

## Investigating different challenges in construction projects

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### CHRONICLE

#### Article history:

Received May 12, 2013  
Received in revised format  
25 June 2013  
Accepted 27 June 2013  
Available online  
June 29 2013

#### Keywords:

Construction projects  
Project management  
Railroad industry

### ABSTRACT

One of the most important issues on construction projects is to make sure that the project is completed on time. In this paper, we present an empirical investigation to verify the effects of four factors namely procedures, technical factors, financial strength and domestic affairs on creating delay on completion of projects. The study uses two measures of Pearson and Spearman correlation tests to examine all hypotheses of the survey. The study designs a questionnaire and distributes it among 40 experts chosen from managers and specialists in railroad construction projects in Iran. The results have confirmed that all four factors influence on creating possible delay on such project, significantly.

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## 1. Introduction

Construction projects play essential role on building necessary infrastructure in economic growth (Winch, 2010). A possible delay on these projects will harm other related projects and slows down the whole economy. Therefore, it is essential to find important factors for creating delay on construction projects (Catanzaro & Mearns, 1990; Hwang & Ng, 2012). According to Rwelamila and Savile (1994), project management is a comprehensive construction discipline, and not just project planning and it promotes sub-disciplines outside the traditional professions. Part of the project manager's function is to make choices, and the manager requires a control tool to make necessary actions. Value engineering (VE) is a suitable control tool, because it makes a trade-off between the project options. According to Hewage et al. (2008), the construction industry lags behind other industries in its acquisition and implementation of modern technology. Therefore, construction workers are dissatisfied with the level and availability of communication systems and channels. Construction managers may not confident to use modern technologies to the construction workplace, because of the unavailability of information on worker abilities, available technologies, possible

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outcomes, related expenses and advantages (Anumba, 2000). Technology providers are also missing in the understanding of the information associated with construction industry specific requirements. There were no direct studies noted in Canada that were concentrating the construction stakeholder views associated with the information technology (IT). Hewage et al. (2008) presented the views of three various construction industry stakeholders regarding the possibilities and opportunities in using IT in construction project to improve communication and worker satisfaction. Ofori (2000) considered some of the challenges facing the construction industries in some developing countries including globalization, culture and environment. Ford et al. (2002) provided a real-option method for valuing strategic flexibility in uncertain construction projects. They addressed potential impacts of the implementation of real options and determined challenges in valuing real options in construction projects as the basis for future research.

In Iran, for many years, most construction projects did not finish, completely and the government attempted to find possible reasons for delay on these projects. Table 1 summarizes some of the reasons reported over the period 2002-2007.

**Table 1**  
Important factors delaying construction projects

Issue	Percentage					
	2002	2003	2004	2005	2006	2007
Insufficient budget allocation	45.8	44.4	48.2	43.7	48.3	53.7
Weakness in execution	13.8	14	10.8	12.5	15.6	11.8
Land acquisition	5.6	7.2	7	8.3	7.9	5.5
Weakness of contractors	7.6	7.4	5.6	7.6	4.7	5.5
Consultant	4.8	5.8	3.4	5.1	3.8	4.3
Preliminary studies	3	3.8	4	4.1	4.2	-
Equipment	2.9	3.5	3.8	3.1	3.8	4.9
Social affairs	-	-	-	-	-	2.7
Others	16.5	13.9	17.2	15.6	11.7	11.6
Total	100	100	100	100	100	100

As we can observe from the results of Table 1, insufficient budget allocation is accounted as the most important issue followed by weakness in execution. These two factors alone are blamed for more than half of challenges in construction projects.

## 2. The proposed study

The proposed study of this paper performs an empirical investigation to verify the effects of four factors namely procedures, technical factors, financial strength and domestic affairs on creating delay on completion of projects as follows,

1. Inappropriate procedures challenge completion of construction projects.
2. Technical factors challenges completion of construction projects.
3. Lack of financial strength among contractors challenges completion of construction projects.
4. Social factors as well as other domestic issues challenge completion of construction projects.

The study is performed among all managers and experts who work for railroad construction project and we use the following formula to calculate the minimum number of sample size,

$$n = \frac{N \times z_{\alpha/2}^2 \times p \times q}{\varepsilon^2 \times (N - 1) + z_{\alpha/2}^2 \times p \times q}, \quad (1)$$

where  $N$  is the population size,  $p = 1 - q$  represents the yes/no categories,  $z_{\alpha/2}$  is CDF of normal distribution and finally  $\varepsilon$  is the error term. Since we have  $p = 0.5$ ,  $z_{\alpha/2} = 1.96$  and  $N = 50$ , the number of

sample size is calculated as  $n=40$ . The study uses two measures of Pearson and Spearman correlation tests to examine all hypotheses of the survey. The study designs a questionnaire and distributes it among 40 experts chosen from managers and specialist in railroad construction projects in Iran. Table 2 shows details of the characteristics of the sample size.

**Table 2**

The summary of the sample size

Item	Population	Number	Percentage	Sample size
1	Managers	10	20	8
2	Experts	40	80	32
Total		50	100	40

In addition, Table 3 demonstrates the educational backgrounds of the participants in our survey.

**Table 3**

The summary of educational backgrounds

Education	Frequency	Percentage	Accumulated
2-year college	8	12	12
Bachelor of science	32	64	64
Master degree	10	20	20
PhD degree	2	4	4
Total	50	100	

According to the information of Table 3, most participants hold at least a bachelor degree of science. We first distributed the 20 questionnaires among some expert to verify the questionnaire. Cronbach alpha has been calculated as 0.851, which is well above the minimum acceptable level and validates the results of our 26-question based survey. In addition, we have calculated the Cronbach alpha for the questionnaire and it was 0.821, which is well above the minimum acceptable level. Table 4 shows details of KMO and Bartlett's test.

**Table 4**

The summary of KMO and Bartlett's test

KMO	KMO and Bartlett's test	Chi-Square	Error
0.733	0	2183.407	0.05

### 3. The results

In this section, we present details of our findings on testing various hypotheses and the survey. Table 5 summarizes the results of Chi-Square test on four hypotheses.

**Table 5**

The summary of Chi-Square test

Hypothesis	p-value	DF	Statistics
First	0.000	6	38.466
Second	0.000	9	23.885
Third	0.000	6	70.632
Fourth	0.000	9	67.925

The results of Chi-Square test have confirmed all four hypotheses when the level of significance is one percent. In order to measure the relationship of each four factors, we use Pearson and Spearman correlation tests and Table 6 shows details of our findings.

**Table 6**

The summary of the results of Spearman and Pearson correlation tests

Hypothesis	p-value	t-student		Correlation value		Results
		Spearman	Pearson	Spearman	Pearson	
First	0	5.945	5.325	0.609	0.651	Confirmed
Second	0	4.612	4.269	0.554	0.525	Confirmed
Third	0	6.804	6.836	0.701	0.702	Confirmed
Fourth	0	5.795	6.683	0.642	0.694	Confirmed

As we can observe from the results of Table 6, there are some positive and meaningful effects from inappropriate procedures, technical factors, financial weakness and social as well as domestic factors towards accomplishment of construction projects.

#### 4. Discussion and conclusion

In this paper, we have presented an empirical investigation to find important factors challenging accomplishment of construction projects in railroad industry in Iran. The proposed study designed a questionnaire and distributed it among some experts and using some statistical tests, we have examined all hypotheses. The results have indicated that were some positive and meaningful effects from inappropriate procedures, technical factors, financial weakness and social as well as domestic factors towards accomplishment of construction projects. Presently, there are many incomplete projects in Iran and we believe it is important that government have to finish these projects before initiating new projects. In addition, it is necessary to use all existing resources in the country for accomplishing all incomplete projects.

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