

Study of Factors Affecting Construction Cost in Indore (M.P.)

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Abstract- *The Construction industry in India has gone through very dramatic fluctuations, since the late 90s due to the near completion of huge infrastructure projects and also due to requirement of development of India in Different manner with a great speed construction. The demand for more construction of all types, coupled with a tight monetary supply, provide the construction industry with a bigger challenge to cut costs.*

This research discusses the main factors that affect the construction cost in India. A survey in North India sides was conducted which included 10 contractors, 5 consultants, and 5 owners. This survey resulted in finding out 38 major factors which affect the construction cost in India. The Severity of those factors measured by the level of importance and ranked according to the severity index of the contractors, consultants and owners indicated that material cost, incorrect planning, previous experience of the contract, contract management and poor financial control on site are the most severe factors.

I. INTRODUCTION

1.1 Background

The competition between contractors to win project bids increased significantly during the mid nineties. The Construction annual growth is about 4.75% during the period of 2000-05 .Moreover the demand for more construction of all types that too coupled with a tight monetary supply; provide the construction industry with a bigger challenge to cut costs. However the efforts in this field are not proportionate to the demands. Consequently, substantial increases are observed in project costs.

1.2 Statement of Problem

The increase in the project cost has led to high level of economic fluctuation, and conflict between parties. It is therefore important to identify the main dominating factors leading to high construction cost so that efforts can be concentrated on those factors in order to reduce construction cost in India.

1.3 Objectives

The objectives of this research can be stated as follows:

1. To identify the factors affecting construction costs of large projects in the northern Province of India. The research will also include the cost factors ranking according to contractors, consultants and owners.
2. To find the agreement ranking factors between contractors/consultants, contractors/owners and consultant/owners.
3. To test the hypothesis that contractors, owners and consultants, generally agree on the Severity rank of the factors.

II. LITERATURE REVIEW

This chapter provides a literature review. This section will also Review some studies that have been carried out in the last few years, which aimed to find the main causes of cost overruns. This review is important for the purpose of this research as one of the main objectives of this research is to identify the main causes of cost overruns in Construction projects. All these factors, a total of 38 essential factors were obtained.

Ftab et.al., (2010) mentioned that the personnel of Project Management Consultant (PMC) ranked ineffective planning and scheduling by contractors as quite significant factor affecting construction cost. This issue seems to be true as it is highly related to cash flow and financial difficulties faced by contractors.

Chimwaso K.D. (2001) mentioned that design changes, inadequate planning, unpredictable weather conditions and fluctuations in the cost of building materials are common factors causing cost overruns.

Huawang Shi et.al., (2014) Construction cost estimation and prediction, the basis of cost budgeting and cost management, is crucial for construction firms to survive and grow in the industry. The objective of this paper is to present a novel method integrating rough sets (RS) theory and an artificial

neural network (ANN) to forecast construction project cost. Because there are many factors affecting the cost of building and some of the factors are related and redundant, rough sets theory is applied to find relevant factors to the cost, which are used as inputs of an artificial neural-network to predict the cost of construction project. Therefore, the main characteristic attributes were withdrawn, the complexity of **neural network system and the** computing time was reduced, as well. A case study was carried out on the cost estimate of a sample project using the model.

Khaled Hesham Hyari et.al., (2015) Cost estimation for public projects includes, but is not limited to, construction costs and engineering services costs. The available cost estimation models for these projects focus on the construction phase, with little or no consideration given to engineering services. This paper presents an artificial neural network model for the conceptual cost estimation of engineering services for public construction projects that considers both design costs and construction supervision costs. In developing the model, the authors first identify the factors that influence the cost of engineering services, and then apply a suitable artificial neural network for a cost estimation model. The model predicts the cost of engineering services as a percentage of construction cost based on project type, engineering services category, project location, and project scope.

Li Liu et.al., (2010) Central to cost-based competition is the capability to accurately predict the cost of delivering a project. Most literature on cost estimation focuses on specific estimation methods as generic techniques and little attention has been paid to the unique requirements at each project stage. This note attempts to identify the critical factors for effective estimation at various stages of typical construction projects. Drawing from organization control theory and cost estimating literature, this note develops a theoretical framework that identifies the critical factors for effective cost estimation during each project phase of a conventional construction project.

Muhammad T. Hatamleh et.al., (2018) Cost estimating process is an important element within the project life cycle. Comprehensive information, expanded knowledge, considerable expertise, and continuous improvement are needed to obtain accurate cost estimation. The purpose of this paper is to identify the critical factors that affect accuracy of cost estimation and evaluate the degree to which these factors are important from contractors' and consultants' viewpoints. Qualitative and quantitative research approaches were adopted in collecting and analyzing the data, and testing the hypotheses. Based on the literature review, a questionnaire was prepared and then was modified according to the results

of face-to-face openended interviews conducted with 11 project managers. The final version of the questionnaire was distributed to a random sample of 265 respondents. For analyzing the collected data Kendall's and Mann-Whitney tests were conducted. The analysis revealed that there is a strong agreement between contractors and consultants in the ranking of the factors related to consultant, contractor, design parameters, and information. A slightly weak agreement between contractors and consultants was noted regarding the factors related to market conditions (external factors) and factors related to project characteristics. Furthermore, the results show that the top ten factors affecting the accuracy of cost estimate are clear and detail drawings and specification, pricing experience of construction projects, perception of estimation importance, equipment (cost/availability/performance), project complexity, clear scope definition, accuracy and reliability of cost information, site constraints (access, storage, services), material availability, financial capabilities of the client, and availability of database of bids on similar project (historical data).

Kanchana S. et.al., (2018) Different views of various authors on cost estimation were discussed. Based on these information obtained from literature search, seventy two factors were identified and used for the study. The study gave the six most important factors and they are: Design related factors, Time or Cost related factors, Parties experience related, Financial issues, Bidding situations, Project Characteristics, Estimating Process. Therefore the major conclusion is that cost overrun in building construction is still a adverse problem due to various known reasons and thus, there result.

Yadav R. Avinash et.al., (2018) Cost escalation factors were identified through a comprehensive literature review and will be analysed in detail through ongoing projects of public importance. Identification of these cost escalation factors supports efforts to understand the causes of project cost escalation. This understanding permits the development of strategies, methods, and tools for better cost estimation and cost estimating management. The cost analysis of projects will be computed using modern method of construction management i.e. by Earned Value Method (EVM) which was explained above. Computation of cost analysis and understanding these factors will allow for appropriate actions to mitigate factor impacts.

The Thirty eight (38) essential factors are combined into five major categories. These categories are as follows.

1. Environmental factors
2. Construction parties related factors
3. Construction items related factors
4. Cost-Estimating factors

5. Financing factors

III. METHODOLOGY ADOPTED**3. INTRODUCTION**

The Research methodology includes the two sections which can understand the Project Development Process Initial Project Costs and Cost Varying Factors in Indore, Madhya Pradesh.

3.1 METHODOLOGY ADOPTED

The method of approach used for the research is as follows:

- Literature review and personal interviews with some contractors, owners, and professionals in the construction and consulting industries.
- Development of a Questionnaire, which is the output of the literature review and personal interviews.

3.2 QUESTIONNAIRE DESIGN

The investigation is undertaken in two stages as follows:

Stage I - The first stage is the collection of data. This stage involves literature search, field visits and interviews.

Stage II - The second stage focuses on data analysis and identification of the most relevant factors influencing construction cost in building construction.

The collection of data led to the formation of a questionnaire which was distributed to construction professionals (owners, contractors and consultants).

There are three main parts in the Questionnaire.

- The First part is an introduction to explain the idea and purpose of the survey as well as the definition of the interested area of study.
- The Second part contains general information questions including annual volume, specialization, experience and nationality of the company.
- The third part concerns the cost factors in building construction projects. For each question, the respondents have five options. These are, “extremely severe”, “very severe”, “severe”, “somewhat severe” and “not severe”.

3.4 The Two Main Sections

Understanding the Project Development Process is the first portion, which basically outlines the stages of the project

development cycle and the roles of the important stakeholders in the construction process.

The second section, First Project Costs and Cost Varying Factors, outlines the basic elements of a project's initial cost estimate as well as some of the many factors that might cause the estimate to change.

3.4.1 Understanding the Project Development Process

Infrastructure project development is a time-consuming and resource-intensive process. However, all projects may be analysed in terms of a similar life-cycle, which consists of a succession of stages. Diagram 1 depicts these steps, with brief descriptions of each level following. Although the steps are depicted in a hierarchical order, some of them can be completed at the same time.

3.4.2 Project Specification and Feasibility

The definition of the need and how it can be met is the first stage of the project cycle. This includes determining the size and quality of the facility needed. At this stage, several choices will be explored and weighed in terms of general cost estimates, predicted operational performance, and economic gain. At this point, preliminary cost estimates may be tried.

A formal or informal cost-benefit analysis will follow the project's initial specification. The goal is to see if the project as defined will be financially viable or if it will provide good value for money. If feasibility assessments are delayed until after a project has begun (as is frequently the case in practise!), possible concerns may not be discovered in time to impact project design.

3.4.3 Outline Design

Following that, work on developing the project's plans will begin. These blueprints will define the broad dimensions of a scheme's design and will include all of the project's major components. The purpose of outline designs is to supply.

- The foundation for the scheme's precise design and accurate cost estimations.
- Information required for the planning and land acquisition processes.

3.4.4 Finance

A project's funding entails securing sufficient finances to pay for the creation and operation of a clearly defined project. In some circumstances, more funding is required to cover maintenance and operations.

The following are the most important aspects of finance for most projects:

- Development financing - to cover the costs of feasibility and preliminary design;
- Construction finance - to cover the cost of the capital investment;
- Cost overruns and delays are covered by contingency finance.

3.4.5 Consents and Site Acquisition

The appropriate consents and authorizations must be in place before building can begin. The time it takes to acquire these is perhaps the most unpredictably variable aspect of a large infrastructure project, and it can have a substantial impact on the schedule and expenditures. Consents for health and safety water, sewage, waste disposal, fire certification, gas, electricity, and roads rights may be required in addition to institutional permission.

3.4.6 Detailed Design

The comprehensive design of a project is used to determine the amount of materials needed and the actual construction effort involved in putting it into action. The amounts are then calculated using drawings and lists of quantities. Drawings and quantity lists are then utilised to create detailed project costing and a schedule for implementation.

Detailed design and engineering develops all required construction documents and drawings up to the AFC (Approved for Construction) stage for the construction, as well as a detailed bill of materials (BOM) for bulk material procurement, based on the basic engineering or front end engineering design (FEED) package.

3.4.7 Procurement of Contractors

The process of selecting a contractor to carry out the project's construction is known as project procurement. The traditional method of procuring public-sector projects entails putting out a call for tenders for the work. These invites could be extended to all businesses or limited to a select group of favoured bidders. All major public-sector project invitations should be published in the Official Journal.

EPC contracts, also known as turnkey contracts, are similar to design and build contracts in that they have a single contract that covers both design and construction. However, under an EPC contract, the customer has less control over the project's design and the contract's terms assumes more risk.

A customer may generate an outline design from which tenders are solicited for a design-and-build project. On an EPC project, the client may request estimates based on a performance specification, but beyond that, with the exception of revisions, the client has no say in the design.

3.4.8 The Construction Contract

This entails the project's actual construction. Contractors may be legally obligated to complete the work under a variety of contractual arrangements. Before a contract can be signed, a decision must be made about how the contractor will be compensated. The elements that may influence the payment decision are :

- The extent to which design information is available when contract documents are prepared;
- The institutional rules of public sector funding parties (including the Commission);
- The nature and size of the project;
- The general economic context;
- The time period available to produce tender documentation;

The following are some different methods of actually paying the contractor for the construction work:

- a lump sum payment that is normally made at the end of the project.
- a lump sum aim (as above, but with more flexibility).
- Payment in stages based on completed activities (based on agreed-upon rates for specific jobs or quantities of materials used)
- Payment is made in stages based on the amount of human resources used (according to an agreed-upon schedule of hourly/daily rates).

3.4.9 Project Handover

A deadline for handing over a project from the contractor to the project sponsor is frequently specified in the contract. This may differ from what was originally agreed in the contract for a variety of reasons. The typical reasons for such extensions are addressed further in this article. incentives) for completing a project late (early). A part of the total project expenditures may also be held until the project

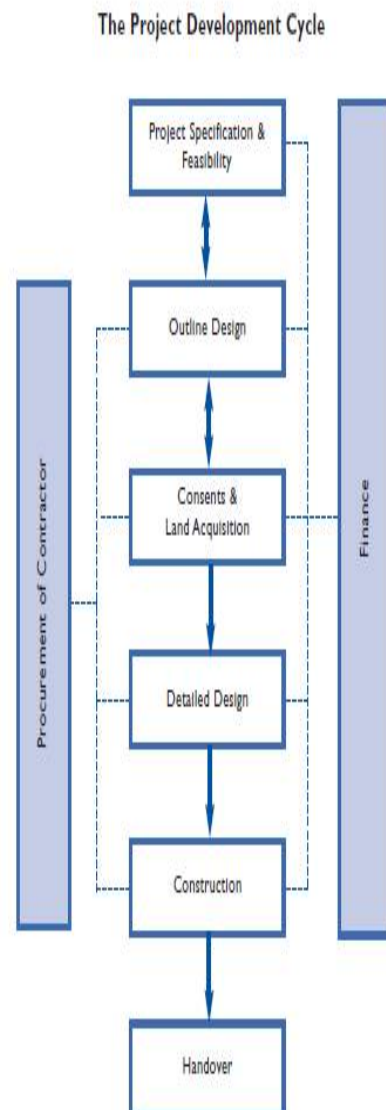
sponsor is satisfied that the project has been finished according to the project's specifications.

Like the five blind men encountering distinct areas of an elephant, each of the multiple participants in the process of planning, designing, funding, constructing, and operating physical facilities has a unique viewpoint on project management for construction. Specialized knowledge can be quite beneficial, particularly in large and complex projects where experts from a variety of professions can provide important support. Nonetheless, understanding how the various elements of the process interact is useful. Waste, unnecessary expenditures, and delays can all result from a lack of cooperation and communication among professionals. It is in the best interests of the owners to avoid such problems.

3.4.10 The Key Players

The key players in the infrastructure development process will vary depending on the institutional structures in the different Member States. The Following roles are typically the most important:

- The Project Sponsor/Programme Manager
- Project Manager
- Consents Managers
- Architect
- Costing/Quantity Surveyor
- Engineer
- Contractor



IV. INITIAL PROJECT COST & COST VARYING FACTORS

This section first focuses on the factors that determine initial project costs and then examines some of the more important determinants of cost changes over time.

4.1 Key determinants of initial project costs

No two infrastructure projects, no matter how comparable, will cost the same amount of money. Aside from fundamental technical factors, the great range of economic and institutional conditions in different Member States will always result in differences. The basic project costs, however, are based on the current cost of land, materials, equipment, and labour in the region where the project is being procured. These fundamental expenses will vary based on a number of factors

that will be described further down. These elements are summarised in Figure 4.1.

4.1.1 The Project Specification

The physical characteristics of a project are defined by the specification. For example, given expected traffic volumes, the length, depth, and width of the road surface, the surfacing material to be used, the number of lanes, bridges, and junctions, and so on will be specified. The needed function and estimated occupancy rate for buildings will result in a specification of total floor area and floor plate size, height, interior and external appearance, floor loadings, heating and lighting requirements, and so on.

4.1.2 Location

Institutional factors and geographical realities both have an impact on project costing. Institutional considerations can have a variety of effects on initial project cost estimates. In some nations, consent procedures, in particular, may be more difficult, affecting the time it takes to successfully undertake a project. Allowance for the costs of maintaining a long-term public consultation process is one example. Where major projects are likely to face substantial opposition on environmental grounds, extra funding for environmental mitigation measures may be required.

4.1.3 Form of Procurement/Contract

Cost savings may be made by means of lump sum contracts although these are usually marginal in relation to the total project costs, which seek to transfer most of the risk of cost over-run from project sponsor to contractor, may in some circumstances yield savings.

You lack the necessary skills to complete a task.

You are unable to accomplish a task or a project due to a lack of resources.

You lack the necessary capacity to provide the goods or services in question.

Obtaining the goods or services in question through outsourcing is substantially less expensive than obtaining them in-house.

Procurement can entail purchasing hardware, equipment, or other commodities required for a project, or it can entail engaging the services of a consultant or service provider. Determine whether the advantages of procuring the project

outweigh the advantages of completing it in-house before starting the procurement process.

Procurement is the most cost-effective way to avoid the time, money, and worry of training workers to perform an activity they have never done before. It's more cost-effective to employ a professional and get the job done correctly. Procurement allows your company to focus on its primary mission while outsourcing chores that aren't related to it.

4.1.4 Site Characteristics

Soil and drainage factors, as well as access obstacles, might have an impact on a site's cost estimations. Poor ground conditions have a significant impact on the quantity of excavation, piling, and foundation work required. When ground conditions are unknown, reliable project costing is impossible to attain without first doing a soil study. This may require the sinking of boreholes to obtain soil samples at different levels beneath the surface.

Clearly defined start and end times (time limit) of

- Unique
- The target has been specified.
- Resources are limited.
- Financial Statements (limited)
- Factors of uncertainty (Risks), etc.
- Scope.

4.1.5 New Build or Improvements

Generally, the construction of new infrastructure is more expensive than improvements to existing infrastructure, or the refurbishment of buildings. This is primarily because the “non-building” costs such as land purchase, foundations, services provision etc. do not have to be included when simply upgrading existing structures.

The construction of a new building or structure from the ground up is a relatively simple project. This type of project is quite different from one project to the next, despite its simple definition. A new construction project almost always necessitates collaboration between architects, builders, construction teams, and general contractors.

Although starting from scratch is more expensive than renovating, it is often the best option for your unique project. For everything from electrical to ecological issues, new construction enables for the use of current technologies throughout the building. New construction also usually entails less maintenance.

4.1.6 Tax Liabilities

An organisation will be liable to pay tax on its purchases. Some organisations and projects are exempt from paying taxes, or they can be reclaimed. Projects by local governments and public infrastructure are examples. Some public or quasi-public sector enterprises, as well as voluntary and private sector organisations, may be accountable, and these tax expenditures can significantly increase gross building costs.

4.1.7 Timescale

In general, the longer a project takes, the more money it will cost. The duration of a project is determined by its specification. The larger the project, the longer it will take to complete. This isn't always the case; with enough more resources, project execution can often be speed up.

Construction managers use a construction timeline to structure a project by breaking it down into separate activities and milestones and assigning dates and deadlines to each. The construction timeline gives you a bird's-eye view of when and how much work will be done on a project.

4.1.8 Inflation

The longer the expected construction period, the more account will need to be taken of expected inflationary price increases over time. This is particularly important where a public authority's expenditure programme is involved. Initial cost estimates will need to allow for the value that will need to be paid at the time the project actually goes ahead.

Inflation is tracked by a central government agency that is in charge of implementing policies to keep the economy running smoothly. The Ministry of Statistics and Programme Implementation in India keeps track on inflation.

Inflation plays a significant impact in the price increases of materials, labour, and machinery, resulting in a difference between the project's original and final costs. Construction expenses are unpredictable, and material and other costs are always fluctuating, causing economic growth to be volatile.

Many building projects require the assistance of a bank to get them off the ground. An increase in borrowing interest rates will result in a drop in profits since firms would have to use more of their own money to pay the higher interest rates.

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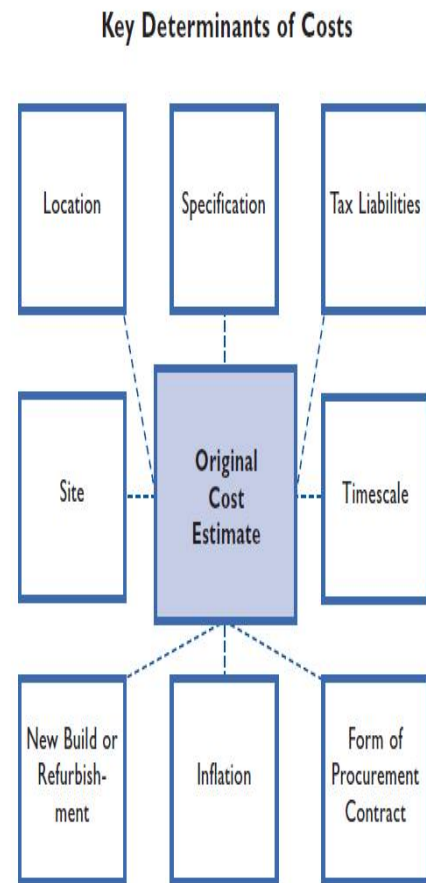


Figure 4.1 Key Determinants of Costs

4.2 Factors which change costs over time

The costs of a project rarely remain constant once implementation begins. Costs may be defined further as more information becomes available. Even after a cost has been firmly defined, there are a variety of circumstances that can cause the cost to rise. Delays are a significant factor. Delays, for whatever reason, nearly always increase budget costs. The delay could have been caused by a number of factors.

4.2.1 Poor Project Management

The project manager's or project management team's function is perhaps the most significant in keeping project expenditures under control. It is frequently true that a bad project managed by a good project manager will be completed successfully. However, even a good project will nearly always

face major issues if it is combined with inadequate project management.

A bad project management structure will have an impact on the construction process at all phases, resulting in:

- A lack of planning and coordination.
- A lack of control over time and a lack of communication between members of the project team and the project sponsor;
- Failure to detect problems and implement necessary design and programming improvements;
- A lack of control on overtime and input cost;

4.2.2 Design Changes

A modification in the design of a project might occur for a variety of reasons. It's possible that the project sponsor wants to add new aspects to the project or make adjustments to current ones. Typically, these design revisions necessitate more time and expense inputs from architects and engineers, as well as additional time and materials inputs from the contractor.

Owners may seek design revisions, such as additions, deletions, and/or modifications to the original scope of work. Changes in design have a significant impact on project cost and timeliness, as well as the potential to raise the likelihood of conflicts between owners and contractors.

The elements that influence design changes can be divided into two categories. The owner, design consultant, construction management consultant, and contractor are internal elements, whereas political and economic issues, the natural environment, technological advancements, and third-party involvement are external ones.

4.2.3 Unexpected Ground Conditions

The full scope of a project's site conditions is frequently not determined until work begins. It's possible that the initial evaluation missed a challenging condition, or that conditions have altered due to inclement weather or changes in sub-soil conditions. Unexpected subsurface conditions might often necessitate a costly re-design of a project. Changes in surface ground conditions can make it difficult to move machinery and supplies across the job site, as well as excavate and install foundations. This can raise prices and lengthen the time it takes to complete a project.

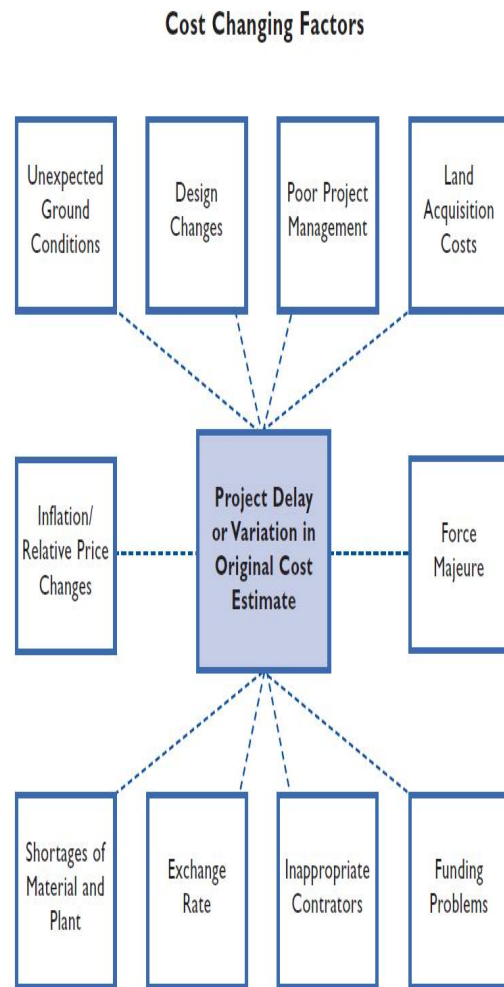


Figure 4.2 Cost Changing factors

4.2.4 Shortages of Material and Plant

There may be shortages of some construction supplies, construction plant (machines and equipment used during construction), and service plant during periods when development activity in a given region is especially high (equipment used in the operation of the infrastructure project). Delays and/or higher charges for these elements may occur if this was not foreseen in the original cost estimate.

4.2.5 Exchange Rates

The exchange rates predicted by project sponsor if exceeds beyond (and the companies providing the services) then the cost of the project can increase. It can of course operate in the opposite way.

When conducting business and using foreign currencies in foreign countries, international contractors must

consider the significant risks associated with unanticipated foreign exchange fluctuation. Because foreign exchange exposure can affect a company's fundamental financial structure, lower market value or profit margins, or disrupt on going and future projects, most international contractors try to keep it within a tolerable range.

4.2.6 Inappropriate Contractors

Contractors are chosen based on price, competence with specific sorts of projects, and a track record of performing high-quality work on time and under budget. When there is a high level of development activity in a particular place and the best contractors are not accessible to compete for the work at that time, problems can arise. Alternatively, the tender evaluation procedure may not have been carried out by those who have the most knowledge of the services requested. As a result, organisations who are not the most experienced in that sphere of activity are chosen, which has consequences for project quality and cost.

There have been instances where contractors and subcontractors have gone bankrupt throughout the construction process. As the project sponsor must re-tender the remaining work, this might result in considerable delays and additional expenses. Because of the potential responsibilities that the new contractor would have to accept for another company's work, finding a new contractor to complete another contractor's job is challenging.

Most of us have heard horror stories about people who have had renovation nightmares as a result of hiring a subpar contractor who did a terrible job on their home. This is, unfortunately, a common occurrence. Over half of homeowners say they had a terrible experience with their renovation or attribute it to a bad contractor. Many homeowners see poor workmanship as the root of their dissatisfaction.

Because built facilities vary so much, it's almost necessary to have different pricing for each one. The construction contract price includes the project's total cost, including field supervision costs, as well as the contractor's markup for overhead and profit. The factors that determine a facility's pricing vary based on the type and location of the facility. Within each of the major construction categories, such as residential dwellings, commercial structures, industrial complexes, and infrastructure, there are smaller divisions with a wide range of pricing regimes.

V. DATA ANALYSIS

The following statistical methods were used for the analysis of the data collected:

Table 5.1 Combined Ranking of Top ten factors

Rank	Cost Factors	Severity index (%)
1	Cost of materials	81.55
2	Incorrect planning	75.00
3	Previous experience of the contract	69.64
4	Contract management	69.21
5	Wrong method of estimation	67.63
6	Lack of coordination between designers and contractors	66.46
7	Poor financial control on site	65.74
8	Relationship between management and labor	63.75
9	Project financing	61.28
10	Economic stability	61.04

- Ranking
- Correlation
- Hypothesis testing

5.1 Ranking

The Ranking of the main factors affecting the construction cost is done by severity index.

The Questionnaire responses and the ranking of all professionals combined, contractors, consultants and clients are shown in the following tables.

The Categories involved in the Ranking tables are more or less the same for all the three parties. The combined ranking also involves almost the same top ten factors. Hence these factors are probably the most important factors of all the 38 factors.

The factors such as Cost of materials and Incorrect planning owns the second position respectively by the Combined parties, Contractors and the Owners, which indicate that they are probably the most Significant factors of all the ten.

Table 5.2 Contractors Ranking of Top ten factors

Rank	Cost Factors	Severity index (%)
1	Cost of materials	79.81
2	Incorrect planning	74.00
3	Contract management	70.00
4	Wrong method of estimation	68.75
5	Previous experience of contract	67.31
6	Lack of coordination between designers and contractors	67.00
7	Relationship between management and labor	65.00
8	Poor financial control on site	64.42
9	Cost of labor	61.54
10	Project financing	57.69

VI. RESULTS & CONCLUSIONS

1. The five most important factors affecting the construction cost as agreed by the three sets of professionals are:

- Cost of materials (Severity index 81.55%)
- Incorrect planning (Severity index 75%)
- Previous experience of the contract (Severity index 69.64%)
- Contract management (Severity index 69.21%)
- Wrong estimation method (Severity index 67.63%)

2. The three least important factors as agreed by the three professionals are:

- Social and Cultural impacts (Severity index 31.51%)
- Insurance cost (Severity index 29.33%)
- Waste on site (Severity index 23.72%)

3. Contractors have ranked the following factors to be the most severe factors affecting construction cost:

- Cost of materials
- Incorrect planning
- Contract management
- Wrong estimation methods
- Previous experience of the contract

4. Consultants have ranked the following factors to be the most severe factors affecting construction cost:

- Cost of materials
- Wrong estimation methods
- Incorrect planning
- Project financing

- Previous experience of the contracts

5. Owners have ranked the following factors to be the most severe factors affecting the construction cost:

Cost of materials

- Incorrect planning
- Poor financial control in site
- Previous experience of the contracts
- Economic Stability

6. Material cost is given the highest rank of all the 38 factors. And the incorrect planning is considered to be the second major problem affecting construction cost.

VII. RECOMMENDATIONS

The following recommendations are the most important ones that can be deduced by this study:

1. It is necessary that efforts should be concentrated in the major factors affecting construction cost in order to reduce the construction cost, enhance the construction performance and generate confidence within the construction industry.
2. The least agreement is between owners and consultants, it is therefore suggested that this group should sit together and resolve all possible misunderstanding and reduce gaps between them.
3. For better management and to control problems, Coordination and Communication among various parties is very important.
4. Estimates based on updated price information should be considered in order to come up with a reasonable offer and avoid any wrong estimation.
5. The pre-qualification procedure should include - as its major priority - the experience of the contractors.

REFERENCES

- [1] Adnan Enshassi, Sherif Mohamed, Saleh Abushaban, "Factors Affecting The Performance Of construction Projects In Gaza Strip" (2009) Page (259-280)
- [2] Aftab, H., Ismail, A., Mohd, A. and Ade, A. (2010) "Factors Affecting Construction Cost in Mara Large Construction Project: Perspective of Project Management Consultant", International Journal Of Sustainable Construction Engineering & Technology.
- [3] Al- Khaldi, Zaitoun S. (1990). "Factors affecting the accuracy of construction cost estimating in Saudi Arabia". Master thesis, King Fahd University of Petroleum and Mineral.
- [4] Arti J. Jari, Pankaj, P. Bhangale (2013). "To Study critical Factors Necessary for a Successful Construction Project".

- In International Journal Of Innovative Technology and Exploring Engineering. Vol. 2, Page (331-335).
- [5] Chimwaso K.D. (2001) “An Evaluation of Cost Performance of Public Projects; Case of Botswana”, 2nd International Conference on Construction in Developing Countries, Rotterdam (Netherlands).
- [6] Ganesh, L and Mehta A.(2010). Critical Success Factors for Successful enterprise Resource Planning Implementation”. In International Journal of Business, management And Social Sciences, Vol. 1, Page (65-78).
- [7] Hanafi, Abdul Aziz (1995), “Contractor Sectors-Problem and Solution.” AL-Aswaq Magazine. Saudi Arabia. Vol. 7. Page (16-17). Journal of Civil Engineering and Management.
- [8] Huawang Shi, Wanqing Li (2014), “The Integrated Methodology of Rough Set Theory and Artificial Neural Network for Construction Project Cost Prediction”, IEEE.
- [9] K.N. Jha & K.C. Iyer ,”Critical factors Affecting Quality Performance in Construction Projects” (2006) vol. 17 Page (1156 -1158).
- [10] Kanchana S, Janani S (2018), “A study on factors affecting estimation of construction project”, (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 11 Nov 2018, pp. 1154-1157.
- [11] Khaled Hesham Hyari, Ahmad Al-Daraiseh, and Mohammad El Mashaleh (2015), “Conceptual Cost Estimation Model for Engineering Services in Public Construction Projects”, ASCE.
- [12] Li Liu and Kai Zhu (2014), “Improving Cost Estimates of Construction Projects Using Phased Cost Factors”, ASCE.
- [13] Muhammad T. Hatamleh, Mohammed Hiyassat, Ghaleb Jalil Sweis and Rateb Jalil Sweis, (2018), “Factors affecting the accuracy of cost estimate: case of Jordan”, Engineering, Construction and Architectural Management, Vol. 25 Issue: 1, pp.113-131.
- [14] Okpala, Daniel C. (1998).”Causes of High Costs of Construction In Nigeria”. Journal of Construction Engineering and Management. Vol. 114 ,no.-2 Page (233-245).
- [15] Text Book of “Construction Engineering & Management” By :- S. Seetharaman.
- [16] Text Book of “Project Management in Construction ”By:- Anthony Walker.
- [17] Yadav R. Avinash , Swamy R. M., (2018), “Factors affecting cost and inflation of a project”, (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 02 Feb-2018, pp. 1713-1717.