

Assessing Contractors' Selection Criteria for Improved Project Delivery

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Received: 01-JUN-2023; Reviewed: 05-AUG-2023; Accepted: 11-AUG-2023

<http://doi.org/10.46792/fuoyejet.v8i3.1084>

ORIGINAL RESEARCH

Abstract- This research assesses the project delivery criteria for evaluating construction contractors, with specific application to construction projects in Jos. The paper adopted a questionnaire survey conducted on construction professionals. A structured questionnaire was administered to 170 professionals to elicit information on criteria used for assessing contractors, out of which 148 representing 87.06% properly filled questionnaires were analyzed. The respondents were asked to rank 10 major criteria for selecting a contractor, 6 reasons for selecting a contractor based on bid, and 5 factors on the need for selecting a contractor as conceptualized and identified from the literature. The study deployed descriptive statistics such as relative importance index, mean rating and mean ranking for data analysis. The project delivery criteria were analyzed and the results indicated that based on bid with an RII of 0.89, low price with an RII of 0.88 and financial stability with an RII of 0.86 were ranked as major criteria for selecting capable contractors. It was reasonably competitive, and the offer was close to our estimate, were rated high as factors for evaluating contractors based on bid. For selection of the most appropriate contractor and to fulfil the sponsor or other stakeholder's requirement were rated high on the need for selecting a contractor. The identified factors were therefore recommended as criteria to be considered for assessing contractors for improved project delivery. Furthermore, this research will help decision-makers, clients and others involved in construction project delivery to be well-informed on contractor selection criteria that influence construction project delivery.

Keywords- Construction Industry, Construction Project Delivery, Contractor Selection Criteria, Construction Contractor, Professionals

1 INTRODUCTION

Contractor selection is a very significant part of a project for successful project performance. It is an important process for the delivery of a project. A capable construction contractor is indispensable in the proper procedure and completion of a project. Project delivery, however, is the complete, comprehensive and systematic process of carrying out, and managing the entire design and build process, and completing a project through a carefully planned measure (Mohammed, 2017). Management of a construction project is a process that begins with activities from its definition through its idealization, planning, execution and control phases up to its completion and closure. Decision milestones are used to anticipate outcomes, this process need be handled by a competent contractor to prevent disasters and sequential delay and ensure that the desirable aim is achieved to avoid schedule delays, budget overruns and compromised specifications. Selecting the wrong contractor can lead to problems of poor quality and also project delay; which ultimately results in substandard quality edifice, cost and time overruns. If any participating body is wrongly chosen, that will certainly influence the achievement of the project completion.

According to Ali (2011), for a project to be successful, a contractor has to be carefully selected based on the availability of knowledge, capacity, capability and experiences; this ought to be considered before the tendering stage in order to ensure that a contractor is appropriately selected. With pre-qualification and final selection exercise, studies have shown that most clients are faced with some challenges as some contractors have been reported to demonstrate incompetency and failed to deliver on schedule and/or within the budget. Appointing a suitable contractor for the right project is the most crucial challenge for any decision maker. The selection of the contractor is one of the most significant issues affecting the success of a construction project and it is one of the most challenging decision-making aspects of a construction project (Kog & Yaman, 2014). In other words, it means to attain the best outcome in terms of cost, time and quality triangle for construction project management the most suitable contractor needs to be selected.

Sidik (2010) asserted that there is no commensurate improvement in construction project success despite all the procurement and contractor selection methods adopted. In Nigeria, a large number of projects have failed due to a lack of competence, capacity and ability of the contractors (Ajayi, 2010). This may have been caused by the absence of appropriate selection criteria which allowed the selection of "the wrong" and incompetent contractor. To improve and enhance the operations of the Nigerian construction industry, it is necessary to understand the key issues affecting the construction industry and its associated operations, with selection of contractors being an important issue. From the foregoing, it is clear that there are unsatisfactory approaches in both private and public sectors in contractor selection methods

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Section E- CIVIL ENGINEERING & RELATED SCIENCES

Can be cited as:

Agboola S.A., Abbas K.I., Sati D.T., Zakari A., and Sanusi R.F. (2023), Assessing Contractors' Selection Criteria for Improved Project Delivery, FUOYE Journal of Engineering and Technology (FUOYEJET), 8(3), 397-402. <http://doi.org/10.46792/fuoyejet.v8i3.1084>

are considered the most important factors that impact construction project success in Nigeria's construction industry.

Wrong contractor selection strategy can lead to disputes, lengthy dispute resolution periods, project or contractor termination, low quality products and defects. Improper selection of the winning contractor may result in problems in the project delivery phase such as bad quality and delay in the expected project duration; which then ultimately results in cost overruns. The fact that the construction industry is a large industry with different types and sizes of projects, one would assume that these cost overruns happen in only certain types of projects, cost overrun is common in larger projects. However, Love et al. (2014) point out that overruns occur irrespective of the size and type of the project. An enormous number of projects have been delayed and also failed in Nigeria because of a lack of efficiency and ability of the contractors. This may have been due to the absence of suitable selection criteria to handle a particular project. This is considered an essential issue in relation to the achievement of construction projects and should be taken into consideration. Delays in project completion time and increases in the cost of construction projects have been closely related to specifications and contractors' qualifications such as financial, technical, experience, contract type, bid price, capacity and capability of the contractor (Omran, *et al.*, 2012). Therefore, more collaborative and inclusive methods need to be used to tackle the deficiencies in the present methods adopted. The influx of new procurement methods brings more complexity in selecting the most appropriate contractor, different organizations have different methods of doing so; there is no universal way to do it, and it is not as simple as awarding the contract to the lowest tender. It is due to the lack of simplicity that the industry has found it difficult to accept the idea; The lack of substantial evidence is not of a lack of trying. However, there is still a lack of evidence to suggest what value these multi-criterion methods add conventional method of choosing the lowest bid.

There are two strategies involved with selecting contractors: one is the lowest tender, and the other is called best value. Selecting the lowest tender is still the most popular strategy as it is relatively straightforward, objective and transparent (Plebankiewicz, 2012; Huang, 2011). However, the criticism of it is that it usually fails to guarantee a contractor's quality performance. The best value strategy would involve the client scoring the contractors' tenders on price and its criteria for quality and ranking them. With all strategies adopted, we are still not sure whether any strategies will actually lead to a successful contractor performance and subsequently a successful project outcome.

A successful project outcome is when the contractor delivers the project within the expected cost and time and with the required quality. Justification in terms of how selection strategy will affect the project's cost, quality and duration and not just theoretical reasons why strategy why a strategy needs to be adopted. Why did selected contractors deemed to have been pre-qualified still show

incompetency or fail to deliver the project as scheduled? Again, pre-qualification does not seem to have any impact on the adequacy of selection using contractors' selection criteria in relation to project success factors. There are cases where awarding to the lowest tendered contractor would not make sense, as it might cost the client even more money. While there are other cases where awarding the contract to the most economically advantageous tender might also not make much of a difference. Again, urging clients to select the best value tender, especially when the best value tender is not the lowest tender, needs justification. Justification in terms of how it will affect project outcomes: quality, cost and duration, and not just theoretical reasons of why the best value strategy is better than the lowest tender strategy.

Management of projects in Nigeria with Jos not being an exception presents problems such as poor performance in terms of cost, quality and time. The Nigerian construction industry can address and reduce these issues through the selection of capable contractors, by the application of strategies in the process of selection. If the best and most capable contractor is not selected poor quality work, cost and time overrun will be experienced during the execution stage of the project. Many projects in Jos is handled by expatriates because client and their representatives have trust in them and indigenous contractors are left in the cold. Achuen, and Bustani (2000) indicated that there is also a need to give attention to the development of construction companies owned by Nigerians to enable them to successfully manage and execute any construction work and also compete favourably in the future with foreign companies in Nigeria and beyond Nigeria's shores. Hence, the selection strategies issues facing the development of the construction industry can be substantially reduced by the use of strategies guiding its selection. This selection will encourage the construction industry to improve its capabilities and ability to deliver projects with required performance. Contractor selection strategies generally use the lowest bid to award the project to intending contractors without considering the client's financial capacity, experience, and technical and management abilities, which this research captured as factors necessary to be considered in the process of selection to enable timely delivery of the project.

The objective was to investigate the criteria for assessing a capable contractor, the factors considered for selecting based on the bid, and the reason for selecting a contractor which is an improved method to procedure used when selecting contractors, to enable clients, client representatives and project owners have a better understanding of contractor selection to have better quality work delivered. When a capable contractor is selected for the job it will reduce overall expenses, reduce project span and improve budget utilization. The need for selecting the most capable contractor is a basic requirement which needs urgent attention in the Nigerian construction industry and this will help put an end to some inconsistencies in project management, resource management, cost and time management and the standard of a project as the research exposes factors needed to be considered in order to have an industry that

is not only effective but also efficient in terms of project delivery. The construction industry is an important sector of the economy, however putting in measures to protect its interests and practices and setting standards is germane to its development of the industry. Therefore, the study tends to assess criteria for assessing contractor's selection for improved project delivery.

2 LITERATURE REVIEW

2.1 SELECTION CRITERIA

Contractor selection is the procedure which is best fit for identifying and subsequent selection of capable, competitive and competent contractors from which tenders may be sought and projects are being handled properly. It aids public and private owners in achieving success by ensuring that only qualified contractors are selected to execute the work (Mills, 2011). Cheng and Li (2004) posited that the performance of a project will be highly affected when inappropriate methods are used. Selection criteria are sets of factors or conditions that need to be considered in the selection of contractors. They are classified as prequalification and project-specific activities. Most times contractor selection is highly underestimated and neglected in construction (Ng & Wan 2005). Single criteria cannot give a full expression of goals proposed by various stakeholders (Zavadskas *et al.*, 2008). Most past researchers verify that a "price-only" selection of contractor system is inefficient in choosing the most capable contractor who can execute projects profitably with winning results. Selecting the cheapest bid usually leads to delay, cost over-runs, and sub-standard quality and sometimes leads to project failure, disputes and escalated claims.

Contractor selection continues to be an area of importance and interest to decision makers responsible for delivering project outcomes. Occurring early in the project life cycle, it is possibly one of the most serious undertakings performed by clients, the effectiveness of which is directly related to project success and the accomplishment of specified objectives (Watt *et al.*, 2010). Client has the sole responsibility of selecting the most appropriate contractor that will complete a project successfully with satisfactory requirement and it involves a procurement system that comprises project packaging, invitation, pre-qualification, short-listing and bid evaluation (Hatush & Skitmore, 1997).

The commonly considered criteria include tender price, financial capability, past performance, past experience, resources, current workload, past relationship and safety performance (Bakhshi & Bioki, 2013). However, the eight criteria are interrelated to a certain extent as one factor affects the other (Bakhshi & Bioki, 2013). For instance, good past experience may lead to good safety performance if the past experience includes good safety records. Good past performances and experiences are good evidence of successful projects, which in turn results in strong financial capability. Resources and financial capability may be positively correlated. Tender price may be negatively related to other criteria, in most studies of contractor selection, the criteria are assumed to be independent of each other.

2.2 FACTORS CONSIDERED IN THE SELECTION OF CONTRACTORS

There is considerable research on the criteria for contractor selection. However, there is still a lack of generic selection criteria that can be adopted as a tool in the selection process. There are several factors that need to be considered in this selection process (Patil, 2016). Selection criteria should include the contractor's organization, financial considerations, management resources, past experience, past performance, and project-specific attributes. Huang (2011) in a study assessed the criteria for construction contractor selection. The author reiterated that the goal of a contractor handling a construction project is to deliver a completed project that serves the intended function. Anything in the construction process that does not contribute to this goal is a potential obstacle and adds unnecessary risk to the project. Some clients may choose to use just one of the criteria used to qualify a contractor to the stage of tendering procedure and it is usually the contractor's experience. Majority of the studied clients evaluate contractor companies after having completed construction works. This proves that great attention is given to reliability and competence of the contractors. In another study by Rashvand *et al.* (2015), it was observed that financial standing was considered the important criterion during the prequalification process followed by technical ability and management capability with 97%, 94% and 85% important indexes respectively. Contractor reputation and health and safety performance were ranked lowest.

Alptekin and Alptekin (2017) performed an analysis of the criteria influencing contractor selection using the TOPSIS method in Turkey. It was found that termination of construction work in previous tenders is the most important criterion of the 12 determined criteria, and the lowest bid criterion was ranked in rank 5. Jiya (2012) established that among the major contractors' prequalification criteria for construction projects; the technical capacity of the contractor was the most important criterion. The remaining criteria considered important are in the following sequence; financial capacity, organization reputation, management and health and safety. Only health and safety was ranked moderately important which means, that all the criteria were important to the public organizations. Brynjarsdóttir (2016) reviewed the contractor selection methods applied by Icelandic organizations, compared them to those recommended by experts, and concluded that the methods posed a high risk for organizations. It came up with results that the Icelandic organizations use multiple criteria selection to some extent but price is the most important criterion. The criteria most frequently used are professional knowledge, experience of a similar project, financial stability of contractors, health & safety policy, and whether they work in accordance with a certified quality management system. The results indicate that the methods used are somewhat lacking and that there is ample room for improvement in order to minimize risk.

A study carried out in Libya by Othman (2016) on the framework for the improvement of contractor selection

procedures, revealed that a significant proportion of the respondents in both the public and private sectors were in agreement that the most general information usually obtained from a contractor could be divided into three groups. The first group, chosen between 80-90% of the respondents, was experience and financial stability. The second group, chosen between 10-25% of respondents was reputation, technical and management, and health and safety record. The third group, chosen by respondents was cultural experience, and it was concluded that it is important for the client to have a set of pre-determined and objective criteria for the selection of contractors.

3 METHODOLOGY

This study sets out to identify project delivery criteria for assessing contractors in Jos, Plateau State. The respondents targeted were Professionals involved in construction project delivery which include project managers, architects, builders, quantity surveyors and engineers. Jos was considered for this study based on the recommendation of Afunnaya, Achoru and Williams (2016) that there are more concentrations of construction activity within the Jos metropolis and it is marred with management problems, delays and issues of cost overrun. The study employed a primary source of data which is the use of the questionnaire. A self-administered questionnaire was administered to professionals using a purposive sampling technique. The choice of purposive sampling was informed by: non availability of an authoritative sampling frame of active contractors in Nigeria (Achuenu, Izam and Bustani, 2000). A total of 170 questionnaires were administered to respondents in the study area. However, only 156 questionnaires were completed and returned, out of which 148 were considered fit for analysis and this is because they were properly filled. These 148 questionnaires represented an 87.06% response rate. This response rate is higher than 25.4% (Emuze, 2011) and 33.5% (Olatunji, 2010) in the construction industry.

The questionnaire consisted of two sections. Section one covered the demographic background of the respondents, while Section two asked respondents to rate the level of importance of each of the identified factors for assessing contractor selection. SPSS was used for the analysis: to run RII, mean and standard deviation (descriptive statistics) to analyze the data obtained from the questionnaire responses. Data for major criteria for selecting a capable contractor, selecting a contractor based on the bid, and why the need for selecting a contractor was evaluated on 5 point Likert scale (1= Strongly Disagree (SD); 2= Disagree (D); 3= Undecided (U); 4= Agree (A); 5= Strongly Agree (SA)). 10 10-item scale was used to analyze major criteria for selecting a capable contractor. The items were well-defined. The Cronbach's alpha reliability of criteria for selecting a capable contractor is 0.83. 6 6-item scale was used to measure selecting a contractor based on bid. The Cronbach's alpha reliability is 0.76. 5 five-item scale was used to measure the need for selecting a contractor. The Cronbach's alpha reliability is 0.91. The measured Cronbach's α recorded for this study revealed that the reliability of the questionnaires' constructs is high according to (Olatunji,

2010); all exceeding the cutoff score of 0.7. This indicated that the questionnaire constructs are highly reliable (consistent) and free from random error. In describing the data, the study writes out the facts the way it is, in clear and fair descriptive reporting, also it filters out those matters which are not relevant to the research problem.

4 RESULTS AND DISCUSSION

Table 1 below presents job description profiles of the professional organization. 52% were from contractor organizations, 29.1% were consultants, and 18.9% were from client organizations. In the profession, 30.4% are builders, 25% are quantity surveyors, 21.6% are architects, 18.25 are engineers, and 4.7% are project managers. The result shows that the professionals are almost evenly represented. Also, 46.6% of the professionals hold a bachelor's degree, 23.6% have a higher national diploma, 18.2% hold a master's degree, 9.5% have a national diploma, and 2% have a doctorate degree. 31.1% of the respondents have 6-10 years' experience in construction, 23.5 have 0-5 years' experience, 18.2% have 11-15 years' experience, 13.5% have 16-20 years' experience, 14.1% have 21 years and above experience. Findings from the professional's demographic profile reveal that respondents are well experienced and educated enough to respond to this research enquiry.

Table 2, presents results on the major criteria for selecting a contractor, the result shows that base on the bid with a relative importance index of 0.95 ranked first, low price with an RII of 0.88 ranked second, and financial stability with an RII of 0.86 ranked third, reputation with RII of 0.85 ranked fourth, experience with RII of 0.84 fifth, timely completion of work with RII of 0.81 ranked sixth, technical and management ability with RII of 0.82 ranked seventh, track and proven record of quality product with RII of 0.78 ranked eighth, cultural experience with RII of 0.77 ranked ninth, health and safety with RII of 0.64 ranked with tenth. Based on bid ranked first as a major criterion for selecting a capable contractor.

Table 3, shows variables for selecting a contractor based on bid. Factors with 3.0-4.0 are ranked as medium, below 3.0 is low while 4.0 - 4.5 is high, 4.5 and above is very high. It was reasonably competitive having a mean of 4.62, the offer was close to our estimate having a mean of 4.57, the client had a good experience with the contractor having a mean of 4.53, the factors above have a very high impact on the reason for selecting a contractor base on the bid, the contractor was the most competent with a mean of 4.32 have a high impact on the reason for selecting a contractor base on bid. The contractor was prequalified and had a mean of 3.82, it is a government practice/policy has a mean of 3.62, the above factors have a moderate impact on the reason for selecting a contractor based on the bid. Table 4 above shows the need why selecting a contractor. The result shows that for selection of the most appropriate contractor have a mean of 4.50, to fulfil the sponsor or other stakeholder's requirement have a mean of 4.45, for transparency and credibility purpose have a mean of 4.40, to comply with the organization rules and regulations have a mean 4.29, to accomplish clients interest have a mean of 4.04, all the above factors are required when selecting a contractor.

To assess criteria used in assessing contractors, the result of the analysis clearly showed that the major criteria for selecting a contractor include base on bid, low price, financial stability, reputation, experience, technical and management ability and timely completion of work. It is also instructive that the major factors used for evaluating contractors based on bid are; It was reasonably competitive, the offer was close to our estimate, the client had good experience with the contractor and the contractor was the most competent. In addition, major factors in the need for selecting a contractor include; for selection of the most appropriate contractor, fulfilling the sponsor or other stakeholder’s requirement, transparency and credibility purpose, complying with the organization's rules and regulations, to accomplishing clients' interest. The above findings show that the contractor selection criteria are in use but not fully effective. According to El-Sawalhi, (2007), the contractor should be competent to perform to standard and to the owners’ desire. In addition, pre-qualification of the contractor is done to make certain that the contractor's characteristics and competence match the desire of the project under consideration, as well as being used to set up a set of criteria through which the competence of the contractor is measured and judged.

Table 1. Personal Data of Respondents

Variable	Frequency	Percentage
Job Description		
Contractor	77	52.0
Consultant	43	29.1
Client	28	18.9
Total	148	100
Profession		
Project Manager	7	4.7
Architect	32	21.6
Builder	45	30.4
Quantity Surveyors	37	25.0
Engineers	27	18.2
Total	148	100
Qualification		
PhD	3	2.0
Msc/Mtech	27	18.2
Bsc/Btech	69	46.6
HND	35	23.6
ND	14	9.5
Total	148	100
Years of Experience		
0-5 years	34	23.0
6-10 years	46	31.1
11-15 years	27	18.2
16-20 years	20	13.5
20 years and above	21	14.2
Total	148	100

Only qualified contractors should be invited to the tender, and the selection process should not discriminate between contractors. According to Watt, et al., (2009) the major requirement for selection of a contractor is the financial credibility of a contractor with which it can handle capital crises of a project. This is however close to the findings of this research which shows financial stability as one of the major criteria for selecting a contractor. Construction clients are becoming more aware of the fact that selection of a contractor based on tender price alone is quite risky and may lead to the failure of the project in terms of time delay and poor-quality standards (Singh & Tiong, 2005). Recruiting a contractor needs to be done strategically to provide quality work and timely completion of construction work and also improve cost management. Adequate quality work and reduced risk will improve project performance. The selection process, consequently, does not distinguish a more technically superior contractor from other marginally qualified ones from their submission, however, the contractor selection process needs to marginalize other factors to improve the process of construction work. In addition, some

contractors unreasonably bid low for the purpose of winning the contracts but this subsequently has a negative effect on their performance (Anvuur et al, 2006).

Table 2. Major criteria for selecting contractor

Factors	W	RII	Mean	Std.	Rank
Base on Bid	661	0.89	4.47	0.95	1
Low price	651	0.88	4.40	1.12	2
Financial Stability	638	0.86	4.31	1.22	3
Reputation	628	0.85	4.24	1.21	4
Experience	623	0.84	4.21	1.28	5
Timely completion of work	602	0.81	4.07	1.11	6
Technical & management ability	604	0.82	4.08	1.09	7
Track and proven record of quality product	579	0.78	3.91	1.22	8
Culture experience	570	0.77	3.85	1.27	9
Health & safety records	477	0.64	3.22	1.21	10

Table 3. Selecting a Contractor Base to Bid

Variables	Mean	Std. Deviation	Level of Existence
It was reasonably competitive	4.62	0.80	Very High
The offer was close to our Estimate	4.57	0.95	Very High
The client had good experience with the contractor	4.53	0.87	Very High
The contractor was the most Competent	4.32	0.92	High
The Contractor was prequalified	3.82	1.35	Moderate
It is a Government practice/policy	3.62	1.32	Moderate

Table 4. Why need for selecting a Contractor

Variables	SD	D	U	A	SA	Mean	Rank
For selection of the most appropriate contractor	2	7	3	39	97	4.50	0.86
To fulfil the sponsor or other stakeholders' requirements	4	9	5	28	102	4.45	1.01
For the transparency and credibility purpose	7	8	6	25	102	4.40	1.10
To comply with the organization rules and regulations	5	10	7	41	85	4.29	1.06
To accomplish clients' interest	8	15	7	51	67	4.04	1.18

5 CONCLUSION

There is an existing contractor selection strategy used in evaluating contractors, as financial stability, experience, reputation and timely completion of work are ranked high as major factors in evaluating the contractor selection process. The contractor's criteria will in the long run help in project performance if frequently used in a more well-strategized manner. The contractor selection process needs stringent policy and to be monitored to improve and increase it usage. The study also shows that it is competitive and the client has a good relationship with the contractor when the selection of contractor was based on bid. In addition, the reasons for selecting a contractor according to the study include, for selection of the most appropriate contractor, to accomplish clients' interest, to fulfil the sponsor or other stakeholders' requirements and for transparency and credibility purposes. The performance and success of any construction project have been greatly linked to the contractor handling the project. It is therefore essential to

explore and establish measures that will guarantee a suitable contractor selected for the successful delivery of a project with the required quality, within schedule and budget. With the above findings, the study concluded that the contractor selection criteria are in use but not fully effective.

6 RECOMMENDATIONS

The criteria used for the selection of contractors during the evaluation of contractors should place much emphasis on contractors' past performance, financial stability, technical and management ability, experience and general records. Different methods of contractor selection should be used to evaluate contractors' bids in order to eliminate all incompetent contractors from winning contracts, also setting clear and visible standards for performance is required from the contractors.

Furthermore, political impact on the contractor selection process should be carried out to determine its effect on project performance. The influence of information technology on the contractor selection process should be carried out to determine its effectiveness and ease of usage in the contractor selection process. Further research in the construction procurement system of construction projects is required to establish a line of action in ensuring policies are carried out. Lastly, analysis of the assessment of professional perception of identified contractor selection factors on Contractors' performance.

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