

A study of the factors affecting delay in apartment projects in Vietnam

Luu, Truong-Van*○ Kim, Soo-Yong**

Abstract

Construction schedule plays a key role in project management due to its influence on the project success. Thus, it is important to identify factors affecting construction delay. The major objective of this study is to identify and evaluate factors affecting construction delay in apartment projects in Vietnam. The findings confirmed that financial difficulties of owners and contractors, contractors without adequate experience, non-available materials on time, slow site clearance, inappropriate construction methods, defective works and reworks, and lack of capable owners/project managers are the major causes of delay in apartment projects.

Keywords: apartment project; delay; time overruns; factor analysis, Vietnam.

1. Background and Objectives of study

Without the use of a schedule it is difficult to coordinate the diverse activities found in a construction project [1]. It is widely accepted that delay causes considerable losses to project parties. Thus, identifying factors affecting delay in construction projects is an initially important step to avoid delay in construction.

The construction environment in Vietnam is risky due to poor infrastructure, backward management mechanisms, a bureaucratic local government, and less competition between stated-own and private enterprises. As a result, the delay of construction projects is common and causes financial loss for project stakeholders. Thus, identifying factors cause delay is an effective solution for raising the success of construction projects. Unfortunately, there has been very little empirical work done on this subject in the Vietnamese construction industry (VCI).

This study attempts to identify construction delay factors in the VCI and to uncover the underlying relationships between these factors. The results is useful not only to participants in the VCI but also to people in other countries.

2. Methodology

2.1 Previous studies

The various studies of significant factors affecting construction delays have appeared in many academic journals and interdisciplinary conferences. These studies have been conducted from developed countries such USA [2] and UK [3] to developing countries such as Turkey [4], Hong Kong [5-8], Malaysia [9], Jordan [10,11], Nigeria [12], Thailand [13], Ghana [14], and Kuwait [15]. A major observation is that most problems are human and management related problems [9,12].

2.2 Research methodology

Based on the information from literature review of previous studies, 42 factors affecting delay in apartment projects were identified through the discussion with some construction professionals who have more than 10 years of experiences. A questionnaire was then carefully designed in order to evaluate the relative importance of factors. The authors adopted a five-point Likert-type scale (from 1="no effect" to 5="strongly affect") to assign to respondents' rating. Two hundred and eighty copies of the questionnaire was distributed to a random sample of a wide range of construction personnel

* 학생회원, 부경대학교 대학원 건설관리협동과정 박사과정

luutruongvan@yahoo.com

** 종신회원, 부경대학교 건설공학부교수

kims@pknu.ac.kr

involved in construction projects in Ho Chi Minh city. The authors received responses from owners (n=31), site supervisors (n=26), designers (n=28) and contractors (n=81). A response rate of 59% is adequate for analysis in construction industry [4]. Sixteen factors (Table 1), which have mean value higher than 3.5 and Cronbach's alpha higher than 0.7, were considered as significant factors.

3. Results and Discussions

3.1 Respondent's characteristics

The response rates from various groups are 49% from contractors, 32% from consultants (15% from site supervisors and 17% from designers) and 19% from owners. This shows a high percent rate of contractors in the survey since they have had much experience of construction delays. More than a half (58%) of respondents were functional managers and top managers (48% from top managements and 10% from functional managers). The large proportion of top management and functional managers reflected the reliability of collected data for identifying factors affecting the construction delay. Among the respondents, 29% of them had experience of less than five year working, 52% of respondents had experience between 5 and 10 years and 19% them had experience more than 10 years. It would have been better if the proportion of respondents more than 10 years experience could be increased.

3.2 Results

The collected data were statistically analyzed to determine the mean value of 42 delay factors. Table 1 shows the top 16 significant factors that influenced the construction delay

Table 1: Ranking 16 significant factors affecting construction delay in apartment projects

No.	Causes of delay	Overall	
		Mean	Rank
1	Owner's financial difficulties	4.23	1
2	Inadequate contractor's experience	4.13	2
3	Non-available materials on time	4.07	3

4	Contractor's financial difficulties	3.98	4
5	Late site handover	3.94	5
6	Delays in progress payments by owners	3.80	6
7	Low awarded bid prices	3.73	7
8	Inappropriate construction methods	3.70	8
9	Defective works and reworks	3.67	9
10	Material price fluctuations	3.66	10
11	Lack of capable and responsible site supervisors	3.64	11
12	Inclement weather	3.63	12
13	Owner's site clearance difficulties	3.57	13
14	Lack of capable owners/project managers	3.56	14
15	Designer's inadequate experience and capability	3.55	15
16	Shortage of equipment	3.52	16

Based on results of factor analysis technique, variables are readily interpretable as: factor 1 concerns human competence, factor 2 concerns construction process, factor 3 is works in the initial phase of the project, factor 4 concerns owners' capability, and factor 5 concerns construction environment (Table 2). Kaiser-Meyer-Olkin (KMO) value is equal to 0.8. Barlett's test is significant at lower than 0.005. These indicated that results of factor analysis is reasonable.

Table 2: Factor analysis results

Variables	Factor				
	Human competence	Construction process	Owners	Initial phase of the project	Environment
Inadequate contractor's experience	0.717				
Designer's inadequate experience and capability	0.695				
Lack of capable project managers	0.637				
Lack of capable and responsible site supervisors	0.604				
Low awarded bid prices	0.592				
Contractor's financial difficulties	0.507				
Non-available materials on time	0.446				
Defective works and reworks		0.707			
Shortage of equipment		0.508			
Inappropriate		0.432			

construction methods					
Delays in progress payments by owners			0.653		
Owner's financial difficulties			0.429		
Owner's site clearance difficulties				0.746	
Late site handover				0.341	
Inclement weather					0.531
Material price fluctuations					0.464

3.3 Discussions

The results in Table 1 revealed that the top main causes of delay in construction of building projects and industrial construction projects included: owner's financial difficulties; contractors without adequate experience; non-available materials on time; contractor's financial difficulties; slow site clearance; inappropriate construction methods; defective works and reworks; lack of capable owners/project managers.

Contractors and consultants ranked "the owner's financial difficulties" as first priority whereas owners ranked it fourth. An acceptable explanation is that the complex procedure and bureaucracy in the local authorities are the main causes of this situation.

The second item in Table 1 which was considered by all parties as a cause of delay in construction projects is contractors with inadequate experience. In Vietnam, there are no specialized construction management firms [16], therefore weak capacity of owners' project management units caused delays in procurement process because most contracts was entrusted to unexperienced contractors.

Owners evaluated "Non-available materials on time" and "Contractor's financial difficulties" as the first source of delay, while contractors and consultants less concern it. These imply that weak competence of project managers/owners in procurement planning and contract management resulted in project delay. It seems popular in developing countries because several studies [15] on delays in the construction projects indicated that "owner's lack of experience in the construction business", "late in reviewing and

approving design documents by owner" and "change of orders by owner during construction" are main causes of time-delays.

Conversely, the factor of "designer's inadequate experience and capability" was ranked relatively low by all parties. Moreover, the lowest significant factor attributing to the cause of delay in apartment projects is the shortage of equipment. Since construction is still labor-intensive work in Vietnam [16], it is apparent that shortage of equipment was not ranked as high influence on construction delay.

As shown in Table 2, the "human competence for project management" factor is predominant. Vietnam is one of countries with transaction economy, thus lack of capable human resources is a big problem in the VCI.

In Vietnam, the Government reserves for itself the land ownership whereas people have only the right of land use. Before commencing construction and starting up the project, owners have to negotiate with communities for compensating the right of land use and then must to meet with approval from the local government. As a result, delay in project time due to the bureaucracy in local government departments for the right of land use as well as the complex procedure for issuing the land-used certificate is popular. Therefore, "works in the initial phase of the project" is one of predominant factors causing delay in apartment projects.

The results of Table 1 and Table 2 shows that capable owners are very important factors to avoid delay in construction. The Vietnamese government, a biggest customer of Vietnamese construction industry, empowered to local authorities to undertake as essential owners of medium and large scale projects. This seems a common problem in developing countries. A study [14] on causes of delay in construction of groundwater projects in Ghana also confirmed this finding.

4. Conclusions

The major objective of this study is to identify and evaluate factors affecting construction delay in apartment projects in Vietnam. The major causes of delay in construction of apartment projects are: owner's financial difficulties, inadequate contractor's experience, non-available materials on time,

contractor's financial difficulties, slow site clearance, inappropriate construction methods, defective works and reworks, lack of capable owners/project managers.

It is recommended that contractors should clearly understand their responsibility to provide materials on time and well prepare for their finance to avoid the time overrun. In addition, owners need to identify their duty in monthly payment on time to contractors as the effective solution to eliminate the time overrun. Moreover, it should be noted that all project parties should focus on issues relating to construction process such as defective works and reworks, shortage of equipment, inappropriate construction methods, for preventing the time overrun. The future research should apply the factor analysis to other kinds of the construction project in order to exploit its usefulness.

References

1. Gould FE. *Managing the construction process: estimating, scheduling and project control*. New Jersey: Prentice Hall, 2002.
2. .
3. Sullivan A, Harris FC. Delays on large construction projects. *International Journal of Operation Production Management* 1986;6(1):25-33.
4. Arditi RD, Akan GT, Gurdamar S. Reasons for delays in public projects in Turkey. *Construction Management and Economics* 1985;3:171-181.
5. Chan DWM, Kumaraswary MM. A study of the factors affecting construction durations in Hong Kong. *Construction Management and Economics* 1995;13:319-333.
6. Chan DWM, Kumaraswary MM. A comparative study of causes of time overruns in HK construction projects. *International Journal of Project Management* 1997;15(1):53-63.
7. Dissanayaka SM, Kumaraswamy MM. Evaluation of factors affecting time and cost performance in Hong Kong building projects. *Engineering, Construction and Architectural Management* 1999;6(3):287-298.
8. Chan DWM, Kumaraswary MM. Compressing construction durations: lessons learned from Hong Kong building projects. *International Journal of Project Management* 2002;20(1):23-35.
- 9.
10. Al-Moumani HA. Construction delay: a quantitative analysis. *International Journal of Project Management* 2000;18(1):51-59.
11. Odeh AM, Battaineh HT. Causes of construction delay: traditional contracts. *International Journal of Project Management* 2002;20(1):67-73.
12. Aibinu AA, Jagboro GO. The effects of construction delays on project delivery in Nigerian construction industry. *International Journal of Project Management* 2002;20(8):593-599.
13. Ogunlana SO, Promkuntong K, Jearkjirm V. Construction delays in a fast-growing economy: comparing Thailand with other economies. *International Journal of Project Management* 1996;14(1):37-45.
14. Frimpong Y, Oluwoye J, Crawford L. Causes of delay and cost overruns in construction of groundwater projects in a developing countries; Ghana as a case study. *International Journal of Project Management* 2003;21(5):321-326.
15. Koushki PA, Al-Rashid K, Kartam N. Delays and cost increases in the construction of private residential projects in Kuwait. *Construction Management and Economics* 2005;23(3):285-294.
16. Long ND, Ogunlana S, Quang T, Lam KC. Large construction projects in developing country: a case study from Vietnam. *International Journal of Project Management* 2004;22(7):553-561.