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Delay Factors Affecting the Completion of the Government Construction Projects in Vietnam

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Abstract: ***The delay in construction is the challenge often faced in the course of executing construction projects. To the government projects, the delays become very serious. This problem directly affects the lives, social welfare of the people, and the other negative social impacts. However, the government projects have not been much interest. The questionnaire surveys in Vietnam were conducted to determine the causes of the delay and to find solutions for dealing with the delay. The average index was used to rank the delay factors and the solutions. This study identified the 5 most highly ranked delay factors and the 8 best solutions from a list of 31 delay factors and 19 solutions for the delay. The five most highly ranked delay factors were: information delays and lack of information exchange between the parties; incompetent owner; incompetent supervision consultant; incompetent contractor; and difficulties in financing project by owner. The findings of the study can help the parties involved the government construction projects and practitioners to give appropriate strategies for countering the delay in their projects.***

Keywords: Delay Factors, Solutions for the delay, Government Projects, and Vietnam.

I. INTRODUCTION

The delay is a common problem in the global construction industry affecting development of the construction industry in particular and of the overall economy of countries in general. Especially in developing countries, the construction industry has some shortcomings such as poor understanding of the project, lack of modern equipment, incompetent contractors, etc. This problem can easily occur and lead to a negative impact on the result of the project as cost overrun, poor quality and lack of safety. Vietnam, is known as a fast developing country in South-East Asia, does not escape the problem of delay in construction.

The construction industry is one of the most booming industries in the economic growth of Vietnam. Many construction projects have completed, going on and many future ones. The delay in construction is the challenge often faced in the course of executing construction projects. Moreover, with the government projects relating the road and bridge projects, the hydropower projects, the thermal power projects, or the low income housing projects; the delays become more serious. This problem directly affects the lives, social welfare of the people as well as the other negative social impacts.

In Vietnam, it is very few cases that government construction projects are completed on the time or deadline specified in the contract. There are many large construction projects suffered the delay, suspension or abandonment include: the thermal power plant of Uong Bi, the Ho Chi Minh City Metro rail system, the National Highway of Ha Noi-Hai Phong, Nhat Tan Bridge, the Tan Rai project for bauxite mining, and so on.

Thus, in order to avoid delays, the root causes of delay should be identified, which help practitioners to give solutions for countering the delays and lessening the causes related to delays. Most of the previous studies analyzed the overall construction project as covering all the types of projects in the construction industry, they did not conduct a deep analysis of each individual case for private projects, public projects or government projects which could be related more to the legislation, the administrative procedures. The objectives of this paper are to:

- To identify factors affecting the delay in the government construction projects in Vietnam.
- To find solutions for dealing with the delay in the government construction projects in Vietnam

II. LITERATURE REVIEW

II.1 Delay in construction

Delay in construction could be defined as the time overrun, happening at a later completion date than planned or expected, specified in the contract or beyond the date of the agreement between the parties for the delivery of the project. (Assaf and Al-Hejji, [1]). A project that is not completed within the predetermined time often happens because the construction process is subject to many conditions and unpredictable elements, which result from many sources such as the performance of contractors, material procurement, site conditions, coordination between the parties, finance, contractual relations, and etc. According to Assaf and Al-Hejji [1], seventy percent of construction projects experienced time overrun and the average time overrun was between 10% and 30% of the original duration. From the contractor's perspective, delay is simply an additional responsibility as: the construction period becomes longer, increasing

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overhead costs and expenses for the longer period of the project, the total working capital of the contractor can be trapped in one project and they cannot participate in other projects (Al-Kharashi and Skitmore, [2]). To the owner's perspective, the delay is loss of yield and revenue due to lack of production facilities and lease space or a dependence on present facilities [1].

II.2 Studies on causes of delay

Many researchers and practitioners have studied the causes of delay in construction projects. Assaf and Al-Hejji [1] conducted a survey on time performance of different types of construction projects in Saudi Arabia to determine the causes of delay and their importance according to each of the project participants, i.e., the owner, consultant and the contractor. Seventy-three causes of delay were identified during the research. These causes are classified into nine groups according to the sources of delay.

Sambasivan and Soon [3] studies causes and effects of delays in the Malaysian construction industry. They highlighted 10 most important causes of delay from a list of 28 different causes and 6 different effects of delay. Ten most important causes were: (1) contractor's improper planning, (2) contractor's poor site management, (3) inadequate contractor experience, (4) inadequate client's finance and payments for completed work, (5) problems with subcontractors, (6) shortage of material, (7) labor supply, (8) equipment availability and failure, (9) lack of communication between parties, and (10) mistakes during the construction stage.

Abd El-Razek et al. [4] conducted a survey to evaluate the degree of importance of 32 delay factors in building construction projects in Egypt. The overall results indicated that the most important causes are: financing by contractor during construction, delays in contractor's payment by owner, design changes by owner or his agent during construction, partial payments during construction, and non-utilization of professional construction/contractual management.

Fugar and Agyakwah-Baah [5] studied the causes of delay of building construction projects in Ghana and found top ten most important factors: delay in honouring certificates, underestimation of the cost of project, underestimation of complexity of project, difficulty in accessing bank credit, poor supervision, underestimation of time for completion of projects by contractors, shortage of materials, poor professional management, fluctuation of prices/rising cost of materials, poor site management.

Haseebet al. [6] investigated problems of projects and effects of delays in the construction industry of Pakistan and concluded that the most common factors of delay are natural disaster in Pakistan like flood and earthquake. The study also acknowledged others which are: financial and payment problem, improper planning, poor site management, insufficient experience, and shortage of materials and equipment.

III. RESEARCH METHODOLOGY

In order to achieve the above research objectives, questionnaire surveys were designed to gather views from industrial practitioners. This study comprises two types of questionnaires: (1) questionnaire 1 for evaluating the level of impact of the factors on the delay in the government construction projects; (2) questionnaire 2 finding the best solutions in order to counter the delays.

The development of the questionnaire 1 was supported by the literature review. A preliminary set of delay factors was collected from the literature review and presented in the pre-test questionnaires. A pilot study was then conducted to validate the questionnaire with five experts through face-to-face interviews. They were two project managers, one engineering managers, and two construction manager in large-sized firms. They were asked to comment on the delay factors in the pre-test questionnaire and to exclude unimportant factors and add other delay factors perceived as being necessary. According to their comments, 31 delay factors were identified from the preliminary list and divided into 6 groups as follows: owner related factors (O), consultant related factors (CS), contractor related factors (CT), project conditions related factors (P), contract related factors (CO), and external factors (E).

The finalized questionnaire 1 consisted of three parts. The first part of the questionnaire introduces the participants to the origin, the purpose of the survey. The second part focuses on causes of construction delay. The respondents were asked to assess the degree of impact of the delay factors. Eventually, the third part of the questionnaire requests background information about the respondents. A five-point Likert scale ranging from 1 (not impact) to 5 (extremely impact) was used to measure the impact of the delay factors. In order to encourage participation of respondents, the questionnaire conveyed that the findings of the study could be shared with the respondents. A total of 220 questionnaires were mailed out and hand delivered to carefully pre-identified target participants involved mostly in the members list of the Construction Management Association in Vietnam. Out of 220 questionnaires that were distributed, 169 respondents returned their questionnaires. Four responses were eliminated because of a high degree of incompleteness. Consequently, this study was based on 165 valid replies, representing a response rate of 75%.

The valid data set was analyzed on Statistical Package for Social Sciences (SPSS) software. First, the reliability of the five-point scale used in the survey was determined using Cronbach's coefficient alpha. Subsequently, the delay factors were ranked using average index. Based on the factors having the greatest impact on the delay, a list of solutions was given through discussion with experts. Finally, the questionnaire 2 with the solutions was developed to collect the experienced practitioners' judgments for finding the best solutions. The solutions include two evaluation criteria that are feasibility and effectiveness. These two criteria were also measured based on the five-point Likert (1- not feasible to

5 extremely feasible, and 1- not effective to 5 extremely effective).

IV. DATA ANALYSIS AND DISCUSSION

IV.1 Profiles of respondents

A frequency analysis was conducted for the profiles related to the general information about the respondents and projects. This information includes the organization of respondents, years of experience, and types of project involving by respondents. The highest number of questionnaires received was from the owners (46%). Thirty-four percent (34%), and 20% of questionnaires were received from the contractors, and the consultants, respectively. The number of respondents having experience from 5 to 10 years, 10 to 15 is 43%, 14%, respectively and more than 15 years as 7%. They account for a large rate of the respondents. Thus, the collected data are relatively reliable and valuable. The respondents with less than 5 years of experience account for only 36%. About the types of project, traffic works account for the highest proportion (37%); the other projects are civil works (31%), infrastructure works (16%), irrigation works (14%) and industrial works (2%).

IV.2 Reliability analysis

To demonstrate reliability of the five-point scale, the Cronbach's alpha coefficient was calculated to examine the internal consistency among the factors (Field, [7]). The acceptable lower limit for the Cronbach's alpha is usually considered to be 0.7, although values as low as 0.6 are sometimes acceptable for exploratory research (Hair et al., [8]). The Cronbach's alpha coefficients of owner related factors, consultant related factors, contractor related factors, project conditions related factors, contract related factors, and external factors are in turn 0.91, 0.826, 0.775, 0.829, 0.784 and 0.822. Therefore the five-point scale measurement was reliable at the 5% significance level.

IV.3 Ranking of the delay factors

Table I shows the ranking of the delay factors according to the value of their means. The factors with $3.5 \leq$ means ≤ 4.5 were rated as "very impact" on the delay (Majid and Mccaffer, [9]). Based on the ranking, results indicate the five most highly ranked factors as (P1) information delays and lack of information exchange between the parties (mean = 3.82); (O7) incompetent owner (mean = 3.81); (CS1) incompetent supervision consultant (mean = 3.8); (CT2) inadequate contractor's human resources (3.79); (O2) difficulties in financing project by owner (3.78).

Although "information delays and lack of information exchange between the parties" was not highlighted in previous studies, it was ranked top by the respondents, suggesting that information exchange between the parties was recognized as paramount for the government construction projects. The information delays and lack of information exchange between the parties are serious problems when the project is running and encountering with deadline or important milestones. These problems lead to the different understanding about the project objectives between the parties. Conflicts can occur when the information is not updated in time to one of the parties. The old information could be done by the contractor. Therefore, the completed works could not meet the owner's requirements, also caused schedule delays and cost overruns.

"Incompetent owner" was ranked second, implying that the owner's competence is very important to ensure project success. The owners are the participant playing a lead role in the project. The incompetent owners may go ahead with the project even with inadequately formulated project, they may freeze the completion date without planning and also may not be able to recruit a competent person to look after their interest. All these result in an unsuccessful outcome as far as the schedule is concerned (Jha, [10]).

"Incompetent supervision consultant" was ranked third. Supervision consultants assigned great authorities and responsibilities in the government projects. They represent owners to supervise construction and accept quantity, quality, construction methods of the contractors, etc. Incompetent supervisors work slowly and may be responsible for defective works and inappropriate application of tools and equipment (Makulsawatudom and Emsley, [11]). More seriously, if they are easy to approve the contractor's poor quality works. These actions are the causes of rework which contributed significantly to the schedule delay.

Next, "Incompetent contractor" was ranked fourth, indicating the importance of selecting competent contractors in each project. The contractors are the participant directly creating products of the project. Incompetent contractors can lead to many negative impacts in their works such as poor site management, inappropriate construction methods, improper planning, errors during construction, inaccurate time estimation, inaccurate cost estimation. Out of these negative impacts, contractor's improper planning and contractor's poor site management are the two most important causes of delays ranked first and second, respectively in Sambasivan and Soon's research [3].

Furthermore, "Difficulties in financing project by owner" occupied the fifth position. Financial issues are always a primary concern as quality and time in the project management triangle. Difficulties in financing project by owner will result in delays in payment to contractors. This directly affects the completion of the project and cause time overrun as well as give rise to disputes between the various parties (Sambasivan and Soon [3]). Some researchers also found that difficulties in financing project by owner are the major cause of delay. For example, it was ranked fourth in Malaysia (Sambasivan and Soon', [3]), ranked second in Nigeria (Aibinu and Odeyinka, [12]), ranked first in Ghana (Frimpong et al., [13]), and ranked second in Kuwait (Koushki et al. [14]).

TABLE I
THE RANKING OF THE DELAY FACTORS

Codes	The delay factor	Mean	Rank
P1	Information delays, and lack of information exchange between the parties	3.82	1
O7	Incompetent owner	3.81	2
CS1	Incompetent supervision consultant	3.80	3
CT2	Incompetent contractor	3.79	4
O2	Difficulties in financing project by owner	3.78	5
CS2	Incompetent project management consultant	3.75	6
CS3	Incompetent design consultant	3.74	7
CT1	Difficulties in financing project by contractor	3.73	8
CT3	Shortage of equipment of contractor	3.72	9
CO1	Lack of strictness and binding in the contract documents	3.69	10
O5	Lack of understanding of technique and constructional legislation of owner	3.68	11
CO2	Ineffective delay penalties	3.66	12
O12	Long waiting time due to owner's authority decentralization in approving design and cost estimate (complying with legal process)	3.65	13
O3	Delay of owner in acceptance of completed works	3.65	13
P2	Lack of coordination between the parties	3.65	13
O14	Long waiting time due to owner's authority decentralization in approving payment (complying with legal process)	3.65	13
O11	Long waiting time due to owner's authority decentralization in approving the project (complying with legal process)	3.65	13
O4	Delay in payment to contractors of completed works	3.65	13
O1	Bureaucracy of owner	3.64	19
O13	Long waiting time due to owner's authority decentralization in approving bidding results (complying with legal process)	3.64	19
O8	Slowness in decision making process by owner	3.58	21
O10	Long waiting time due to owner's authority decentralization in approving adjustments (complying with legal process)	3.56	22
O6	Delay of owner in solving the arising during the project implementation	3.55	23
P4	Remote location of site	3.47	24
P3	The complexity of project	3.46	25
O9	Lack of continuous updating of the project implementation process by owner	3.42	26
CO3	Unavailability of incentives for the contractor for finishing ahead of schedule	3.39	27
E3	Complex geological condition	3.27	28
E2	Changes in government regulation and laws	3.25	29
E1	Price fluctuations of construction materials	3.07	30
E4	Natural disasters (earthquake, flood, etc.)	3.04	31

The two factors that have the lowest means with comparing to other factors are: (E1) price fluctuations of construction materials (mean = 3.07), and (E4) natural disasters (mean = 3.04).

IV.4 Solutions of avoiding or minimizing delays

Based on the five most highly ranked factors, a total of nineteen solutions have been identified through discussion with experts in order to avoid or minimize construction delays as follows:

P1: "information delays and lack of information exchange between the parties"

- S1: Clear information and communication channels.
- S2: Asking the stakeholders to regularly report on the schedule, status, and plan of the project implementation.

O7: "Incompetent owner"

- S3: The need for training programs for owners' personnel about leadership and project management skills.
- S4: Strengthening inspection, oversight as well as strengthening the cooperation between the owner and the consultants.
- S5: Urging acceleration of site activities and asking the stakeholders to comply with the signed contracts.

CS1: "Incompetence supervision consultant"

- S6: Selecting the supervision consultants that are unconnected with the contractors.
- S7: Selecting the supervision consultants with competence, professionalism, professional ethic, and prestige.
- S8: Publicity, plainness, and seriousness in selecting the supervision consultants.
- S9: Increasing the budget for supervision contract.
- S10: Routine inspection of the supervision consultant's reports.

CT2: "Incompetent contractor"

- S11: Asking contractors to focus high-level human resources for key projects.
- S12: Visiting and learning the similar projects to improve the level of engineers and workers.
- S13: Publicity, plainness, and seriousness in selecting the contractors.
- S14: Selecting the contractors with competence and experience in similar projects.
- S15: Routine inspection of the contractor manpower compared with contracts or bid documents.

O2: "Difficulties in financing project by owner

- S16: Accurate initial cost estimates.
- S17: Having the reasonable disbursement plan for each stage of the project.
- S18: Converting the public projects into public-private projects or private projects to mobilize private capital.
- S19: Focusing allocate capital for key and urgent projects, projects that are likely to end soon.

In order to find the best solutions for countering the delays, the questionnaires 2 were distributed to twenty experienced practitioners for collecting their judgments. The evaluation criteria include feasibility and effectiveness of the solutions. The mean values of feasibility ($Mean_1$) and effectiveness ($Mean_2$) were then calculated to extract the best solutions. The solutions with $3.5 \leq mean_1$; $mean_2 \leq 4.5$ were considered as an

agreement of the practitioners (Majid and Mccaffer, [10]). As the outcome of this stage, the eight best solutions were identified, including S14, S3, S1, S5, S2, S7, S18, and S13 as shown in Table II.

TABLE II
SOLUTIONS OF AVOIDING OR MINIMIZING DELAYS

Codes	Solutions	$Mean_1$	$Mean_2$
S14	Selecting the contractors with competence and experience in similar projects	4.00	4.15
S3	The need for training programs for owners' personnel about leadership and project management skills	4.00	3.85
S1	Clear information and communication channels	3.90	3.90
S5	Urging acceleration of site activities and asking the stakeholders to comply with the signed contracts	4.05	3.75
S2	Asking the stakeholders to regularly report on the schedule, status, and plan of the project implementation	3.75	3.95
S7	Selecting the supervision consultants with competence, professionalism, professional ethic, and prestige	3.70	3.95
S18	Converting the public projects into public-private projects or private projects to mobilize private capital	3.55	4.10
S13	Publicity, plainness, and seriousness in selecting the contractors	3.50	3.65
S11	Asking contractors to focus high-level human resources for key projects	3.45	3.60
S19	Focusing allocate capital for key and urgent projects, projects that are likely to end soon	3.40	3.45
S10	Routine inspection of the supervision consultant's reports	3.15	3.05
S8	Publicity, plainness, and seriousness in selecting the supervision consultants	3.00	3.10
S16	Accurate initial cost estimates	2.80	2.95
S6	Selecting the supervision consultants that are unconnected with the contractors	2.80	2.90
S4	Strengthening inspection, oversight as well as strengthening the cooperation between the owner and the consultants	2.90	2.75
S9	Increasing the budget for supervision contract	2.70	2.85
S15	Routine inspection of the contractor manpower compared with contracts or bid documents	2.75	2.60
S17	S17: Having the reasonable disbursement plan for each stage of the project	2.55	2.80
S12	Visiting and learning the similar projects to improve the level of engineers and workers	1.90	2.85

V. CONCLUSIONS

This study identified the delay factors affecting the completion of the government construction projects in Vietnam as well as gave appropriate solutions for countering the delay. This study identified 31 delay factors. The results of the study showed the five most highly ranked factors as: (1) information delays and lack of information exchange between the parties; (2) incompetent owner; (3) incompetent supervision consultant; (4) incompetent contractor; and (5) difficulties in financing project by owner. Based on these five highly ranked factors, 19 solutions were given through discussion with experts and the 8 best solutions were identified to prevent and limit the negative impact of the delays. The results of this study can be of immense help to the parties involved the government construction projects and practitioners. They can better understand about the causes of the delay in the government construction projects that help them to have appropriate strategies for countering the delay in their projects.

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