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The Application of Statistical Package for the Social Sciences into Data Analysis to Identify and Evaluate the Risk Factors Influencing to the Implementation of the Renovation and Improvement National Highway 53, Tra Vinh - Long Toan Section, Tra Vinh Province, Vietnam

Anh Tuan Nguyen, Lecturer, PhD.
Ho Chi Minh City University of Transport
2 Vo Oanh Street, Binh Thanh District,
Ho Chi Minh City, Viet Nam.

Truong Vu Pham
Ho Chi Minh City University of Transport
2 Vo Oanh Street, Binh Thanh District,
Ho Chi Minh City, Viet Nam.

Abstract - This article applies a descriptive statistical analysis method through the Statistical Package for the Social Sciences (SPSS) software based on the results of surveyors' opinion through a questionnaire with The 5-level Likert scale of respondents to check the level of risks affecting the implementation of The Renovation and Improvement National Highway 53, Tra Vinh - Long Toan section, Tra Vinh Province Project in Vietnam. The research results show that the capacity of the Stakeholder including: Contractors, Sponsors and PMUs; and the price slippage are the risk factors that most affect the investment process. So the authors make recommendations to the Sponsors to develop a plan, study well the issues related to the capacity of contractor, sponsors and PMUs as well as the selection of contractors; promptly respond to macroeconomic fluctuations and instability that cause an increase in fuel and material price indexes. Sponsors, PMUs need to improve their management capacity, honesty and objectivity in project management, especially the selection of contractors so that their real capacity is appropriates their performance in the bids in order to minimize risk factors affecting the project investment implementation.

Keywords: ***Risk management; Descriptive statistical analysis, SPSS; Project Management Unit.***

I. INTRODUCTION

Risks are situations that occur randomly, unforeseen when practical activities cause negative impacts on objects, subjects, things or phenomena, leaving reversible consequences but paying costly or irreversible such as fatal accidents.

Construction risks are the risks occurring in the process of work construction investment from the stage of investment preparation, investment execution and investment completion. Risks in construction activities include all the one of delaying progress, low quality of the works, the construction costs rising above the total investment, traffic accidents, labor accidents and others.

Risk management in construction investment activities is a set of processes, orders, procedures, methods and solutions that are mandatory conditions that participants must comply to avoid risks, treatment risks in best effectiveness.

In fact, the process of investing in the construction of works, especially transport works contruction, always has potential risk factors causing unpredictable consequences such as: In serious sittuation, it will be deadly. For example, In the Can Tho bridge contruction project, due to lack of geographic research, the scaffoldings collapsed suddently while concreting the bridge deck, killing many people; poor quality of the work: Forr the highway of Da Nang - Quang Ngai section project, the work have just completed for one month but started damaging, leading to prosecution of the accuseds as well as the projects. If it is mild, it will make progress slowly, exceed the total cost. This risk level is common.

To overcome this situation, we need to correctly identify the risk factors and properly assess the level of risk for each factor in order to develop a response plan to minimize the risk in construction investment activity.

To determine the cause of a risk, first of all, we must identify the factors that cause risks in traffic construction investment activities, including:

R1: Group of risk factors related to project characteristics such as: Natural topographic characteristics and project characteristics, long survey time, prolonged bidding time, Inaccurate survey. Because it is a road traffic project, stretching along as route, through many different geological regions, topographical and geological surveys require the true reflection of the nature, representing each area to meet the task requirements. new approved survey has suitable design solution. Do not accept the value of interpolation and prediction survey. Therefore, the survey time is longer than construction works with more concentrated scope. Due to the very large volume of the transport industry, divided into many

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bidding packages, the bidding packages cannot be completed at the same time from design to verification, evaluation and approval. So, when completing designing approval any package, the Investor will auction that package. This stage should last a long time. If these causes occur, consequences are serious such as: Poor construction quality, death, delayed progress, exceeding the cost total. If the survey is inaccurate, It must be adjusted and supplemented.

R2: Group of risk factors related to the capacity of stakeholders such as: The design and estimate Unit; Investor; PMU; the verification Unit. If the capacities of these subjects fail to meet the requirements, it will endanger the work's quality, death, wrong order, procedures, delay, and total investment.

R3: Group of risk factors specific to traffic works: Difficulty in site clearance; works stretching in wide area, causing difficulties in management and construction organization; the coordination between consultancy units. Road traffic works require construction ground with a large and prolonged occupation area, so site clearance is time consuming, difficult and complicated; construction management needs to be scientific to promote construction efficiency, to avoid loss of properties and materials; the coordination between consulting units, especially supervision consultants, verification consultants, design consultants, regularly and continuously. Failure to perform these factors will cause delay, exceeding the total investment, prolonged complaints, and unsatisfactory quality of the work.

R4: Group of risk factors involved in the design process: Changing design drawings; Time for designing and estimating; Time for designed and estimated verifying. These factors cause the risk of delayed progress, unsatisfactory design quality require additional adjustments which makes construction costs increase.

R5: Group of risk factors related to economics and legal policy: Financial resources of the investor; Domestic financial market; Regular legal policy changes; The guiding documents are not specific. This is a group of objective factors that happen with a very low frequency. However, if it happens, it will have a great impact on the success of the project, the project may have to delay, postpone or bankrupt, for example: In 2011, to stabilize the macro economy, the Government. issued Resolution No. 11/2011/NQ-CP on reducing equitable investment by suspending and rescheduling a series of projects. Considering the current economic context, this group of factors does not affect The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project due to the identified and arranged capital as well as The project has deployed 70% of the volume.

R6: The group of risk factors is related to the price slippage factors that cause excess investment: the price of fuel, materials, labor and machine increase. This group of factors occurs often, most of the projects are affected by the group of price slippage factors due to the increase of the material price index causing the increase in construction costs.

The project to renovate and upgrade NH.53, Tra Vinh - Long Toan section, Tra Vinh province with a total length of 43,800 km, was invested and built in the areas of Chau Thanh, Cau Ngang and Duyen Hai districts, Tra Vinh province. The project road is designed according to The III level road design standard (for plain section), the design speed is 80km/h according to TCVN 4054-2005 with the following parameters: Cross section B_n/B_m = 12m /11m; High-grade asphalt concrete pavement A1, only for high-grade plastic straightening and smoothing sections A2; Modulus $E_{yc} \geq 140$Mpa.

The bridge section consists of 5 repaired bridges, 2 renewed bridges, of which Bang Da, Phuoc Hao, Tra Cuong 1, Tra Cuong 2 and O Lak bridges proceed to dismantle balustrades and different - level sidewalks to expand the vehicle lane up to 9m, turning into 10m for total of bridge width; Nhi Trung and Lo Da bridge has been newly built with a bridge width of 12m, with vehicle lane Bmc = 11m, the barrier and handrail lane Bgc = 2x0.5m = 1.0m. the bridge is built permarnently of reinforced concrete and prestressed reinforced concrete.

Surveying the current situation, determining the risk factors, the risk factors affecting the implementation of The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project from experts' opinions. Analysis and ranking of the found risks and model construction aims to further study the nature of risk factors in construction investment, to improve project management qualifications; to understand more of the viewpoint of experts on risk factors in transport construction investment; to practice proficiently in SPSS software to apply in work.

II. RESEARCHING METHOD

A. Introduction to research method

Apply descriptive statistical methods to statistic and analyze opinions of experts working in relevant agencies and units on the risk factors affecting The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project. This method uses SPSS software to perform frequency statistics and description. The research steps are shown in Figure 1.

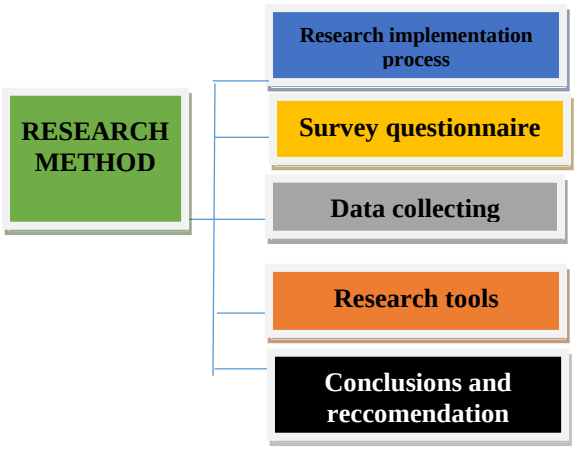

Figure 1. Diagram of research process according to SPSS method

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B. Method content

B.1. Detailed research implementation process

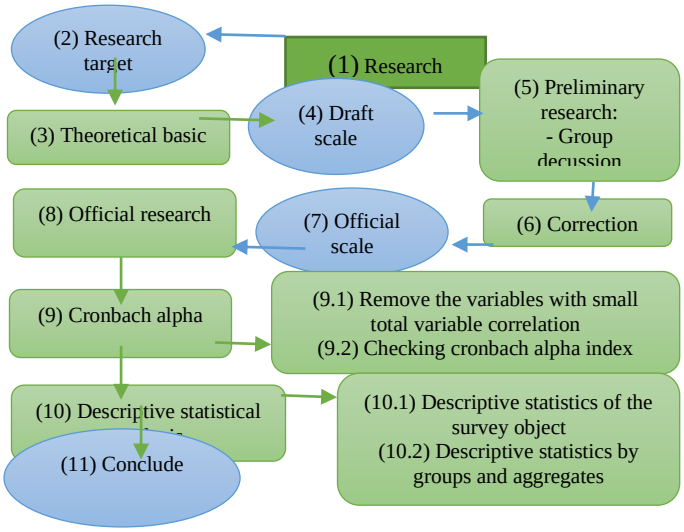

Figure 2. Research implementation process

B.2. Research model

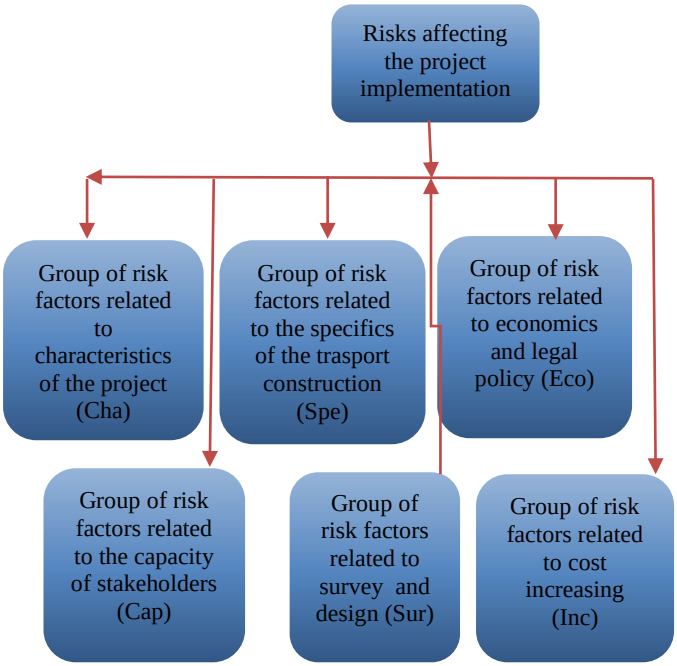

Figure 3. Research method

B.3. Survey questionnaire content

The survey questionnaire is designed as shown in Appendix 1.

B.3.1. Qualitative factor group Includes: Gender, Age, Education, Experience, Agency.

B.3.2. Quantitative factor group

a) Group of independent factors: There are 06 independent groups of risk factors and 24 observed variables for these 06 groups of risk factors as follows:

- Group of risk factors related to project characteristics

(1) Natural topographical features and project characteristics.
(2) Survey time prolongs.
(3) Bidding time prolongs.
(4) The survey result is not accurate

- Group of risk factors related to the capacity of stakeholders

(5) Capacity of the designing and estimating unit
(6) Capacity of Investor or PMU.
(7) Capacity of constructor.

- Group of risk factors that are specific to traffic work contruction

(8) Difficulty of site clearance
(9) Construction organization
(10) Asset management
(11) Appropriate to local contruction planning
(12) The coordination between consultants

- Group of risk factors involved in the design process:

(13) Change of design drawing
(14) Time of designing and cost estimating
(15) Time of design and cost estimate verification

- Group of risk factors related to economics and legal policy

(16) Investor's financial resources
(17) Financial capacity of contractor
(18) Frequent legal policy changes
(19) The guiding documents are not specific
(20) Policy on construction investment

- Group of risk factors related to cost increasing

(21) Increased fuel prices
(22) Material price increases
(23) Labor cost increases
(24) Prices of construction machine and equipment increase.

b) Group of dependent factors: There is an independent group of risk factors and 01 observed variable. Therefore, the observed variable is also a research and evaluation factor: Risks affecting the implementation of investment The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project

3.3. Data collection

a) Scale

In the survey questionnaire, the five-level Likert scale of the respondents will be used to examine the impact of risks affecting the implementation of The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project. The Likert scale shows 5 levels from 1 = "No effect" to 5 = "Very much impact".

TABLE I. FIVE LEVELS LIKERT TABLE

Infulence level				
Non - Influence	**Little Influence**	**Medium Influence**	**Quite Influence**	**Enormous Influence**
(1)	(2)	(3)	(4)	(5)

b) Research tools:

- Sample size: Objects which surveyed consist of the subjects related to the surveyed content.
- About sample size:
- Analysis of discovery factors EFA:

+ According to Hair et al. (1998), the sample size is> 100 units;

+ On the other hand, according to Comrey (1973), the minimum sample size is 5 times to the total number of observed variables. This is a suitable sample size for research using factor analysis. Therefore, the sample size should be n> = 5 * m, m is the number of questions in the survey. The

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research topic has 24 observed variables (24 questions) for groups of independent factors. So the sample size needed is: 5 * 24 = 120 samples

- For multivariate regression analysis:

+ According to Tabachnick and Fidell (1996): The minimum sample size to achieve is calculated by the formula as n> = 50 + 8 * m (m: number of independent variables). Research topic has 06 independent variables. So the sample size needed is: 50 + 8 * 6 = 98 samples.

Thus, to choose a sample that satisfies the conditions for EFA test and multivariate regression analysis when choosing the number of samples must satisfy all three conditions above. The team decided to take a sample size of 120 samples to increase the value of the study.

c) Survey Questionnaire coding:

Questions entering the SPSS software are encoded as shown in Appendix 2.

d) Data processing tools:

After issuing the survey questionnaire, the results will be collected, then the collected data and the coded variables will be imported into SPSS 20 Software (Statistical Package for the Social Sciences 20) - a software that is widely used on computers and it is used for scientific, social and econometric research. SPSS is also used as an optimal tool for parametric analysis, correlation analysis, scale reliability testing, ...

e) Descriptive statistics

Descriptive statistics is a technique that helps researchers to describe generally the characteristics of research samples and survey results obtained. Descriptive statistics will include: Frequencies statistics and average statistics. Sample information includes gender, age, work experience, position, education level. The study uses a tool to calculate the average value (mean), the maximum value (maximum) and the minimum (minimum). At the same time, fully synthesizing the sample information such as quantity, calculating percentage, cumulative percent.

f) Methods of analyzing reliability for Cronbanch's Alpha Index.

- The reliability of the scale is assessed by the method of intrinsic consistency through Cronbach's Alpha coefficient. Use Cronbach's Alpha's confidence coefficient method before analyzing EFA factors to eliminate unsuitable variables because these variables can create dummy factors (Nguyen Dinh Tho & Nguyen Thi Mai Trang, 2009). Confidence Cronbach's Alpha's coefficients only indicate whether measurements are linked; but does not show which observed variables to remove and which observed variables to keep. Then, the calculation of the variable-sum correlation coefficient will help to eliminate which observed variables do not contribute much to the description of the concept to be measured (Hoang Trong & Chu Nguyen Mong Ngoc, 2005).

Criteria to use when evaluating the reliability of the scale:

- Types of observed variables with small variable-total correlation coefficient (less than 0.3); criteria for selecting the scale when the alpha reliability is greater than 0.6 (the larger the alpha, the higher the internal consistency reliability) (Nunally & Burnstein 1994; cited by Nguyen Dinh Tho & Nguyen Thi Mai Trang, 2009).

Cronbach's Alpha coefficient formula is:

$$a = Np1 + p(N - 1)$$

with:

+ p is the average correlation coefficient between the questions. Greek characters p in the formula represents the mean correlation between all pairs of questions is checked.

+ By convention, coefficient α is greater than or equal to 0.8, a set of questions used to measure is evaluated well.

- Values for evaluating Cronbach's alpha coefficients: (Nunally, 1978; Peterson, 1994; Slater, 1995; cited by Hoang Trong and Chu Nguyen Mong Ngoc, 2005).

+ From 0.8 to close to 1: The scale is very good. + From 0.7 to almost equal to 0.8: The scale is fine.

+ From 0.6 or more: Scale qualified.

- The observed variables with small variable-total correlation (less than 0.3) are considered garbage variables, they will be eliminated and the scale is accepted when the confidence coefficient Alpha is satisfactory (greater than 0.6). (Nguyen & Nguyen, 2009).

III. DATA ANALYSIS AND RESEARCH RESULTS

A. Analyze evaluation results

A.1. Description of survey object information

After issuing survey forms (directly and indirectly), 120 valid votes were collected. All samples after being tested are satisfactory because there is no sample with a defective answer, the answer is not wrong with the question. A sample of 120 was entered into SPSS software for the study.

The survey sample information includes: Gender, age, professional qualifications, work experience and fields of work in the transport construction industry.

1.1. Gender statistics

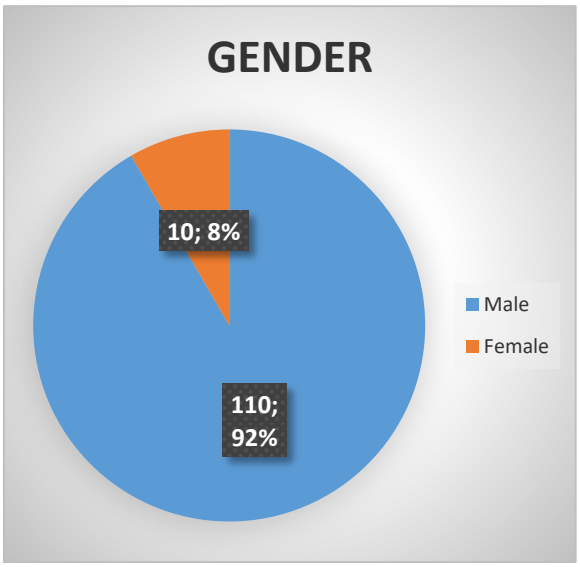

Figure 4. Gender statistic

Based on the above survey results, it can be seen that, with a total of 120 questionnaires collected, the rate "gender" is:

Female accounted for 8.33% with 10 votes.

Male accounted for 91.67% with 110 votes

1.2. Statistics on the age of the surveyed person

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2. Based on the above survey results, it can be seen that, with a total of 120 questionnaires collected, the rate of "Age" is:
3. Under 30 years old accounts for 14.17% with 17 votes.
4. From 30 to 40 years old accounts for 35% with 42 votes.
5. From 41 years old to 50 years old, accounts for 46.66% with 56 votes.
6. Over 50 years old accounts for 4.17% with 5 votes.
7. Thus, the survey samples mostly show that most of the respondents at the age from 30 to 50 years old are working in the transport construction industry.

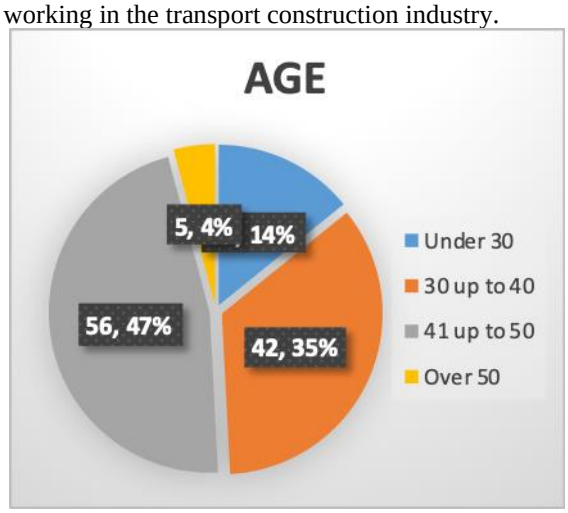

Figure 5. Age stastitic

1.3. Statistics of the surveyed people's qualifications

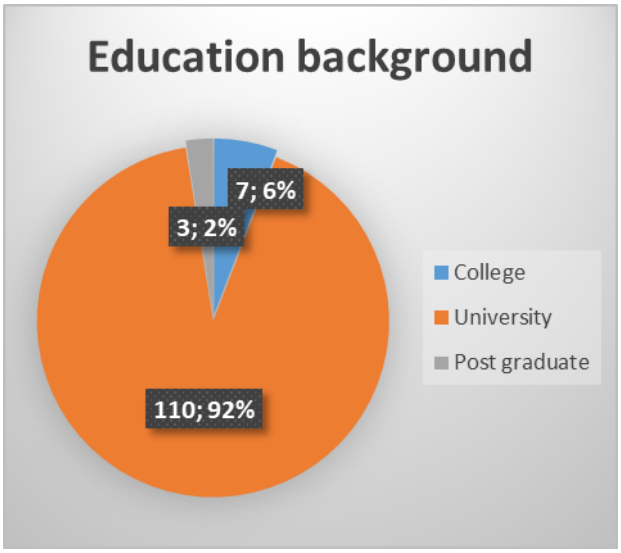

Figure 6. Education background

Based on the above survey results, it can be seen that, with a total of 120 questionnaires collected, the rate of "Educational attainment" is:
College accounts for 5.83% with 7 votes.
University accounts for 91.67% with 110 votes
Postgraduate level 2.5% with 3 votes
Thus, the majority of survey samples show that most of the surveyed subjects have university degree, no one has intermediate degree.

1.4. Statistics of the surveyed's work experience

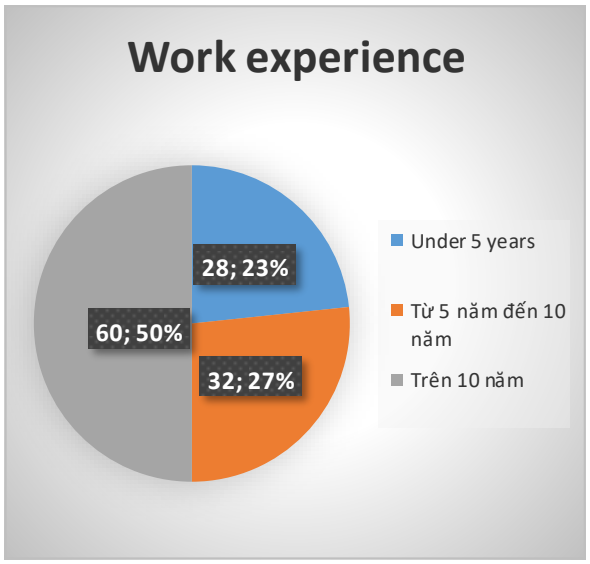

Figure 7. Work experience

Based on the above survey results, it can be seen that, with a total of 120 collected survey forms, the rate of "Work experience" is:
Under 5 years accounted for 23.33% with 28 votes,
From 5 years to 10 years accounted for 26.67% with 32 votes,
Over 10 years accounted for 50% with 60 votes.
Thus, the majority of survey samples show that the majority of respondents have more than 10 years of experience.

1.5. Statistics of the surveyed person's work agency

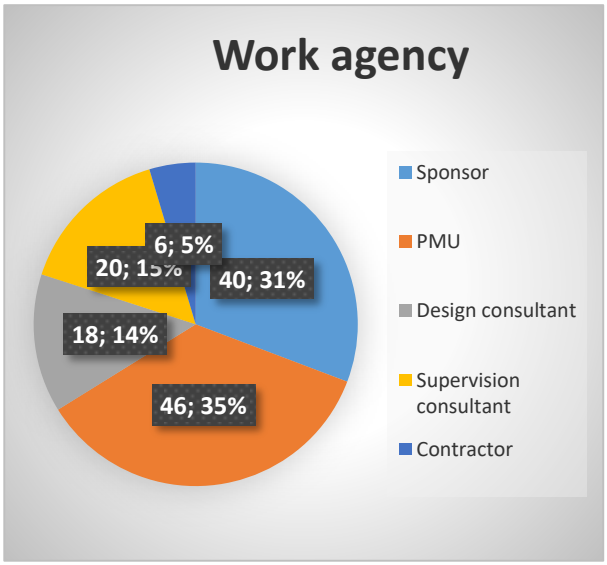

Figure 8. Work agency

Based on the above survey results, it can be seen that, with a total of 120 questionnaires collected, the rate of "Working Unit" is:
Investor accounts for 33.33% with 40 votes,
Project management board accounted for 38.33% with 46 votes.
Design Consulting accounted for 15% with 18 votes,

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Supervision Consultant accounted for 8.33% with 10 votes.
Contractors accounted for 5% with 6 votes.
Thus, the survey samples mostly show that most of the surveyed subjects are working at the Investor and Project Management Board 7, who directly invest in the project.

B. General information about the object to be surveyed
Information of surveyed subjects is summarized in Table 2.

TABLE II. OVERVIEW OF SUBJECTS TO BE SURVED

INFORMATION SAMPES		Sample mass	Percent (%)	Cumulative percent (%)
Gender (C1)	Male	110	91,67	91,67
	Female	10	8,33	100
Age (C2)	Under 30	17	14,17	14,17
	30 up to 40	42	35	49,17
	41 up to 50	56	46,66	95,83
	Over 50	5	4,17	100
Education background (C3)	College	7	5,83	5,83
	University	110	91,67	91,67
	Post graduate	3	2,5	100
Work experience (C4)	Under 5 years	28	23,33	23,33
	5 up to 10 years	32	26,67	50
	Over 10 years	60	50	100
Work agency (C5)	Sponsor	40	33,33	40
	PMU	46	38,33	71,66
	Design consultant	18	15	86,66
	Supervision consultant	20	8,33	95
	Contractor	6	5	100

C. Test the model

Cronbach's Alpha's test of scales
Test the reliability of the scale Cronbach's Alpha is to test the reliability scale of a observed variables set that can also be measured, showing the properties of the "parent factor". This tool will help to check whether the observed variables of the "parent factor" (factor A) are reliable or not. This test reflects the degree of close correlation between observed variables in the same factor. It shows the observed variables in the same factor, which variables contributed to the measurement of the concept of factors, which variables did not.
Factors that need to be verified include (1) Group of risk factors related to project characteristics (Cha); (2) Group of risk factors related to the capacity of stakeholders (Cap);
(3) Risk factors are specific to the traffic construction industry (Spe); (4) Group of risk factors related to the design process (Des); (5) Group of risk factors related to economics and legal policy (Pol); (6) Group of risk factors related to cost increasing (Inc).

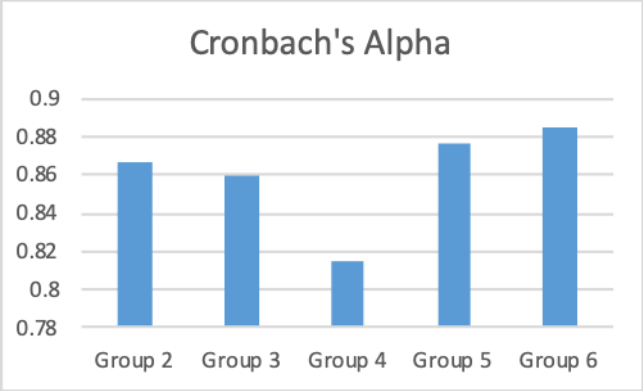

Figure 9. Chart of Cronbach's Alpha Index of factor groups

TABLE III. RISK FACTORS

Group of risk factors	Cronbach's Alpha	N of Items
Project characteristics	0,,823	4
Capacity of stakeholders	0,866	3
Traffic construction characteristics	0,859	5
Involved in the design process	0,815	3
Economics and legal policy	0,877	5
Cost increasing	0,885	4

Factors with total variable correlation coefficients of greater than 0.3 should not be excluded (Nunally & Burnstein 1994; cited by Nguyen Dinh Tho & Nguyen Thi Mai Trang, 2009). Therefore, all of these 4 research variables on the reliability scale. Cronbach's Alpha will be further analyzed in other contents.

D. Descriptive Statistics

D.1. Descriptive statistics by group of factors

**** Group of risk factors related to project characteristics***

The average value of the observed variables from Cha1 to Cha4 in the group of risk factors related to the project's characteristics are in the range from 2.5 to less than 4 on the 5 point Likert scale. Thus, more than half of the respondents who responded to the survey agreed with the criteria in the group of risk factors related to the project's characteristics.
Average values of Cha1 to Cha4 are not much different and are in the range from 2.5 to 3.5 on a 5-point scale. This shows that these risk factors have impacts on the implementation of The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project. However, just above average.

TABLE IV. STATISTICS DESCRIPTION OF RISK RELATED TO PROJECT CHARACTERISTICS

	N	Min	Max	Mean	Std. Deviation
Cha1	120	1,00	4,00	2,55	0,672
Cha2	120	2,00	4,00	2,57	0,645
Cha3	120	2,00	5,00	3,42	0,668
Cha4	120	2,00	5,00	2,69	0,754
Valid N (listwise)	120				

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**** Group of risk factors related to the capacity of stakeholders***:

The average value of observed variables from Cap1 to Cap3 in the group of risk factors related to the capacity of stakeholders are in the range from 4.42 to 4.47 on the 5-point Likert scale. Thus, most of the survey responses agreed with the criteria of stakeholder capacity significantly affecting the implementation of The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project. The average values of Cap1 to Cap3 are not much different from each other and are in the range from 4.4 on a 5-point scale. This suggests that these risk factors have approximately the same degree of impact.

TABLE V. STATISTICS DESCRIBUTING RISK RELATED TO THE PERFORMANCE OF PARTIES

	N	Min	Max	Mean	Std. Deviation
Cap1	120	3,00	5,00	4,43	0,603
Cha2	120	3,00	5,00	4,42	0,512
Cha3	120	3,00	5,00	4,47	0,517
Valid N (listwise)	120				

* ***Group of risk factors that are specific to the traffic construction industry***

The average value of the observed variables from (1 to Spe 5 in the group of risk factors related to the specifics of the traffic construction industry ranged from 2.30 to 4.02 on the 5-point Likert scale. Thus, about half of the survey responses agree with the criteria specific to the transport construction industry affecting the implementation of The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project. The average value of Spe1 to Spe5 is not much different and lies in the range from 2.3 to 4.02 on a 5-point scale. This suggests that these risk factors have varying degrees of impact.

TABLE VI. STATISTICS DESCRIPTION OF RISK OF TRAFFIC CONTRUCTION INDUSTRY CHARACTERISTIC

	N	Min	Max	Mean	Std. Deviation
Spe1	120	3,00	5,00	4,02	0,809
Spe2	120	2,00	5,00	3,20	0,729
Spe3	120	2,00	5,00	3,13	0,681
Spe4	120	2,00	5,00	3,07	0,676
Spe5	120	1,00	4,00	2,03	0,669
Valid N (listwise)	120				

**** Group of risk factors related to the design process***

TABLE VII. STATISTICS DESCRIPTION OF RISK RELATED TO THE DESIGN ESTABLISHMENT

	N	Min	Max	Mean	Std. Deviation
Des1	120	2,00	3,00	2,15	0,359
Des2	120	2,00	3,00	2,05	0,219
Des3	120	2,00	3,00	2,05	0,219
Valid N (listwise)	120				

Average value of observed variables from Des1 to Des3 in the group of risk factors related to the design process is from 2.05 to 2.15 on the 5-point Likert scale. Thus, less than half of the respondents who answered the survey agreed with the criteria in the group of risk factors related to design. The average values of Des1 to Des3 are not much different and are in the range from 2.05 to 2.15 on a 5-point scale. This shows that these risk factors have impacts on the implementation of The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project. However, just below average.

**** Group of risk factors related to economics and legal policy***

Average values of observed variables from Pol1 to Pol5 in the group of risk factors related to economics and legal policy ranged from 2.96 to 4.17 on the 5 point Likert scale. Thus, most of the respondents who answered the survey agree with the criteria in the group of risk factors related to economics and legal policies. The average values of Pol1 to Pol4 are not much different and are in the range from 3.24 to 4.17, while Pol5 has a value of 2.96 slightly lower than other factors on the 5 point scale. This shows that these risk factors have a relatively large impact on The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project.

TABLE VIII. STATISTICS DESCRIPTION OF ECONOMIC RISK AND LEGAL POLICY

	N	Min	Max	Mean	Std. Deviation
Pol1	120	3,00	5,00	4,17	0,760
Pol2	120	3,00	5,00	3,68	0,552
Pol3	120	3,00	5,00	3,68	0,552
Pol4	120	2,00	5,00	3,24	0,550
Pol5	120	1,00	4,00	2,96	0,585
Valid N (listwise)	120				

**** Group of risk factors is related to slippage factors***

Average values of observed variables from Inc1 to Inc4 in the group of risk factors related to slippage are in the range from 3.84 to 4.47 on the 5-point Likert scale. Thus, most of the survey responses agreed with the criteria of stakeholder capacity significantly affecting the implementation of The Renovation and Improvement NH.53, Tra Vinh - Long Toan

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section, Tra Vinh Province Project. The average values of Cap1 to Cap3 are not much different from each other and are in the range of 4.22 on the 5-point scale. This suggests that these risk factors have approximately the same degree of impact.

TABLE IX. STATISTICS DESCRIBUTING THE RISK RELATED TO THE EXCHANGE FACTORS

	N	Min	Max	Mean	Std. Deviation
Inc1	120	3,00	5,00	4,47	0,660
Inc2	120	2,00	5,00	4,22	0,822
Inc3	120	3,00	5,00	4,21	0,721
Inc4	120	2,00	5,00	3,84	0,722
Valid N (listwise)	120				

D.2. General descriptive statistics

Average values of 24 observed variables of risk factors affecting the real implementation of The Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh province are in the score from 2 , 55 to 4.47 on the 5-point Likert scale, only 2 observed variables have the value 2.05.

TABLE X. DESCRIPTION STATISTICS SUMMARY OF RISK FACTORS

	N	Min	Max	Mean	Std. Deviation
Cha1	120	1	4	2.55	.672
Cha2	120	2	4	2.57	.645
Cha3	120	2	5	3.42	.668
Cha4	120	2	5	2.69	.754
Cpa1	120	3	5	4.43	.603
Cap2	120	3	5	4.42	.512
Cap3	120	3	5	4.47	.517
Spe1	120	3	5	4.02	.809
Spe2	120	2	5	3.20	.729
Spe3	120	2	5	3.13	.681
Spe4	120	2	5	3.07	.676
Spe5	120	1	4	2.30	.669
Des1	120	2	3	2.15	.359
Des2	120	2	3	2.05	.219
Des3	120	2	3	2.05	.219
Pol1	120	3	5	4.17	.760
Pol2	120	3	5	3.68	.552
Pol3	120	3	5	3.68	.552
Pol4	120	2	5	3.24	.550
Pol5	120	1	4	2.96	.585
Inc1	120	3	5	4.47	.660
Inc2	120	2	5	4.22	.822
Inc3	120	3	5	4.21	.721
Inc4	120	2	5	3.84	.722
Valid N (listwise)	120				

IV. CONCLUSIONS AND RECOMMENDATIONS

In the current stable economic conditions (although affected by the COVID -19 translation), most of the survey responses agree with the criteria of the group of risk factors. Risks affecting the implementation of Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province Project are as follows:

- The factor of NL3 in construction contractor's capacity and TG1 - fuel price slippage (due to COVID -19 epidemic affecting world oil prices) has the highest average value of 4.47. This shows that most of the responses agree that given the fully equitized state-owned transport construction state-owned enterprises, the capacity of privately owned joint stock companies is no longer available. keep the capacity, experience and tradition of operation, construction management in association with professional ethics as before. Hence, it caused a decrease in confidence among industry experts. This survey results reflect the concerns of industry experts about the contractor's capacity to have a great impact on the risks in project construction investment. Regarding the factor that Inc1 is fuel price slippage, many experts worry that the Covid-19 pandemic could cause fluctuations in gasoline prices to the point where it is difficult to control, so the majority of respondents agree that this is a risk factor that greatly affects. most to the project implementation process.

- Next, the observed variable Cap2, Investor's capacity and PMU average value of 4.42 also significantly affect the project investment implementation process.

- The time of design and cost estimation by the factor of Des2, time for design verification and estimate is equal to the average value of Des3 and by 2.05 as the lowest value in the description table. This shows that, in the context of the current design and verification consulting capacity, the references that these two factors also affect the level of risk in project implementation but at the below average, not insignificant.

With the above results, making recommendations to the Investor to develop a plan, study well the issues related to the capacity of the contractor, the capacity of the investor and the PMU in the selection of contractors; promptly respond to macroeconomic fluctuations and instability that cause an increase in fuel and material price indexes. The solution is that the Investor, the PMU needs to improve their management capacity, honesty and objectivity in project management, especially the selection of contractors so that their capacity is really suitable. evaluation capacity according to the bidding documents in order to minimize the risk factors affecting the investment implementation of Renovation and Improvement NH.53, Tra Vinh - Long Toan section, Tra Vinh Province.

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Regarding the factor of fuel price slippage, it is recommended that the Investor need to reserve a budget to compensate for the contractor to avoid exceeding the total investment in case the world oil price fluctuates strongly due to the Covid pandemic - 19.

In addition, it is necessary to carefully consider other factors that have a relatively large impact on the risk level of the Project in order to have appropriate response measures.

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APPENDIX 1. SURVEY QUESTIONNAIRE

PART I. PERSONAL INFORMATION

1. Your gender:

☐ Male (1) ☐ Female (2)

2. Your age:

☐ Under 30 years old (1) ☐ 30 – 40 years old (2)

☐ 41 - 50 years old (3) ☐ Over 50 years old (4)

3. Your education background:

☐ Highschool (1) ☐ University (4)

☐ Intermediate (2) ☐ Postgraduate (5)

☐ College (3)

4. Your major experience:

☐ Under 5 years (1) ☐ 5 – 10 years (2)

☐ Over 10 years (3)

5. Your major:

☐ Contractor (1) ☐ Supevisor (4)

☐ Sponsor (2) ☐ PMU (5)

☐ Design consultant (3)

PART II. QUESTIONNAIRE

Would you please tell us the influence of the factors listed below on the factors that affect the implementation of the NH.53 Improvement and Upgrading Project, Tra Vinh - Long Toan, Tra Vinh Province .

Check the box containing the corresponding numbers:

(1) Non influence, (2) Very little influence, (3) Medium influence, (4) Big influence, (5) Great influence.

No.	Influe-nt factors	Your coments				
		Non - influen-ce	Very little influence	Med. influen-ce	Big influe-nce	Great influe-nce
		(1)	(2)	(3)	(4)	(5)
1	***Group of risk factors related to project characteristics (Cha)***					
	Natural topographic al features and project characteristi cs.					
	Survey time prolongs					
	Bidding time prolongs					
	The survey result is not accurate					
2	***Group of risk factors related to the capacity of stakeholders (Cap)***					
	Capacity of the designing and estimating unit					
	Capacity of Investor or PMU.					
	Capacity of construct-or					
3	***Group of risk factors that are specific to traffic work contruction (Spe)***					
	Difficulty of site clearance					
	Construc-tion organizati-on					
	Asset managem-ent					
	Appropriate to local contructo-n planning					
	The coordinati-on between consultants					
4	***Group of risk factors involved in the design process (Des)***					
	Change of design drawing					
	Time of designing and cost estimating					

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	Time of design and cost estimate verificatio-n					
5	***Group of risk factors related to economics and legal policy (Pol)***					
	Investor's financial resources					
	Financial capacity of contractor					
	Frequent legal policy changes					
	The guiding document-s are not specific					
	Policy on constructio-n investment					
6	***Group of risk factors related to cost increasing (Inc)***					
	Increased fuel prices					
	Material price increases					
	Labor cost increases					
	Prices of contructio-n machine and equipment increase					

PART III. EVALUATE

1. In your opinion, are there any different factors effecting to this project, apart from the above ones, in fact?

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8. With the factors that you just mentioned, if you face in reality, what solutions do you have to overcome?

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In case of need, you can contact me via email at Vpt1975@gmail.com

Thank you very much for taking the time to answer the question!

APPENDIX 2. CODING THE SURVEY QUESTIONS

- **Group of qualitative factors:**

- Gender:

Observed variables	Coding
Male	1
Female	2

- Age:

Observed variables	Coding
Under 30	1
30 up to 40	2
41 up to 50	3
Over 50	4

- Education background :

Observed variables	Coding
Highschool	1
Intermediate	2
College	3
University	4
Post graduate	5

- Work experience :

Observed variables	Coding
Under 5 years	1
5 up to 10 years	2
Over 10 years	3

- Work agency:

Observed variables	Coding
Contractor	1
Sponsor	2
Design consultant	3
Supervision consultant	4
PMU	5

*** GROUP OF QUANTITATIVE FACTORS**

No	Variables coding	Factor group
A	**QUALITATIVE FACTORS**	
	C1	Gender
	C2	Age
	C3	Education background
	C4	Work experience
	C5	Agency
B	**QUANTITATIVE FACTORS**	
		INDEPENDENT VARIABLES
1	**Cha**	**Group of risk factors related to project characteristics (Cha)**
	Cha1	Natural topographical features and project characteristics
	Cha2	Survey time prolongs
	Cha3	Bidding time prolongs
	Cha4	The survey result is not accurate
2	**Cpa**	**Group of risk factors related to the capacity of stakeholders (Cap)**
	Cap1	Capacity of the designing and estimating unit
	Cap2	Capacity of Investor or PMU.
	Cap3	Capacity of constructor
3	**Spe**	**Risk factors are specific to the traffic construction industry (Spe)**
	Spe1	Difficulty of site clearance
	Spe2	Construc-tion organization
	Spe3	Asset management
	Spe4	Appropriate to local contructon planning
	Spe5	The coordinati-on between consultants

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4	**Des**	**Group of risk factors related to the design process (Des)**
	TK1	Change of design drawing
	TK2	Time of designing and cost estimating
	Des3	Time of design and cost estimate verification
5	**Pol**	**Group of risk factors related to economics and legal policy (Pol)**
	Pol1	Investor's financial resources
	Pol2	Financial capacity of contractor
	Pol3	Frequent legal policy changes
	Pol4	The guiding documents are not specific
	Pol5	Policy on construction investment
6	**Inc**	***Group of risk factors related to cost increasing (Inc)***
	Inc1	Increased fuel prices
	Inc2	Material price increases
	Inc3	Labor cost increases
	Inc4	Prices of contruction machine and equipment increase
		DEPENDENT VARIABLE
7	**Y**	Risks affecting the implementation of the renovating and upgrading NH.53 from Tra Vinh - Long Toan, Tra Vinh Province project.