Identification of Factors Affecting Time and Cost Performance in Vietnam Construction Projects

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Abstract

In-planned duration and cost at project closing are the two of criteria of successful project and successful project management. In Vietnam, regularly, construction projects are delayed and their costs are overrun. This research employed a questionnaire survey to elicit the causes of this situation by interviewing 87 Vietnamese construction experts. After processing data, 21 causes of delay and cost overruns appropriate with building and industrial project in construction stage were inferred and ranked. Spearman's rank correlation tests showed that there're no differences in the viewpoints between parties in project.

Keywords: large construction project; delay; cost overruns; questionnaire, Vietnam.

1. Background and Objectives of study

Two main concerns in construction projects are cost overruns and delay. These problems have not only been in Vietnam but in other developing countries. Along with cost overruns and delay, the frequently faced consequences are project failed, reducing profit margin, losing the belief of citizen in government with government-driven funded projects. There're many reasons being exposed to justify but the need of a research to find the root causes is essential.

This research was carried out to find the root causes of delay and cost overruns during construction stage of projects in Vietnam. The research's objective is to focus on large construction projects. This type of project has mushroomed in Vietnam from 2000. Because it is difficult to exactly define large construction projects in Vietnam, in this paper we accompanied a previous study (Long et al, 2004 [3]) to define large construction project as a project with a total budget more than $1 million. These causes were ranked by adopted 'mean score' method as suggested by owners, contractors, consultants and all parties. In order to test for agreement in ranking between groups, Spearman rank correlation analysis was used for any two groups with level of significance = 0.05 for the exploratory purpose. It is similar to other developing countries most of the problems are human or management problems.

2. Methodology

2.1 Previous works

Researching on the causes of delay and cost overruns in construction projects was done elsewhere in the world. Mansfield et al 1992 [1] found that in Nigeria almost problems originating from human factors. Competence and poor management are difficulties in construction project in Vietnam(Long et al, 2004, 2003 [3,6]). And relating to the success of project, stressing on the Competence and Comfort is a must that means financing, materials, leadership…will create favorable conditions for project implementation (Long et al, 2004 [2]). Delays were scrutinized with many efforts for various objects from fast growing economy (Ogunlana et al, 1996 [8]), large construction projects (Sullivan et al, 1986 [9]) or construction industry (Abdul-Rahman et al, 2006 [12], Chan et al, 1996, [16]). And many try to assess their affects on the projects (Jannadi et al, 2003 [12]; Oztas et al, 2005 [15], Chaester, 2005 [10]).

2.2 Methodology

This research adopts survey methodology to uncover factors influencing on delay and cost overruns during

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construction stages. A questionnaire was designed and distributed to 285 construction professionals involved in large projects. A weighting scale of 0 to 2 was adopted for evaluating the effect of each factor. These numerical values were assigned to the respondents' rating: '0 = Not Significant; 1 = Moderately Significant; 2 = Very Significant'. In order to fit into conditions in Vietnamese Construction Industry (VCI), a pilot test was performed for preliminary questionnaire. Six experts in VCI were involved in this pilot test. Face-to-face delivery was preferred to promote respondents and raise the response rate. The chosen construction projects are located in Ho Chi Minh City, Vung Tau, Binh Duong and Long An provinces because these provinces are robustly developing economics zones in Vietnam. Questionnaires then collected and statistically processed by SPSS V13. Before analyzing, the inadequate data was eliminated to ensure it was adequate and appropriate for statistical testing. Eighty-seven full responses were obtained showing a rate of 30.5%.

The response rates are 43.7% from contractors, 33.3% from owners and 23% from consultants. It is impractical to separate construction managers from designers /consultants in Vietnam since there are no specialized construction management firms (Long et al, 2004 [3]). Among respondents, respondents were involved in building and industrial projects (75.9%), hydroelectric and irrigation projects (17.2%), bridge and road projects (4.6%), and others (2.3%). Since most of respondents are from building engineering, the survey results may be useful not in overall project categories but only limited to building and industrial projects.

3. Results and Discussions

3.1 Results

Table 1 lists mean scores and ranks of causes of delay and cost overrun in projects during construction phase with various viewpoints: Owners, Contractors, Consultants and All. The Cronbach's alpha reliability coefficient of these variables is 0.701. According to Berstein [17], this value is reliable.

Table 1: Ranking causes of delay and cost overruns

Items	All		Owners		Contractors		Consultants	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Poor site management and supervision	1.634	1	1.571	3	1.657	2	1.684	1
Poor project management	1.614	2	1.643	2	1.556	3	1.684	1
Inadequate financing of Owner	1.590	3	1.481	7	1.667	1	1.600	3
Inadequate financing of Contractor	1.554	4	1.655	1	1.457	4	1.579	4
Design changes	1.430	5	1.483	5	1.405	6	1.400	5
Discrepancies between designs and real conditions	1.300	6	1.520	4	1.270	7	1.059	16
Slow payment of completed works	1.294	7	1.357	9	1.243	9	1.300	7
Inaccurate estimates	1.286	8	1.357	9	1.222	13	1.300	7
Shortages of materials	1.272	9	1.154	16	1.432	5	1.111	12
Mistakes in design	1.267	10	1.483	5	1.243	9	1.000	18
Poor contract management	1.250	11	1.357	9	1.216	14	1.158	9
Price fluctuations	1.244	12	1.385	8	1.243	9	1.053	17
Unsuitable or obsolete construction methods	1.220	13	1.111	18	1.250	8	1.316	6
Low competence of subcontractors	1.217	14	1.308	12	1.184	15	1.158	9
Slow inspection of completed works	1.173	15	1.148	17	1.229	12	1.105	14
Mistakes during construction	1.143	16	1.179	15	1.108	18	1.158	9
Slow information flow between parties	1.138	17	1.185	14	1.114	17	1.111	12
Additional works	1.133	18	1.296	13	1.017	19	1.105	14
Shortages of skilled workers	1.049	19	1.000	19	1.135	16	0.947	19
Weather	0.915	20	0.808	20	0.973	20	0.947	19
Obstacles from government	0.827	21	0.808	20	0.806	21	0.895	21

Table 2: Spearman's rank correlation tests

	Owners Contractors	Owners Consultants	Contractors Consultants
rs	0.718	0.576	0.653
p value	0.000	0.01	0.002
Reject Ho?	Yes	Yes	Yes

The five first ranking reasons from All viewpoint had a good agreement between professionals in three parties of projects, but there was closer agreement between Consultants and All. The Inadequate financing of Owner was ranked first by Contractors and the Inadequate financing of Contractors was ranked first by Owners. These opposite ranks may be due to the culture within project or the expectation of one party to the other. Out of these factors, poor management related or human related factors are vast.

Table 2 represents the results of Spearman's rank correlation tests. The null hypotheses (Ho) for the no agreements between three parties in project in respect of

the ranking factors making delay and cost exceeded were tested with level of significance = 0.05. From the results, it can be concluded that between all parties of project there are no significant disagreements in respect of ranking these causes.

3.2 Discussions

- In developing countries, going with fast swelling of construction industry, design-related problems must be received a significant care. This matter is not only found in Vietnam but elsewhere in the world (Mansfield et al, 1992 [1]; Oztas et al, 2005 [13]; Chan et al, 1996 [16]...). Mistakes in design or poor design come from low-competence of designer have frequently existed. Unrealistic design leads to changes or owners don't clearly specify the scope of project resulted in additional works so that project could be delayed or postponed. These reduced project's profits or caused extravagance. Inspection and approval of design or drawing process has been thought very strictly but, especially with government-funded projects, this situation still presents. Design corporations are mushrooming but the quantity does not suit the quality. Applying ISO standard to design works might be a good solution however strict management from appropriate authorities or the owners by themselves is always the best.

- Although project management is now gradually professionalized in Vietnam after applying 'Open door' policy and many foreign project management firms have been joining to this market, actually this work remains weakness. According to Long et al [2] (2004), Competency is one of factors contributing to the success of construction project. Along with poor project management, weakness of contractors represented through poor site management, mistakes during construction or subcontractor has been tough problem. Training skilled human resource in site management and organization is insufficient. Chief site manager is often rated on years of experience without caring of updating knowledge.

- Contractors selection stage must be received more serious consideration. Many of researches have done in the world to propose applicable model for contractor selection but very few in Vietnam. Testing practically contractors' experience and competency through successful projects in the past should have bigger weight in score-scale of contractor selection. Similarity should apply to supervisor selection. Setting an information flow between parties that run effectively to quick solve differences, difficulties arising during implementation is not too hard or expensive in the IT era (Long et al, 2004 [2]).

- Owners pay a little concern on subcontractors. In most cases, owners manage subcontractors through some simple clauses in contract signed with contractor; these clauses very often just stipulate the limited percentage or a list of subcontractor works. This is in fact insufficient. Owners need to build a closer subcontractor management mechanism in order to minimize their adverse effects on project.

- Slow inspection or payment of completed works and discrepancies between designs and real conditions certainly lead to the delay. To minimize their consequences, all parties should identify clear responsibility for each party in contract. Contract related work however, is rather poor or cursory so that contract cannot be used as a tool in conflicting resolution. There should be experts in contract management and they will prepare fair and close contract clauses. The usage of FIDIC contract form needs be encouraged.

- Construction method is another difficulty of VCI. Obsolete technology has caused many problems for scheduling work (Long et al, 2004 [3]). International integration gives chances to approach and import new modern technology and encourages technology transferring. But at first, investigating the appropriateness of these techniques with Vietnam condition and training human for operating them have to be done carefully.

- Shortages of materials and price fluctuations, two factors have much effect on construction projects in fact. Their solutions are just increase ability of planning of contractors and careful survey. Price fluctuation is rather difficult to predict because this is one of objective factor group. It should be prepared and approved a mechanism in which benefit of parties must be guaranteed and fair.

- Financing factors relate to Owner and Contractor, current problems of VCI. Many projects is now delayed (not only in construction stage) because of insufficient fund. Owner should prepare an available fund for project. It should be a must that Owner build financial plan to pay Contractor as in contract agreement. On the other hand, Contractor must prepare a detail financial plan for project and it should be submitted and ratified by Owner as one of criteria for contract award.

- And others such as worker, government or weather produce less adverse effects on project during construction phase. However, practitioners also should pay attention to them to minimize latent risks.

4. Conclusions

By administered and analyzed a questionnaire survey, this research inferred risk items made project cost overrun and delayed during its construction stage and then ranked them from different viewpoints of parties. All viewpoint identified poor site management and supervision, poor project management, inadequate financing of owners, inadequate financing of contractors, design changes as 5 most important causes. Spearman rank correlation tests resulted in no significant disagreements between parties of project in respect of ranking these causes.

From these results, one more time, it is noted that most causes of delay and cost overrun of construction project relate to human and management problems (Mansfield et al [1]; Long et al [3]). Improving ability of managers and engineers work is necessary and emergent. Training human resource for construction industry, this is a task that does not only concern quantity but quality. Project feasibility study must be received a serious attention and must be done carefully. Specially, with government funded projects, a mechanism that closely stipulates feasibility study, contractor selection, financing... must be built and seriously applied. Consistent models for contractor selection sufficient with project types should be researched and realized. Alarming from this paper, contract management work should be focused. It always needs professionals to do contract work and suit template to real project conditions.

Researching to build practical models assessing the changes of schedule and cost that fit VCI circumstances is now prospective and necessary. Nowadays, there have been many efforts focused on this domain such as mathematical models, artificial intelligence models. But in fact, these efforts are scattered and haven't been appraised. The results from this research can be used as input variables in such models.

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