



# A QUALITATIVE STUDY OF STRATEGIC FACTORS INFLUENCING BID DECISION IN INDIAN CONSTRUCTION INDUSTRY

**B R K Holla, Sudhanvkrishna G and Kiran K. Shetty M**

Department of Civil Engineering, Manipal Institute of Technology,  
Manipal Academy of Higher Education, Manipal, Karnataka, India

**Vasudev Rao A. S**

Sr. Professor, T. A. Pai Management Institute,  
Manipal, Karnataka, India

## ABSTRACT

*Construction industry is a major contributor to the socio-economic development of the country. Even under ample scope, the survival of the construction organization is a difficult task. Addressing the selection of suitable project, which satisfies the present status and the future growth is an important challenge for contractor. The formulation such strategy generally includes the outcome of past experience of bidding, the present work load, need for the work, scope for future expansion, type of project, contract, client, and risk involved etc. In this study, the major focus is on collection of practically adopted factors other than the theoretical and those factors which are listed by the past researches. Here large contracting organizations sector from India was considered for the study. Qualitative data was collected through structured interview of experts. The analysis was done using descriptive text analysis, which resulted in total of 50 factors classified under 10 major groups. The study identified 9 additional factors for the bid selection analysis. With knowledge of all the identified factors, the incompatible bid invitations can be eliminated in the initial bid selection stage itself, thereby increasing the valuable time for bid preparation of most appropriate bid proposals with enhanced chances of winning.*

**Key words:** Bid decision; Indian Construction Industry; Descriptive Text Analysis; Qualitative analysis; Bid selection.

**Cite this Article:** B R K Holla, Sudhanvkrishna G, Kiran K. Shetty M and Vasudev Rao A.S, A Qualitative Study of Strategic Factors Influencing Bid Decision in Indian Construction Industry. *International Journal of Civil Engineering and Technology*, 9(1), 2018, pp. 290-300.

<http://www.iaeme.com/IJCIET/issues.asp?JType=IJCIET&VType=9&IType=1>

## 1. INTRODUCTION

A country's development is measured with its infrastructure, well connected transport system and socio-economic life. Hence, construction sector supports and shares maximum responsibility in the development of the developing countries. In spite of huge opportunities for the construction organizations of the country, only a small number of organizations will succeed and establish its existence. The basic reason for the failure of many numbers of construction organizations is selection of inappropriate projects for execution which leads to inefficient contract management and disputes thereafter. So, the bid selection phase plays a vital role in the success of a contractor. In Indian construction industry, some of the large construction organizations practice a specific and standardized strategy in the selection of best project proposal. Contracting organization considers either financial target or company's growth needs during bid decision. In order to satisfy either one or both of these goals, they consider a large number of internal and external factors for the bid selection analysis. Every contracting organization has its own plan and process to evaluate the best among several project proposals. Sometimes, in order to adhere to the organization policy, they may not consider some of the factors which are assumed to be 'key' by the other organizations. However, for the critical analysis, to ascertain all possible contingencies and its solutions, the knowledge about a complete set of factors is essential.

## 2. LITERATURE REVIEW

In the process of identifying various factors influencing the bid selection, the study was carried out by several researchers on construction industries from various countries. The past researches tried to collect the major factors, its individual influence, inter-relation between the major factors and effect of combinations on bidding strategy.

A regression model was developed by (Drew, D. et al., 2001) [1] to find the effect of client, type and size of construction work on a contractor's bidding strategy which revealed that, the bidding behavior of the reputed construction contractor was largely unaffected by the type of construction work, but significantly affected by the client type and size of the construction work. Further, to study the difference in bidding styles of the inexperienced and experienced contractor, the study was carried out by (Fu, W. K. et al., 2003) [2] in Hong Kong construction industry which showed that past experience has a significant influence on bid competitiveness in the case of standardized bid packages. Similarly, consolidated review of several such types of past research was presented by (Bagies, A. and Fortune, C. ) [3] which collated 94 potential factors influencing bid decision. Further, these factors were grouped under 10 headings namely project characteristics, business benefit, client characteristics, the contract, project finance, company characteristics, organization's previous experience, bidding situation, economic situation and competition. However, among the 94 factors, 48 were identified as success factors which enhance the competitiveness of contractor by (Lu, W. et al., 2008) [4]. These 48 factors were further grouped into eight clusters namely project management, organization structure, organization resources, competitive strategy, relationship, bidding, marketing and technology. Among them, bidding strategy, competitive strategy, relationship with government departments, cost management are found to be most important factors and IT application, organization size and history are the least important factors in determining competitiveness. Over the period of five years, the research carried out by (Deng, F. et al., 2012) [5] on Chinese Construction Industry gave similar results with additional key factors influencing bid decision like qualified professionals, skilled workers, management and work ethic and steady growth of the home market. In another research, (Jarkas, A. M. et al., 2014) [6] found that, previous work experience, project type, project size, current workload, financial conditions of company and clients, available time for

completion of the project, tender documents quality levels are the most important factors which are to be considered before taking the bid or no bid decisions. In the study carried out by (Setiawan, H. et al., 2015) [7] using semi structured interviews to know the key factors for aggressiveness of the contractor which was analyzed using thematic analysis revealed the most important factors as acting as a problem solver for clients, being different compared to competitors, maintaining client's confidence, maintaining good relationship and concern about quality are the main key factors.

Further, it can be observed from the above literature that most of the factors influencing the strategy of bidding are same. Whereas, it was also seen that the key factors which were proven to be important in construction environment of one country were disproved in another. This was true also with respect to the time. Understanding of various factors influencing the bid decision in the construction industry in the present scenario is essential because it gives overall factors to be considered, its necessity and importance, risks associated with factors specifically in the proposed project. So the contracting organization can give a thought to what extent these factors are to be considered in order to avoid the unforeseen risks. Also, literature showed that the small and medium construction contractors generally do not consider these factors during their bid decision and mostly adopt high volume strategy. But, by considering the influencing factors any contracting organization can select a best suited bid for their organization and provide more time for preparation of these bids. This provides more effective time and increases the chances of winning with more accurate assumptions in their bid proposals. Hence, a study was carried out to understand the key factors prevailing for Indian Construction Industry.

### **3. METHODOLOGY**

In order to identify factors influencing bid decision from Indian Construction Industry, a total of 94 factors from the past literature was initially gathered. The reduction of these factors to an optimum level was done so as to minimize the time, resource and complexity of the data collection. Further, these key factors were merged to form a minimum number of questionnaire without sacrificing the essence of key parameters. A total of 18 structured questions was prepared.

#### **3.1. Data Collection**

For the collection of data the respondents were selected based on their current designation, past experience, reputation and size of the company. Initially, the structured questions which were validated by experts from industry and academia having experience of more than 20 years in the field of research. For the collection of qualitative data, the organizational leaders occupying key roles like managing directors, vice presidents and general managers of contract departments from 10 experts from leading construction organizations of Indian construction industry were chosen.

The validated questionnaire was sent one week prior to the individual experts through e-mail or post. Then a structured interview of these experts from large construction organizations was carried out by personally meeting them. During the same, in order to eliminate the chances of omission of any important points or key words in the analysis, the audio recording of the whole interview was done with the permission of the experts. The data thus gathered was converted into the text to facilitate a descriptive text analysis. The process of analysis of data was done question wise, by comparing the response across the experts. During the compilation of the factors influencing the bid decision, the emphasis was given to identification of those factors which practically adopted by the Indian large construction

organizations. The study also tried to understand the rationale behind the adoption of such factors and its implications. The extracted results were compiled to provide a framework for inexperienced contracting organization to decide on their bid proposal.

#### 4. RESULTS AND DISCUSSIONS

At the beginning of the structured interview, an open ended question was asked for each expert regarding the factors they have considered at the time of bid decision making depending on their past experiences and company policies. This paper focuses on the results of the open ended question covering the key factors for bid decision. The result obtained from the descriptive text analysis is tabulated in table 1. This intern identified a total of 50 factors. Since, major part of the factors discussed by the experts other than 9 additional factors were similar to the past research studies from various other countries. Hence, the segregating the identified factors were done similar to the past literatures. The same is shown in the table 2. However, it is important to note that, the various organizations may consider the same factors for analyzing the bid proposal, but with the different weightages to the factors. Also, the basis for deciding the weightage depends on the project itself. The same can be observed in the figure 1, which depicts, the consideration of ‘project characteristics’ more by all the respondents. The ‘project characteristics’ like project type, volume of work, geographical, political and safety consideration of location, execution complexity, degree of importance in terms of reputation, project duration, proposed project distance from the existing setup, existence of critical and expensive activities, payback period of the project and specialty or uniqueness of the project were compiled from the analysis of structured interview.

Similarly, the ‘Company characteristics’ was considered to be the next level important factors by the respondents. The ‘company characteristics’ like readily available or possible to mobilize or hireable resources like men and machineries, proximity to the available resources from the proposed project, current work load of the organization, need for the work, capital available with the organization and willingness of the management to mobilize the additional resources were considered for the bid decision making.

The ‘Business benefit’ was the third most emphasized parameter by the respondents. The factors like expected profitability, chances of future scope, work continuity with the same investment, growth needs of the organization, possibility of joint venture and market demand for the proposed type of construction were resulted from the descriptive text analysis. It can be noted that, the identified additional factors were used successfully by the experts in their professional life or by their organization as a policy. The rationale behind considering these factors and the impact on bid decision is discussed below.

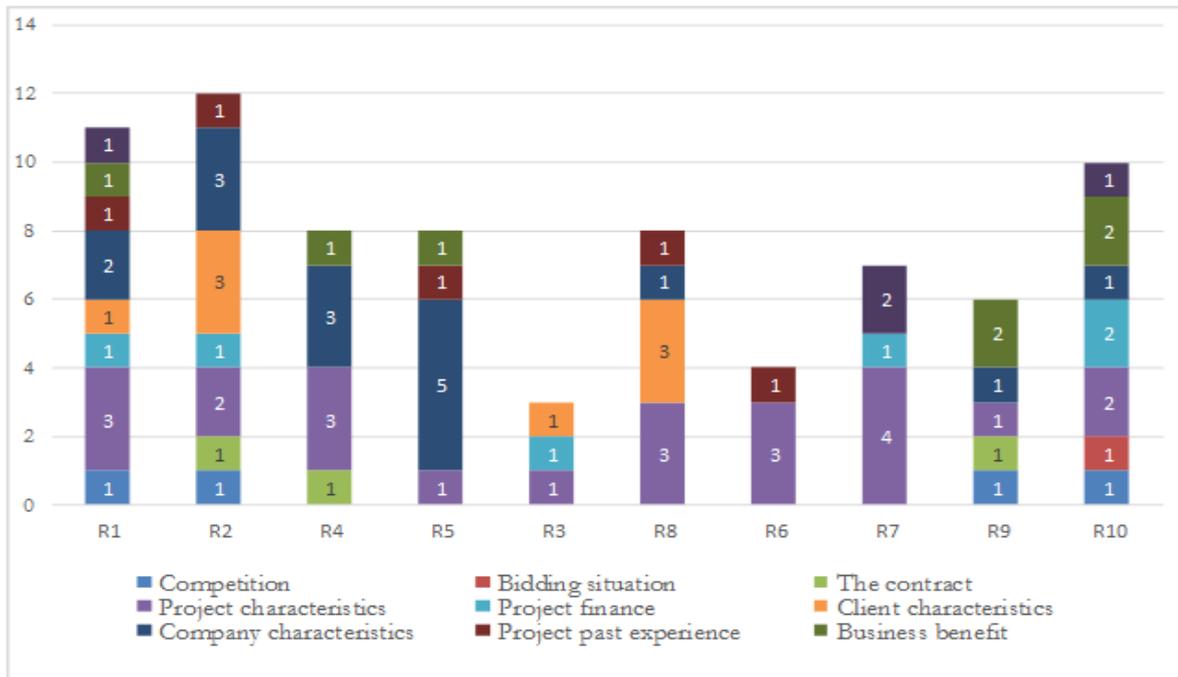
**Table 1** Major factors considered for bid decision by experts

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10
Competition	Number of competitors likely to be in bidding	Who are our competitors							Who else is there? Possible bidders	
Bidding situation										When the project needs to be executed/ season of the project
The contract		Conditions of the contracts through review		BOQ specification or scope of work					Clear scope of work	

Project characteristics	Geographical and political considerations of location of project; Run of the job or specialized?	Uniqueness of job; Scope of work	Type of project; Size of project, Bid Volume, Quick term projects	New bid or extension bid; Type of work, Safety of location	Type of project	Location of project; Complexity of project	Importance of the project	Volume of work; Type of project, Location of the project	Identifying more expensive/ critical activities	Payback period of the project; Completely new design/ special or ordinary
Project finance		Client's board members linked to financial commitment	Turnover proportional to speed of construction				Fund availability of the client			Return on investment
Client characteristics	Proposed to work with existing client or new?	Clients reputation and credibility of payment; Relationship between the client and contractor; Client's board members linked to financial commitment				Who the client is? Reputation of client; History of client; Past association with client	Financial viability of the client			
Company's past experience	Past experience of executed projects	Past experience in executing similar projects			Past experience in similar project	Past experience		Experience		
Risk	Nature of risk in general involved		Risk involved in returns on investment; Price variation of materials							
Company characteristics	Availability of resources like human, plant, machineries, labors etc.	Financial capability of contractor; Resources available with organization		Strength of contractor, facility to accommodate resources, availability of materials; Proximity to availability of resources; Labor transportation	Requirement of job for contractor; Strength of the company; Current work load; Availability of resources; Capital available	Availability of administrative support for mobilization; Existing capacity of the company to take up new project				Existing work load
Business benefit	Business development; Profitability or loss?			Future scope or work continuity availability	Growth needs of contractor				Availability of profitable item; Possibility of balancing the items available in bid; Joint venture	Margin; Future work continuity with same investment; Market demand for the constructed facility;

**Table 2** Factors influencing bid/no bid decisions of Indian Construction Industry

<p><b>Competition</b></p> <ul style="list-style-type: none"> <li>• Number of competitors likely to be in bidding</li> <li>• Possible bidders</li> <li>• Market demand for the constructed facility</li> </ul> <p><b>Bidding situation</b></p> <ul style="list-style-type: none"> <li>• When the project needs to be executed/ season of the project</li> </ul> <p><b>The contract</b></p> <ul style="list-style-type: none"> <li>• Thorough review of Conditions of the contracts             <ul style="list-style-type: none"> <li>• BOQ specification or scope of work</li> </ul> </li> </ul> <p><b>Project characteristics</b></p> <ul style="list-style-type: none"> <li>• Geographical and political considerations of location of project</li> <li>• Scope of work</li> <li>• Type of project/type of work</li> <li>• Size of project</li> <li>• Bid volume</li> <li>• Quick term projects</li> <li>• Safety of location</li> <li>• Location of the project</li> <li>• Importance of the project</li> <li>• Complexity of the project</li> <li>• Availability of more expensive and critical activities</li> <li>• Payback period of the project</li> <li>• New bid or extension bid? Availability of administrative support for mobilization</li> <li>• Run of the mill job or specialized job? The uniqueness of the job/ completely new design/special or ordinary?</li> </ul> <p><b>Project finance</b></p> <ul style="list-style-type: none"> <li>• Turnover proportional to speed of construction</li> <li>• Fund availability of the client</li> <li>• Additional work capital required for the job</li> <li>• Expected margin/profit</li> </ul>	<p><b>Client characteristics</b></p> <ul style="list-style-type: none"> <li>• Proposed to work with existing client or new?</li> <li>• Client's reputation and credibility of payment/ History of the client</li> <li>• Relationship between the client and contractor/ Past association</li> <li>• Client's board members linked to financial commitment</li> <li>• Financial viability of the client</li> </ul> <p><b>Company characteristics</b></p> <ul style="list-style-type: none"> <li>• Need for work</li> <li>• Availability of resources like human, plant, machinery, labors etc.</li> <li>• Financial capability of contractor</li> <li>• The strength of the organization in the industry. SWOT analysis</li> <li>• Current assignment/ present work load</li> <li>• Availability of profitable items/ profitability</li> <li>• Proximity to available resources</li> <li>• Availability of assets to arrange resources.</li> </ul> <p><b>Company's past experience</b></p> <ul style="list-style-type: none"> <li>• Past experience in executing similar projects</li> <li>• Past experience of organization</li> </ul> <p><b>Business benefits</b></p> <ul style="list-style-type: none"> <li>• Business development/opportunity for opening up of new avenue</li> <li>• Future scope or work continuity availability</li> <li>• Growth needs of contractor</li> <li>• Possibility of balancing the items available in bid</li> <li>• Joint venture</li> <li>• Business benefits in terms of improvement of organization's reputation</li> <li>• Future continuity with the same investment.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Nature of risk in general involved</li> <li>• Risk involved in returns on investment</li> <li>• The risk of price variation on materials of construction, which doesn't come under price escalation clauses.</li> </ul>
--	---



**Figure 1** Frequency of key parameters used by experts in bid decision

#### 4.1. Existing Client or New Client

It was noted that the decision on bid or no bid may depend on whether the project proposal is to work with existing client or new client. In the case of bidding a project with a new client, the competition may become tougher. Because, the contracting organization may have to compete with the repeated contractor who has worked several times with that client. The advantage in the repeated order is that the contracting organization can understand the moves of the client beforehand and even negotiate the rates amicably. Hence, it is better to continue the relationship with the client, contractor or execute jobs with the same client. Also, experts expressed that, understanding the reliability and the contract management is much easier in the case of existing client. Hence, in the case of availability of such project proposals, the contractor can give more preference to existing client, rather than the new client. On the other hand, in the case of rigid and complex nature of the existing client, the contracting organization may decide to go for project proposal from the new client. Hence, prior knowledge about either existing or the new client has a vital role to play in deciding to bid or not.

#### 4.2. Client’s Board Members Linked to Financial Commitment

In the case of Client’s organization, consisting of a set of board members who are also responsible for the project and decision making, then the contracting organization should verify whether the finance is controlled by them. If yes, then the contracting organization should verify their reliability in past, their present status of finance and a broad view on their future plans. Hence, this factor plays an important role in bid decision making of projects with the private clients.

#### 4.3. Strength, Weakness, Opportunities and Threats (SWOT) Analysis

From the interview, most of the experts suggested that irrespective of a number of bidders in the competition, they believe in carrying out their SWOT analysis and rate analysis to know the feasibility of proposed project, along with visiting the site personally. Based on the data

gathered during the primary visit to a site like topography, soil condition, local climate, labours availability and rates etc., the contracting organization has to carry out an in depth SWOT analysis. The experts shared their bad experiences of the huge difference in the level of the site, unavailability of local resources and extreme weather conditions, where they did not do reconnaissance survey of proposed site and the SWOT analysis thereafter. Hence, instead of comparing the contracting organization's proposed bid with various other bidders in the competition, it is better to believe in their own SWOT analysis.

#### **4.4. New Bid or Extension Bid**

The method adopted for integration of resources for the proposed project depends on whether it is a new bid or extension bid. In the case of the new bid, it is important to analyze the availability of resources like readily available resources, transferable resources, and resources that are available locally for hire. Here, consideration should be given to charges associated with accommodation and transportation of the resources. Whereas in the case of extension bid, since results of this analysis are readily available and there are chances of sharing of resources possible results in contracting organization to go with the lesser price. In both, the above cases the locally available resources reduce the cost and hence lesser will be the price. Contracting organization has more chances of bidding in case of extension bid than the new bid. Some experts expressed their unwillingness to bid in case of a new bid which is far off from the established areas of the organization. In such cases, even if the new bid is from the existing client, contractors generally tend to take 'no bid' decision or to bid with higher quotes to take shelter from the all unforeseen charges. Hence, in the case of the new bid, the contracting organization will not be able to submit a highly competitive price to the client under the presumed higher risk.

#### **4.5. Proximity to Available Resources**

In analyzing the project proposals with reference to the availability of resources, the experts said that the contracting organization should also consider the proximity of the available resources from the proposed project site. They shared their experiences of additional charges for transportation of the labourers to project site from their habitation, additional charges for the materials supply to an extreme topographic site in remote areas and the unwillingness of the labours to travel for longer distances, which leads to the loss of productive time of execution, increased stress and fatigue. So, the labourers try to choose their work place nearer to their habitation, which increase productive time, if they are working on 'item rate contract'. In the case of infrastructure projects where the spread of the project large, this factor needs to be addressed with utmost care. Since, along with the men, material requirement is also large in infrastructure projects. Hence, location of aggregate quarry or source of sand, bitumen plants becomes crucial.

#### **4.6. Availability of Assets to Arrange Resources**

In the case of requirement of a huge investment in addition to the readily available capital for the proposed project, the assets which are readily available with the organization can be used for the arrangement of resources. While selecting a project for bidding, the organization generally considers the present requirement of the project in order to facilitate its smooth running and for its necessary future growth. The organizations normally take the project to its maximum financial capacity. However, there are chances that, they may tend to take no bid decision, even when the organization has the manpower, but, fails to arrange the material resources due to a shortage of financial resources. In such case, if the organization has shares of other organization, or the shares of the same organization, or any other shares, and if there

is an opportunity to convert the shares into resources by selling it, then the contracting organization may decide to bid.

#### **4.7. Availability of More Expensive and Critical Activities**

In order to compete in a highly competitive environment, it is essential for the contracting organization to analyze the Bill of Quantities and identify some items in the contract which are contributing to maximum expenses in the project. In existence of such items, the contracting organization has to estimate various such items specifically for the proposed project. If the contracting organization has the willingness in getting the contract, it will tend to load more on these items which give higher profit margin. Experts feel that such items are essential to creating competition for the proposed project. Similarly, to compensate the above item price and to keep the higher competitiveness, some other items are to be loaded with lesser cost than the actual. These items will give some leverage during bidding. In case if, the contracting organization is not interested in bidding, then they keep the quote on the higher side by considering other competitors in the bidding. For example, if the contracting organization has any tie up with other organization like lobbying in the bidding or if there is their own group of company in competition, then they may not be playing with the price of considering the critical and expensive items of contract. So, in such a case they keep the price of all the items 20-30% high.

#### **4.8. Payback Period of the Project**

Generally, for the contracting organization who adopts high volume bidding strategies must consider this factor in their bid decisions. If the project cost is huge and the duration is also longer, then, can take the decision to go for bid. If the project cost is less and duration is more, then, it is better to avoid such bids unless and otherwise a lot of idle resources are available with the contracting organization. Hence, the contracting organization should ensure that the volume of bid and duration are spread out appropriately. A short period of payback should be always preferred. Because in such cases the block of cash flow is minimum.

#### **4.9. Future Continuity with the Same Investment**

According to experts the bid or no bid decision, they consider this factor along with the other important factors like present workload of the organization, expected commencement of the project, and the additional investment required for the proposed project. The contracting organization has to essentially verify the payback period of the proposed work as well as compare the payback period of the all other projects in hand. The contracting organization should also verify the feasibility in terms of recovering the complete hours and the investment in the same project or whether there will be spill over for the other projects. In the case of purchase of plant and machinery, the same may be utilized for the other projects with the same investment which will be done by keeping in mind the future projects. The contracting organization should foresee the possibility of getting similar projects or projects with the utilization of the invested equipment based on the thorough market survey. If there is no possibility of the further utilization of the invested equipment, then the contracting organization is bound to load the whole investment cost on the proposed project only without sacrificing the margin. This additional investment cost will reduce the chances of winning the contract. Hence, it is better to bid those projects which the contracting organization is already building similar ones or in which they have the capacity of investment. However, the contracting organization will be ready to compromise on the margin in case they are entering a new area of construction or a new country. This is done to create a foot print in the new field.

Above discussed factors influencing the bid or no-bid decision were considered along with the other factors listed in table 2. It was also found that all the listed factors were not considered by the experts from various contracting organizations. They were choosy in factors depending on their past experience, organizations' policy and the need of work for the organization.

It should also be noted that, even when there is similarity of factors considered by some organizations, but they vary in the assignment of weights to it. However, they consider these standard factors for all bid decisions unless and otherwise there is a specific requirement of change of strategy of bidding for a specific project. Based on the importance of the project perceived by the contracting organization and the financial and resource status, they will take a decision on changing the strategy of bidding. So, from this study, the following conclusions can be drawn.

## 5. CONCLUSIONS

The factors identified in the study is with reference to present scenario of bid decision process in large construction sector of India. The contracting organizations give priority to only a few factors which are decided by their organizational policy and goals. They follow a unique pattern for analyzing the bid decision. Generally, the large contracting organizations rarely change their strategy of bidding. Organizations using high volume strategies will not be worried about these list of factors except very few to analyze the risk. However, organizations who were adopting selective bidding strategy showed more inclination towards considering most of the factors for their bid decision.

Factors obtained from the study can be used by the budding contracting organizations. This will help them in analyzing the risk or the complexities associated with the proposed project as well as the possibility of maximization of the profit.

The knowledge of the factors influencing bid decision helps in understanding the bid decision pattern of competing contracting organizations. This can be further studied by analyzing some of their past bid proposals. This helps in predicting the move of competitor and the necessary modifications in contracting organizations' bid proposal to maximize the chances of winning.

Further, for the faster growth of any developing country, the improvement in infrastructure should see an exponential growth. But, in the current scenario of Indian construction industry, the major projects are suffering cost and time over run along with poor quality of construction. It is known that, the successful implementation of a mega project is achieved by optimally addressing the key parameters like time, quality and cost. However, for the inexperienced contracting organizations, it is very challenging to understand the various parameter linked with these key parameters. An appropriate approach of balancing these key parameters combined with the comprehensive knowledge of the factors identified from this study will facilitate the contracting organizations to address the key parameters in much more professional way. This contributes to the healthy development of the country's infrastructure and social life.

However, a study on understanding major bidding strategies in Indian construction industry through which the time, quality and cost are balanced, has to be conducted to arrive at the best suited strategy for a given situation.

## REFERENCES

- [1] Drew, D., M. Skitmore, and H.P. Lo, *The effect of client and type and size of construction work on a contractor's bidding strategy*. Building and Environment, 2001. **36**(3): p. 393-406.
- [2] Fu, W.K., D.S. Drew, and H.P. Lo, *Competitiveness of Inexperienced and Experienced Contractors in Bidding*. Journal of Construction Engineering and Management, 2003. **129**(4): p. 388-395.
- [3] Bagies, A. and C. Fortune. *Bid/no-bid decision modelling for construction projects*.
- [4] Lu, W., L. Shen, and M.C. Yam, *Critical success factors for competitiveness of contractors: China study*. Journal of construction engineering and management, 2008. **134**(12): p. 972-982.
- [5] Deng, F., G. Liu, and Z. Jin, *Factors formulating the competitiveness of the Chinese construction industry: Empirical investigation*. Journal of Management in Engineering, 2012. **29**(4): p. 435-445.
- [6] Jarkas, A.M., S.A. Mubarak, and C.Y. Kadri, *Critical Factors Determining Bid/No Bid Decisions of Contractors in Qatar*. Journal of Management in Engineering, 2014. **30**(4).
- [7] Setiawan, H., B. Erdogan, and S.O. Ogunlana, *Competitive aggressiveness of contractors: A study of Indonesia*. Procedia Engineering, 2015. **125**: p. 68-74.
- [8] Nadine Nabeel Abu Shaaban, Construction Industry on the Renewable Energy Bandwagon. International Journal of Management, 7 (4), 2016, pp. 51 - 60
- [9] L. Saikala and Dr. A. Selvarani. A Study On Work Stress Among Architects And Construction Professionals In Indian Construction Industry. International Journal of Management, 6 (1), 2015, pp. 585-593