



PERCEPTION OF CONSTRUCTION PROFESSIONALS ON THE EVALUATION OF CONTRACTORS' SELECTION CRITERIA ON BUILDING PROJECTS IN NORTH CENTRAL, NIGERIA

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ABSTRACT

Underlying the selection of contractors is the use of contractor pre-qualification data in order to identify the most qualified contractor. This research was aimed at evaluating the criteria for selecting contractors for construction projects on the basis of their order of importance and ease of usage respectively. Primary data was elicited from a sample size of 77 clients, 83 consultants and 65 contractors spread across the six states of North-Central Nigeria. Frequency distribution tables, percentiles, mean item score, and analysis of variance constitute the tools for data analysis. The study revealed that the major rationale for stakeholders' adoption of contractor selection criteria is to meet clients' objectives. While technical competence constitutes a major driver for contractor selection, the study unveiled that only financial reputation exhibits statistical significance with respect to ease of use towards selecting competent contractors in the study area. It was recommended that stakeholders should pay serious attention to technical competence and the quality of past performance which are essential determinants for contractor pre-qualification; reason being that a technically competent contractor with track record of quality project delivery will automatically pass the assessments tests with respect to indices of financial reputation and managerial capacity.

Keywords: Objectives of contractor selection, Criteria for contractor selection, Multi-criteria evaluation

INTRODUCTION

Construction is a complicated process with a number of stages, which must be appropriately adjusted and managed. It is on this

premise that stakeholders involved in the selection of contractors for construction projects rely on a plethora of pre-qualification data which are essentially criteria for the selection of contractors. As construction projects become more complex, the need for evaluating contractor performance become more crucial owing to organizational and technological complexity of construction projects which generate enormous risks. This evaluation paves the way for the selection of a suitable contractor who is capable of delivering the project within the targets set by the client.

There is an interesting synergy between contractor evaluation and contractor selection. Contractor evaluation is the process of investigating or measuring contractor attributes while contractor selection is the process of aggregating the result of evaluation to identify an optimum choice (Holt, 1998). Therefore, Contractor selection is the process of selecting the most appropriate contractor to deliver the project as specified by the client in order to achieve best value for money. The use of evaluation criteria to select contractors is a task which has assumed a complex dimension (Albino and Garavelli 1998, Tserng and Lin, 2002, and Shiau et al, 2002) because of stakeholders' inherent intuitions and judgements arising from past experience (Albino and Garavelli 1998, and Luu and Sher 2006). In spite of this snag, the selection of a qualified contractor gives confidence to stakeholders that the selected contractor can achieve the project goals. In addition, Kumaraswamy and Mathews (2000) and Ng and Wan (2005) affirms that the importance of contractor selection is mostly underestimated and neglected in construction thereby complicating the analysis of trades-offs involved in decision-making under conditions of uncertainty in the construction industry.



Over the years, the construction industry in the North-Central Nigeria has thrived following contractor selection and execution of engineering and infrastructural projects which has impacted positively on the livelihood of inhabitants. Underlying the selection of contractors is the use of contractor pre-qualification data in order to identify the most qualified contractor. While such activities linger on in construction management practice, there has been a dearth of scholarly works aimed at evaluating these toolkits for contractor selection in North-Central Nigeria. It is within the framework of this gap that this study attempts to address these toolkits in order of their importance and ease of usage by stakeholders namely clients, consultants and contractors in the study area.

This research is aimed at evaluating perception of construction professionals on the criteria for selecting contractors for building projects in north central, Nigeria. Specific objectives for this study include to:

- (a) evaluate the objectives for the adoption of contractor selection criteria;
- (b) assess contractor selection criteria in their order of importance; and
- (c) evaluate the ease of usage of contractor selection criteria.

Zavadskas and Vilutiene (2006) and Turskis et al. (2006) opined that the success or failure of a construction projects is anchored on the quality of contractors. The overall benefit of selecting the most suitable contractor can be an improvement of the stakeholders overall performance. To this end, this research seek to provide an assessment of the importance which stakeholders attach to the various toolkits for contractor selection as well as their ability to easily apply these criteria in practice. Expectations from this research includes identification of critical toolkits for contractor selection as well as those criteria which can easily be applied for the purpose of

meeting the overall objectives of contractor selection, long-run benefit of which include an improvement in tendering and contractors pre-qualification in the study area.

REVIEW OF LITERATURE

Multi-Criteria evaluation system.

Credited to Holt *et al.* (1994) is the multi-criteria evaluation system for contractor selection, which utilizes myriads of variables to pre-qualify and select suitable contractors for construction activities. In a similar vein, Alsugair (1999) proposed a framework of 36 evaluation factors further grouped into nine classes. It is within the framework of the multi-criteria evaluation system that this study draws its analytical relevance.

Objectives of contractor selection.

Huang (2011) reiterated that contractor pre-qualification is not only aimed at contractor competence evaluation but limiting potential bidders. From a rational perspective, contractor selection is aimed at bringing into the project implementation team a crop of competent contractors capable of delivering the project on time and achieving best value for money. It is within the framework of this aim that Aje (2008) identified the objectives of contractor selection to include:

- meeting client's objectives
- maintaining standard procedure
- Public accountability
- ensuring value for money
- reducing the cost of tendering
- ensuring safety during- and after construction
- limiting the number of potential builders
- achieving the quality of the proposed project
- meeting cost target of the proposed project, and



- meeting time target of the proposed project

Criteria for Contractor Selection.

Lam, Hu, Ng, Skitmore, and Cheung (2001) proposed a wide variety of criteria for contractor selection. While different clients operate under varying objectives and constraints, public sector clients as examined in this study differ from private sector clients owing to their primary focus on accountability for public funds as well as their ability to monitor the proper conduct of contractors. A review of criteria and sub-criteria for contractor selection as documented by different researchers has been summarily captured in Figure 1 below.

S/N	Authors	Criteria for contractor selection	Sub-criteria for contractor selection
1	Russell and Skibniewski (1998)	(i) References (ii) Past performance (iii) Financial stability (iv) Current work load (v) Technical expertise	-
2	Dennis (1993)	(i) Past performance (ii) Business location (iii) Capacity (iv) Financial status (v) Resources (vi) Procedure (vii) Quality Assurance	-

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3	Holt et al (1994)	(i) Contractors' organization	<ul style="list-style-type: none"> ▪ Age ▪ Size ▪ Image ▪ Quality control policy ▪ Health and safety policy ▪ Litigation tendency
		(ii) Financial considerations	<ul style="list-style-type: none"> ▪ Ration analysis accounts ▪ Bank reference ▪ Credit reference ▪ Turnover history
		(iii) Management resources	<ul style="list-style-type: none"> ▪ Qualification of owners ▪ Quality of key personnel ▪ Years with company ▪ Formal training regime
		(iv) Past Experience	<ul style="list-style-type: none"> ▪ Type of projects completed ▪ Size of projects completed ▪ National/Local Experience

Figure 1: Scholarly evidences of contractor selection criteria and sub-criteria, continued.



S/N	Authors	Criteria for contractor selection	Sub-criteria for contractor selection
		(v) Past Performance	<ul style="list-style-type: none"> ▪ Failure of a contract ▪ Overrun time ▪ Overrun cost ▪ Actual Quality achieved
4	Hatush and Skitmore (1997)	(i) Financial soundness	<ul style="list-style-type: none"> ▪ Financial stability ▪ Credit rating ▪ Banking arrangements and bonding ▪ Financial capacity
		(ii) Technical ability	<ul style="list-style-type: none"> ▪ Contractor experience ▪ Plant and equipment ▪ Quality of personnel
		(iii) Managerial capacity	<ul style="list-style-type: none"> ▪ Past performance ▪ Quality of work ▪ Project management and organization ▪ Experience of technical personnel ▪ Management knowledge
		(iv) Health and Safety	<ul style="list-style-type: none"> ▪ Proposed health safety programme ▪ Health and safety programme

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		<ul style="list-style-type: none"> ▪ Compliance with Health and Safety regulations ▪ Safety records ▪ Company's safety policy
	(v) Contractor's past performance	<ul style="list-style-type: none"> ▪ Corporate image ▪ Litigation tendency ▪ Time overrun ▪ Cost overrun ▪ Quality achieved on past projects
5	Palaneeswram and Kumaraswamy (2001)	<ul style="list-style-type: none"> (i) Administrative preparedness (ii) Technical information (iii) Managerial data (iv) Experience (v) Performance (vi) Safety information (vii) Environmental concerns

Figure 1: Scholarly evidences of contractor selection criteria and sub-criteria, continued.



S/N	Authors	Criteria for contractor selection	Sub-criteria for contractor selection
6	Al-Harbi (2001)	(i) Experience (ii) Financial stability (iii) Quality Performance (iv) Manpower resources (v) Equipment resources (vi) Current workload	
7	El-Sawalhi et al (2007)	(i) Financial stability (ii) Management and technical ability (iii) Contractor's experience	

Figure 1: Scholarly evidences of contractor selection criteria and sub-criteria.

With reference to Figure 1, appropriate criteria and sub-criteria for contractor selection can be drawn for the purpose of this study. Using the criteria for prequalification proposed by Hatush and Skitmore (1997) and excerpts from the works of Holt et al (1994), Odusami (1998), Ogunsemi (2002) and Aje and Olatunji (2005), the criteria for contractor selection suitable within the Nigerian construction industry can be identified to include Technical competence, Managerial capacity, Financial stability, Quality of past performance, and Health, Safety and Environmental compliance. These criteria were adopted for North-Central Nigeria but with some modifications in certain co-variables associated with these criteria.

Technical Competence

Aje (2008) opine that the technical ability of a contractor connotes his experience, plant and equipment, the personnel and its general ability. While it is expedient to consider the geographical area of operation during prequalification process (Aje, 2008), it may not be out of place to redefine the co-variables of technical competence for the purpose of this study to include contractors' experience and ability, and quality of plant and equipment (Holt *et. al.*, 1994, Hatush and Skitmore 1997, Odusami, 1998, Ogunsemi, 2002, and Aje and Olatunji, 2005). Included in the list of co-variables is sophistication in construction technology, which is an indication of modern expertise in construction business (Hendrickson and Au, 2000).

Managerial Capacity

Contractors' involvement in construction projects demand that they should be able to exercise knowledge of modern management in addition to their traditional bias in the design and construction process. The heightened competition in the construction industry requires good managerial skills and improved productivity (Hendrickson and Au, 2000). It is within this framework that the co-variables for managerial capacity were drawn from the works of Aje and Olatunji (2005) and Aje (2008) to include integrity of directors, registration status of organization, past performance and quality of contract execution, construction management skills, and quality control programme. Corporate social responsibility was included among the co-variables of managerial capacity bringing to bear its role in carrying the project host communities along through employment of the youths and provision of infrastructural facilities to support community development (Oppen, Sack and Wegener, 2000). Managerial capacity is not just all about the



soundness of decision-making; it should embrace public relations activities without which the project may not be feasible.

Financial Reputation

While some Nigerian authors among whom are Odusami (1998), Ogunsemi (2002) and Aje and Olatunji (2005), and Aje (2008) choose to refer to this criterion as financial stability or financial capability, it can be adjudged to be a narrow concept. In its place therefore, financial reputation which is similar in content with financial soundness as put forward by Hatush and Skitmore (1997) was upheld by the authors of this study. Financially distress is an impediment to a contractor who aspires to harness credit facilities for the actualization of proposed projects and expansions of business opportunities. Mangitung and Emsley (2002) reiterated that the evaluation of financial soundness should emphasize historical data of the financial reputation of the contractor in contrary to the current financial position. For the purpose of this research, financial reputation has annual turnover, financial stability, financial status, credit worthiness, tax status (Aje, 2008, Russell, 1992, and Hendrickson and Au, 2000). For the first time in this kind of research, value engineering was included among the co-variables of financial reputation. The concept of value engineering was captured among these co-variables owing to its role as a conscious and organized effort towards analyzing the requirements of a project for the purpose of achieving its essential functions at the lowest total costs over its life cycle (Dell'Isola, 1999).

Quality of Past Performance

Hendrickson and Au (2000) reiterated that quality of work and performance are critically important to the success of a project since it is the owner who will have to live with the results. This

accounts for why a contractor is often selected on the basis of past performance, recommendation, familiarity with the work, or previous experience with the client/agents (Brook, 2004). Among the co-variables of past performance that influence contractor selection include level of responsibility exhibited, number of years in construction business, contractor's performance in ex-post invitations, quality of referrals, and the ability to handle client-contractor relationships. In reaction to these co-variables, Alarcon and Mourgues (2002) observe that quantification of a contractor's reputation is subjective. However, its objective assessment has been made possible through scoring systems.

Health, Safety and Environmental Records

Accidents during the construction process can result in personal injuries and evoke adverse cost implications. Therefore, it is a hallmark of good project management to ensure proactive prevention of major accidents on project sites. Brook (2004) reiterated that health and safety issues currently top the agenda of construction organizations in recent times. This is in response to legislations controlling the design and procurement stages and the application of managerial skills towards adequate costing for project safety. In spite of the ISO 14001 policy on environmental safety and other international treaties concerning occupational safety, little or no emphasis has been placed on health, safety and environmental safety as a criterion for contractors' prequalification and selection in Nigeria. Aje (2008) described this when he demonstrated the lacklustre attitude of Nigerian contractors towards possession of a first aid box. Other relevant concern is the poor attention which contractors accord to the safe handling and disposal of construction wastes on sites. To check all these snags, Hendrickson and Au (2000) have advocated that pre-



qualification of contractors and sub-contractors should consider their attitude towards health, safety and environment. For the purpose of this study, compliance with Health, Safety and Environmental records is anchored on sub-criteria of occupational safety policy, availability of health insurance for staff, level of compliance with Health and Safety regulations, quality of safety records, frequency of Safety meetings, and compliance with environmental regulations. In other words, contractors without an acceptable record of health, safety, and environmental protection should be screened out. Analysis of these criteria and sub-criteria shall form the basis for the achievement of the objectives posed in this research.

The order of Importance of Contractor Selection Criteria

According to Huang (2011), it is not necessary to judge the ability of a contractor to fulfil all the criteria for selection but a degree to which the contractor fulfils these criteria. He further posits that not all these criteria are important to a client. This according to him calls for the assignment of weights to ascertain those criteria which the client accepts to be the most important. It is within this framework that this study examined the 5 criteria and 36 sub-criteria for contractor selection in their order of importance to clients, consultants and contractors in the study area. In order to trim down the ranking of these sub-criteria, emphasis was placed on the top 20 important sub-criteria for contractor selection.

Ease of Usage of Contractor Selection Criteria

The application of contractor selection process should exhibit a reasonable degree of ease of usage otherwise it may become sheer drudgery for the stakeholders involved in contractor selection. While one of the conditions for evaluation of bids is the ease with which it can be carried out, a complementary side

of the process is the ease with which the selection criteria can be applied in a given contractor selection model (Aje, 2008). In other words, it is irrational if plethora of criteria meant to serve the purpose of contractor selection pose difficulty in the process of application. It is within this framework that this study further evaluated contractor selection criteria on the basis of their ease of usage. An evaluation of contractor selection criteria shall be carried out using their order of importance and ease of usage by the various stakeholders comprising clients, consultants and the contractors in the study area.

RESEARCH METHODOLOGY.

The research population and sample frame comprise three independent population parameters made up of clients and project owners, consultants, and registered contractors. Clients for this research comprises state ministries of works and housing, state housing corporation/property companies, and works departments of Local government councils in North-Central Nigeria. The population of consultants within the study area comprising Architects, Quantity Surveyors, Consulting Engineers, Builders, and project managers was obtained from the state branches of their respective professional institutions, while that for contractors and construction firms was sourced the state branches or chapters of the Association of Registered Building and Civil Engineering Contractors within the each state in North-Central Nigeria. Determined from the sample frame is the sample size using a model adopted by Shash and Abdul-Hadi (1993):

$$n = \frac{n'}{1 + (n'/N)}$$

3.1



Where $n' = S^2/V^2$

3.2

Such the V = standard error of sampling distribution = 0.05, S = standard deviation of population elements = $p(1-p)$; while p is the proportion of population elements belonging to the defined class taken as 50%. The sampling technique adopted in this study includes a combination of probabilistic and judgemental techniques. The probabilistic sampling technique adopted in this research is the stratified sampling method to cater for population parameters that are clearly defined and classified into homogenous strata of clients, consultants and contractors per state.

Table 1: Population and sample size of Local Government works department

States	No. of Local Govt. Works department	State Ministry of Works and Housing	State Housing Corporation and Property Development Company	Sample size of Local Government Works department	Sample size of public sector clients
Benue	23	1	1	12	14
Kogi	21	1	1	11	13
Kwara	16	1	1	10	12
Nassarawa	13	1	1	9	11
Niger	25	1	1	13	15
Plateau	17	1	1	10	12
Total	115	6	6	65	77

Table 2: Sample frame and sample size of consultants

Consultants	Professional bodies	Sample frame	Sample size
Architects	NIA	79	19
Builders	NIOB	65	18

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Project Managers	PMIN	56	17
Quantity Surveyors	NIQS	14	9
Consulting Engineers	NSE	93	20
Total		307	83

Table 3: Population and sample size of contractors

States	No. of Local Govt. Works department	Sample size
Benue	21	11
Kogi	27	13
Kwara	18	10
Nassarawa	15	9
Niger	33	14
Plateau	12	8
Total	126	65

Adopting stratified sampling method, the study population Tables 1 - 3 was produced showing the desired samples for each category of respondent. On the other hand, purposive/judgemental sampling was adopted for the state ministries of works and housing, and state housing corporations/property companies across each state in the region in order to avert the risk of their being excluded from the sample size computation. These were purposively drawn into the sample and added to the probabilistic sample of local government works department thereby bringing the total sample size for public sector clients in the study area to 77. The administration of study questionnaires to three classes of respondents comprising clients, consultants and contractors within the study area constitute the major instrument for primary data collection, while recourse to scholarly publications cognate to this study formed the basis for secondary data collection. Methods for data analysis include the use of frequency distribution tables, percentiles, mean item score, and analysis of variance.



DATA ANALYSIS AND RESULTS

Socio-Economic Characteristics of Respondents.

Contrary to Aje (2008), table 4 indicates that HND holders constitute the highest categories of respondents in North-Central Nigeria. However, the analysis of highest academic qualification of respondents indicates that all respondents have a reasonable level of higher education necessary for the performance of their professional tasks.

Table 4: Background information about respondents.

Category	Classification	Frequency	Percentage
Academic qualification of respondents	MSc/MTech/MEng	35	19.77
	PGD	39	22.03
	BSc/BTech/BEng	51	28.81
	HND	52	29.39
	Total	177	100.0
Professional affiliation of respondents	Architect	38	21.47
	Builder	32	18.08
	Engineer	39	22.03
	Quantity Surveyor	36	20.34
	Project Manager	32	18.08
	Total	177	100.0
Membership of professional bodies	NIA	30	16.95
	NIOB	39	22.03
	PMIN	33	18.64
	NIQS	34	19.20
	NSE	41	23.20
	Total	177	100.0
Cadre of	Member	132	74.58

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professional membership	Associate	11	6.22
	Graduate/Probationer	34	19.21
	Total	177	100.0
Type of organization/firm	Contracting	53	29.94
	Consulting	58	32.77
	Client	66	37.3
	Total	177	100.0
Years of experience in construction Business	1 - 10	52	29.38
	11 - 20	48	27.13
	21 - 30	69	39.00
	31 - 40	8	4.50
	Total	177	100.0
	Mean	17.25	
Number of tendering executed within the past 2 years	1 - 5	62	35.0
	5 - 10	69	39.0
	11 - 15	46	26.0
	16 - 20	0	0
	Total	177	100.0
	Mean	7.16	
Total value of project executed within the past 2 years in ₦'m	1 - 20	29	16.4
	21 - 40	61	34.5
	41 - 60	28	15.8
	61 - 80	18	10.2
	81 - 100	11	6.2
	Above 100	30	16.5



Total	177	100.0
Mean	₦51.74m	

Inference can be drawn from the second and third items in Table 4 that Engineers constitute the highest number of respondents owing to their active involvement in contractor selection and contract execution process. Confidence in the data elicited from respondents was drawn from the fourth item in table 4 which indicates that 74% are full members of professional organizations. The fifth item in Table 4 indicates that 53(29.94%) are contractors, 58(32.77%) are consultants, and 66(37.3%) are clients. This result indicates that there is a high response rate from clients compared to the other classes of respondents. Respondents have amassed an average of 17.25 years' experience and a modal class of between 21 and 30 years' experience which implies that authoritative responses from respondents experienced in construction business in the study area have been harnessed. Data on number of tendering executed within the past 2 years reveals that a modal class representing 39% of respondents have been engaged in about 5 to 10 tendering activities. A corollary to number of tendering executed over the past 2 years is the total value of project executed within the same period which stood at an average of ₦51.74 million.

Objectives for the Adoption of Contractor Selection Criteria

Table 5 captures the mean score per category of respondent as well their group mean and collective ranking of the various objectives of using contractor selection criteria. Ranked first among these objectives is to meet client's objectives, which implies that stakeholders in contractor selection are sensitive to client's needs. Ranked second, third, and fourth are public accountability, ensuring value for money, and maintenance of

standard procedure. Using the criteria for results of the mean score, it can be adjudged that the first six objectives are significant rationale for adoption of contractor selection criteria among respondents.



Table 5: Objectives of contractor selection criteria.

Objectives	Mean item score			Group mean	Rank	F - ratio	p - value
	Contractor	Consultant	Client				
To meet client's objectives	4.51	4.39	4.56	4.49	1	45.618	0.001*
For public accountability	4.16	4.14	3.86	4.05	2	16.872	0.009*
To ensure value for money	3.71	4.05	4.18	3.98	3	3.658	0.118
To maintain standard procedure	4.11	3.63	3.89	3.88	4	6.531	0.048*
To ensure safety during and after construction	4.07	3.27	3.88	3.74	5	1.397	0.377
To achieve the quality of the proposed project	3.44	3.79	3.92	3.72	6	2.645	0.184
To meet time target of the proposed project	3.44	3.45	3.79	3.56	7	1.268	0.412
To reduce the cost of tendering	3.96	3.25	3.40	3.54	8	2.878	0.165
To meet cost target of the proposed project	3.16	3.45	3.76	3.46	9	1.936	0.269
To limit the number of potential bidders	3.29	3.68	3.11	3.36	10	0.335	0.843

*Significant at $p < 0.05$

Contrary to the ranking criteria, table 5 indicates that respondents are critical about those objectives with p-values greater than 0.05 among which are value for money, safety during and after construction, achievement of quality project delivery, timely completion of proposed project, reducing the cost of tendering, achieving cost target of the proposed project, and restricting the number of potential bidders.

Contractor Selection Criteria in their order of Importance.

Table 6 indicates the group mean and ranking of major criteria for contractor selection in the order of their importance. Ranked first is technical competence which exhibited a group mean of 3.94.

Table 6: Analysis of Group means for the importance of contractor selection criteria.

Contractor selection criteria	Mean item score			Group mean	Rank	F - ratio	p - value
	Contractor	Consultant	Client				
Technical competence	3.83	3.78	4.20	3.94	1	7.143	0.042*
Financial reputation	3.92	3.74	4.05	3.90	2	14.096	0.013*
Managerial capacity	3.88	3.73	4.04	3.88	3	14.131	0.013*
Quality of past performance	4.07	3.49	3.84	3.80	4	3.459	0.128
Health, safety and Environmental records	3.54	3.76	3.36	3.55	5	3.237	0.074*

*Significant at $p < 0.05$

Financial reputation, Managerial capacity, Quality of past performance, and Health, safety and Environmental records were ranked second, third, fourth and fifth respectively. The p-values of 0.042, 0.013, 0.013, and 0.074 recorded against the first, second, third, fifth criteria in table 6 indicates that there is no significant consensus among respondents concerning the importance they attach to these criteria. However, the group mean for the first four criteria indicates that they are important in the decision to select a suitable contractor for projects contrary to Health, safety and Environmental records



which respondents adjudged to be moderately important. A further analysis was performed on sub-criteria lined to each major criteria identified in table 6 leading to the results in table 7 which is the arrangement of the top-20 in their order of importance. Ranked first on the overall basis of group means is contractor's experience and ability. Inference from table 7 indicates that the first sixteen sub-criteria are weighed to be important to contractor selection, while the seventeenth to the twentieth criteria exerts moderate importance to contractor selection.

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Table 7: Top 20 contractor selection sub-criteria in the order of importance.

Contractor selection sub-criteria	Mean item score			Group mean	Rank	F - ratio	p - value
	Contractor	Consultant	Client				
Contractor's experience and ability	4.42	4.02	4.80	4.41	1	9.602	0.004*
Occupational safety policy	4.56	4.18	4.00	4.25	2	4.810	0.028*
Level of responsibility exhibited	4.85	3.95	4.18	4.33	3	7.219	0.009*
Registration status of organization	3.73	4.07	4.75	4.18	4	1.628	0.258
Integrity of Directors	4.85	3.88	3.62	4.12	5	4.808	0.028*
Annual turnover	4.13	4.38	3.77	4.09	6	25.839	0.000*
Past performance and quality of contract execution	4.02	4.02	4.18	4.07	7	9.677	0.004*
Value Engineering and financial prudence	4.16	3.54	4.41	4.04	8	5.204	0.023*
Number of years in construction business	3.75	4.25	4.00	4.00	9	6.186	0.014*
Quality of plant and equipment	3.73	3.82	4.41	3.99	10	3.576	0.059
Financial stability	3.75	3.91	4.18	3.95	11	9.584	0.004*
Construction management skills	4.13	3.48	4.20	3.94	12	2.642	0.113
Credit worthiness	3.75	3.84	4.18	3.92	13	4.105	0.042*
Quality control programme	4.13	3.54	4.00	3.89	14	0.634	0.653
Tax status	4.16	3.18	4.18	3.84	15	3.714	0.054
Quality of personnel	3.58	3.84	4.00	3.81	16	2.759	0.104
Contractors performance in ex-post invitations	4.02	3.30	3.59	3.64	17	5.653	0.018*
Level of compliance with Health and safety regulations	3.62	3.61	3.61	3.61	18	3.404	0.066
Financial status	3.60	3.61	3.59	3.60	19	5.907	0.016*
Compliance with environmental regulation	3.42	3.93	3.39	3.58	20	1.903	0.203

*Significant at $p < 0.05$



Ranked twentieth in table 7 is contractor's compliance with environmental regulation. The p-value reported against the fourth, tenth, twelfth, fourteenth, fifteenth, sixteenth, eighteenth and twentieth sub-criteria in table 7 infer that there is a significant consensus among respondents in the ranking of the importance of these sub-criteria in contractor selection.

Ease of usage of contractor selection criteria.

A collective analysis was performed on the ease of usage of contractor selection criteria within the study area. Table 8 indicates that technical competence is still ranked first with a group mean of 3.60.

Table 8: Analysis of Group means for the ease of usage of contractor selection criteria.

Contractor selection criteria	Mean item score			Group mean	Rank	F - ratio	p - value
	Contract or	Consultant	Client				
Technical competence	3.43	3.37	4.01	3.60	1	15.096	0.011*
Financial reputation	3.51	3.33	2.93	3.26	2	2.301	0.220
Managerial capacity	3.37	3.21	2.96	3.18	3	7.067	0.010*
Quality of past performance	3.32	3.00	2.96	3.09	4	8.056	0.034*
Health, safety and Environmental records	2.99	3.08	2.51	2.86	5	14.588	0.012*

*Significant at $p < 0.05$

Financial reputation, Managerial capacity, Quality of past performance, and Health, safety and Environmental records were ranked second, third, fourth and fifth respectively. The 0.220 p-value indicates that financial reputation is significantly ease to use as a criteria for selecting a suitable contractor in the study area. A further break down of these criteria into sub-criteria was carried out in tables 9 with a view to isolate the top-20 variables of contractor selection criteria which respondents consider to meet the goal of easy usage.

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Selection Criteria on Building Projects in North Central, Nigeria**

Table 9: Top 20 contractor selection sub-criteria in the order of ease of usage

Contractor selection sub-criteria	Mean item score			Group mean	Rank	F - ratio	p - value
	Contractor	Consultant	Client				
Contractor's experience and ability	3.58	3.80	4.41	3.93	1	3.254	0.073
Quality of plant and equipment	3.27	3.54	4.21	3.67	2	1.328	0.339
Financial stability	3.57	4.07	3.00	3.55	3	3.070	0.083
Registration status of organization	3.42	3.61	3.61	3.55	4	1.963	0.193
Past performance and quality of contract execution	3.55	3.38	3.41	3.45	5	1.245	0.366
Construction management skills	3.55	3.38	3.41	3.45	6	2.015	0.185
Sophistication in construction technology	3.73	2.96	3.61	3.43	7	3.359	0.068
Value Engineering and financial prudence	3.71	3.16	3.39	3.42	8	1.550	0.277
Credit worthiness	4.02	3.39	2.82	3.41	9	1.815	0.219
Number of years in construction business	3.56	3.61	3.00	3.39	10	3.443	0.064
Quality of personnel	3.15	3.16	3.80	3.37	11	1.412	0.314
Level of responsibility exhibited	3.73	3.18	3.00	3.30	12	10.148	0.003*
Financial status	3.44	3.07	3.00	3.17	13	13.764	0.001*
Occupational safety policy	3.29	3.54	2.61	3.15	14	3.218	0.075
Tax status	3.29	3.05	3.00	3.11	15	5.327	0.022*
Integrity of Directors	4.16	3.09	2.00	3.08	16	1.205	0.380
Quality control programme	3.11	3.05	3.00	3.05	17	1.002	0.460
Ability to handle client - contractor relationship	3.29	2.84	3.00	3.04	18	3.625	0.057
Contractors performance in ex-post invitations	3.00	2.89	3.00	2.96	19	9.683	0.004*
Frequency of safety meetings	3.33	3.00	2.41	2.91	20	0.657	0.638

*Significant at $p < 0.05$



Ranked first on the overall basis of group means is contractor's experience and ability, while key variables comprising the quality of plant and equipment, and financial stability of the contractor were aggregately ranked second and third respectively. Inference from table 9 indicates that the first four sub-criteria are weighed to be easily applicable to contractor selection, while the fifth to the twentieth criteria are moderately easy to apply in the process of contractor selection. Ranked twentieth in table 9 is frequency of safety meetings. Save for the twelfth, thirteenth, fifteenth and nineteenth sub-criteria for which a consensus ranking could not be significantly reached among respondents, the other sub-criteria were adjudged to be statistically significant in their ease of usage in contractor selection process.

CONCLUSION AND RECOMMENDATIONS

Although Hatush and Skitmore (1997) did not provide any empirical results that meeting clients' objective is key to the adoption of contractor selection criteria, this study empirically discovered that it is a major rationale for the adoption of contractor selection criteria. In consonance with findings and assertions of Hendrickson and Au (2000) and Brooks (2004), it is empirically established that past performance is the most reliable driver of contractor selection in the study area irrespective of its being ranked fourth in the order of importance. Other criteria in their order of importance include technical competence, financial reputation, managerial capacity, and health, safety and environmental records. Only financial reputation exhibits statistical significance with respect to ease of use in the selecting contractors in the study area. Besides meeting client objectives, it is recommended that the attention of stakeholders in contractor selection should be drawn to other vital rationales for contractor selection among which are

public accountability and value for money in project execution. It is also recommended that stakeholders in the bidding and selection process should pay serious attention to technical competence and the quality of past performance which are essential determinants for contractor pre-qualification. This is because a technically competent contractor with track record of quality project delivery will automatically pass the assessments tests in benchmarks of financial reputation, and managerial capacity. Provided the selection of contractor underlies the success or failure of a project (Zagorskis and Turskis, 2006, Turskis et al., 2006 and Zavadska and Vilutiene, 2006), it is expected that stakeholders in the construction industry should comply with the criteria for contractor selection with a view to meeting clients' objective which is the reason why consultants and contractors are in business.

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