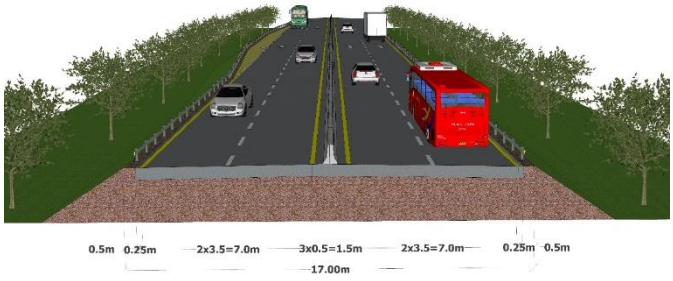

Figure 1: Cross-sectional scale = 17 m [2]

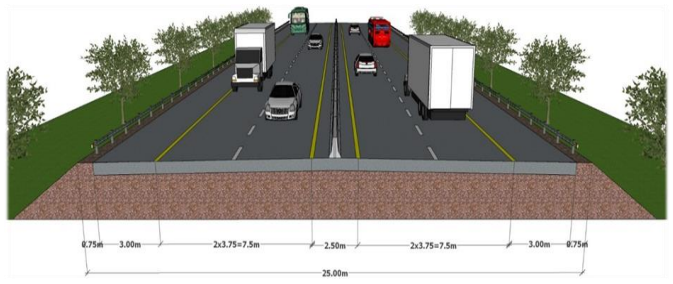

Figure 2: Cross-sectional scale = 25 m [2]

II. ASSESSMENT OF THE ACTUAL STATUS OF THE OPERATION OF THE EXPRESSWAY CLASS II IN THE SOUTHWEST REGION

Trung Luong - My Thuan Expressway Project is invested by BOT mode, with a length of 51.5km, invested as a grade II expressway with a design speed of 60 ÷ 80 km/h [3]. In the 12 months of being put into operation, there have been a number of inadequacies, causing traffic unsafety as follows [4]:

From January 28, 2022 to February 6, 2022, in the process of putting the route into testing, there were 04 traffic accidents that killed 01 person and damaged 10 vehicles.

From April 30, 2022 to June 9, 2022, during the test toll collection on the route, there were 225 incidents of damaged vehicles and traffic accidents, causing traffic jams for many hours due to lack of connection points and emergency lanes for rescue vehicles.

In December 2022, there were 02 traffic accidents on the whole route, severely damaging 02 vehicles [5].

In the first phase of 2023, the connection work has been relatively completed, the work of signs and operating instructions has come into order. However, the incidents still happened as follows:

In January 2023, there were 10 traffic accidents on the whole route, causing 01 death, 02 injuries and 17 damaged vehicles [6].

In February 2023, the whole route had 05 traffic accidents; damaged 06 means of transport and 09 cross braces, 21 round pipes and 01 main pillar [7].

In addition, there were also minor congestion incidents such as damaged vehicles, tire explosions, engine failures, etc., which are resolved quickly, so the congestion was only temporary.

Through the given data and the evaluation of many experts, there are some shortcomings of the route as follows [8]:

Regarding the quality of the road surface: because the road has just been put into operation, it is still in the warranty period; so it is not possible to accurately assess the quality and longevity to draw conclusions.

Regarding safety and congestion: excluding the test period of 03 months mentioned above, there were 17 traffic accidents on the whole route, 01 death, 02 injuries and 25 damaged vehicles. Although on the route, there are many speed warning signs, guiding vehicles in traffic and camera monitoring systems, etc., there are still many unfortunate accidents, not to mention other minor damages. So, what are the causes? After the process of research, testing and analysis with the reality of Vietnam in general, the Southwest provinces in particular in the current period and regulations on road traffic laws, some comments can be made that the Grade II expressway for Trung Luong - My Thuan route is not practical for the following reasons:

This expressway is supposed to reduce pressure on National Highway 1, but the allowed driving speed is only at 60-80 km/h. This should not be called expressway but named "Toll road" or route 60 ÷ 80 km/h to suit the common understanding of users.

In the current conditions, Vietnam's road traffic law has not yet applied regulations and forms of handling on slow vehicle speed when participating in traffic on expressways. Therefore, in the case of two vehicles running parallel the same slow speed (there are vehicles driving at the wrong speed), then the two vehicles will hinder the cars following the correct speed, creating local congestion.

When there is an accident on both lanes of 07m, the congestion will last for a long time to wait for rescue or investigation of the accident, causing prolonged congestion. The entire route was changed to 0km/h because of the lack of emergency lanes to clear vehicles.

In the weather conditions of the southwestern provinces in the hot season, the outdoor temperature is high, the asphalt concrete on the road surface can heat up to 60 ÷ 700C. When the vehicle suddenly breaks down or the tire explodes, causing an accident, etc., the vehicle behind in traffic in a passive state can easily cause an accident.

In addition, similar inadequacies also occurred in some other projects such as [9], [10]:

My Thuan - Can Tho Expressway Project: The route length is 23km. The starting point is at km107+ 363.08 in Tan Hoa Ward, Vinh Long City, the end point is at Cha Va intersection (intersection with National Highway 1, coinciding with the beginning point of Can Tho bridge project), in the territory of Thuan An commune, Binh Minh town, Vinh Long province. The project is in the complete construction stage with 06 lanes, roadbed width is 32.25m, design speed is 100km/h. Phase 1 with 04 lanes, roadbed width 17m, bridge width 17.5m, maximum design speed is 80km/h. Thus, phase 1 is similar to the Trung Luong - My Thuan project, which is very easy to cause traffic unsafety.

An Huu - Cao Lanh Expressway Project: Approved by the Prime Minister by Decision No. 769/QD-TTg phase 1, the project has a route length of 27.43km. The first point intersects with My An - Cao Lanh Expressway (Dong Thap province) and the end point intersects with Trung Luong - My Thuan Expressway (Cai Be district, Tien Giang province). Scale of 04 lanes, roadbed width of 17m including hard medians and guardrails, operating speed of 60 ÷ 80km/h. Currently, this project has not been implemented, so it is not possible to evaluate other factors. As for the traffic safety factor, with 02 one-way lanes, 3.75m each, there is no emergency stop lane, while the traffic density on the route is very large; it is certainly difficult to ensure traffic safety due to accidents. When there is no emergency lane to serve the rescue work and ensure traffic flow, it is necessary to make adjustments to minimize traffic congestion.

In terms of investment efficiency from an economic-technical perspective: the current expressway systems of Vietnam often use the phrases "investment in phase 1" and "investment in phase 2", in which phase 2 usually extends in both directions, with each direction extending from 8m to 10m. Thus, from the perspective of total subsidence, STP = STT + SCK + STB (STT: Instantaneous subsidence, SCK: Consolidation subsidence, STB: Gradual subsidence), the route is unlikely to be identical when the two investment

phases are completed in 10 ÷ 15 years apart, it is difficult to smoothen the road surface. Any deformation of the ground and road surface in the joint position can be the cause of traffic unsafety for vehicles, although the designers have tried to handle it as much as possible. And from a maintenance perspective, the cost of maintenance and repair to overcome the inconsistency between the two investment stages is very expensive. Meanwhile, the old Saigon - Trung Luong Expressway, which was designed according to the standard of a grade I expressway with an emergency lane after 15 years of operation, is now outdated and the Government is having to choose a an investor for "phase 2" to expand the route and handle the overload [11].

Thus, it can be concluded that any standard must be tested through practice. Taking practice as the standard for all actions, including standards applied by foreign countries to Vietnam, must also be based on practice in all aspects (people, laws, customs, scientific development level, usage habits, weather, climate, etc.).

III. RESULTS AND DISCUSSION

In the situation of lack of capital to invest in transport infrastructure, decisions on public investment or investment in the form of public-private partnership - PPP, etc., in transport infrastructure need to be carefully researched by the government. Prolonging the investment period will lead to the waste of investment capital and exploitation efficiency, and the quality of exploitation will not reach the set target. The consequences are not only capital but also human lives and social security.

A. In macro perspective [12]

The Ministry of Transport, representing the state management, needs to study and develop an investment process suitable to Vietnam's reality, including:

- In the stage of investment preparation, implementation, completion, exploitation, it must be assigned specific responsibilities for time, cost, quality and traffic safety in all aspects openly, with the participation and criticism of experts, especially road design and management experts, and managers who are operating and organizing transport activities.
- As the state management of specialized fields, the Ministry of Transport studies and promulgates independent, mandatory, and public regulations for investment projects with high professionalism and socialization value, large investment value, related to social security, safety of human lives and property [13].
- Actively change the technical regulations and standards that do not keep up with the development of science, the movement of socio-economic development, through practical lessons of the project Trung Luong - My Thuan Expressway and other projects, for timely research and adjustment to avoid waste and reduce investment efficiency.
- There are mandatory processes for consulting companies when formulating projects [14], there must be consultation through open and transparent questionnaires for local management levels, transport enterprises, suppliers, etc. [15] before deciding on the level of road design in order to be in line with the reality of economic development, with consideration for the future.
- The Ministry of Transport needs to separate between state management and business management to create transparency in business management to avoid the following phenomena: the project must wait for capital, the project must depend on the investors (PPP), causing problems and doubts from public opinion.
- Responsible for proposing changes to outdated technical standards or cost estimates so that the competent authority can study and make adjustment decisions, in order to reduce the time for bidding, construction, and exploitation, etc...
- The government needs to have more specific and clearer regulations for the managers of the appraisal agencies on responsibility when appraising projects without detecting errors that cause harm, or reduce

investment efficiency due to lack of objectivity or weak professional capacity.

B. **In micro perspective**

- Compulsory bidding for consultants to set up projects, should consider minimizing the form of appointing consulting contractors.
- There are regulations on how to handle when consulting for project formulation, not proposing outdated technical criteria and blaming other reasons, causing consequences to the whole society.
- Localities benefiting from investment in expressway construction, including central-invested road routes, are required to submit written comments on design standards, route location, connection work, and emergency exits, etc. [16], [17].

IV. CONCLUSION

The above study comes from the practice of operating a number of expressways designed according to highway design standards of grade II, adjacent to the design route of grade I expressway (Ho Chi Minh City – Trung Luong expressway project) that is currently overloaded and proposed to an expansion project (investment in phase 2).

Assessing the current situation during the exploitation process under the following criteria: driving speed, traffic safety, risks of difficulty in storing frozen goods when traffic is congested, the investment in phase 1 does not reach the targets.

If in "Phase 2", the technical costs will be high when ensuring the technical homogeneity of the 2 investment phases, etc. And the causes are that the design work is too dependent in investment capital and investment decisions have not been thoroughly reviewed, immediate adjustment is required.

The above is just the work of collecting data through practice as well as collecting opinions of drivers when participating in traffic and analysis by experienced experts, on a qualitative basis, but it has been shown several inadequacies. The Prime Minister must intervene in the immediate future when opening the pilot route of Vinh Hao - Phan Thiet, Phan Thiet - Dau Giay sections that are requested "to speed up the exploitation".

V. RECOMMENDATIONS

To have a big change or reform in an industry, it is not easy to do without the drastic involvement of the whole political system, the authors suggest some recommendations:

- The Government should soon adjust and direct the additional investment in phase 2 and backup plans for expressway projects invested in grade II with 17m road bed, driving speed of 60 ÷ 80 km/h.
- Proposing to supplement regulations on penalties for vehicles traveling slower than the prescribed speed when participating in traffic on expressways in order to limit congestion and ensure the operating speed.

VI. REFERENCES

[1] Nguyen Phuong Cham (2018), "Research to improve the management of construction investment and operation of highways in Vietnam", PhD thesis in economics, University of Transport.

[2] Transport Design Consultancy Corporation (2021), "Report on investment projects to build a number of expressway sections on the eastern North-South routes in the period of 2017-2020".

[3] Law on Investment 2020, No. 61/2020/QH14

[4] People's Committee of Tien Giang Province (2022), "Report on the works presided over by the Ministry of Transport in Tien Giang province".

[5] Trung Luong - My Thuan BOT Joint Stock Company (2023), "Report No. 17/2023 dated 14/01/2023".

[6] Trung Luong - My Thuan BOT Joint Stock Company (2023), "Report No. 29/2023 dated 07/02/2023".

[7] Trung Luong - My Thuan BOT Joint Stock Company (2023), "Report No. 81/2023 dated 13/03/2023".

[8] Le Huong Linh (2018), "Risks in state management of investment in the form of public-private partnership (PPP) in road transport: policy identification and solutions", Institute for Management Research Central Economy, Hanoi.

[9] Le Manh Tuong, Le Hoai Linh, Dang Hoang Tuan, Le Phi Vu, "Assessment on Vietnam's Transport Infrastructure Development Investment under the mode of Public-Private Partnership-Proposing Solutions", International Journal of Scientific Research in Civil Engineering (IJSRCE), ISSN: 2456- 6667, Volume 5 Issue 5, pp. 156-163, September- October 2021.

[10] Dang Hoang Tuan, Le Manh Tuong, Dinh Dang Quang, Le Hoai Linh, Le Phi Vu, "Enhance the Quality of the Management System for BOT road Transport Investment Project in Viet Nam", International Journal of Scientific Research in Civil Engineering (IJSRCE), ISSN: 2456-6667, Volume 5 Issue 5, pp. 144-155, September-October 2021.

[11] Le Manh Tuong, Le Hoai Linh, Dang Hoang Tuan, Le Phi Vu, "The transport infrastructure investment in form of public-private partnership in Vietnam - Current situations and recommendations", International Journal of Engineering Research & Technology (IJERT), IJERTV11IS050184 Volume 11 Issue 5, May - 2022.

[12] Le Manh Tuong, Huynh Van Tung (2021), "Application of quality planning to optimize product and construction project quality", Istraživanja i projektovanja za privredu Journal of Applied Engineering Science 05/2021.

[13] Pham Quoc Truong (2022), "State management of construction investment projects under the mode of public-private partnership in Vietnam", PhD Thesis in Construction Management, Hanoi University of Construction.

[14] Hwang, T. And Chen, C. (2004), The future development of competition framework, Netherland: Kluwer law international.

[15] Koch, C. and Buser, M. (2006), "Emerging Metagovernance as an Institutional Framework for PPP Networks in Denmark", International Journal of Project Management, 14 (2006): 548-556.

[16] Nyagwachi, J.N. and Smallwood, J.J. (2006), "South Africa PPP projects: a systematic model for planning and implementation", The 5th Post graduate construction industry development Board conference, Bloemfontein on 16-18 March 2008.

[17] Cuttaree, V. (2008), "Successes and Failures of PPP projects", The World Bank Europe & Central Asia Region.

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