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Identification of Key Factors that Obstruct the Cost Benefits of Construction Projects in Pakistan, Lahore

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Abstract

Construction is one of the important sectors that has enough potential to bring prosperity and betterment in the country. It plays elementary role in the growth of national income because it is among the largest sectors that generates employment in the country. It is one of the best key driver for economic development of Pakistan.. The common obstacles that every developing country has to face are critical factors that overruns the time and cost benefits of construction projects. In the same way, Pakistan is also facing critical project management related issues that are significantly important. There are several factors that are responsible for these hurdles. Few construction projects are quoted that are delayed because of some known and unknown reasons. To identify those reasons a research is made that belongs to Lahore, which in future can help with these overruns. For this purpose a questionnaire is distributed among the contractors, developers, consultants and project managers and critical factors are ranked by using relative index approach upon which the recommendations are based.

Keywords: *Cost & time overrun, Project management factors, Causes of delay, Effects of delay.*

1. Introduction

Adeyinka (1998) stated that construction industry is a source of development in the country and it has its importance for both clients i-e. public and private. Construction industry plays a major role in developing countries and achieving the goals of society. Construction industry always helps in the achievement of a suitable share for the country; it contributes 10% of gross national product (GNP) in countries; that are industrialized. (Navon, 2005)

However, in Pakistan construction industry has become highly competitive market with narrow profit margins because of an increase in the prices of raw materials and taxes. Unfortunately Pakistan's construction industry is contributing only 2.3 per cent to GDP and employs about 9 per cent of total labour force (Khan, 2008). At present the challenge for the construction companies is to identify the critical success factors that are creating hurdles in the way of construction projects in Pakistan. Khan (2008) explained that the selection of contractor for construction projects in Pakistan is primarily based on a low bid tendering system without evaluating the skills and capabilities of the contractor. This open-tender and awarding system leads to many problems; an increase in the overall construction cost and decrease in cost benefits, other includes; delay in construction projects, bankruptcy of the contractors and late in execution of the projects. According to (Kaming, Olmolaiye, Holt, & Harris, 1997) frequently occurring factors are time and cost overruns. Whereas, cost overrun is more significant than time overruns. The other factors that are obstructing the construction project are; inaccurate material estimation, and the cost of material increases because of inflation, productivity of labour is poor, shortages of resources, changes in designs and poor planning.

1.1 Problem Statement

Pakistan is witnessed of large development and growth in the recent decade, whereas, in past ten years the construction projects were slow. There are number of infrastructure development projects currently in process as well as under planning. With the hope that these projects will provide prosperity to the construction industry and people for living in a shelter and overall growth in Pakistan's economy that would make local industry to work again and get international recognition but this can be achieved through proper efforts that should be extended to achieve the same. When there is large development and construction projects then the need to highlight the critical factors is must, to avoid the unknown and known circumstances, there are many projects that took long time to complete or needed more funds or faced design changing and planning changing

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challenges; it includes Lahore Rapid Mass Transit Rail Project which has been planned completely to the end of in 2020 but after spending so much to the project's feasibility. (Haris Engineering and Management Consultants, Pakistan (HEMC PAK), 2014)

it is converted to the Lahore Rapid Mass Transit Bus Project. Lahore Ring Road (LRR), in which the circumference of rings is edited again and again; same is the case of its length. (Hameed, Farooq, Qazi, & Sharif, 2012) An Other example is construction of Shalimar Flyover / Mughalpura Lahore, project delayed because of the unforeseen factors that hindered its way. Furthermore, Muslim Town bridge / Ferozpur Road Lahore, project is another example of delay in construction projects in Lahore, Pakistan.

1.2 Key Aim

- To explore and rank the critical factors that hinder the cost benefits of construction projects in Lahore, Pakistan.

The main theme of this study is to identify and rank the most critical factors that are hindrance in the construction projects; this includes the construction of all types that may be PVT or Public.

1.3 Scope of Study

This research is conducted in Lahore that belongs to Punjab, Pakistan during the construction phase; whether it belongs to civil, residential or general buildings. As through the past studies and recent failures of construction projects its necessary to identify the factors that are causing failures, so it would help in achieving the objectives of the paper.

This research would assist owners, consultants and contractors and to improve performance of construction projects. Hence, the degree of impact and frequency of occurrence of factors will-be evaluated. These factors can be named as key performance indicators. These key performance indicators are those resources that would help in identifying the hurdles of construction industry and will provide a helping hand in benchmarking the future prospects.

2. Literature Review

(D.K.H.Chua, Y.C.Kog, & P.K.Loh, 1999) defined project participants as the key players, including project manager, client, contractor, consultants, subcontractor, supplier, and manufacturers.

(Chan, D.W.M., & Kumaraswamy, 1997) Designer has lot of important work to do in a project as their work involves from start to the end for the completion of a project. Factors that are related to design team consists of design team experience, project design complexity and also delays in producing design documents.

(Junaid, 2004) the construction process of buildings includes range of complex operations and multifaceted decisions taken by the management. For handling the difficult operations and decisions, qualified, experienced personnel are required at all the stages of the project even including planning, drafting, engineering, and aesthetic design.

(Hassan, 1995) a construction project requires team spirit; therefore, team building during the time of completing and processing a project is very vital. Team effort by all parties to a contract I-e contractor, developer, consultant, project manager and subcontractors has significant importance for the successful completion of a project.

(Mohieldin & Y.A., 1989) environment and resources are the two main inputs for any construction where environment represents the external circumstances and any physical product is the output of the construction project.

(Azhar,N., Farooqui,R.U., & Ahmed,S.M., 2008) conducted their studies in Pakistan and identified top ten cost overrun factors affecting the cost effectiveness of the construction projects. These factors are: Changes in the prices of Raw material, High cost of Machines, not properly planned, No cost control, Wrong estimation of cost method, Unstable cost of manufactured materials, lowest bidding procurement method, long period between design and time of bidding/tendering, inappropriate government policies,

(Clough, R.H. & Sears, G.A., 1994) An architect engineer is a qualified and an experienced individual or body of professionals who works for private or public organizations to design the project, the contractor can be an individual or business that provides material and labor and put other diverse inputs together as a single element during the construction process. According to (Clough, R.H. & Sears, G.A., 1994) there are three types of construction projects:

- Building Construction Projects
- Heavy/Highway Construction Projects
- Industrial Construction Projects

3. Methodology

Methodology consists on the following design and procedure.

3.3 Research design

This research consists of few phases; beginning with the proposal for identifying and defining the problems and establishment of the objectives of the study and development of research plan. The second phase of the research includes literature review.

The third phase of the research included a field survey which included the owners, contractors, consultants and project Manager.

The fourth phase of the research includes; questionnaire design which is done by distributing the questionnaire as a sample to local contractors, consultant's and owners' and project manager. The purpose of the pilot study was to test and prove that the questionnaire's questions are clear to be answered in a way that helps to achieve the target of the study. The questionnaire was modified based on the results of the pilot study.

The fifth phase of the research was questionnaire distribution; the questionnaire was used to collect the required data to achieve the research objectives.

The sixth phase of the research focused data analysis and discussion. Excel and Statistical Package for Social Sciences (SPSS) were used to perform the required analysis. The last phase of the research includes the conclusions and recommendations.

3.1 Research Instrument

A survey questionnaire method is selected and a list of all the construction parties was acquired from yellow pages of Pakistan. Out of 120, 98 questionnaires were filled up by the participants out of whom 58 were filled up by the Contractors, 33 were filled up by the Developer, and 7 were by the Consultant and 1 by the Project Manager.

Table 1: Number of Respondents

Groups	Number of Respondents	Percentage (%)
Contractors	58	59.18
Owners	33	33.67
Consultants	7	7.14
Project Managers	1	1.02
Total	98	100

Source: Questionnaire

3.1.1 Procedure

The research was based on two phases of data collection. Phase 1 was consisted of a widespread review of the literature to collect detailed information about the factors affecting the cost effectiveness of the construction projects. Whereas, Phase 2, belongs to the factors identified in phase1 with more detail. The questionnaire was broadly classified into three main categories such as

- Basic information about respondents including their job roles, type of the constructions they are involved in and their experience.
- General information about cost effectiveness.
- The factors affecting the cost effectiveness of the construction projects.

The data collected through the questionnaires was analyzed using Relative Index technique to represent the strength of responses.

3.2 Ranking of Factors

Ranking of the significant factors is calculated on the basis of the Individuals' Relative Index and averaging them for ranking purpose. The highest Relative Index gets the 1st rank and the least Relative Index gets the 30th rank. Relative Index is a leading indicator, therefore, this technique is used for determining contractors, owners, consultants and project managers' perceptions regarding relative importance of each indicators in Pakistan; Lahore construction projects.

RII= $\frac{\sum W}{A*N}$

Where:
W= is the weight given to each factor by the respondents and ranges from 1 to 5
A= the highest weight = 5
N= the total number of respondents

There were total 58 contractors, 32 developers, 7 consultants and 1 project manager who participated in the questionnaire survey. According to them, the most critical top ten factors that affects the cost effectiveness of the construction projects in Pakistan, Lahore, are 'Changes in the Prices of Raw Materials; which means it's the biggest hurdle in the successful completion of any construction project with relative index rate of 87.14' 'The Non-availability of funds creates more hindrance in the construction project with relative index of 83.67' 'A shortage of qualified engineers is always been a problem to the construction industry with relative index rate of 79.39' 'Obviously a shortage of equipment availability critically effects any construction related problem with relative index rate of 79.18' 'Wrong evaluation of project time or duration hits the project's funds directly with a relative index rate of 77.35, sixth position is occupied by Frequent changes in the government policies with a relative index of 76.53, Fraud and corruption is another very highlighted factor of construction projects which has 74.69 importance, Delay in sub-contractors works also leads in delay of projects with 69.39 index, Delay in decisions and bureaucracy takes the projects beyond its stipulated time period and has 68.57 relative index, Occurring additional costs to carry out stagnant processes seldom helps, that has a relative index of 67.35, Rest of the factors include Changes in Design, Not properly implementing the cost accounting, Depending on imported raw-materials, Lack of qualified staff, High Transportation cost, Delay in Material Supply, Cost control methods are inappropriate, Expensive plants machinery and equipment, High cost of rework, Mistakes in the investigation of soil, Lack in communication between the parties, Poor manpower productivity, Changes in Material specifications, Shortage of Construction Material, External Factors, Breach of contract by the contractors, Unforeseen circumstances and geological problems, Material quality problems, Lack of coordination with contractors, Disputes between the parties involved in project.

Table 2: The key factors that hinder the cost effectiveness of construction projects in Pakistan, Lahore

FACTORS	Least Imp.	Somewhat Important	Moderate Important	Important	Very Important	Total	R.I	Rank
	1	2	3	4	5			
Changes in the prices of raw-materials	3	4	11	17	63	98	87.14	1
Non-availability of funds	0	5	16	33	44	98	83.67	2
Shortage of Qualified engineers	4	5	12	46	31	98	79.39	3
Shortage of equipment availability	3	4	20	38	33	98	79.18	4
Wrong evaluation of project time or duration	2	4	26	39	27	98	77.35	5
Frequent changes in the government policies	2	11	21	32	32	98	76.53	6
Fraud and corruption in the projects	6	3	30	31	28	98	74.69	7
Delay in sub-contractors work	1	15	32	37	13	98	69.39	8
Delay in decisions and bureaucracy	2	12	44	22	18	98	68.57	9
Occurring additional costs to carry out stagnant processes	7	14	30	30	17	98	67.35	10
Frequent changes in Design	4	22	34	18	20	98	65.71	11
Not properly implementing the cost accounting	4	22	34	19	19	98	65.51	12
Depending on imported raw-materials	3	21	41	21	12	98	63.67	13
Lack of qualified staff	2	32	27	24	13	98	62.86	14
High Transportation cost	9	30	22	25	12	98	60.20	15
Delay in Material Supply	16	20	20	35	7	98	59.39	16
Cost control methods are inappropriate	23	15	18	27	15	98	59.18	17
Expensive plants, machinery and equipment	23	20	15	31	9	98	56.53	18
High cost of rework	29	13	17	29	10	98	55.51	19
Mistakes in the investigation of soil	29	14	18	30	7	98	54.29	20
Lack in communication between the parties	13	38	30	11	6	98	51.63	21
Poor manpower productivity	21	42	15	5	15	98	50.00	22
Changes in Material specifications	20	43	15	7	13	98	49.80	23
Shortage of Construction Material	22	42	20	10	4	98	46.12	24
External Factors	30	40	15	9	4	98	43.06	25
Breach of contract by the contractors	34	39	10	13	2	98	41.63	26
Unforeseen circumstances and geological problems	30	50	10	6	2	98	39.59	27
Material quality problems	47	44	5	2	0	98	32.24	28
Lack of coordination with contractors	60	30	6	2	0	98	29.80	29
Disputes between the parties involved in project	60	38	0	0	0	98	27.76	30

4. Discussion and Conclusion

Construction industry is considered significantly important because the bread and butter of most of the people are connected to this industry. The main objective of this research is to identify the critical factors that hinder the cost effectiveness of construction projects in Pakistan, Lahore, which would help in the future, by avoiding these factors; in the successful completion of construction project. In a nut-shell we can conclude that the list of top 30 critical factors has been summed up by ranking them under the relative index technique and the primary objective of the research got achieved. Therefore, all the parties to the construction project should complete its part well on time and under the stipulated funds allotted to them, otherwise there would always some quarrel between the party which would lead in the delay of project and that's what happens mostly in any type of project. Hence, the main factors that have been mentioned must be kept in view while completing a project timely.

5. Recommendations

The following points are the recommendations for all the parties, in order to minimize cost and control the time, of the construction projects.

It is strongly recommended that the material should not face the shortage situation and must be checked properly before use, which would avoid any unknown happening to the development in the future. To avoid the financial issues, all parties to the construction projects make payment timely and the culprit to the corruption should be taken care of properly by the management.

New technology and techniques preferred as they would save the time and there should be skilled workers & labour working on the construction projects. All changes to the site or agreement should be done before start of construction, once the construction begins there would be no changes facility available, otherwise, it would become the source of delay, cost push or breach of contract element. There should be consideration for disaster, geographical and soil conditions as well.

Construction companies should conduct proper training sessions and classes to train their employees regarding handling every situation patiently and timely.

Time and Cost overruns can be lessened by proper taking care of their causes, once the construction has started it should be ended on time, if in some cases the construction has abandoned for some reason, then the all proceedings must be ended as soon as possible, it could be further understood by studying the cause and effect relationships.

Many large projects in Pakistan get failed because of delay, whereas, these large construction projects are the sources of development and progress in a country. The economy would be affected because of loss of resources. It is therefore recommended that against the delays in construction projects a proper action should be taken.

Contractors should set up a computerized system for documentation process, to all the activities at the site; they could detect the performance and complete the activities according to the time regularly.

Finally it is recommended that every Pakistani professional should take great care of time because it is one of the influential factors in whole process of construction.

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