

# Assessing the management of road traffic infrastructure in form of BOT in Tien Giang province from the perspective of traffic safety and investment efficiency

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## ABSTRACT

Road traffic infrastructure management and exploitation is a material production industry with both service and technical attributes, directly related to human life, means of transport and other assets. Traffic safety criteria are expressed through the ability to smooth traffic and the safety when traveling. To meet the above requirements, the road traffic infrastructure system must ensure quality in all aspects such as: design - construction - operation management. The Trung Luong - My Thuan expressway through Tien Giang province, invested in BOT form, phase 1, does not meet traffic safety criteria. The route does not have an emergency stop lane for rescue activities in the event of an accident. This is due to the issues in investment project planning, surveying and designing. For that reason, the article evaluates the management and operation of roads invested in the form of public-private partnership (BOT) in Tien Giang province from the perspective of traffic safety and investment efficiency. The, the article points out the gaps of state management in the field of road exploitation, as a basis for proposing solutions to improve the efficiency of BOT road traffic operation in Tien Giang province, Vietnam.

**Keywords:** Public Private Partnership (PPP); Safety in exploitation; Exploitation management; Traffic safety; Build Operate Transfer (BOT)

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## I. INTRODUCTION

The planned economy as well as the "stagnation, avoidance of responsibility" attitude is present in many manufacturing industries of Vietnam, especially the

public investment. The traffic construction industry is also affected by this thought.

The transition to an internationally integrated market economy, inheriting as well as accessing scientific and technological advances has promoted and raised the

awareness of Vietnam's manufacturing industries. Because of the above-mentioned macro reasons, the exploitation of road traffic infrastructure in Vietnam has been taken into consideration in the past two decades and identified as an important production sector related to the development of road traffic infrastructure and human life in particular, to the development of the whole economy in general.

The road traffic exploitation activities in recent years has been increasingly complicated by the constant increase in vehicle density and loading capacity, in order to meet the mandatory requirements of economic development. The construction, renovation and upgrading of the road traffic system is an increasingly urgent requirement. The phrase "Management and exploitation of road traffic infrastructure" was created in order to meet the requirements of transportation activities.

The theoretical basis of the field of road traffic construction has been shown through the textbook "Economics - Management of the exploitation of bridges and roads" by Professor, Doctor of Science Nghiem Van Dinh and group of authors [3].

Diving into the specialized field with the textbook "Construction Management and Exploitation" by author Le Manh Tuong [10].

Textbook "Management and exploitation of traffic tunnels" by the group of authors Le Manh Tuong, Nguyen Anh Tuan [11].

Such textbooks have supplemented in a specific and detailed manners to serve the teaching of undergraduate and graduate students of Vietnam's universities specializing in construction engineering.

The exploitation management of road traffic infrastructure includes the following contents:

- + Manage project technical documents (survey, design, construction, acceptance, completion and records of repairs, renovations and upgrades).
- + Protection, maintenance and repair of works (regular, periodical, special)...
- + Manage costs (management costs, technical costs) and toll collection (if any) in the form of PPP

investment and other business activities permitted by law.

All of these activities are for the purpose of maintaining the operational function of the roads, meeting the conditions for optimal transportation activities on the basis of ensuring traffic safety at the highest level.

The current problem of the whole country in general and Tien Giang province in particular is the lack of transport infrastructure, in the context of limited public investment capital. It is necessary to mobilize and attract investment capital from other sources [8]. According to the experience of developed countries in the world such as the United Kingdom, the United States, the Republic of Korea, the Philippines, etc. the type of investment in the form of PPP (Public Private Partnership) has been successful and effective for the economy development [6], [7].

In the past 20 years, Vietnam has applied the PPP form with a certain amount of success [5], [9]. In addition, there are still some shortcomings, many inadequacies are reflected in exploitation activities such as: design quality, construction quality, road surface quality, traffic speed, ability to ensure traffic safety, etc ... that have not yet satisfied the requirements for use. It is necessary to make timely adjustments to ensure the project's objectives in terms of work performance, traffic speed, and safety in exploitation. Currently, many investment projects under the mode of public-private partnership (BOT) highways are still ambiguous between the two concepts of expressways and "tolled" roads. They are expressed right from the design stage, the section of the route, the speed of the vehicle, the ability to rescue, the connection work, the time and the toll level, etc. Such issues created many inadequacies, from the use of the road, the fares, traffic safety, etc., causing bad public opinion about transparency in PPP investment [12].

Thus, the control responsibility of the state management needs to be reconsidered since there are many negative public opinions of the community during the exploitation process. To identify the above

inadequacies, we can evaluate through a number of projects in Tien Giang province and neighboring provinces to serve as a basis for identifying shortcomings in order to take remedial measures and make lessons for the whole country.

## II. INVESTMENT PROJECTS UNDER BOT FORM IN TIEN GIANG PROVINCE

### A. Trung Luong - My Thuan expressway

Trung Luong - My Thuan expressway project (phase 1) with the route length of 51.5 km. The starting point is at Than Cuu Nghia intersection (Saigon - Trung Luong), the ending point intersects with National Highway 30 at An Thai Trung intersection. The whole route has a width of road surface including hard medians and guardrails of 17m with four lanes (4x3.5); there is no emergency stop lane, the maximum design speed is 80 km/h. However, there are many sections where the speed limit is 60km/h. Regarding the plain condition of this area, such speed is not suitable, reducing the efficiency of exploitation [13].

With a roadbed design of 17m wide, including 4 lanes, each lane is 3.5m wide and a median strip with guardrails, no emergency lanes, in case the vehicle has a problem or traffic accident, there will be no ground to serve the repair and rescue, leading to traffic congestion and unsafety.

\* This project had a number of shortcomings and limitations, including the following points [8]:

- Traffic safety

Report of the Department of Transport of Tien Giang: in 10 days (from January 28, 2022 to February 6, 2022 during the test of the route) 4 traffic accidents occurred with 1 person killed, 10 cars damaged. From April 30, 2022 to June 9, 2022, through the test of toll collection, there were 225 breakdowns of vehicles and traffic accidents, causing traffic jams for many hours; rescue work was also slow, due to lack of connection points for rescue vehicles to enter.

At the intersection of Trung Luong - My Thuan expressway and National highway 30, there was a serious traffic accident at 3:30 pm on August 12, 2022, a 7-seat car with plate No. 51H5-54689 crashed into the median, severely damaged, some people on the vehicle were slightly injured. While dealing with the accident, the 62A-07689 vehicle running in the same direction also crashed into the median right next to the accident. The driver died, many people were injured. The issue of safety needs to be carefully studied at this intersection.

- There is no emergency lane, causing unsafety and traffic jams

With a roadbed design of 17 m wide, including 4 lanes of 3.5 m wide and a median strip with guardrails, there is no emergency lane. So in case the vehicle encounters a traffic accident, when there is no emergency stop lane to serve the repair, rescue works, leading to traffic congestion and great economic losses.

- Fee collection

From August 9, 2022, the project was officially put into toll collection, but according to the report of the BOT route management unit, the number of vehicles participating in traffic was the half of the trial period. Moreover, the number of vehicles traveling through the route gradually decreased, equivalent to only 1/3 of the trial toll collection day. So the efficiency of the operation decreased gradually. Business vehicles did not accept the above price and switched to National Highway 1. It is necessary to determine the reason for such decrease, the toll price or the danger due to traffic insecurity.

- Speed

The maximum allowable operating speed is 80 km/h, which is not suitable for highways in the plain areas.

This shows that the investment appraisal of the State management is not effective, because the maximum allowed speed of the highways in the delta in Vietnam is usually from 100 to 120 km/h. Therefore, calling this project "highway" is not appropriate in practice, this case can only be called "toll road". This shows that the design and appraisal agencies have not complied with

the mandatory standards on highway design. These agencies also lacked of practicality as well as traffic safety knowledge. The design agency could not evaluate the economy growth, leading to increased density and vehicle load. The process of exploiting the route has revealed errors, especially the inefficient appraisal work of the State management.

- Investor capacity is not guaranteed

This is reflected in the fact that the project has changed investors twice. The first time (in 2015) - the investor was a consortium of investors Tuan Loc. The second time (in 2019) – the investor was Deo Ca Group. This proves that the project preparation, bid evaluation, investor selection of the State management do not meet the requirements of the project. This is entirely the responsibility of the State Administration in selecting investors. On the other hand, if the investor's professional capacity is qualified, then, why they did not propose to the State management about traffic safety and traffic speed right from the construction preparation stage. This is due to the lack of professionalism of the investor.

### **B. Cai Lay Bypass Project**

The BOT project of Cai Lay bypass is part of the investment project to build the National Highway 1 bypass and strengthen the National Highway 1 road surface of the section passing Cai Lay town. The route length is 38 km, in which the length of the National Highway 1 bypass section passing Cai Lay town is more than 12 km and the length of the old National Highway 1 route is 26 km. The project collected the toll fee from August 1, 2018.

\* This project had some shortcomings and limitations in the exploitation process, including the following points [7], [8]:

- Unreasonable station location

During the toll collection process, many vehicle owners refused to pay the toll, causing trouble, congestion at the station for a long time. This affected security and social order, forcing the BOT project to temporarily stop toll collection. The main reason is

that the toll station is placed improperly and must be adjusted (Cai Lay toll station is located on National Highway 1 to collect tolls for all vehicles traveling on National Highway 1 route and bypass). This is not reasonable because vehicles that do not take the bypass still have to pay the toll. Thus, the appraisal of station location is not good, lacking of transparency. This also confused public investment with investment under BOT mode, proving that the controlling role of state management is inadequate during the preparation and implementation process. Currently, the state management of the project has not really paid attention to the social environment, affecting the investment environment for the PPP form. In terms of traffic safety, the purpose of the bypass is to reduce the density of vehicles passing through Cai Lay town. However, there is no sign prohibiting trucks and containers, especially during rush hour, to go by bypass while vehicles still circulate normally on National Highway 1 through Cai Lay town. Therefore, the traffic safety goal is not achieved. On the other hand, National Highway 1 must be a public investment, but the appraisal is still for investment under the BOT method, to collect tolls, which has created public unrest in the community about the lack of transparency in investment.

- The toll policy has many shortcomings

Cai Lay BOT station collects fees from VND35,000 to VND180,000/turn for cars of all kinds, not considering exemption or reduction for citizens living near the station, citizens not travelling the entire route. After that, it must be adjusted to exempt 100% of the fee for the above-mentioned people [16]. The state management has not fully anticipated the social impact; State management in some areas also has different ways of understanding, affecting the investment environment under the PPP method.

### **C. My Thuan - Can Tho highway project**

My Thuan - Can Tho highway project with route length of 23 km. The starting point is at Km107+363.08, located in Tan Hoa Ward, Vinh Long City, Vinh Long,

the ending point is at Cha Va intersection (with National Highway 1, coinciding with the beginning point of Can Tho bridge project), in Thuan An commune, Binh Minh Town, Vinh Long. The project is constructed with 6 lanes, the width of the roadbed is 32.25m, the design speed is 100km/h. Phase 1 with 4 lanes, roadbed width of 17m, bridge width of 17.5m and the design speed is 80km/h.

\* This project had some limitations, including the following points [7], [8]:

The total project investment in the PPP form is VND 5,408 billion (approved by the Ministry of Transport in 2017). However, in April 2020, the project was adjusted to the form of public investment. At this time, the total investment decreased to VND 4,758 billion (a decrease of VND 650 billion) [16]. It proves that the control of the BOT project preparation stage has been abandoned and the appraisal is not good. On the other hand, from the perspective of traffic safety, similar to Trung Luong - My Thuan expressway project, the road surface is 17m with 4 lanes, it is inevitable that traffic jams will occur, especially at the connection points to National Highway 1 and Trung Luong Expressway - My Thuan, Cao Lanh - An Huu Expressway, from An Huu to Can Tho bridge when connecting to My Thuan - Can Tho Expressway.

#### **D. Cao Lanh - An Huu expressway project**

An Huu - Cao Lanh expressway project - phase 1 has been approved by the Prime Minister by Decision No. 769/QĐ-TTg, the project has a route length of 27.43 km. The first point intersects with My An - Cao Lanh expressway (Dong Thap province) and the ending point intersects with Trung Luong - My Thuan expressway in Cai Be district, Tien Giang province. Scale of 4 lanes, road bed width of 17m including hard medians and guardrails, operating speed of 80 km/h. Currently, the newly approved project has not been implemented, so it is not possible to evaluate other factors. As for the traffic safety factor, with 2 one-way lanes, 3.75m each, there is no emergency stop lane, while the traffic density on the route is very large,

certainly not ensuring traffic safety, In case of traffic jams due to accidents, due to breakdowns, when they occur, there will be no emergency stop lanes to serve the rescue and rescue work and ensure traffic flow, which requires timely adjustment [8].

#### **E. Ho Chi Minh City - Trung Luong expressway project**

Ho Chi Minh City - Trung Luong expressway project with route length of 61.9 km. The starting point of the route is at the intersection of Cho Dem - Binh Chanh - Ho Chi Minh City, the ending point is the intersection of Than Cuu Nghia - Chau Thanh district - Tien Giang province.

The route is invested to build standard expressways of grade A, grade 120 corresponding to 120Km/h. Phase 1 is built with 4 lanes and 2 emergency stop lanes (4 x 3.75m + 2 x 3.0m) excluding hard medians and guardrails with the width of the roadbed from 25.0 m to 26.0 m.

\* This project had a number of shortcomings and limitations, including the following points [7]:

- The regional linkage has not been promoted, reducing the efficiency of exploitation.

The connection from the expressway to Ben Luc and Thu Thua districts is not available. When the project is put into operation, it must be supplemented. Currently, such construction has not been completed stopped because technical contractor violated the law and was prosecuted. This proves that the project appraisal is not good. There are shortcomings when not considering the connection effect, reducing the efficiency of the route's exploitation.

- Insufficient business management process - inadequate (O&M) form

This leads to a loss of state budget (VND 725 billion of tax and incorrect determination of vehicle traffic due to the lack of automatic ETC toll collection). This proves that the state management has not done well in the project transfer contract and control the toll collection activities. On the other hand, from the perspective of exploitation, issues in toll collection as

mentioned above have resulted in a loss of government revenue of thousands of billion VND. Moreover, from the perspective of traffic safety, the state has now determined that the density of vehicles is too large, which does not guarantee the speed of traffic, due to the small cross-sectional area. It must be upgraded, and an additional lane must be added in each direction. So each direction of traffic will be 3 lanes for traffic and 1 emergency lane. In this case, the route with the minimum width of the roadbed excluding medians, guardrails, railings, etc. will be  $(6 \times 3.5 + 3 \times 2 = 27\text{m})$  and the connector segments will increase to over 40m. Thus, the route will ensure safe traffic for a long time without congestion. Overall, when connecting Ho Chi Minh city - Trung Luong expressway to Trung Luong - My Thuan route, it will cause a big traffic jam at Than Cuu Nghia intersection because there are only 2 lanes on the way to Trung Luong - My Thuan expressway, causing traffic unsafety and when merging 2 expressways.

In general, this will be a gap in the planning and investment of the State management, which has created serious local inefficiencies. When investing in expressways, the PPP Department of the Ministry of Transport has not fulfilled its responsibility in investment proposal and control when connecting expressways. This will be the first cause of traffic unsafety in management and operation of the expressway system, as commented by author Le Manh Tuong (Doctoral thesis "Planning affects the quality of construction works")

### III. EVALUATION OF ROAD TRAFFIC PROJECTS IN MEKONG DELTA REGION

#### A. Results

Reviewing objectively at the macro level, the transport system, including public and PPP investment, has partly changed the Mekong Delta. It is the foundation for other industries, especially rice processing and export, seafood processing, fruit and vegetable trade to

all regions of the country and overseas. Particularly for rice production, due to the development of transportation to remote areas, it has lowered the rice cost in Ho Chi Minh city, the Southeast region and the central highland provinces, etc. The transportation system has changed the countryside, reducing the urban-rural gap in many aspects.

Thus, in general, thanks to the transportation infrastructure, the Southwest localities in general and the whole country in particular have made significant economic development, serving as a driving force and a basis for the development of Vietnam economy.

#### B. Drawbacks of the projects

In-depth assessment of the highway system in the South region, there still have been shortcomings in terms of planning, quality, etc., causing many inadequacies for the above-mentioned exploitation process. In addition to reducing the efficiency of operation, there are potential risks of traffic unsafety due to the following reasons:

- The planning of road traffic infrastructure is not synchronized. It is clearly shown through the Ho Chi Minh City - Trung Luong expressway; Trung Luong - My Thuan; My Thuan - Can Tho; An Huu - Cao Lanh, etc., because the expressway system is becoming increasingly narrow in terms of road cross-section, number of lanes in each direction, rescue points, etc. State management and investors use the phrase "Investment phase 1" to defend themselves when calculating the toll price. Thus, when connecting routes together, it is easy to form bottlenecks, which are potential causes of congestion, traffic accidents, reducing the efficiency of route operation, causing damage to the economy.
- Design work is complied with old standards, lacking practical usage. Up to the present time, the expressways in the delta are still designed with 2 lanes, no emergency lane with a maximum speed of 80km/h. Meanwhile, the national road system also allows

driving speed of 80km/h. Thus, the design perspective of the consultanting agencies is that the vehicles never break down, never lose their brakes or blow a tire, etc., which are true "ideal" assumptions. Meanwhile, the design appraisal needs feedback to re-evaluate and control the design contractor to find the most effective and safest solution. But the appraisal agency still approved the design. They do not evaluate the the safety of human life and property of society.

**- Roles and Responsibilities of the State Management**

The roles and responsibilities of state management are currently confusing. The state management cares much about the capital in the context of limited public investment. As for investment in the form of PPP, the safety and profit for investors are the highest priorities. So, the state management does not consider social benefits of the projects.

To summarize, state business management are two confusing concepts, which are the causes for low investment and road exploitation efficiency. State management needs adjustments to improve their roles and responsibilities.

**IV. RECOMMENDATIONS FOR SOLUTIONS**

**A. Foundations**

- Law on investment under the mode of public-private partnership No. 64/2020/QH14 dated June 18, 2020 [4].
- Decree No. 35/2021/ND-CP dated March 29, 2021 of the Government detailing and guiding the implementation of the Law on Investment under the mode of public-private partnership [2];
- Circular No. 09/2021/TT-BKHDT dated November 16, 2021 of the Ministry of Planning and Investment guiding in detail the selection of investors to implement PPP projects [1].

**B. Solutions**

1) Completing the master plan

Expressway projects connected to the national road system in the Mekong Delta (Southwest) generated

many shortcomings, specifically through the connection between routes that are not synchronized on the basis of transparency, ensuring the right of criticism of economic sectors, beneficiaries, and service-using communities. The two phrases "Investment phase 1" and "Investment phase 2" are unconvincing reasons for such issues.

**\* Proposed solutions**

Transparency in the overall planning scheme of the Transport sector, including highway projects in any form (Public investment, PPP, etc...). Currently, regarding investment and planning of the road transport system, the link between industries (river & sea ports, electricity, construction industry, seafood processing industry, etc.) and economic regions on the basis of contributions, criticisms, ministries, sectors and localities, has not been thoroughly studied, including investment scale, schedule, etc., Such research should be publicized and transparent with a protective legal corridor, within a certain time limit as proposed by the Ministry of Transport.

- The adjustment of the planning should be based on the principles for economic development, the benefit of the people not for the investors. This is the only way to regain the trust of the people, which has been lost for a long time.

- Traffic planning must be determined as the orientation and basis for other material production industries to have investment and production development plans.

- Sectoral planning also needs to be submitted to the National Assembly for criticism, because this is the agency closest to citizens and delegates in general, and local delegates in particular.

2) Promulgating mandatory standards for design works

From capital perspective, to eliminate group benefits, there should be regulations on classification of Level 1 expressway and Level 2 expressway, etc.

- Level 1 expressway: In each direction, there must be at least 4 lanes (3 lanes for driving; 1 lane for emergency stop) with a dark cross-section (3x3.5+3) so

the cross-section has a minimum size of 13.5m excluding hard medians, guardrails, slope of about 3m.

- Level 2 expressway: In each direction, there must be at least 3 lanes (2 lanes for driving; 1 lane for emergency stop) with a minimum cross-section (2x3.5+3) so the cross-section must have the minimum size. > 10m excluding hard medians, guardrails, about 3m.

This is the authors' proposal from the perspective of traffic safety, project effectiveness, minimizing accidents and traffic jams.

3) Strengthen the roles and responsibilities during design appraisal

- In the transition period, the design appraisal, especially small projects, is sometimes just a procedure. But currently, especially PPP projects, (BOT projects or a combination of BOT and BT), there is a pressing public opinion about the transparency of projects in terms of cost and quality. In which, the quality of design work is being criticized by public opinion in terms of safety, trafficability, and efficiency. Therefore, Decree No. 35/ND-CP dated March 29, 2021 stipulates the legality of project appraisal for investment projects in the form of PPP, which is the responsibility of the Ministry of Planning and Investment. But for specialized projects that specialize in technical aspects and safe operation during exploitation, specialized ministries or independent specialized agencies should be assigned to be responsible for the appraisal of technical aspects and safety. It is important for investment projects to be transparent. This will be an issue that can create "group interests".

4) Defining the roles and responsibilities of state management

Currently, in Vietnam, projects invested in public-private partnership form have low investment attraction. So, what is the cause? What is the responsibility of the state management? According to the research of group of authors, state management has not fulfilled its responsibilities on the following issues:

- The legal framework is not compatible with actual circumstances, not suitable for PPP investment method.

- The system of Decrees and Circulars is not detailed, easily causing misunderstanding or leading to delays and increasing costs. Such issues expose many potential risks for the state and investors.

- There are not regulations defining responsibilities and resolutions for minimum standards on design, construction, exploitation, etc....

- Transparency regulations have not been developed in all aspects, especially public's opinions in order to increase the control level of the community.

- State management is still dominant (abuse of power) in the field of business management, which has created an inequity between investors and state management. They must be two equal subjects in the contract to perform the bidding package. The feedbacks between the competent state agency and the investor/project enterprise can not be properly conducted which inevitably leads to a decrease in the effectiveness of the bidding package (traffic safety, effectiveness, etc.)

## V. CONCLUSIONS

The PPP investment method has been successfully applied in many countries, reducing the pressure on the shortage of public investment capital. Meanwhile, in Vietnam, this form has not been a huge success, especially the investment in expressways.

From the perspective of project exploitation and efficiency, there have been many issues and concerns such as: the project efficiency is not high, the traffic clearance and traffic safety are low, the rescue work is still forgotten. Therefore, in phase 1 of investments, how to deal with the target of recovering capital of investors. What are the measures to ensure traffic safety; minimize vehicle speed; limit vehicles with large loads; oversized, overloaded vehicles, etc.? Finally, the efficiency of the project is low. This question should be left to the Ministry of Transport to answer and provide appropriate solutions.



## VI. REFERENCES

- [1]. Ministry of Planning and Investment (2021), "Circular No. 09/2021/TT-BKHDT dated November 16, 2021 of the Ministry of Planning and Investment detailing the selection of investors for PPP project implementation PPP".
- [2]. Government (2021), "Decree No. 35/2021/ND-CP dated March 29, 2021 detailing and guiding the implementation of the Law on Investment under the mode of public-private partnership".
- [3]. Nghiem Van Dinh, Nguyen Quynh Sang (2009), "Economics - management and exploitation of bridges and roads", Transport Publishing House, Hanoi.
- [4]. National Assembly (2020). Law on investment under the mode of public-private partnership No. 64/2020/QH14, promulgated on June 18, 2020.
- [5]. Nguyen Thi Hong Minh (2016). State management of investment projects in the form of public-private partnership in the construction of road transport infrastructure in Vietnam, PhD Thesis in Economic Management, National Economics University, Hanoi.
- [6]. Bui Thi Hoang Lan (2010), Applying PPP model in the development of road traffic infrastructure in Vietnam, Ministerial-level scientific project, B2009.06.126.
- [7]. Le Huong Linh (2018). Risks in state management for investment in the form of public-private partnership (PPP) in road transport: policy identification and solutions, Central Institute for Economic Management, Hanoi.
- [8]. Tien Giang Provincial People's Committee (2022). Report on the works carried out by the Ministry of Transport in Tien Giang province.
- [9]. 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.
- [10]. Le Manh Tuong (2016), "Management and exploitation of construction works", Transport Publishing House, Hanoi.
- [11]. Le Manh Tuong, Nguyen Anh Tuan (2018), "Management of traffic tunnel operations", Transport Publishing House, Hanoi.
- [12]. 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.
- [13]. 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.
- [14]. 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 Vietnam", International Journal of Scientific Research in Civil Engineering (IJSRCE), ISSN : 2456-6667, Volume 5 Issue 5, pp. 144-155, September- October 2021.

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