International Journal of Advanced Biotechnology and Research (IJBR)
ISSN 0976-2612, Online ISSN 2278–599X,
Vol-8, Issue-3, 2017, pp1677-1683
http://www.bipublication.com

Research Article

Study of the main factors of increasing the delay projects in the Lorestan province and rank them with using multi-criteria decision.

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ABSTRACT

The aims of this study was investigating the main factors of increasing the delay projects in the Lorestan province Iran and rank them with using multi-criteria decision. The methodology that used in this study is descriptive-survey. The population of our development projects in the province, including 100 project. Samples of 30 projects have been selected.

A questionnaire was used to collect data. The results show that the variables of financial, human, natural factors and employer have affect on delay projects. These factors in turn include, financial factors by 47 percent, or 25 percent of the employer, manpower by 23 percent and 19 percent of natural factors can delay the impact on the project.

Keywords: Project delays, financial factors, natural factors, human factors, the employer.

1. INTRODUCTION:

Projects are envisaged and visualized with the foresight of achieving the primary objective of timely completion. Some projects are planned and executed successfully whereas others get delayed due to reasons, some of which are analyzed and evaluated in this dissertation. Delay to projects is considered to be one of the common problems in the construction industry. (A. Abu Hammad 2008) [1].

Delays have a negative effect on the project in terms of performance, time and cost. Thus, it is essential to identify the types of delays that normally occur in a project. The types of delays can be broadly split in two categories of delay by the client (compensable delays) and the contractor (non excusable delays).

The delays can be identified as critical or non critical and whether the delay is concurrent or non concurrent. The identification of the types of delays leads to the reasons of delay. (T. Williams 2015) [12]. The reasons for the delays are identified so that the effect on construction projects can be reduced. The reasons for delays are client and contractor related. Unreasonable project scope and inadequate early planning are the prime delays by the client.

The client interference and delay in the decision making process also major reasons for delays. The client in some cases delays the design or changes the design leading to various other changes like design related changes to drawings and their approval by the authorities. The contractor had delays related to overambitious estimates and incorrect task assessment which lead to delays and affect the project.

In case of lack of task clarity, an inexperienced contractor or subcontractor may unknowingly delay the works. (Noori. S, Faraji. H. 2009) [5].

2. REVIEW OF LITERATURE

Delays are of various types and researchers have their own parameters to rate and identify them. Delays have numerous reasons which vary from project toproject and the reasons are different and unique for every project. Efforts to reduce the delay by mitigation or eliminate the delay by acceleration are measures that can be or may be applicable in some cases and will depend on the projects being considered for those measures.

Change is the primary cause for a delay. If projects do not have changes then the projects would finish on time as there would be no or little disruptions to the works. (Sadi A. Assaf, Al-Hejji, Sadiq 2007) [10]. The contractors would also like to work on projects where the designs are finalized and there are no changes and disruptions. “In a perfect world, all construction projects would finish on time, without changes or disruptions. Despite the common public perception that contractors cannot wait for the changes to start on a project because that is where they allegedly “make their money”, most contractors would prefer their projects to complete without changes.” (I. Ndekugri, N. Braqimah, R. Gameson 2008) [14]. However, this is an idealistic situation, in reality changes are inherent to nearly all project of substantial size due to the fact that projects rarely commence after all the designs are completed and approved. It is important that all the key stakeholders for the project agree as to how the changes to the project would be handled and by whom. This is in the interest of the project as beneficial to the owner and the contractor.

The continuous striving for improvement makes it necessary to incorporate changes even though they may disrupt the works to a certain extent.

However, the overall result is likely to be better than the initialafter incorporating the changes and the satisfaction of achieving a better final product makes the changes more acceptable rather than no changes at all. The stage at which changes are proposed to be implemented is important as any major changes proposed when the project is in an advanced stage of progress will complicate the works, impact the schedule and likely to cause delays to the completion. The changes will increase the cost of the project as abortive works, modification and changes will come with a cost. “Changed work complicates a project, invites delays and increases the project cost – all things that make owners unhappy.” (Sweis, R. Sweis, A. Abu Hammad, A. Shboul 2016) [8]. A detailed literature review for the objectives is done to evaluate the types, reasons of delay and the methods for the mitigation and prevention of delays. (sadi A. Assaf, Al Hejji, Sadig 2012) [2].

2.1 Critical delays and Non critical delays

Delays can be analyzed based on the criticality of activities in the program. The baseline master program prepared in line with the conditions of contract has a critical path.

The critical path is the longest path in the network. The delay to the project occurs when an activity on the critical path is delayed and they have an impact on the successor activities and the overall project. Such activities known as critical activities are important and it should be ensured that he activities on the critical path are not delayed. When the activities on the critical path are delayed, the delay is reflected on the entire project. Hence, it is required to review the critical activities and analyze whether the re sequencing of works can be done for effective project control “resequencing construction activities is a critical task for project planners for effective project control. Resequencing activities require planners to determine the impact or "role" an activity has on successor activities. They also need to determine the status of activities, i.e., which activities may or may not be delayed”. It is required to distinguish the function and status of activities which would mean that the planners have to understand the logic and sequence of activities.

The critical path method (CPM) identifies the sequence of works based on the precedence logic and relationships and identifies the activities based on the criticality in relation totime. Thus for complex and large projects it is difficult to monitor individual activity logic and sequence and this cannot be done manually. (Belassi, W, Tukelo, I 1998) [6].

2.2 Non Excusable (Contractor Caused) Delay.

Any delay to the project which is solely due to the contractor is regarded as a non excusable delay. It becomes the responsibility of the contractor and entirely his risk for the delay and the owner is entitled to claim any delays to the project in line with the terms and conditions as stipulated in the contract.

The claim by the owner in such cases of delay by the contractor are normally related to penalty and or liquidated damages. (Sambasivan, Murali and Soon,) [9]. The owners claim for the contractor's delay usually range from delayed commencement of work at site, failure in proper coordination affecting progress of works, inability to finalize, order and procure in time and insufficient manpower to carry out the works in line with the program of works. (Shajeri. E, Karamoozian. A. H., Amiri. O; 2012) [7].

2.3 Compensable (Owner Caused) Delay &Non-Compensable Delays.

Here, the owner is responsible for both the time and cost effect of the delay. The contractor may claim the owner interfered with the work, did not deliver owner purchased equipment or supplies on site as promised, or that the owner's actions or inaction caused other delays. An owner cannot contract out of its obligation to pay for compensable delay, although it may be able to limit its liability for such delays. (Mohamed M. Marzouk, Tarek 2013) [4].

"Any clause in a construction contract, which purports to waive, release, or extinguish the rights of a contractor, subcontractor, or supplier to damages or an equitable adjustment arising out of unreasonable delay in performance which delay is caused by the acts or omissions of the contractee or persons acting for the contractee is against public policy and is void and unenforceable." (Fallahnejad M 2016) [16].

2.4 Concurrent delay & Non concurrent delay.

In these situations, neither party is responsible to the other for any costs associated with the delay. These delays are those that are typically included in force majeure clauses – abnormal weather, labor strikes, acts of God, acts of war, etc The delays that occur in a project are either due to the owner such as additions, alterations, modifications and changes to plans and specifications.

The delays where the owner may still be responsible are site conditions which are differing and suspension of works. The delays by the contractor which occur in the same period as the owner will be regarded as concurrent delays. "Delays considered will include those caused by changes in the plans or specifications, occurrence of differing site conditions, holds on the work due to owner-initiated suspensions of work, and so-called 'excusable' delays, all when taking place concurrently with contractor-caused delays." (Y. Frimponga, J, Oluwoyeb, L. Crawfordc 2013) [13].

The most important factor for the owner and the contractor in any construction project is the time frame of the project. Still, it is found that many of the construction projects get delayed. "Delays may be caused by the owner (compensable delay), by the contractor (nonexcusable delay), by acts of god, or a third party (excusable delay), or several different kinds of delays may happen concurrently.

Because of the many sources and causes of construction delays, it is often difficult to analyze the ultimate liability in delay claims." (Abdalla M. Odeh, Hussein T. Battaineh 2012) [11].

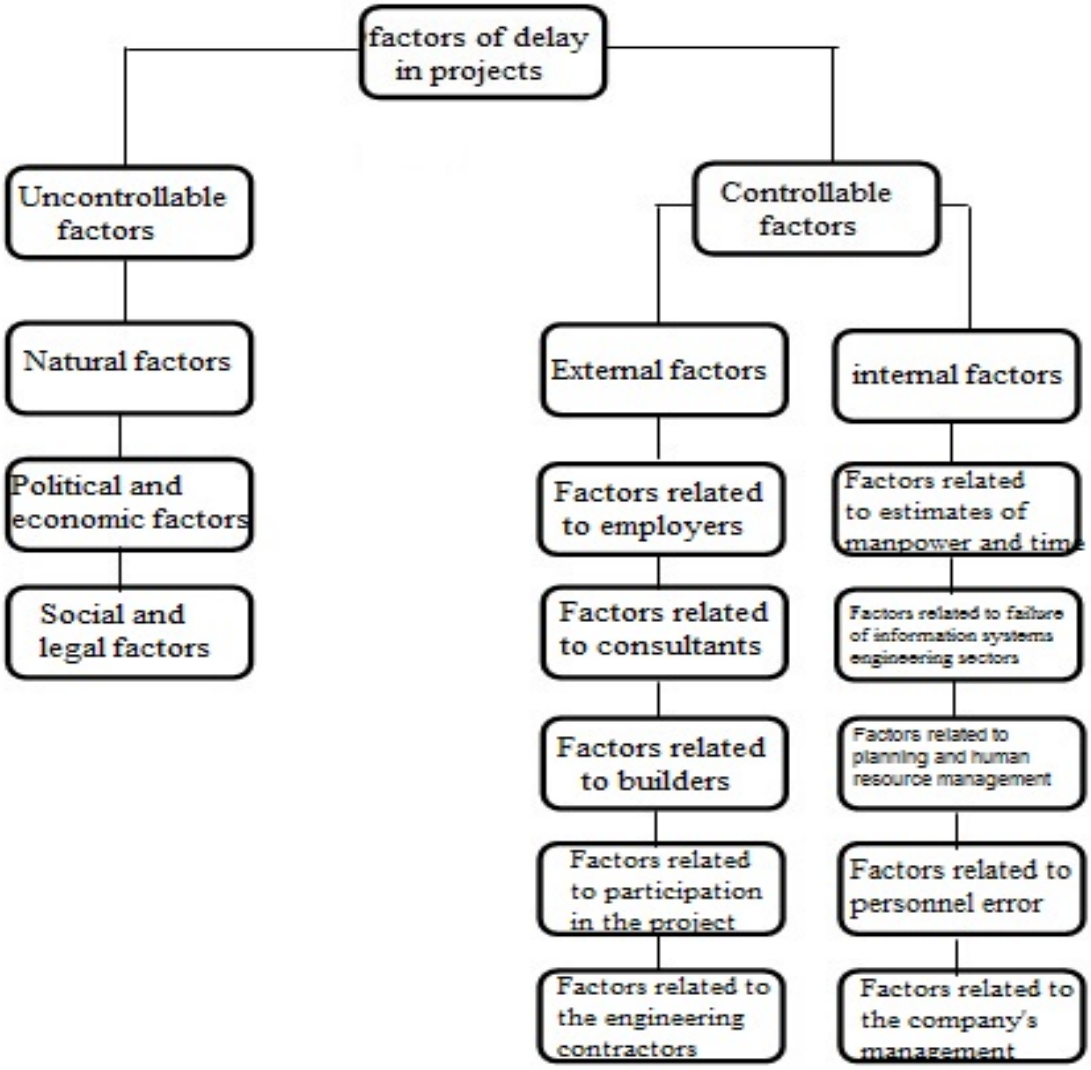
3 Development of model (theoretical framework):

The main hypothesis: Financial factors have impact on delay projects.

Secondary Hypothesis 1: Lack of manpower has impact on delay projects.

Secondary Hypothesis 2: Natural factors have impact on delay projects.

Secondary hypothesis 3: Employer involvement has impact on delay projects.



Present research in term of goal, is applied and in term of the type of methods, is descriptive survey study in which tried to identify independent factor (Khaki, 2005, p. 217).

4, RESULTS

The main hypothesis: Financial factors have impact on delay projects.

The correlation between the scales of financial factors in project delays

Adj. R^2	R^2	R	sig	F	Mean square	df	Sum of squares	
0.45	0.47	0.68	0.000	25.07	364.6	1	364.6	regression
					14.5	28	407.2	remaining
						29	771.8	Total

		sig	t	standard coefficients	Non-standard coefficients		Variables Prediction
				Beta	standard error	B	
		0.000	10.6		5.6	59.8	Constant
		0.000	5	0.68	0.26	1.3	Time management and study environment

Financial factors 99 percent significantly explained the variance of projects delay as much as 47%. The share of sub-scale financial factors (B=0.68) is significant at a confidence level of 99%. Partial correlation coefficients calculated values confirms the standard correlation

coefficient. Based on standardized coefficients between the criteria variables and to predict variables direct and significant relationship can be found.

Secondary Hypothesis 1: Lack of manpower has impact on delay projects.

The correlation between the scale of human resources in project delays

Adj. R^2	R^2	R	sig	F	Mean square	df	Sum of squares	
0.21	0.23	0.48	0.006	8.8	184.8	1	184.8	regression
					20.9	28	587	remaining
						29	771.8	Total
		sig	t	standard coefficients	Non-standard coefficients			Variables Prediction
				Beta		standard error	B	
		0.000	7.2			8.5	62.4	Constant
		0.006	2.9	0.48		0.3	0.89	Time management and study environment

Lack of manpower 99 percent significantly explained the variance of projects delay as much as 23%. The share of sub-scale Lack of manpower (B=0.48) is significant at a confidence level of 99%. Partial correlation coefficients calculated values confirms the standard correlation coefficient. Based on standardized coefficients between the criteria variables and to predict variables direct and significant relationship can be found.

Secondary Hypothesis 2: Natural factors have impact on delay projects.

The correlation between the scale of natural factors in project delays

Adj. R^2	R^2	R	sig	F	Mean square	df	Sum of squares	
4.7	0.19	0.44	0.014	6.9	152.7	1	152.7	regression
					22.1	28	619.1	remaining
						29	771.8	Total
		sig	t	standard coefficients	Non-standard coefficients			Variables Prediction
				Beta		standard error	B	
		0.000	12.6			5.7	72.7	Constant
		0.014	2.6	0.44		0.3	0.97	Time management and study environment

Natural factors 99 percent significantly explained the variance of projects delay as much as 19%. The share of sub-scale Natural factors (B=0.44) is significant at a confidence level of 99%. Partial correlation coefficients calculated values confirms the standard correlation coefficient. Based on standardized coefficients between the criteria variables and to predict variables direct and significant relationship can be found.

Secondary hypothesis 3: Employer involvement has impact on delay projects.

The correlation between the scale employer in project delays

Adj. R^2	R^2	R	sig	F	Mean square	df	Sum of squares	
0.23	0.25	0.50	0.004	9.6	198.1	1	198.1	regression
					20.4	28	573.6	remaining
						29	771.8	Total
		sig	t	standard coefficients	Non-standard coefficients			Variables Prediction
				Beta	standard error		B	
		0.000	4.9			10.9	53.7	Constant
		0.004	3.1	0.50		0.47	1.4	Time management and study environment

Employer involvement 99 percent significantly explained the variance of projects delay as much as 25%. The share of sub-scale Employer involvement (B=0.50) is significant at a confidence level of 99%. Partial correlation coefficients calculated values confirms the standard correlation coefficient. Based on standardized coefficients between the criteria variables and to predict variables direct and significant relationship can be found.

6 DISCUSSIONS AND CONCLUSION

Based on standardized coefficients can be found direct and significant relationship between the criterion variable and predictor variables. The variables of financial, human and natural factors affect the employer to delay projects. These factors in turn include, financial factors by 47 percent, or 25 percent of the employer, manpower by 23 percent and 19 percent of natural factors can delay the impact on the project. The results of this study is consistent with the study with research of Abu Ahmed (2008), Gamsvn (2008) and Iqbal Shakeri (2011). The project has six main features are as follows:

The project is a unique, new and non-repetitive work. Once the project has a clear start and end points, and time is not unlimited. Its budget is limited and predictable and must have a sponsor. Construction management in their areas of work that not apply, as follows: Construction work safety, control of overtime, training managers and supervisors, worker's motivation and ability to use modern management systems, adherence to schedules and quality of execution. In the management of construction projects in Iran, many factors are involved. To examine how to manage construction projects should be classified and convenient grouping of projects carried out. The majority of problems in the way of construction projects related to delays in implementation, lack of credit and the cost and lack of supply of suitable quality. 36% delay in development projects to lack of funding and budget, that it is beyond the capacity of project management, but with Project Management Based on knowledge of project management can be a 64 percent delay in construction projects controlled and minimized. Delays in projects due to their particular complexity, it is undeniable. (R. gameson 2014) [3]. Studies show that most large construction projects in the world encountered with more than 50 percent of the time. Also, because of the direct relationship between the time and cost of the project increased runtime will often lead to increased costs. The causes of delay in construction projects and make a decision to reduce them is a serious issue that is considered in the world. Interestingly, the According to the PBO 90% of development projects have increased in time and cost and 60% unfinished projects need to during 15 years to be completed. Be noted current average age of development projects in Iran is about 9 years which is far from the standard age. (ORANGI, E. PALANEESWARAN, J. WILSON 2011) [15]. The purpose of identifying the causes of the rise time was

eliminating or reduce the effects of those factors, so that we can project with minimal changes to the original schedule to finish. It can be concluded that the need to move away from traditional management to modern management, especially management system implementation project is self-evident in large cities. And applying the science of time management, cost, quality, coalition, objective, risks, communications, logistics and human resource issues that matter to them, including project management system is necessary.

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