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FACTORS AFFECTING QUALITY OF BASIC DESIGN OF THE TRANSPORT INVESTMENT CONSTRUCTION PROJECTS IN HOCHIMINH CITY

Nguyen Van Sang and Nguyen Hoang Phuong

Abstract: *This paper presents the research results identifying the factors affecting the quality of basic design of the transport investment construction projects in Hochiminh City. The survey was conducted in Hochiminh City, focusing on the subjects working at consultingy units, investors and specialized state agencies. 190 surveys were issued, among which there are 140 valid responses, 6 main groups of factors affecting the quality of basic design were indetified, including: Project consulting and setting up contractor, Investor, Project budget, standards – legislation, the compatibility between basic design, technical design and science and technology. The exploratory factor analysis (EFA) was used to assess the influence levels of the factors. The management implications and basis of the proposed solution were also presented.*
Key words*: Basic design, Quality of investment project, Quality of basic design*

University of Economics Ho Chi Minh City, Viet Nam
Academy of Politics Region II, Ho Chi Minh City, Vietnam

I. INTRODUCTION

Along with the preliminary design, basic design is the first step in the contruction engineering design steps. The basic design is legally valid and oriented to the subsequents designs. The quality of basic design determines the quality of the subsequents designs and has a significant impact on the quality of the construction.

According to the Construction Law No 50/2014/QH13: "Basic design means a design made in the construction investment feasibility study report, based on the selected design plan, demonstrating the principal technical parameters suitable to applied standards and technical regulations, which serves as a basis for proceeding with subsequent designing steps."

The basic design must express the contents: The location, sizes, direction of the line of works, total construction ground; selected technological, technical amd equipment plan; solutions on structure, architectural, dimensions ... of construction works; solutions on construction technology, materials, estimated investment budget; Plan on connection of technical infrastructures inside and outside the works; fire and explosion prevention and fighting solutions; and applicable standards and regulations.

The idetification of the factors affecting the quality of basic design plays a critical role in prosposing the solutions to improve the quality of the basic design.

II. RESEARCH METHOD

The research process involves the following steps :

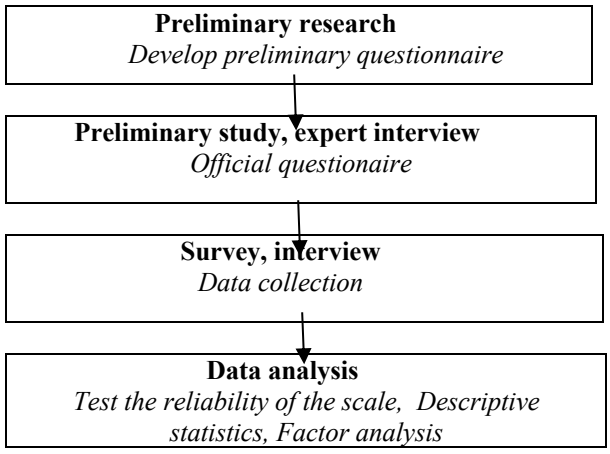

***Fig 1**. Research process*

Based on the preliminary list of influencing factors, design the pilot survey, conduct the pilot survey and analyse with SPSS 21 software. Based on the results of the scale test, eliminate the inappropriate factors, complete the questionnare and conduct the official survey.

III. DATA ANALYSIS

The pilot survey was conducted with a questionnare of 20 factors affecting the basic desgin and was sent to 30 experts and 30 questionnares were collected. Experts invited to the survey are department-level leaders at the Project Management Boards, consultants and designers specialized in transport.

The official questionnaire issued included 23 factors (experts added 3 factors), convenience sampling method was used. The total number of questionnaires issued directly and indirectly were 190, mainly in Hochiminh City. The number of valid questionnaires was 140.

Descriptive statistics and statistical tests are performed by SPSS software. The results show that all factor groups have a Cronbach Alpha coefficient of 0.7 or higher and the observed variables in each group have a correlation coefficient greater than 0.3, thus the scale is reliable, ensure conditions for factor analysis in the following section.

Through the study of published researches and experimental surveys, 23 observed variables were identified, Exploratory factor analysis (EFA) with Varimax rotation was used. Observed variables with a weight of less than 0.5 are discarded. The criteria for evaluating the EFA model: Total variance explained (explain the variance of observed variables) >= 50%, Bartlett's test of sphericity with the significance level value <= 0.05 ; KMO >=0.5. Other criteria: Extraction factor >0.5, Factor loadings of all factors >=0.5 ; factors have to display a 0.3 loading difference with any other factor.

Table 1. *KMO and Barlett's Test results*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0,836
Bartlett's Test of Sphericity	Approx. Chi-Square	2291,471
	df	252
	Sig.	0,000

According to Table 1, KMO = 0,838 > 0,5, indicates the sampling is adequate and the Chi-Square test statistic is 2291,471 with a significant level of 0,000. Thus, the factor analysis ensures the required standards to implement next steps.

Based on the results of the EFA factor analysis, the extracted factors meet the requirements of the reliability value, however there is a difference from the hypothetical model, the author adjusts the model compared to the initial hypothesis and rename the groups of factors.

- Group 1: Project planning contractor
- Group 2: Investor.
- Group 3: Project budget
- Group 4: Standard - Legal.
- Group 5: Compatibility between basic design and technology design.
- Group 6: Science and Technology

Table 2*. The main groups of factors affecting quality of basic design*

Group 1: Project planning contractor	
NT105	The basic design is too detailed;
NT623	The competence of basic design verification unit;
NT206	Experience of the staff involved in basic design (chairman, leader..);
NT414	The basic design is sketchy and no longer suitable to actual conditions;
Group 2: Investor	
NT102	Information and requirements of the investor in the design phase;
NT101	Investment policies; plans and guidelines;
NT105	The investor intervenes too deeply, imposes ideas on the design;
NT311	Time for approval at state management agencies
Group 3: Project budget	

NT103	Capital sources, cash invested for the project
NT518	Cost for hotel, basic design;
NT517	Exchange rate fluctuations
Group 4: Standard – legal	
NT519	Conformity between technical standards;
NT310	Legal procedures and quality of current normative standards
NT219	Regional infrastructure connection design;
Group 5: Compatibility between basic design and technology design	
NT413	Difference between the consulting contractor for project planning and technology design consulting;
NT620	Differences in project formulation survey results and technology design surveys
Group 6: Science and technology	
NT621	The development of science and technology makes basic design backward;

The analytical result show that there are 6 factor groups, the cumulative% of variance is 67,229% > 50%. It shows that 6 factor groups explain 67,299% of the variance is satisfactory, which means these 6 factors represent the remaining factors.

IV. ANALYSE THE INFLUENCE OF THE FACTORS

The components of the first group explained 16,010% the data fluctuations related to the experience of the designers (chairman, leader), the design was sketchy or too detailed. In order to reduce cost, consultancy units made the basic design quite general, which made it difficult to identify work and volume, resulting in the inaccurate total investment.

The components of group 2 explained 30,519% of data fluctuations related to investors such as policies, plans and invetsment guidelines... In fact, there are many cases where the investor intervenes deeply in the design, their subjective opinion leads to a mixed final basic design, lacking main ideas to implement the technical design.

The components of group 3 explained 42,820% of data fluctuations related to project finance. The source of capital is especially important so that the investor, the design contractor can calculate and provide the most effective and suitable solutions, make a balance between budget and benefits.

The components of group 4 explained 54,234% of data fluctuations related to policies, legal standards, normative standards. The change of legal documents increases the waiting time for implementing guidelines, the application is still inadequate, and there is not a complete synchronization between state management agencies. On the other hand, the project implementation period is long, so it is necessary to adjust many times when new legal documents are issued.

The components of group 5 explained 54,234% of data fluctuations related to the compatibility between basic design and technical desgin, especially the connection with regional infrastructure. Many projects have not been handed over because they cannot connect to the common infrastructure of the are when completed.

The components of group 6 explained 67,299% of data fluctuations related to science and technology application. There is a length of time from basic design to acounting account and contrucstion blueprint design, thus some of the proposed technologies used in basic design may be already outdated at the construction time.

V. CONCLUSION

Through the study, 06 groups of factors affecting the quality of basic design of the transport investment construction projects in Hochiminh City

The analysis results have pointed out that the factors of mechanism, policy, orientation and financial planning affect the quality of the basic design. The factors of the project implementers, science and technology also directly affect the quality of basic design.

The scope of the research is applied to the transport construction project in Hochiminh City. Subsequent studies can be extended to many subjects and across the country.

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