Factors Influencing Contractors Selection in Construction Projects

Dr. V. Sathish Kumar[1], Dr. P. R. Dhevasena[2]

[1,2]Assistant Professor, Department of Civil Engineering,
[1]Government College of Engineering, Dharmapuri, Tamil Nadu, India
[2]Government College of Engineering, Trichy, Tamil Nadu, India

ABSTRACT

Contractor selection is a critical decision that is undertaken by client organizations and is central to the success of any construction project. The process should be conducted prior to the award of contract, characterized by many factors such as: contactor's skills, experience on similar projects, track-record in the industry, and financial stability.

Selection of the best contractor is a vital process in construction projects. This paper identifies the most important factors that influence the selection of contractors. A questionnaire was distributed to experts in the construction domain to determine the importance of factors that are taken into consideration by the main contractor to select the most suitable contractor. A survey was carried out which was conducted with many experts in the construction field to determine the score of each factor.

KEYWORDS: contractor selection, construction project, client

A. INTRODUCTION

Construction contractors have big influences upon projects and their successes. Therefore, it is quite critical to select a qualified contractor in the process of construction management. A competent construction contractor is one of the indispensable conditions of a proper process and completion of a construction project. There are several theoretical frameworks or models applied in the evaluation of contractors. And there are some practical criteria for selecting an appropriate contractor.

B. BUILDING CONTRACT

1. A building contract is an agreement between two parties, the landlord and a contractor's, to undertake an agreed amount of work, to an agreed standard and for a fixed sum of money. There are common elements which every contract should be
2. Provisions for every party to deal fairly with each other and to mutually cooperate.
3. A clear separation of the role and responsibilities of all involved.
4. Established methods of payment.
5. A clear description of the work to be carried out .
6. A agreed time scale for start and completion.

Figure 1 Types of Contract

C. LITERATURE REVIEW

B. Dean Kumar *et al.*(2013) " In this study, for contractor selection unlike the conventional methods that are based on lowest value suggested for the project implementation, the selection of a contractor is based on the contractor's ability to do the project. In this paper, combination of the risk management process and fuzzy logic, have been used to identify and assess the risks of the contractors. After identifying risk the factors and the evaluated using AHP fuzzy, It is suggested that after obtaining weight, the fuzzy

criteria and competence score for each contractor is obtained. Finally, very few qualified contractors will implement the project.

Naren Gupta et al.(2013) reported that "Ranking of the main criteria for contractor selection procedures on major construction projects in Libya" this paper evaluates the current state of knowledge in relation to contractor selection process. contractor selection is a critical decision that is undertaken by client organizations and is central to the success of any construction project. The process should be conducted prior to the award of contract, characterized by many factors such as: contactor's skills, experience on similar projects, track-record in the industry, and financial stability.

Mostafa Khalifa *et al.***(2013)** "A survey was carried out which was conducted with 29 experts in the construction field to determine the score of each factor. Statistical analysis is carried out on the feedback of the respondents of the survey. By using SPSS software, This paper identifies the most important factors that influence the selection of sub-contractors. By using SPSS software. This paper introduces ten criteria and their 46 factors. These factors are used for the selection of sub-contractors.

Xiaohong Huang (2011) "Analysis of the selection of project contractor in the construction management process" studied an a competent construction contractor is one of the conditions of a proper process and completion of a construction project. This paper analyzed the relevant theoretical methods for contractor evaluation and examined the actual criteria for the selection of contractors. And there are some practical criteria for selecting an appropriate contractor.

Heng Li et al. (2010) "Contractor selection using the analytic network Process" presented that investigate Contractor selection using the analytic network Process Without a proper and accurate method for selecting the most appropriate contractor, the performance of the project will be affected. The multi-criteria decision making (MCDM) is suggested to be a viable method for contractor selection. The analytic hierarchy process (AHP) has been used as a tool for MCDM. However, AHP can only be employed in hierarchical decision models. For complicated decision problems, the analytic network process (ANP) is highly recommended since ANP allows interdependent influences specified in the model.

D. SCOPE AND OBJECTIVES
OBJECTIVES
➢ To identify from the literature and other sources the variables which have been determined to be used for contractor selection.
➢ To determine the common underlying factors which affect contractor selection based on the perceptions of clients and consultants using factor analysis.
➢ To determine multi criteria selection methods that construction professionals prefer in order to enhance contractor selection.
➢ To recommend the factors to be considered in the selection of contractors.

SCOPE OF STUDY
Given the constraints of time and resources, the actors involved, the spatial coverage of a research have to be clearly defined. For that matter, this research was done on clients and consultants from the various professional bodies involved in construction in India. Since the time is too short for a study research, maximum efficiency was made to get actual information. As the questionnaire has been filled by respondents of Surveyor (Quantity Surveying Division) were surveyed because they are directly involved in contractor evaluation and selection for construction projects.

E. METHODOLOGY
➢ Study of literature related to contract selection factors analysis.
➢ Preparation of questionnaire.
➢ Site visit to many construction project sites.
➢ Distribution of the questions to in person and e-mail.
➢ Collection of data from the respondents.
➢ Analyzing the questionnaire.
➢ Remedial measures are to be suggested and the present data is to be recorded for future references.
➢ Conclusions, recommendations and suggestions for future study.

F. DATA C OLLECTION
The survey was self administered and distributed between two hundred clients in various construction organizations in the state of Tamil Nadu, India. Initially the questionnaire was distributed to the respondents and proposed to be collected later. However before handing over the questionnaires, all the questions were explained to every respondent so that they could fill the questionnaire easily and properly. The responses were collected and analyzed. Out of 200 copies of questionnaire administered to respondents, 55 were retrieved and analyzed.

G. QUESTIONNAIRE DESIGN
In this research, few methods of data collection were used including observation, documentations, interviews and questionnaire and documentary analysis. The good design of the questionnaire is a key to obtain good results and warranting a high rate of return. The questions of the research questionnaire are constructed based on:

H. DATA ANALYSIS
The questionnaire constituted three parts, which are as follows:
Part A - personal details
Part B - questions related to selection factor.
Part C - question related to past contractor performance.

I. ANALYSIS OF CONTRACTOR SELECTION
The analysis of contractor selection factor was identification in statistical analysis by ranking method; discriminant function analysis was software in SPSS. There are separate selection factor are details given following main factor and sub factors are them rank vice discuss in this chapter.

There are which is given in the most contractor selection are the normally given the main factor to sub factors is given the table then allocated by ranking method in statistical package of social scientist of (totally 22) factors are given on this contractor selection factors.

Table 1, Contractor Section Factor

| F. No	Factor	N	Percentage		Mean	Rank
			yes	no		
8	Whether the contractor maintain good relationship with client?	55	100	0	2.000	1
2	Whether the Past performance meets the expectation of the client?	55	96	4	1.964	2
5	Material management capabilities are also accounted?	55	95	5	1.945	3
20	Whether they maintained Safety record (Company safety policy)?	55	94	6	1.938	4
13	Whether you will look into the past project experience of contractor?	55	93	7	1.927	5
9	Whether the contractor completed the project in time without delaying?	55	91	9	1.909	6
3	Whether the contractor has good amount of field experience?	55	89	11	1.891	7
11	Whether the contractor have good management skill ?	55	88	12	1.873	8
17	Whether you will check Contractor-technical inspection relationship?	55	87	13	1.867	9
7	Whether the contractor have qualified site engineers for supervation?	55	85	15	1.855	10
4	Whether the equipments used by the contractor are of good quality and modern?	55	84	16	1.836	11
6	Whether the contractor have well experienced labour?	55	82	14	1.820	12
1	Whether the Contractor's k2wledge of the contract and general bases?	55	81	19	1.800	13
18	Whether you will identified into tender price and bid amount?	55	80	20	1.782	14
10	Contractor's expertise and skill?	55	75	25	1.745	15
12	Whether the contactor have good financial background and assets?	55	71	29	1.709	16
22	Whether you will check the Positive credit rating of contractor ?	55	67	33	1.673	17
21	Whether you will investigate on-going projects?	55	65	35	1.655	18
16	Whether you will look into educational qualification?	55	60	40	1.600	19
15	Whether you will choose same contractor for all project or different?	55	55	45	1.545	20
14	Whether you will check in Relationship with(Suppliers, sub contractors and local works)?	55	42	58	1.418	21
19	Whether you will select the contractor locally available?	55	40	60	1.400	22
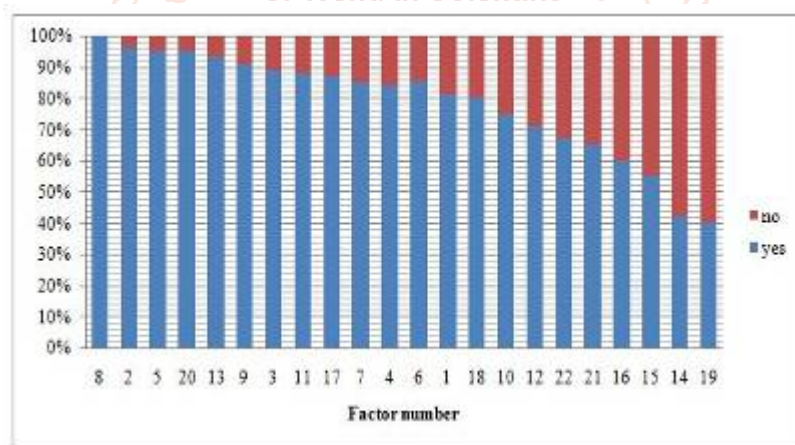
Figure 2, Contractor Selection Factor

J. Past Project Contractor's Performance Analysis

Forty four factors, identified as the contractor for selection, were given to the respondents and they were asked to rank the factors in a five point Likert scale as per their opinion. The responses of all the 55 respondents were collected and the means calculated for each one of the reasons; all these are presented in Table.2

Table 2, Past Contractor Performance Factor Responses Details

F. No.	Factor	N	Very poor	Poor	Average	Good	Very good
1	**Cost**						
C1	Financial stability		1	5	9	36	4
C2	Flexibility in payment terms and conditions		0	10	31	2	12
C3	Tender price		5	5	14	16	15
C4	Flexibility in Contractor's payment	55	0	0	19	31	5
C5	Monthly payment difficulties		0	7	15	25	8
C6	Past project Cost overruns		5	1	22	23	4
C7	Financial references		0	5	22	23	5
			1.57	4.71	18.86	22.29	7.57

2	Quality						
Q1	Material quality		2.00	0.00	4.00	36.00	13.00
Q2	Equipment quality	55	3.00	3.00	11.00	18.00	20.00
Q3	Quality assurance and quality control programs		1.00	9.00	9.00	29.00	7.00
			2.00	4.00	8.00	27.67	13.33
3	Staff's behavior and experiences						
S1	Site management and supervision		0.00	11.00	4.00	27.00	13.00
S2	Staff qualification		3.00	6.00	21.00	15.00	10.00
S3	Experience of technical personnel		2.00	5.00	8.00	29.00	11.00
S4	Use of experienced subcontractors and suppliers	55	2.00	1.00	5.00	21.00	26.00
S5	Frequent progress meetings		3.00	5.00	13.00	30.00	4.00
S6	Cooperation with the other subcontractors on the project		3.00	5.00	6.00	28.00	13.00
S7	Creativity and innovation		2.00	4.00	25.00	10.00	14.00
			2.14	5.29	11.71	22.86	13.00
4	Safety						
Sf1	Jobsite cleanliness during projects and upon leaving jobsites		2.00	8.00	16.00	19.00	10.00
Sf2	Proper disposal of construction waste	55	0.00	15.00	13.00	19.00	8.00
Sf3	Safety consciousness on the job site		0.00	4.00	26.00	17.00	8.00
Sf4	Onsite plant maintenance and repair programs		2.00	5.00	25.00	17.00	6.00
			1.00	8.00	20.00	18.00	8.00
5	Disputes and risks						
D1	Suppliers incompetency to deliver materials on time		0.00	3.00	36.00	8.00	8.00
D2	Disputes and arbitration	55	0.00	2.00	14.00	34.00	5.00
D3	Failure to comply with the quality specifications		0.00	3.00	21.00	27.00	4.00
D4	Lack of readily available utilities on site		3.00	2.00	27.00	15.00	8.00
			0.75	2.50	24.50	21.00	6.25
6	Time						
T1	Flexibility and cooperation when resolving delays		1.00	5.00	9.00	33.00	7.00
T2	Delay	55	4.00	18.00	18.00	14.00	1.00
T3	Length of time in industry		0.00	7.00	23.00	18.00	7.00
T4	Flexibility in critical activities		0.00	4.00	10.00	32.00	9.00
			1.25	8.50	15.00	24.25	6.00
7	Experiences of the company						
E1	Planning and scheduling process		1.00	4.00	7.00	31.00	12.00
E2	Past project performance		0.00	3.00	7.00	30.00	15.00
E3	Past project supplier relationship		6.00	11.00	14.00	11.00	13.00
E4	Knowledge of construction regulations	55	0.00	5.00	10.00	30.00	10.00
E5	Experience in local area		2.00	3.00	18.00	17.00	15.00
E6	Executive Records		1.00	7.00	3.00	31.00	13.00
E7	Scale of projects completed		1.00	6.00	7.00	29.00	12.00
			1.57	5.57	9.43	25.57	12.86
8	Tender						
T1	Tender quality	55	5.00	4.00	6.00	31.00	9.00
			5.00	4.00	6.00	31.00	9.00
9	Resources						
R1	Manpower resources		2.00	5.00	11.00	28.00	9.00
R2	Equipment resources	55	4.00	4.00	6.00	13.00	28.00
R3	Material resources		2.00	7.00	7.00	25.00	14.00
R4	Physical resources		2.00	3.00	4.00	34.00	12.00
			2.50	4.75	7.00	25.00	15.75
10	Others						
O1	Site proximity		0.00	4.00	13.00	31.00	7.00
O2	Ongoing work commitments	55	1.00	2.00	17.00	27.00	8.00
O3	Relationships with the client		0.00	1.00	6.00	30.00	18.00
			0.33	2.33	12.00	29.33	11.00

Forty four past contractor performance factor are compute ten main factor in SPSS. They get value (percentage) are shown in Figure 5.2.
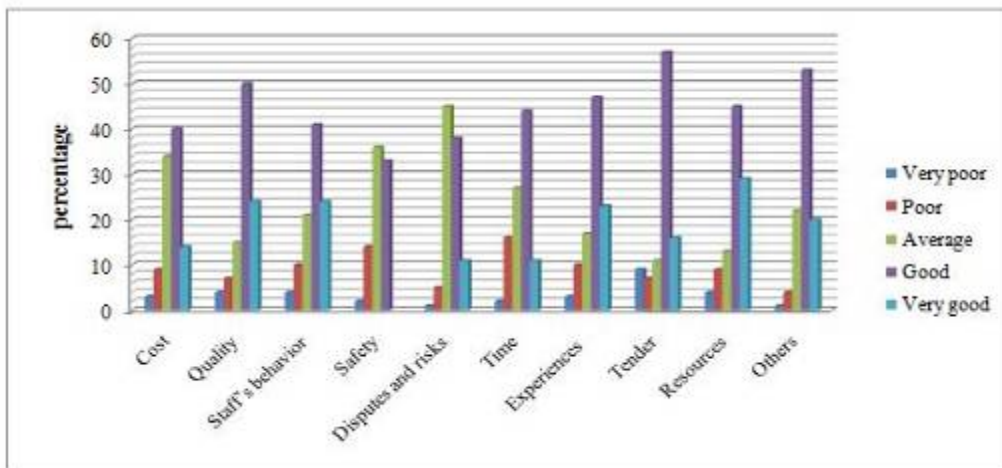
Figure 3, Past Contractor Performance Details

K. CONCLUSIONS

A majority of the respondents were either diploma holders or bachelor's degree holders. Only less than 10% of the respondents had a master's degree. Also single contractor are using entire project were very less in number, being only 11% among the respondents. 5to 10 and above contractor are select the respondents.

FINDINGS AND CONCLUSION
Contractor Selection Factor

A list of twenty two factors were put across to the respondents to denote whether the factor was of yes or no. A value of 2 was given, if it was a reason of 'yes' factor accepted , and a value of 1 was given if it was a reason of 'no' factor rejected. The respondents were given a list of 22 factor and were asked to say their level of 'yes' or 'no' with the statement. These statements to find out the best factor which will make the selection of contractor.

The following seven factors had mean values higher than 1.90.
1. the contractor maintain good relationship with client.
2. the Past performance meets the expectation of the client.
3. Material and equipment management capabilities.
4. Maintained Safety record.
5. The past project experience.
6. Completed the project in time without delaying.
7. Field experience

Past Contractor Performance

A list of forty four factors were put across to the contractor selection to denote whether the factor was of very poor, poor, average, good or very good. A value of 5 was given, if it was a factor of very good, and a value of 1 was given if it was a factor of very poor.

Hence,(table3) it could be interpreted that a value of 4 or above could be considered as a reason of high important factor. The minimum mean value for any factor was 2.818, which is higher than 5. Hence, the conclusion was that none of the factor listed were considered of very poor. Five factors out of these forty four factors had a mean value higher than 4 which could be interpreted as, that these five factors had a high importance level as a factor for the contractor selection. Since none of the reasons had a mean value above 5, (the maximum mean value was 4.236) it could be concluded that the factor for selection of contractor in construction project.

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