

Appraisal of Qualitative Factors Affecting Contractors Tender Price in a Developing Country

Ayodeji OKE, South Africa; Oriabure IJIE, Nigeria; and Clinton AIGBAVBOA, South Africa

Key words: Buildability, Form of Tender, Infrastructure Procurement, Quantity Surveying, Tender Price, Tendering Process.

SUMMARY

An important process in the procurement of infrastructure is tendering. Tendering involves invitation to submit tender by clients or their representative, submission of required documents by contractors and selection of appropriate contractors to execute the project. This study examines important constituents of tender price submitted by a contractor and factors affecting their tender price in Nigeria with a view to improving their competitiveness and success rate locally and internationally. Using quantitative design approach, data were obtained through questionnaires administered on registered construction professionals and contracting firms with adequate practicing experience. Prior to the study, pilot study was carried out to ensure proper validity and reliability of the instrument. From the final survey, there is no significance difference in the significance, importance and level of contractors' awareness of constituents of tender price. This implies that contractors are conversant of important elements of their tender price but the major factors affecting this price are related to incorrect/incomplete design as well as buildability and technicality associated the project. These factors are more of project characteristics than that of stakeholders and external variables. In view of this, nature and size of projects should be considered as major factors in estimating tender figure of construction projects by contractors. More so, for the contractors to remain in construction business, there is a need for training, innovation and advancement in the use of new and modern technology.

Appraisal of Qualitative Factors Affecting Contractors Tender Price in a Developing Country

Ayodeji OKE, South Africa; Oriabure IJIE, Nigeria; and Clinton AIGBAVBOA, South Africa

1. INTRODUCTION

Tendering method is one of the major influences of construction project performance. As indicated by public procurement Act (2007), competitive tendering in Nigeria is to encourage due process, accountability and transparency. A detailed evaluation is usually done by the client's representative to identify two or three lowest bids that meet the client's requirements and these are further evaluated by the client (Ogunsanmi, 2013). However, designing and implementing an effective tender is a huge challenge for most contractors seeking government contract in Nigeria. According to Dalrymple (2006), major factors affecting construction projects are qualitative in nature and due to this, these factors are difficult to analyze. Elhag, Boussabaine and Ballal (2005) argued that only quantitative factors can be taken into consideration when estimating tender prices of projects. It was further noted that since the nature of qualitative factors - client priorities, project characteristics, and procurement methods - are difficult to measure, they are often ignored in the actual cost estimation process. According to Cong, Mbachu and Domingo (2014), the understanding of these qualitative tender cost-influencing factors by an organisation could improve the competence of quantity surveyors to prepare more reliable and accurate tender estimates. This knowledge is also critical for quantity surveyors to achieve cost control at the construction stage.

According to Skitmore and Drew (2003), pricing practice are further compounded by the special characteristics of the industry, which include the high level of uncertainty in demand level, separation of design and production process and the lumpiness of construction demand and supply among competitors in bidding. Unfortunately, the aspect of contractor selection has been neglected in the construction industry and contractor found that the most important objective in bid pricing is to win jobs. Moreso, Xiaohong (2011) opine that accepting the lowest price is the basic cause of the project completion problems because very often lowering the price means lowering the quality and in other to avoid this, it is important to properly evaluate the contractor's capabilities. With this background, contractor have to rely on effective pricing method in order to translate potential business into reality. This research therefore examined basic group of qualitative factors influencing tender price of construction projects in Nigeria.

2. CONSTITUENTS AND INFLUENCES OF CONTRACTORS' TENDER PRICE

Tender price for a proposed construction project consists of the actual cost of carrying out the agreed scope of construction works plus a mark-up (Wong, Holt and Harris, 2001). The usual practice is for the contractor's estimator to provide an estimate of the actual construction costs, while the tendering committee considers the appropriate mark-up to arrive at the final tender price for submission. The risk margin constitutes the bulk of the mark-up, which largely depend on a range of risk factors. The risk factors according to Cong, Mbachu and Domingo (2014) include

Appraisal of Qualitative Factors Affecting Contractors' Tender Price in a Developing Country (8484)
Ayodeji Oke (South Africa), Treasure Ijeh (Nigeria) and Clinton Aigbavboa (South Africa)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

level of competition for the job, importance of contractor to win the job, present workload, anticipated design risks, nature and type of client and consultants, familiarity and experience of the job, the project characteristics, the time allowed for proper risk analysis, and the general market conditions.

Various studies have been carried out on factors influencing the tender price of construction work. Enshassi, Mohamed and Madi (2015) identified 12 factors: building function, type of contract, conditions of contract, contract sum, price intensity, contract period, number of bidders, good/bad year, procurement basis, project sector (public, private or joint), number of priced items and number of drawings. Using data from 42 projects in Singapore, Ling and Boo (2001), found similar results while comparing 5 variables. Skitmore and Picken (2000) observed the effects of four independent variables (building type, project size, sector and year) on tender accuracy and tested these variables against 217 projects from the perception of quantity surveyors based in the USA. It was discovered that bias existed in project size and year and consistency errors existed in project type, size and year of execution. By reviewing 67 process industry construction projects around the world, Kang, *et al.*, (2015) identified and grouped a total of 45 factors that contribute to the accuracy of early stage estimates into 11 orthogonal factors. Of these 11 factors, the 5 most important are process design, team experience in cost information, time allowed to prepare tenders, site requirements as well as bidding and labour climate. Elhag, Boussabaine and Ballal (2005) stated that technological and project design, contractor's expertise and management ability as well as client's desired level of construction sophistication play important roles in determining the cost of a project. Based on previous studies on influences of contractors' tender price, the significant factors are qualitative in nature. These factors are summarised into various categories including project, client, contractor, consultant and design characteristics as well as tendering situation, market and external factors.

3. RESEARCH METHODOLOGY

Using survey method, questionnaires were administered on stakeholders that are directly involved with tendering and construction activities within the study area. These includes contractors, architects, quantity surveyors, engineers and builders. Their list and register were obtained from their respective professional bodies that are shouldered with the responsibility of governing and controlling the profession and activities of their members. These include Nigerian Institute of Quantity Surveyors (NIQS), Nigerian Institute of Architects (NIA), Nigerian Society of Engineers (NIE) and Nigerian Institute of Building (NIOB) for quantity surveyors, architects, civil engineers and builders respectively. The list of the contractors were obtained from Ministry of Works (MOW) in the study area. The number of respondents in the study area as at October 2015 is 285 as indicated in table 1.

In calculating the sample size, the equation devised by Yamane (1967) was adopted.

$$n = \frac{N}{1 + N(e)^2}$$

Where "n" is the sample size for a group; "N" is that actual population of the group; and "e" is the level of significance (taking as 0.05). results of the calculation are highlighted in table 1 indicating a total number of 247.

Table 1: Research Population of respondent

S/N	Firms	Population	Sample size	Retrieved Questionnaires
1	Quantity surveyors	65	56	14
2	Architect	45	41	13
3	Civil engineers	48	43	16
4	Builders	35	32	9
5	Contractors	92	75	54
	Total	285	247	106

Source: NIQS, NIE, NSE, NIOB, MOW

Well-structured questionnaire with close-ended questions was designed based on factors identified from reviewed literature with the aim of assessing qualitative factors influencing contractors' tender figure. Two sections were provided with the first planned to elicit information regarding personal data of the respondent and their organization. The second section was constructed to obtain information regarding the opinion of the respondents on the constituents and influences of contractors' tender prices. 5-point Likert scale was adopted in seeking their opinion on the issues of tender prices. Due to inability to reach some of the listed contractors and professionals, convenience sampling was adopted as the sampling technique for the study. A total of 247 questionnaires - representing the sample size - were administered from which 106 were retrieved representing about 37% and 43% of the sample size and population respectively. This response rate is appropriate for the study based on the opinion of Moser and Kalton (1999). It was stated that the result of a survey could be considered as biased and of little significant if the return rate was lower than 20-30%.

Cronbach's alpha (α) was computed to test the reliability of the 5-point Likert. Results of the analysis indicates a value of 0.936 for factors affecting tender price of construction projects. Since the degree of reliability of the instrument is more perfect as the value tends towards 1.0 (Moser and Kalton, 1999), it can be concluded that the instruments used for this research are significantly consistent and reliable. For the analysis, mean item score (MIS) was computed from the Likert scale and the values were employed to determine the significance and rank of the identified variables.

4. FINDINGS AND DISCUSSION

4.1 Respondents' Characteristics

The findings from this study indicates that the respondents possesses an average of about 8 years of experience in the construction industry and they have been involved in various building, civil and industrial engineering works. The least category of respondents have been involved in more than 6 projects ranging from renovation, extension and new projects.

4.2 Influences of Contractors' Tender Price

Table 2 indicate level of importance of qualitative factors affecting contractors' tender prices of construction projects. The identified factors were listed under various subheadings as discussed earlier in this article. For project characteristics, project buildability is the most important with a mean of 4.41 followed by the construction technique, project size, type of structure, location of

Appraisal of Qualitative Factors Affecting Contractors' Tender Price in a Developing Country (8484)
Ayodeji Oke (South Africa), Treasure Ijeh (Nigeria) and Clinton Aigbavboa (South Africa)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

project, type of construction as well as scale and scope of the project. The least factors are related to project duration as well as access to site and storage. Type of client is the most important client characteristics followed by client requirement on quality, financial ability of the client and certainty of project brief while the least is related to deadline requirement factor.

Table 2: Factors Affecting Contractors' Tender Price

Factors	Mean	Ranking
Project Characteristics		
Buildability of the project	4.41	1
Construction technique	4.38	2
Project size	4.27	3
Types of structure	4.20	4
Location of the project	4.18	5
Type of construction	4.14	6
Scale and scope of construction	4.13	7
Project duration	3.90	8
Assess to site and storage	3.66	9
Client Characteristics		
Type of client	4.12	1
Client requirement on quality	4.05	2
Financial ability of the client	3.99	3
Certainty of the project brief	3.90	4
Deadline requirement	3.76	5
Contractor Characteristics		
Experience on Similar project	4.00	1
Management Team	3.92	2
Planning capability	3.88	3
Past relationship with client	3.66	4
Current work load	3.61	5
Need for work	3.54	6
Tendering situation, consultant and design characteristics		
Incomplete/incorrect design	4.40	1
Procurement method	4.25	2
Tendering method	4.11	3
Type of contract	4.03	4
Completeness of the project information	3.75	5
External factors and Market conditions		
Material cost	4.27	1
Labour cost	4.16	2
Interest/inflation rate	4.10	3
Market stability	3.97	4
Level of competition and level of construction activities	3.82	5
Number of builders	3.59	6

Appraisal of Qualitative Factors Affecting Contractors' Tender Price in a Developing Country (8484)
Ayodeji Oke (South Africa), Treasure Ijeh (Nigeria) and Clinton Aigbavboa (South Africa)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

Inaccuracy of cost estimating

Poor tender document	3.90	1
Insufficient analysis of tender document	3.79	2
Poor requirement standing	3.71	3
Insufficient tendering time	3.67	4

The third group of factors that affects contractors tenders price are the contractors characteristics. Experience of similar project is the most important followed by type and nature of management team, planning capability, past relationship with client, current workload and essential or need for the work. Incomplete design is a major design characteristics factors while type of contract as well as procurement and tendering method are also important influencing factors. Concerning external factors and market conditions, material cost, labour cost as well as interest and inflation rate are major tender price influencing factors. Other factors are market stability, number of builders, level of competition and level of construction activities. Inaccuracy of cost estimating is another group of factors and the major issues under this heading are related to poor tender document, insufficient analysis of tender document, poor requirement standing and insufficient tendering time.

4.3 Discussion of Findings

Considering the factors affecting contractors tender price which were categorized under various groups as project characteristics; client characteristics; contractors characteristics; tendering situation, consultant and design characteristics; external factors and market condition; and inaccuracy of cost estimating. A similar study carried out in New Zealand by Cong, Mbachu and Domingo (2014) revealed that buildability and complexity of design are the most important project characteristics factor that affect the price of a tender while this study reveals that buildability of the project and construction technique are the major factors. For client characteristics, the studies of Akintoye (2000) as well as Chan and Au (2009) are in agreement with the outcome gotten from this research. Type of client has a significant effect on tender price due to the fact that there are many differences between public clients and private clients, as their priorities vary. For instance, Cong *et al.* (2005) noted that public projects need to be more accountable than private projects. However, this study focused mainly on public projects.

In agreement with the findings of this research on contractors characteristics, Cong, Mbachu and Domingo (2014) noted that experience on similar project is the most important factor affecting contractor tender price followed by management team. However, Elhag, *et al.*, (2005) observed that management team is the most important contractor characteristics factor from the perception of quantity surveyors in the USA. Experience on Similar project was also highlighted as an important factor considered by contractors during tendering because that will guide in understanding items to be included and given attention during tendering. Management Team is another factor that was discovered to affect contractors price and this is due to the fact that the stronger the management team through the employment of competent professional, the higher the tender price because the contractor will definitely increase his profit and overhead to cover up for administrative cost. The least identified factor is the Need for work and this is due to the fact that during tendering, especially in selective tendering, some contractor who do not have interest for the work just put in their tender price which may not be feasible.

Appraisal of Qualitative Factors Affecting Contractors' Tender Price in a Developing Country (8484)
Ayodeji Oke (South Africa), Treasure Ijeh (Nigeria) and Clinton Aigbavboa (South Africa)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality
Helsinki, Finland, May 29–June 2, 2017

For tender situation, consultant and design characteristics, it was discovered that incomplete/incorrect design can affect contractors' tender price negatively. Cong, Mbachu and Domingo (2014) noted that completeness of project information is the most important factor affecting tender price while other factors are related to incomplete or incorrect design, procurement method, type of contract and tendering method in order of their importance. Akintoye (2000) highlighted that material cost and labour cost are major factors affecting tender price which is in agreement with this research outcome. In another study, Cong, Mbachu and Domingo (2014) stated that level of completion and level of construction activity follow by market cost are the major external factor and market conditions characteristics.

5. CONCLUSION AND RECOMMENDATIONS

In the quest to enhance the competitiveness of contracting firms in tendering and winning of construction contracts, this study examined various qualitative factors influencing the tender sum of Nigerian contracting firms from the opinions of contractors and construction professionals. The factors were grouped into various characteristics with reference to information available in reviewed literature materials. For project characteristics, it was discovered that the five most important factor that influence tender price of contractors in the study area are the buildability of the project, construction technique, project size, type of structure and the location of the project. Factors relating to client characteristics are related to type of client, client requirement on quality and the financial ability of the client.

The contractors characteristics factors include contractor experience on similar project, management team and planning capability of the contractor. More so, incomplete design/incorrect design, procurement method and tendering method were the important tendering, consultant and design characteristics factors affecting tender price of construction projects. Furthermore, the external factors and market condition characteristics influencing tender price are concerned with labour cost, interest rate, inflation rate and market stability. Poor tender document, insufficient analysis of tender document, poor requirement stand and insufficient tendering time are the inaccuracy of cost estimating factors affecting contractor tender price.

This study has explored important variables that are essential to the survival of contracting firms. It provides various important factors grouped under basic characteristics that will help quantity surveyors in Nigerian contracting firms in pricing of their tender in order to ensure their competitiveness both in the local and international market. It therefore become the responsibility of top management staff of the contracting firms to keep themselves abreast with latest technique and principles require for effective and efficient tendering as highlighted in this study. There is also a need for training and development of both management, professional and technical staff especially those involve in tendering activities on the basis and principles of tendering.

REFERENCES

- Aje, I. O., Oladinrin, T. O., & Nwaole, A. N. C. (2016). Factors Influencing Success Rate of Contractors in Competitive Bidding for Construction Works in South-East, Nigeria. *Journal of Construction in Developing Countries*, 21(1), 19-34
- Akintoye, A. (2000). Analysis of factors influencing project cost estimating practice. *Construction Management and Economics*, 18(1), 77-89.
- Akintoye, A., & Fitzgerald, E. (2000). A survey of current cost estimating practices in the UK. *Construction Management and Economics*, 18(2), 161-172.
- Chan, E., & Au, M. (2009). Factors influencing building contractors' pricing for time-related risks in tenders. *Journal of Construction Engineering and Management*, 135(3), 135-145.
- Cong, J., Mbachu, J. and Domingo, N. (2014). Factors influencing the accuracy of pre-contract stage estimation of final contract price in New Zealand. *International Journal of Construction Supply Chain Management*, 4(2), 51-64.
- Dalrymple, (2006). *Clients Driving Innovation: Moving Ideas into Practice*. Victoria.
- Elhag, TMS, Boussabaine, AH & Ballal, TMA (2005), "Critical determinants of construction tendering costs: Quantity surveyors' standpoint", *International Journal of Project Management*, 23(7), 538-545.
- Enshassi, A., Mohamed, S., & Madi, I. (2015). Cost estimation practice in the Gaza Strip: A case study. *IUG Journal of Natural Studies*, 15(2), 153-176
- Kang, B. G., Elbashier, M. M. M. E., Goh, B. H., & Song, M. K. (2015). A Comparative Study between Clients and Contractors on Competitive Tendering in the Sudan Construction Industry. *Open Journal of Social Sciences*, 3(7), 67-73.
- Ling, YY & Boo, JHS (2001), "Improving the accuracy estimates of building of approximate projects", *Building Research and Information*, 29(4), 312-318.
- Moser, C.A. & Kalton, G. (1999) *Survey Methods in Social Investigation*, (2nd ed.), Aldershot: Gower Publishing Company Ltd.
- Public Procurement Act (2007). Procurement Procedures Manual for Public Procurement in Nigeria, Bureau of Public Procurement, Abuja, FCT, Nigeria.
- Sarker, S. Salah, M., Chowdury, U. & Deb, P. (2012) Study of Influencing Factors of Tenders Evaluation: an evidential Reasoning Approach , *International Journal of Research in computer science*. 2, 15-20.
- Schmidt, M. (2015). Price Determination in Public Procurement: A Game Theory Approach. *European Financial and Accounting Journal*, 10(1), 49-62
- Shukery, N. M., Amirudin, R., & Sofield, T. (2016). Level of Importance of Performance-based Tender Evaluation Indicators. *Indian Journal of Science and Technology*, 9(34), 1-8
- Skitmore, M & Drew, D (2003) "The analysis of pre-tender building price forecasting performance: a case study", *Engineering, Construction and Architectural Management*, 10(1) 36-42.
- Skitmore, M & Picken, DH (2000), "The accuracy of pre-tender building price forecasts: An analysis of USA data", *Australian Institute of Quantity Surveyors Refereed Journal*, 4(1), 33-39.
- Xiaohong, H. (2011). An analysis of the selection of project contractor in the construction management. *International Journal of Business Management*, 6(3), 184-189.

CONTACTS

Dr. Ayodeji Oke
University of Johannesburg
P. O. Box 17011, Doornfontein 2018
Johannesburg
SOUTH AFRICA
Tel. +27849155117
Email: emayok@gmail.com

Mrs. Oriabure Ijie
Federal University of Technology
P. M. B. 704
Akure
NIGERIA
Tel. +2348137247112
Email: ijiehtreasure@gmail.com

Prof. Clinton Aigbavboa
University of Johannesburg
P. O. Box 17011, Doornfontein 2018
Johannesburg
SOUTH AFRICA
Tel. +27787958231
Email: caigbavboa@uj.ac.za

Appraisal of Qualitative Factors Affecting Contractors' Tender Price in a Developing Country (8484)
Ayodeji Oke (South Africa), Treasure Ijeh (Nigeria) and Clinton Aigbavboa (South Africa)

FIG Working Week 2017
Surveying the world of tomorrow - From digitalisation to augmented reality
Helsinki, Finland, May 29–June 2, 2017