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An Observational Examination on Components Affecting Cost Overwhelm on Construction Projects – A Case from Karachi, Pakistan

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Abstract

The purpose of this research is to summarize the factors affecting cost overrun of construction projects, which were already identified by other researchers. Project cost is the major consideration throughout the management in project life as the success of the project is highly affected by project cost. Karachi being an urban city thus construction of commercial and residential projects is common. Previous researchers have done extensive work to identify the numbers of cost overrun causes by studying expert opinion from developing countries and global construction industries scenario. From several hundred identified factors, total 42 factors were shortlisted and top 10 were summarized. In order to collect data, the researcher was required to visit offices of 579 builders and contractors in order to get to get the questionnaire filled. After the factor analysis application, factor affecting the cost overrun were further reduced to four important factors which include F1: Fluctuation in price of raw material, F8: Additional Work, F9: Improper planning, F10: In appropriate govt. policies. These four factors represent 74.3% of the whole data set of 10 factors. Therefore, enabling construction organization and researchers to evolve remedies for the identified four factors and consider them as of prime importance to secure the project cost overrun.

Keywords: Construction Projects, Project Cost, Cost Over Run, Karachi.

1. Introduction

Construction sectors play a very important role in the development of a country as it helps increase employment, spending and investment opportunities in a country (Arcila, 2012). One of the major issues that both developing and underdeveloped countries are facing regarding the development projects is that usually the cost of project exceeds the cost that have been estimated this cost is known as cost run. For instance, according to researcher only 16% of 8000 projects used to be completed on time and within the budget, similarly 63% of 1778 construction projects have an issue of cost overrun (Ameh, Soyingbe, & Odusami, 2010).

Although developed countries are able to managed the cost run to some extent but on the contrast the under developed countries this is a severe issue as most of the times the cost exceed by 100%

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causing organizations and government to suffer the loss (Durdyev, Ismail, & Bakar, 2012). Thus, decreasing the construction projects, taking place in a country.

1.1 Research Problem

One of the main problems facing developing and untapped countries for development projects is that the cost of the project generally exceeds the projected cost and that's called cost management. This study aims to identify most factors summarized from various already known factors and provide guideline / help for construction industry to improve accuracy of their cost estimation.

1.2 Research Objectives

The objective of this research to provide guidance/help to the construction industry to improve the accuracy of cost estimates.

1.3 Purpose of the Study

The purpose of this study is to provide guidance/tips for the construction industry to improve the accuracy of cost estimates by summing most of them from a variety of known factors.

1.4 Research Question

Q1. Identifying the most factors summarized from various already known factors and provide guideline / help for construction industry to improve accuracy of their cost estimation

2. Literature Review

Highlighting the factors that cause cost overrun of construction projects is not new, there are many studies helping constructors in identifying various factors that result in over run cost. For instance, factors such as inflation making the cost of products to be purchased for construction become higher, wrong estimation of budget, intergroup conflict, lack of skilled human resource, changing governments regulations, deceiving activities, poor management and planning, uncertain whether, change in exchange rate that making imports expensive, lack of proper documentations (Arcila, 2012). While the following factors consider all type of projects there are also studies that have identified different factors associated with different type of project.

For instance according to Kaming, Olomolaiye, Holt, and Harris (1997) causes of overrun of Highrise projects include inflation which cause rise in the prices quoted in the tender, changing conditions of whether, changing government rules and regulation, working with workforce that

lack the experience of performing the work, similarly another researchers for instance Jackson (2002) and Kaliba, Muya, and Mumba (2009) found that factors such as strike, pressure exerted by the government, change in the scope also play an important role in causing the overrun cost in road projects. Likewise there are also researchers who found out that different countries have different reasons for cost overrun for instance Alaghbari, Kadir, Salim, & Ernawati (2007) in his study found out that the main reason for cost overrun are lack of productive skills in labors, poor management of site, shortage of material on the construction site, mistake that are been made during the construction on the project, intergroup conflict between contractors, suppliers or workers, absence of consultants on the site of management, slow implantation of order or directions, modification in the construction contract , improper documentation of contract , time taken to deliver material to site causing the construction on the projects to be delayed, unavailability of material in the market.

On the other hand, factors which were found to be contributing to cost overrun in Malaysia were not same as identified in Indonesia such as absence of consultants on the site of management, slow implantation of order or directions, modification in the construction contract, improper documentation of contract, unavailability of material in the market showing that the factors varies not only with the respect of the type of construction project but also with the respect of countries. Another study conducted by Okuwago (1998) further supporting the statement that the factors vary with respect to countries in his study showed that Thailand although a neighboring country of Malaysia but have different factors causing cost overrun such as inefficiency in organization, wrong construction planning, misuse of construction material at the site of construction, poor quality of material etc.

Viewing in the context of Pakistan, the construction industry of Pakistan is one of the largest sector of Pakistan economy hiring both skilled and unskilled employees from both rural and urban area of Pakistan thus growth in the construction sector is important for the economy of Pakistan, however like other developed and underdeveloped countries of the world, Pakistan construction industry is also facing issues resulting in the cost overrun, there are also many researchers in Pakistan helping constructors identifying the causes of cost overrun such as but however none is able to focus the attention of constructors toward the main issues they need to focus first.

2.1 Hypothesis

H_1**:** The factors affecting cost overrun can be minimized to highly correlated components which may represent the overall impact of all factors.

3. Methodology

3.1 Research Design

Research theory is positivism and is the beginning of an organized and maintained methodology.

The study follows the hypothesis, and its inferential method comes out. The test is conducted according to the investigation method, and quantitative information is collected from the sample size and investigated.

3.2 Sample Size

The data is collected in the form of questionnaire from 120 respondents from the different compnies.

3.3 Sample Technique

Convenience and purposive sampling used and the researcher was required to visit contracting companies, consultant offices in order to get the questionnaire filled from where refernces of other contractors were obtained.

3.4 Population

The target population of this study was 579 included contracting companies, consultants and public owners sectors, who had (Kaming, Olomoliaye, Holt, & Harris, 1997) valid registration in year 2012 at Association of Builders and Developers (ABAD).

3.5 Instrument

The instrument has chosen a "qualitative method" the qualitative trick is accepted through the usage of open-handed questionnaires.

4. Result

Table 4.1: Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Fluctuation in prices of raw materials	73.506	16.2440	89
Unstable cost of manufactured materials	64.775	18.3766	89
High cost of machineries	62.854	22.6292	89
Lowest bidding procurement method	58.798	82.4314	89
Poor project (site) management/ Poor cost control	68.809	24.3590	89
Long period between design and time of bidding / tendering	68.618	24.5914	89
Wrong method of cost estimation	50.124	21.7600	89
Additional work	56.416	23.8936	89
Improper planning	61.124	22.8790	89
Inappropriate government policies	73.236	20.7238	89

The descriptive table shows the mean of every selected variable, the highest mean tells the higher impact on cost overrun, while looking at the table, "F1: Fluctuation in prices of raw materials" and "F10:In appropriate government policies" variables, shows the mean of 73.506, and 73.236.

Hence the lowest mean shows the lesser impact which is reflected here by the value of 50.124, for the "F7: Wrong method of cost estimation".

From the standard deviation we can conclude the variation in data by the respondent point of view. The least deviation of "F1: Fluctuation in prices" shows the maximum no. of respondent has given the similar rating to this factor. The highest deviation is shown by "F4: Lowest bidding procurement method", that means the respondents has high variation in rating for this factor.

But some other variables have similar or close deviations, like "F5: Poor project (site) management" 24.3590 and "F6: Long period between design and time of bidding" 24.5914. Similarly some more of these variables may have correlation, which is the required characteristic to run the factor analysis as a basis to minimize the data/ variable on similar characteristics.

Table 4.2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.574
Bartlett's Test of Sphericity	Approx. Chi-Square	217.795
	Df	45
	Sig.	.000

The result of KMO test is 0.574, which is > 0.5 the benchmark to go ahead for the factor analysis. Because the KMO test value >0.5 indicates there is correlation in variables, and it is fit to continue factor analysis. At the same time, Bartletts test sig value is <0.05, which is the second measure of verification the presence of correlation in data under observation. In case the value of KMO <0.5 or Bartletts test sig value is > 0.05, then Factor analysis will not be recommendable method to run.

The anti-image correlation matrices, defines the loading of every individual variable on itself and other variables. As per the criteria these loadings require to be having values 0.5, or above. These loadings can have maximum value of 1.00, so far, the values lower than 0.5 mention a low correlation, thus for the variables having lower than 0.5 values, are required to be excluded from selection set of factor analysis.

If any variable possesses low correlation then the factor analysis process will be repeated from step 1, after exclusion of that variable.

Here we have the value of 0.474 for the variable factor “F7: Wrong method of cost estimation”, hence in the next step, this variable will be excluded, and Factor analysis will be re-processed.

Table 4.3: Communalities

	Initial	Extraction
Fluctuation in prices of raw materials	1.000	.792
Unstable cost of manufactured materials	1.000	.727
High cost of machineries	1.000	.798
Lowest bidding procurement method	1.000	.503
Poor project (site) management/ Poor cost control	1.000	.801
Long period between design and time of bidding / tendering	1.000	.755
Additional work	1.000	.797
Improper planning	1.000	.820
Inappropriate government policies	1.000	.695

Extraction Method: Principal Component Analysis

The table of communalities shows variances loading to each variable component; mathematically this is the loading of sum of square variances, initial table is the reflection of loading of every variable on itself, but the extraction table shows the variance of the factor on other variables overall components. Higher the value of extraction shows that factors represented here have the maximum representation of all data in component. If any factor is having extracted lower value then it requires extracting another component. Because our sample size is 89, then for this study lower boundary value of communalities is 0.60.

The communalities table shows the square of variances loading on overall variables. The higher the value shows high loading, and extreme correlation. While lower values shows the minimal impact. Here in the above table we have higher value of 0.820, which interpreting 82% loading of "F9: Improper planning" on over all factors.

Table 4.4: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.251	22.507	22.507	2.251	22.507	22.507	1.860	18.600	18.600
2	2.068	20.676	43.183	2.068	20.676	43.183	1.788	17.880	36.481
3	1.624	16.237	59.420	1.624	16.237	59.420	1.784	17.837	54.317
4	1.193	11.935	71.355	1.193	11.935	71.355	1.704	17.037	71.355
5	.753	7.534	78.888						
6	.644	6.436	85.324						
7	.439	4.393	89.718						
8	.387	3.867	93.585						
9	.373	3.727	97.312						
10	.269	2.688	100.000						

Extraction Method: Principal Component Analysis.

The Eigen value should be greater than 1 (>1), for acceptability as component, while the above table shows 4 components are having Eigen value greater than 1, also after rotation loading these are shown more balanced, representing 74.3 % of whole data.

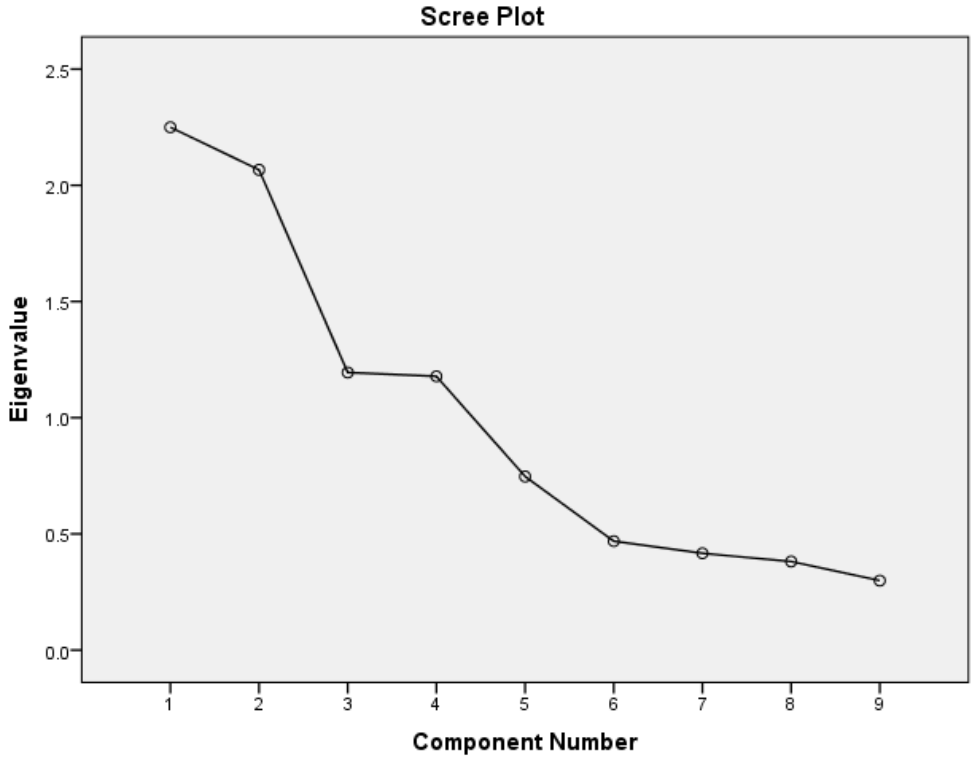

Table 4.5: Rotated Component Matrix[a]

	Component			
	1	2	3	4
Fluctuation in prices of raw materials	.875		.109	-.113
Unstable cost of manufactured materials	.807	.237	¤	.124
Additional work		.868	.148	-.146
High cost of machineries	.231	.839	-.185	
Inappropriate government policies	.156	.140	.802	
Long period between design and time of bidding / tendering	.387		.741	-.218
Lowest bidding procurement method	-.174	-.100	.636	.241
Improper planning	-.127			.891
Poor project (site) management/ Poor cost control	.170	-.380		.791

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table 4.6: Rotated Component Matrix[a]

	Component			
	1	2	3	4
Fluctuation in prices of raw materials	.875			
Unstable cost of manufactured materials	.807			
Additional work		.868		
High cost of machineries		.839		
Inappropriate government policies			.802	
Long period between design and time of bidding / tendering			.741	
Lowest bidding procurement method			.636	
Improper planning				.891
Poor project (site) management/ Poor cost control				.791

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.a

Rotation converged in 6 iterations.

From the above table we conclude that the following components are the representatives of 74.3% of total data, losing 25.7%. Whereas the higher score factors identified by component tables are

F1: Fluctuation in price of raw material (from component 1)

F8: Additional Work (from component 2)

F10: In appropriate govt. policies (from component 3)

F9: Improper planning (from component 4)

5. Discussion and Conclusion

After the factor analysis application, factor affecting the cost overrun were further reduced to four important factors F1: Fluctuation in price of raw material, F8: Additional Work, F9: Improper planning, F10: In appropriate govt. policies. These four factors represent 74.3% of the whole data set of 10 factors. The descriptive table shows the mean of every selected variable, the highest mean tells the higher impact on cost. The result of KMO test is 0.574, which is > 0.5 the benchmark to go ahead for the factor analysis. Because the KMO test value >0.5 indicates there is correlation in variables, and it is fit to continue factor analysis. If any variable possesses low correlation then the factor analysis process will be repeated from step 1, after exclusion of that variable. The table of communalities shows variances loading to each variable component; mathematically this is the loading of sum of square variances, initial table is the reflection of loading of every variable on itself, but the extraction table shows the variance of the factor on other variables overall components. Eigen value greater than 1, also after rotation loading these are shown more balanced, representing 74.3 % of whole data. As business man, these summarized components can be given due importance to revise look and understand their importance to result in increased profit and saving in project losses. It is recommended for construction organization and researchers to evolve remedies for the identified four factors and consider them as of prime important ace to secure the project cost overrun.

References

Alaghbari, W., Kadir, M. R., Salim, A., & Ernawati. (2007). The significant factors causing delay of buliding construction projects in Malaysia. Engineering, Construction and Architectural Management, 14(2), 192-206.

Ameh, O. J., Soyingbe, A. A., & Odusami, K. T. (2010). Significant Factors Causing Cost Overruns in Telecommunication Projects in Nigeria. Journal of Construction in Developing Countries, 15(4), 49-67.

Arcila, S. G. (2012). Avoiding Cost Overruns in Construction Projects in the United Kingdom. England: University of Warwick.

Durdyev, S., Ismail, S., & Bakar, N. A. (2012). Factors Causing Cost Overruns in Construction of ResidentiaFactors Causing Cost Overruns in Construction of Residential Projects; Case Study of Turkey. International Journal of Science and Management, 1(1), 3-12.

Jackson, S. (2002). Project cost overrun and risk management. Management 18th Annual ARCOM Conference (pp. 2-4). Newcastle: Northumber University.

Kaliba, C., Muya, M., & Mumba, K. (2009). Cost Escalation and Schedule delay in road construcion contracts. International Journal of Project Management, 25(5), 522-531.

Kaming, P. F., Olomoliaye, P. O., Holt, G. D., & Harris, F. C. (1997). Factors Influencing Construction Time and Costoverruns on High-rise projects in Indonasia. Construction management and Economics, 15(1), 83-94.

Okuwago, A. A. (1998). Cost-time Performance of Public Sector Housing Projects in Nigeria. Habitant International, 22(4), 389-395.