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TECHNOLOGY****COST INFLUENCING FACTOR IN ESTIMATING AT PLANNING STAGE****Mihir S. Lakdawala*, Bhavin K. Kashiyani, Vyom B. Pathak**

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ABSTRACT

The objective of this study is to determine the critical cost influencing factors of building construction projects. The importance of accurate estimates during the early stages of capital projects has been widely recognized for many years. Early project estimates represent a key ingredient in business unit decisions and often become the basis for a project's ultimate funding. Identification of cost-determinant variables and evaluation of their degree of influence play an essential role in construction building. The objective of this research is to extract the key cost-influencing factors with new concept and methods to help control the expenditure. Paper served as a summary of literature review done on variables affecting at the planning stage construction cost estimates are identified through literature. Most important several to analysis them & ranking the most important factor cost influencing factor in estimated to helpful the whole budget the overall cost to help the project manager, consultant, site engineer.

KEYWORDS: Cost-influencing factors; Estimating; Construction projects; planning stage.**INTRODUCTION**

Construction industries have win projects with the lowest bids. Therefore, without any controlling key of cost influencing factors, construction companies will not be able to control the overall cost effectively, which will in turn increase project costs and affect overall profit. In fact, construction cost overrun is a common problem in construction industries.

Cost estimation is an experience-based process. Construction practitioners are aware of unknown circumstances, uncertainty, and incompleteness of factors affecting construction costs.

Early estimates are critical to the initial decision-making process for the construction of capital projects. It has major risk for construction company to decide at initial stage. As such, the importance of early estimates to owners and their project teams cannot be overemphasized.

Early estimates are typically plagued by limited scope definition and thus high potential for scope change and are often prepared under stiff time constraints. Furthermore, reliable cost data are often difficult to obtain during the conceptual stages of a project, particularly if basic design and geographic issues remain unresolved. Early estimates, even when grossly inaccurate, often become the basis upon which all future estimates are judged with future estimates sometimes being "corrected" to be consistent with early estimates.

PROBLEM STATEMENT

In construction industry it is usual problem that the actual cost of project exceeds than estimated cost of a project. This problem needs proper planning, management and control on project to resolve it.

The aim of this study is to determine the critical cost influencing factors of building construction projects at the planning stage.

FACTOR AFFECTING OF COST INFLUENCING IN ESTIMATING

The standpoint of the quantity surveyors to explore cost-influencing factors. To identified variables which affect planning stage of construction cost estimates through literature. These factors are divided into 9 categories—client characteristics, consultant, design parameters, contractor attributes, firm's ability & site management, project characteristics, contract procedures and procurement methods, resource availability and external factors and market conditions.

Client characteristics

- ✓ Financial ability / payment record
- ✓ Project finance method / appropriate funding in place on time
- ✓ Priority on construction time / deadline requirements
- ✓ Client requirements on quality
- ✓ Experience level
- ✓ Monitoring & feedback by client

Consultant

- ✓ Working relationships with client / contractors / other design team consultants (previous / present)
- ✓ Submission of early proposals for costing / cost planning
- ✓ Absence of alterations and late changes to design (no 'design-as-we-go' on site philosophy).
- ✓ Expertise of consultants
- ✓ Extent of experience on the type of construction

Design parameter

- ✓ Completeness and timeliness of project information (design, drawings, specifications)
- ✓ Buildability of design
- ✓ Quality of design and specifications
- ✓ Inspection, testing and approval of completed works (toughness / requirements)

Contractor attributes

- ✓ Financial capability
- ✓ Experience on similar projects
- ✓ Current work load
- ✓ Number of sub-contractors
- ✓ Record of payments to sub-contractors
- ✓ Sub-contractor & nominated supplier

Firm's ability & site management

- ✓ Management team (suitability, experience, performance)
- ✓ Estimation method and cost control technique (accuracy and reliability)
- ✓ Planning capability and level of resource deployment / utilization / optimization
- ✓ Productivity effects: (managerial, organizational, labour, technology)
- ✓ % of main contractor direct work and % of sub-contracted work
- ✓ Mark up policies and % (general and project wise) (special or normal conditions applied)
- ✓ Previous claims record & Present claims
- ✓ Accidents on sites record
- ✓ Bond / warranty arrangement
- ✓ Reference about the contractor.

Project characteristics

- ✓ Size / gross floor area
- ✓ Height / no. of stories
- ✓ No. of basement levels

- ✓ Level of uncertainty of soil conditions
- ✓ Complexity
- ✓ Type of structures (steel, concrete, brick, timber, masonry)
- ✓ Location (regions / rural; urban) (inner city / outskirts)
- ✓ Site conditions / site topography
- ✓ Construction method / technology
- ✓ Availability of free space
- ✓ Project schedule
- ✓ Intensity & complexity of building services

Contract procedure and procurement method

- ✓ Type of contract / Use of standard form of contract
- ✓ Payment modalities (fixed price, cost plus, BOT, PFI-DBFO, etc.)
- ✓ Method of procurement (traditional, design and build, project management, etc.)
- ✓ Claims and disputes resolution methods (litigation / arbitration / others)

Resource availability

- ✓ Material prices / availability / supply / quality / imports
- ✓ Labour costs / availability / supply / performance / productivity
- ✓ Plant costs / availability / supply / condition / performance

External factors and market conditions

- ✓ Weather condition
- ✓ Government regulations/policies (health and safety, fire, etc.)
- ✓ Level of competition and level of construction activity
- ✓ Number of bidders on competitive projects
- ✓ Interest rate / inflation rate
- ✓ Stability of market conditions.

METHODOLOGY

A two-stage research methodology was adopted: First, literature survey and interviews with Site engineer/Consultant/Project Manager in the Surat & Navsari were conducted to identify factors affecting the cost of construction projects. These semi-structured interviews were regarded as pilot study to adjust and modify the questionnaire manuscript before take it to Site engineer/Consultant/Project Manager.

Second, a questionnaire methodology was adopted to evaluate and rank these factors according to their influence and significance regarding the planning stage of cost estimates of construction projects. The questionnaire survey was conducted by Site engineer/Consultant/Project Manager in the Surat & Navsari.

SEVERITY INDEX ANALYSIS

Severity index analysis was conducted on the sample data to rank the factors according to their relative importance. Severity indices rather than mean scores were used since the data were ordinal in nature. Severity Index Analysis was chosen because it is known to provide a meaningful interpretation of ranks rather than analyses that use the mean score derived from non-parametric data. It is used for ranking variables.

$$S.I. = \left(\sum_{i=1}^3 w_i * f_i \right) * \frac{100\%}{n}$$

ANALYSIS

The primary data collected from the first part of the questionnaire was analysed from the perspective of Consultant, Project manager, Site engineer. The total 106 number of respondents comprises of 29 Consultant, 24 Project manager, and 62 Site engineers who participated in this field survey. The responses of them were taken for this analysis.

Total Percentage of Questionnaire Distributed and Responses Received

NO.	RESPONDENT	QUESTIONNAIRE DISTRIBUTED	RESPONSES RECEIVED	PERCENTAGE OF RESPONSES
1	CONSULTANT	68	29	42.64
2	PROJECT MANAGER	56	24	42.87
3	SITE ENGINEER	121	62	51.23
	TOTAL	245	115	46.93

RESULT

Top 15 Ranking by SI Method

The Severity index, SI, is computed for each cost influencing in estimating factors to identify the most significant factors. The cost influencing factors are ranked based on SI values. From the ranking assigned to each cost influencing factor, it is possible to identify the most important cost influencing factor that affect the project in construction industry.

NO.	FACTOR	CODE	SI
1	Labor costs/availability/supply/performance/productivity	H2	95.30435
2	Priority on construction time/deadline requirements	A3	90.26087
3	Financial ability/payment record	A1	90.08696
4	Project finance method/appropriate funding in place on time	A2	89.04348
5	Estimation method and cost control technique	E2	88.52174
6	Plant costs/availability/supply/condition/performance	H3	88.34783
7	Material prices/availability/supply/quality/imports	H1	86.43478
8	Project schedule	F11	86.08696
9	Client requirements on quality	A4	85.91304
10	Absence of alterations and late changes to design & additional works	B3	85.21739
11	Complexity of project	F5	85.04348
12	Construction method/technology	F9	85.04348
13	Financial capability	D1	84.69565
14	Quality of design and specifications	C3	84.52174
15	Inspection, testing and approval of completed works	C4	83.13043

CONCLUSION & RECOMMENDATIONS

The preliminary study is that the factors that affect design stage cost estimating accuracy must be given adequate consideration in the construction estimation process to secure an accurate design stage cost estimate as a reliable budgetary tool that guarantees cost certainty for building projects.

The paper is to provide a preliminary literature review, prior to a full research project aimed at developing have a better and reliable prediction of final cost of building projects from the elemental cost plans.

It is most affect the factor that list out the table to rank that severity important them. It is recommended that clients and consultants give more attention to the most important factors that affect the accuracy of pre-tender cost estimates in order to achieve more reliable and realistic estimates.

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