ANALYSIS OF TENDERING STRATEGIES ON THE SURVIVAL OF CONTRACTING FIRMS IN NIGERIA

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Abstract

In a competitive tendering situation, contractors constantly face the dilemma of submitting a high price to maximize profit with the possibility of failing to win the contract and thereby suffering a shortage of work. Alternatively, the contractor may submit low prices which wins contract, but show very little or no profit margin. A bidding strategy may be evolved for determining the optimum bid, which will be the relationship between maximum profit and the possibility of being the lowest tenderer (Ashworth, 2002). With the introduction of due process in the procurement of works in the country, especially the public contracts, and the multiplicity of contracting firms, it has become very expedient for contractors to find a way of surviving in the highly competitive environment construction market. The aim of the study is to examine the use of tendering strategies by construction firms in Nigeria as a survival strategy. This study uses cross sectional survey research design to examine the common subjective winning tendering strategies among construction contracting firms in Nigeria. Findings show that Client long term gain or losses which include other sub-factors like amount of work the client carries out regularly, the amount of repeat business level that the client has been following, the client's possible effect by giving recommendations in referral markets, the relationship between the company and the decision makers in the owner's institution and the possibility of solving problems that may occur during work and the client's general procedures to awarding the contracts was identified as the most important factors in tendering decision and percent mark-up to be added to base estimates; tendering strategies/models were rarely used in determining the appropriate mark-up to be allowed for in a tender by contracting firms. However, a few firms do use it with no observed marked difference from those that do not. Respondents identified the unsuitability of tendering models as survival strategies in the Nigerian construction industry as a major factor that negates the use of the different tendering models. A greater proportion of them believe that they were not designed for our kind of environment where reliable data are difficult to come by. It was recommended that when considering tenders for construction projects, contracting firms should give primary attention to client's long-term gains or losses. This factor should also be weighed when deciding on the most suitable mark-up size for tenders.

Keywords: *Tendering, Strategy, Market Share, Solvency ratio, Tendering Model*

Introduction

With the introduction of due process, where the contract is awarded to the lowest responsive tenderer, the task of selecting the appropriate mark-up to the base estimate has become a very important consideration in the survival of any contracting firm. A bidder will maximize profits when he/she either bids a naira less than the lowest competitor bids, if that amount is above cost, or abstains if it is not (Seydel, 2003). A potential value of this research is to ensure the

survivability of construction firms and prevent them from insolvency and bankruptcy resulting from lack of jobs. The objectives of this study are to determine the underlying key determining factors in tendering strategy and to evaluate the best tendering strategy as used by contractors in Nigeria.

The bidding strategy has been a subject of keen interest right from the fifties. There are a great number of theoretical bidding models based on the works of Friedman and Gates who happen to be the pioneer writers on bidding strategy (Wanous, Boussabaine and Lewis, 2000). All these mathematical models proved to be suitable for academia but not for practitioners. This study will be an addition to the few existing qualitative approaches which study how the bidding decisions are made in practice. Gates as cited by Wanous et al (2000) suggested a non-mathematical bidding strategy based on the Delphi technique, designated as the (expert subjective pragmatic estimate (ESPE)). In this model, the range and distribution of competitors' possible low bids will be estimated, and then another estimate made for the company's range and distribution of possible low bids. The two sets are then compared to select the most appropriate bid. This is done by a group of experts who, through an iterative process, will estimate the optimum bid. Wanous et al (2000) cited Ahuja and Arunachalam as proposing a model to aid contractors in evaluating systematically the risk due to the uncertainty of availability of the required resources before bidding on a new project. As argued by Wanous et al (2000), it is vital for contractors to use their own resources optimally by procuring new projects to employ resources that will be released progressively from ongoing projects.

Literature Review

Need for tendering strategy

The need for tendering strategy cannot be over emphasised if the rate at which contracting firms go insolvent is anything to judge by. This view is also shared by Edum-Fotwe et al (1996) in their comment on the performance of the British construction industry, that the construction industry has always experienced a relatively high proportion of insolvencies compared with the rest of the economy. The deep decline in output and orders for the industry, because of the cyclical recession, has resulted in the escalation of competition combined with record levels of corporate collapses in the industry. To ameliorate the negative impact of competition, contracting firms must devise a strategy of surviving through thick and thin.

Mathematical Bidding models

Banki *et al* (2008) observed that numerous researchers have developed models for bid/no bid and mark-up size decisions. They also discovered the difficulty in developing realistic models that capture the complexity and uncertainty of the full construction contract bidding situation, which is

perhaps why many contractors did not show interest in such models. There are various bidding models used as tendering strategies ranging from the simplest to the complex mathematical models. *the* gives a view of the development of bidding strategy.

There is a great volume of literature concerned with bidding models. The basic assumption of all the bidding calculations is that a relationship exists between the tender sum and the 'probability' or 'chance' of winning the contract (Banki et al., 2008). The aim of probabilistic models is to express this numerically. In entering a bidding competition, it

development of a 'probabilistic model' which will predict the chances of winning in the type of competitive bidding that is common in the construction industry. These probabilistic
is assumed that the contractors first estimate their costs and then add a mark-up to cover profit (or a mark-up to cover contribution, i.e. profit and company overheads). The aim of most of these works has been the development of a 'probabilistic model' which will predict the chances of winning in the type of competitive bidding that is common in the construction industry. These probabilistic
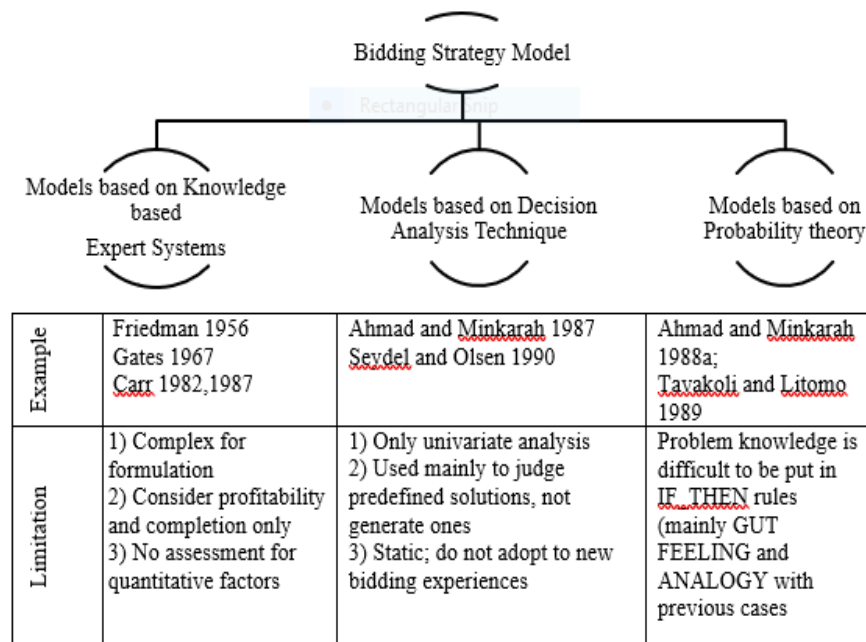

	Models based on Knowledge based Expert Systems	Models based on Decision Analysis Technique	Models based on Probability theory
Example	Friedman 1956 Gates 1967 Carr 1982,1987	Ahmad and Minkarah 1987 Seydel and Olsen 1990	Ahmad and Minkarah 1988a; Tavakoli and Litomo 1989
Limitation	1) Complex for formulation 2) Consider profitability and completion only 3) No assessment for quantitative factors	1) Only univariate analysis 2) Used mainly to judge predefined solutions, not generate ones 3) Static; do not adopt to new bidding experiences	Problem knowledge is difficult to be put in IF..THEN rules (mainly GUT FEELING and ANALOGY with previous cases

Figure 1: Bidding strategy models
Source: Banki et al (2008), p154

models have attempted to give guidance to bidders by producing statements of the type: 'If you bid at

mark-up of 12% you have 30% chance of winning this contract'. Following on from these calculations of probability, previous works have

attempted to drive a mark-up which purports to represent the 'optimum mark-up', that is the mark-up which in the long term will produce the maximum profit.

Contractors' insolvency

The structure of the construction industry makes it particularly susceptible to insolvency. First, shortage of work makes the tendering process keener. Contractors submit excessively optimistic or even "tender low, claim high" bids. Second, in a recession, the major national contractors tender for work which normally they would leave medium-size contractors to chase. This process, repeated through the industry, has a squeeze effect and insolvency results for many. As a result, some contractors have become very claim-conscious (Newman, 1992).

Factors influencing the choice of tendering strategy

According to Kemblowski et. al. (2015), the outcome or choice of a strategy depends on the actions of competitors. They stated further that the decision-maker may often have incomplete information regarding nature, style, state, pay-offs, etc. about his adversary. Chua and Li (2000) through their interviews with six persons experienced in competitive bidding, identified four key considerations in bidding. These include the potential level of competition, the possible risk margin, the essential company's position in bidding, and the

company's keenness in getting the job. These concerns constitute the sub-goals in reaching their bid decisions. In the decision process, contractors access these sub-goals from a multitude of factors relating to the job, social and economic environment, and the company. However, they observed that in previous studies, no deep reasoning has been made about the bid decision process itself. In actuality, a contractor arrives at a bid decision only after a complex reasoning process. They further stated that the assignment of an appropriate level of mark-up to the base estimate is the critical part of a contractor's business strategy. To bid with a higher mark-up increases the profit if the bid can be won but decreases the probability of winning.

Methodology

This study was carried out among construction contracting firms of all categories in Lagos State. The sample size used in this study was the registered contractors involved with building and/or civil engineering works in Lagos state. Their list was sourced from NIOB consisting of ninety-two (92) Lagos based building contractors, eleven (11) electrical contractors, nine (9) air conditioning installation contractors, nine (9) general contractors, eleven plumbing and pipe works contractors, ten (10) aluminium works contractors, seven (7) lift contractors, eleven (11) extra low voltage contractors, ten (10) borehole and water treatment contractors, eight (8) sewage treatment contractors, six (6) roofing

contractors and five (5) iron-mongery contractors. They totalled up to one hundred and seventy-eight contractors (178). A descriptive Cross-sectional survey design was used whereby structured questionnaire was administered in eliciting information from respondents using purposive sampling method. Both descriptive and inferential statistical tools were used in analysing the data collected. To measure the effect of tendering strategies on the objectives of this study, the contracting firms were asked to state their net sales (i.e. cumulative contract sum for the last financial year), earning before taxation for the last financial year, fixed asset, current asset, work in progress (value of contracts under execution) and their current liability on a six-point scale (1=0-5 million, 2=6-15 million, 3=16-100 million, 4=101-300 million, 5=301-900 million and 6=over 900 million).These values were used in determining the accounting ratio of the respondents so as to determine their survivability. Where they cannot give these figures, respondents were asked to indicate their market share vis-a-vis the number of contracts tendered for and won using or not using tendering strategies in order to assess the extent of effect of tendering strategies on the survival of their businesses. Respondents were also asked to give direct information regarding their survivability in terms of cost and cost overrun, time and time-overrun and other factors relating to the standard/quality of the delivered project. Respondents were given the option to choose from given project characteristics in order to measure this variable (characteristics or variables considered were; client's satisfaction with delivered project, contract period, total contract sum, variations, disputes etc. The contractors were scaled on 1-3 depending on their size. Data for the study were processed and analysed with the aid of the Statistical Packages for Social Sciences (SPSS 17.0) and Excel 2007 packages. Data measured on nominal scale were analysed using descriptive statistics such as mode frequency distribution and percentages. Mean score and standard deviations, as well as inferential statistics such as Pearson's Chi-Square, Cramer's V symmetric measure and Pairwise t-test were used to determine the significance of the relationships between application of tendering strategies and corporate survival. The levels of importance of identified factors were determined by the magnitude of their mean scores. With the greatest mean representing the most important factor.

A total of 178 questionnaires were sent and 120 completed questionnaires were returned. 100 of the returned questionnaires were properly filled and were used for analysis. The response rate is 56%. Survival is the ability of a contracting firm to remain in business and still be solvent for a particular period of time. This ability is measured in four ways. The first is by contract time overrun, contract cost overrun and delivery of project to specified

quality standard (Wong et al, 2003). The second is by solvency ratio. Solvency ratio indicates the ability to meet obligations of all creditors by liquid assets and without becoming solvent. A ratio greater than 1 is normally considered satisfactory for construction contractors (Edum-Fotwe et al, 1995). The third is by Return on assets (ROA)

$$= \frac{Earning\ before\ taxation}{Total\ Asset}$$

Return on assets (ROA) $=$

$$\frac{Earning\ before\ taxation}{Net\ Sales} \; x \; \frac{Net\ Sales}{Total\ Asset}$$

(Performance)
= Profit margin ratio x Total Asset turnover ratio

(Performance) =
(Effectiveness) $\quad x \quad$ (Efficiency)

The last method is by analyzing the market share of the contractors within a specific time frame and comparing it with the tendering strategy adopted. This was done by comparing the number of contracts tendered for and won by the use of tendering strategies.

Market share

$$= \frac{contracts\ won}{contracts\ tendered\ for\ and\ decided} \; x \; 100$$

measuring the company's performance which eventually was decomposed to financial ratios. Drucker (1977) in Kumar and Gulati (2010) defines performance as the combination of efficiency (doing things right) and effectiveness (doing the right thing). Mathematically put,

Results and Discussion
Demographic characteristics of the respondents

Table 1 shows the summary of the demographic and company characteristics of the respondents. All the respondents were from general contractor organization making up 100% of the respondents. Most of the respondents were from medium scale companies having 8-114 employees on their payroll. This constitutes 60% of the total respondents. The remaining percent were shared equally between respondents from both small and large contracting firms, having 20% representation each in the population. This suggests that the construction industry in Lagos state consists of many small and medium sized general contractors responsible for highly specialized construction work requiring huge capital and massive technology.

Table 1 Demographic Characteristics of The Respondents

Number of employees	Organisation type	Frequency
1-7employees	General contractor	20.00%
8-114 employees	General contractor	60.00%
115-1200 employees	General contractor	20.00%
Total		100.00%

Table 2 Mean Involvement in Different Types of Project

Project types	Mean	Rank

	Mean	Rank
Residential Real estate	3.5333	1
Public Facilities- Schools, Government building	2.9333	2
commercial building involvement	2.6667	3
Industrial Facility	2.5581	4
Public Infrastructure-Bridges, Roads	2.2791	5
Hospitals, Medical Facilities	2.0714	6

From the analysis in Table 1, it was observed that 100% of the respondents were general contractors.

Table 2 shows the frequency of involvement in public infrastructures such as bridges and roads. It was observed that 4.4% of the respondents do not carry out jobs in this field, 46.7% of the respondents rarely get to carry out works in this category, 15.6% of the respondents sometimes carry out this nature of work, 6% of the respondents often carry out this nature of job while 9% of the respondents carry out the construction of bridges and roads most often. This explains why the minimum mean value in the different types of project is 2.0714. What this means is that majority of the respondents, tender for almost all kinds of contract that is available for tendering and have been fortunate to be engaged in virtually all the project types at one time or another. However, it is worthy of note that the respondents were involved 40-100% of the times in real estate development; this means that more than half of their time is spent on residential real estate which ranks first with mean value of 3.5333. They were also involved in public facilities- schools which ranked second with mean value of 2.9333, government building which ranked third with 2.7 mean values. Likewise, they were also involved with other project types such as commercial building and the construction of industrial facilities with 2.3 and 2.1 mean values respectively.

Factors Which Affect Tendering Decision.
Table 3   Factors affecting tendering decision

Factors	Mean	Rank
Client-long term gain or loss	4.73	1
Job Complexity	4.67	2
Client and Consultant on the project	4.62	3
Project-long term gain or loss	4.6	4
Contract conditions risk	4.58	5
Consultant firm- long term gain or loss	4.58	6
Strength of the firm	4.53	7
Project condition	4.53	8
Future Market condition	4.53	9
Competition on Current Project	4.47	10
Competition in current market	4.44	11
Need for work	4.33	12

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Laws and Government Regulation	4.09	13
Economic Condition and instability	4.07	14
Availability of Resources	3.91	15

Table 3 shows the factors that determine whether a respondent will tender or not. **Client long term gain or losses** which has a mean score of **4.7333** was considered as the most important factor followed by **job complexity, client and consultant on the project** with their mean rating as **4.6667, 4.6222** and **4.6** respectively on a 5-point Likert scale.

Factors which affect percent mark-up decision.

Table 4   Factors affecting percent mark-up

Factors	N	Mean	Rank
Client-long term gain or loss	45	4.67	1
Contract conditions risk	45	4.60	2
Client and consultant on the project	45	4.51	3
Competition on Current Project	45	4.51	4
Job complexity	45	4.47	5
Competition in current market	45	4.47	6
Project-long term gain or loss	45	4.47	7
Future Market condition	45	4.36	8
Strength of the firm	45	4.33	9
Project condition	45	4.07	10
Need for work	45	4.00	11
Economic condition and instability	45	3.98	12
Availability of Resources	45	3.91	13
Laws and Government regulations	45	3.84	14
Consultant firm- long term gain or loss	45	2.98	15

Table 4 shows the response of the contractors on the factor that is most paramount in deciding on the percent mark-up to allow for in their estimate at the adjudication. Client long-term gain or loss top the list with a mean rating of 4.6667 and followed by contract condition risk, client and consultants on the project, competition on the current project and job complexity. Consultant firm long-term gain or loss, Laws and government regulations, availability of resources and economic condition and instability were considered as the least factors that influenced percent mark-up decisions with mean ratings of 2.9778, 3.8444, 3.9111 and 3.9778 respectively on a 5-point Likert scale.

Table 5: Paired Samples Test Between Factors Influencing Tender Decision and Percent Mark-Up Decision

Factors	Paired Differences	t	Sig. (2-tailed)
Need for work	0.333	2.057	.046
Strength of the firm	0.200	3.317	.002
Project condition	0.467	3.843	.000
Job Complexity	0.200	1.848	.071
Contract conditions risk	-0.022	-.274	.785
Client and Consultant on the project	0.111	1.402	.168
Economic Condition and instability	0.089	.942	.352
Availability of Resources	0.000	.000	1.000
Laws and Government Regulation	0.244	2.206	.033
Competition on Current Project	-0.044	-.703	.486
Competition in current market	-0.022	-.330	.743
Future Market condition	0.178	3.084	.004
Client-long term gain or loss	0.067	.903	.372
Project-long term gain or loss	0.133	2.602	.013
Consultant firm- long term gain or loss	1.600	7.022	.000

*Significant at $p<0.05$

Table 5 shows the t-test between the determining factors for tender decision and percent mark-up decision. The p-value selected for this test was 0.05. This shows that not all factors have the same degree of influence on deciding whether to tender and the percent mark-up to be allowed for in a tender. The table shows that the factors that had the same influence on decision to tender and the appropriate percent mark-up to be added to base estimate were: job complexity, risks associated with contract conditions, client and consultants on the project, economic condition and instability, availability of resources, competition on current project and current market and client long term gain or loss.

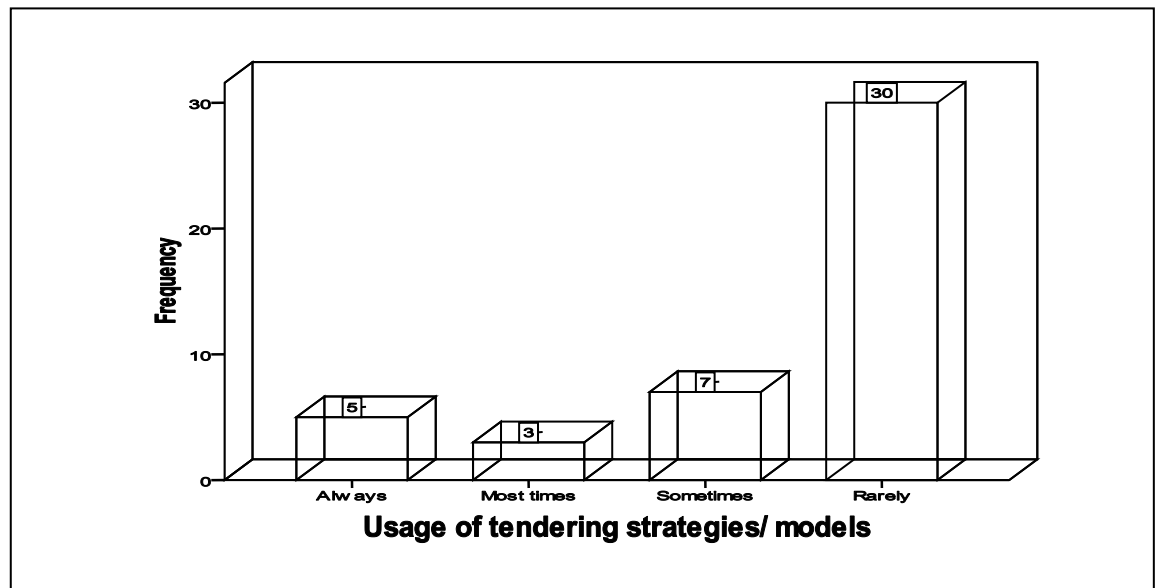*Usage of tendering model as aid in deciding appropriate mark-up to base estimate.*

Fig. 2 *Level of use of tendering strategies/models*

Figure 2 shows the responses of respondents on the level of use of tendering strategies in which 66.7% of the respondents rarely use tendering models in apportioning mark-up to their base estimate. It was also observed that 11.1% of the respondents use tendering strategies while 15.6% sometimes use it.
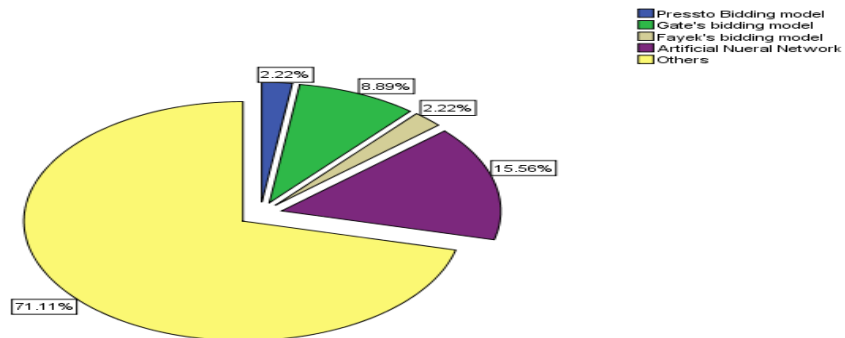
Tendering models as used by respondents.

Figure 4.3 Types of tendering models used by contracting firms

Figure 4.3 shows the percentage of respondent that use the different types of tendering models. It was observed that 71.1% of the respondents do not use tendering models at all but use their experience and intuition, based on the

circumstances that surround the project, to determine the appropriate mark-up to be added to base estimate. It was also observed that 15% of the respondents use artificial neural network, 8.89% claimed to use Gate's model while both Pressto and Fayek's bidding models are used by 2.22% of the respondents each. This means that the use of tendering model in Lagos state is not a popular practice.

Reasons for inability to use tendering models/Strategies

Table 6 is the survey of the opinion of the respondents on possible factors that could be hindering the use of tendering strategy. The most common factor identified is the fact that **it does not work with Lagos market** as observed with a mean rating of **3.07** on a 5-point Likert scale. The factor that followed closely is lack of expertise to use it.

Table 6   Factors Responsible for Inability to Use Tendering Strategies

Factor description	N	Mean	Rank
It does not work with Lagos market	45	3.07	1
Lack of expertise in my firm to use it	45	3.00	2
Lack of historic data on competitors	45	2.67	3
Time for tendering is too short for tendering strategies	45	1.82	4
Never knew tendering strategy/model existed	45	1.73	5
The process is too mathematical	45	1.71	6
I require training for its use	45	1.42	7

Table 7   Comparison of frequency of tendering strategy usage with survival indicators: mean solvency ratio and mean market share

Survival indicators	Level of tendering strategy usage				
	Always	Most times	Sometimes	Rarely	Never
Mean Solvency Ratio	42.7	-20.13	11.37	Nil	Nil
Mean Market Share	61.13%	33.24%	42.54%	0%	0%

Work performance related issues	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant

From Table 7, it was observed that while the solvency ratio of the firms that always and sometimes use tendering strategies is very strong i.e. greater than 1, the solvency ratio of those firms that use tendering strategies most of the time is however very weak i.e. below 1, indicating danger in the survivability of those firms and their ability to meet their immediate financial commitments. It is also worthy of comment to say that the mean market share of those contracting firms that always and sometimes use the tendering strategies is also higher when compared with those that use it most times. Whereas, work performance related issues as factors in deciding whether there is a relationship between frequencies of use of tendering strategies and survivability proves inadequate/insignificant.

Discussion of findings

This study identifies client long term gain or loss as the most important key determining factor in deciding whether to tender or not for a construction project and also in deciding on the appropriate mark-up to be added to the base estimate. Studies by Fayek et al (1998) reveal resource availability as a very important factor influencing contractors' decision to tender for a project. Although it was not considered as an important factor in contractor's tendering decision in the research findings of Shash (1993) and Fayek et al (1999). Wanous et al (1998), in his findings however discovered that client characteristics is a very and the most important factor in choosing whether to tender or not. It was concluded that fulfilling the to-tender conditions, financial capability of the client, and relation with/reputation of the client are the most important factors.

The use of tendering strategies in the survival of contracting firms using tendering models emerged in this study as having zero influence on the survival of contracting firms in Lagos state. Edum-Fotwe et al (1996) when commenting on the performance of British construction industry however believed that without the use of these strategies, the rate at which contracting firms were going insolvent will continue to escalate. Most bidding models were developed on the assumption that profit and overhead margin allowed for in an estimate is the only factor that can give rise to different tender as submitted by contracting firms (Fayek, 1998).

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Summary of the study

The ability to understand bid or not decision and predict mark-up price to make profit is of fundamental importance for the survival and progress of any contractor. Business profitability is closely related to the willingness and ability of businessman to invest and employ.

Conclusions

Many contracting firms, irrespective of size and niche, are still finding their feet in their respective market shares and most with very weak financial ratios. The study was set out to determine the underlying key determining factors in tendering strategy and to evaluate the best tendering strategy as used by contractors in Nigeria.

The study has been able to identify that *Client long term gain or loss* is an important and a key factor both in deciding to tender and in apportioning the appropriate mark-up size to be allowed for in a tender. This is because most contracting firms believed in future benefits coming from the client if the present work is properly executed. Furthermore, another important factor identified is that the tendering strategy models available in the construction industry needs modification to be usable by the majority of contracting firms and to be applicable for use in Nigerian construction market.

It is also established that the mathematical tendering models do not enjoy any popularity among contractors in Nigeria, owing greatly to its impracticality of use. The models work only where there are established cost standards that are strictly adhered to by market participants where the only variable left for competition is the mark-up level assigned by individual competitors. The subjective approach is largely favoured by the majority of the contractors. This trend looks like its going to continue until a time that the government decides to standardise categorisation of contractors and construction prices or rates.

Recommendation

When considering tenders for construction projects, contracting firms should give primary attention to client's long term gains or losses (this are; amount of work the client carries out regularly, the amount of repeat business level that the client has been following, the client's possible effect by giving recommendations in referral markets, the relationship between the company and the decision makers in the owner's institution and the possibility of solving problems that may occur during work and the client's general procedures to awarding the contracts).

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