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Cost Prediction Model for Building Construction Projects

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Abstract:- The building construction industry facing the major problem is that building contracts are completed at sums much higher than estimated cost, hence the need to develop predictive cost model that capture factors affecting project cost using principal components regression. The cost prediction model is created with the help of SPSS software, the factors influencing the project cost are already determined with the help of questionnaire survey. Ten major factors are selected for the cost prediction modeling.

Keywords:- *overrun, Model, Prediction, Principal components.*

I. INTRODUCTION

In modern building construction industry to examine the importance of the factors related to construction cost and develop cost predictive model is very essential. Because of the reason is that these factors are highly influencing the construction cost. The cost prediction model is to help analyzing the factors and reducing the effect of cost overrun. SPSS soft ware can be used for the model creation.

A. Prediction model

Construction cost estimation includes predicting labor, material, equipment, utilities and other costs associated with a project. Many factors like as construction type, location, size, unforeseen conditions, scheduling, and the disposal, recycling, reuse of material are considered in the cost estimation of a project. It is a process that attempts to predict the final cost of a future project because the accuracy of estimation of costs is a critical factor in the success of a project

B. Multiple Regression Analysis

`Regression is a statistical technique to determine the linear relationship between two or more variables. Regression is primarily used for prediction and causal inference. It includes many techniques for modelling and analysing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. It helps one understand how the typical value of the dependent variable changes when any one of the independent variables id varied, while the other independent variables are held fixed. In its simplest (bivariate) form, regression shows the relationship between one independent variable (X) and a dependent variable (Y), as in the formula below:

$$Y=a+b1X1+b2X2+b3X3+\ldots \quad (1)$$

Where,
Y is the value of the Dependent variable (Y), what is being predicted or explained
a (Alpha) is the Constant or intercept
b1 is the Slope (Beta coefficient) for X1
b2 is the Slope (Beta coefficient) for X2
b3 is the Slope (Beta coefficient) for X3
X1 is the First independent variable
X2 is the Second independent variable

C. Statistical Package for Social Science (SPSS)

SPSS is a widely used program for statistical analysis in social science. It is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and others. The original SPSS manual has been described as one of "sociology's most influential books" for allowing ordinary researchers to do their own statistical analysis

II. RESEARCH OBJECTIVES

This study, factors influencing building construction cost and are analyzed and discussed through ranking. Design-bid-build projects, both executed by governmental or private companies and selected in an open tendering are selected for the scope of this study. The main objectives of this study is to identifying factors influencing the accuracy of the building construction projects, and create a cost prediction model.

III. METHODOLOGY

A questionnaire was developed to participate of General Manager, Project Manager, Contractor, Supervisor, Site Engineer to Rank the cost overrun factors according to importance and their effect. The questionnaire has been conducted around of main 80 factors which affect the cost in construction projects . The questionnaire survey is conducted by 50 construction projects in Wayanad. Identified 80 factors of performance on a five-point Liker scale as: not important, slightly, moderately, very important , and extremely important. Relative importance index is calculated for every factor using the following formula:

$$RII= \Sigma W/A*N \quad (2)$$

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

IV. FACTORS INFLUENCING PERFORMANCE OF CONSTRUCTION PROJECT

A questionnaire- survey was conducted to find the response of general manager, project manager, contractor,

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supervisor, site engineer towards factors affecting the cost of building construction project. 80 factors are to be considered and distributed to the respondents. The most important factors agreed by the general manager, project manager, contractor, supervisor, site engineer as in the building construction projects are : Level of specialization required of contractors, Consultant's level of construction sophistication, Importance for project to be delivered(F1), Consultant experience with similar project(F2), Communication among project team, Availability of management and finance plans(F3), Uncertainty of taxes(F4), Level of competition(F5), Knowledge of client and consultant average(F6), Availability of cost indexes(F7). Position of rank in the above is 1. These are the major factors affecting the building construction cost.

V. RESULT AND CONCLUSION

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std.Error			
1	(Constant)	-.184	.415		-.443	.660
	F1	1.113	.282	.996	3.947	.000
	F2	-.262	.475	-.193	-.552	.584
	F3	-.861	.417	-.852	-2.062	.045
	F4	-.025	.121	-.032	-.207	.837
	F5	.770	.358	.767	2.149	.037
	F6	.248	.491	.191	.505	.616
	F7	-3.117 E-14	.647	.000	.000	1.000
	Dependent Variable: Level of specialization required of contractors					

Table 1:- Prediction model

This research centered on developing predictive cost model for public building projects using principal components regression. The technique is applicable for purposes of reducing large number of variables required for the estimation. The research has shown that project cost depends largely on factors related to; Level of specialization required of contractors, Consultant's level of construction sophistication , Importance for project to be delivered , Consultant experience with similar project , Communication among project team , Availability of management and finance plans , Uncertainty of taxes , Level of competition , Knowledge of client and consultant average , Availability of cost indexes average .The study has been able to develop a predictive cost model using the ten selected factors that exhibit a significant effect on project cost and these factors accounted for the model. Further research is required for the model to be fully appreciated.

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