IDENTIFICATION OF CONTRACTORS' NEEDS IN THE SELECTION OF CONSTRUCTION SUBCONTRACTORS IN NIGERIA

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Abstract

The delivery capability of construction firms is determined to a large extent by the quality of their subcontractors. A survey was therefore undertaken among main contractors to identify and prioritize their needs in the selection of construction subcontractors in Nigeria. Findings were presented from 78 main contractor organizations out of 120 construction firms surveyed in the six geo-political regions of the country. Utilizing the Quality Function Deployment (QFD) approach, pair-wise comparison matrix and other descriptive statistical techniques, the results indicated that the three most important needs are: subcontractors' past experience in terms of type and size of projects completed; nature of contract to be executed; and prior relationships with the contractor organizations. The study concluded that for an enhanced performance of construction subcontractors on sites, priority attention should be accorded to some of the identified influencing needs by main contractors in this perspective.

Keywords: Contractors' Needs, Identification, Nigeria, Priority, Selection, Subcontractors

1. Introduction:

Studies into the performance of the construction products have engaged the attention of many researchers including Sidwell (1983), Sink (1985), Campbell (1995) and Chimwaso (2000). Main contractors of the construction industry have measures for assessing subcontractors' performance depending on the type of projects and other related factors. According to Seeley (1996), the traditional project performance measures of cost, time and quality are frequently used to measure contractors' performance by clients on one hand and subcontractors' performance by main contractors on the other hand.

Several needs affect the subcontractors' selection by contractors on a project. Hatush and Skitmore(1997) grouped the needs affecting the environment of construction projects under cultural, economic, political, social, physical, aesthetic, financial, legal, institutional, technological and policy. Other influencing needs identified include other non-traditional measures such as health, safety, material waste and management expertise (Smallwood, 2000), size and scope of project (Kumaraswamy and Chan, 1995), clients' influence with respect to clarity of requirements and avoidance of changes to the design (Akinsola et al., 1997). Sink(1985) further identified seven dimensions of organizational needs to include: effectiveness; efficiency; quality; productivity; quality of work of life; innovation and profitability. Dissanayaka and Kumaraswamy(1999) compared contributors to time and cost needs of subcontractors by main contractors in building projects and concluded that procurement sub-systems variables are less significant than the non-procurement related variables in predicting time and cost need levels in Hong Kong building projects.

Chimwaso(2000) evaluated the cost needs of public projects in Botswana by identifying the factors that influence construction cost overruns. He concluded that seven out of ten projects investigated had reported cost overruns and that the five influencing needs are incomplete design at the time of tender, technical omissions at design stage, additional work at the client's reques, adjustment of prime cost and provisional sums as well as contractual claims.

In his studies on construction projects in the United Kingdom, Holt, et al.(1994) identified the factors influencing the choice of contractors and subcontractors as contractor/subcontractor organizations, financial considerations, management resource, past experience, past performance, project specific and other specific variables. These seven macro needs were then fragmented into 31 micro variables. These include age, size, health and safety policy, litigation tendency, bank reference, turnover history, qualification of owners, formal training regime, type of projects completed, size of projects, time overruns,

cost overruns, experience geographically, plant resource availability, current workload, past relationships, weather condition, form of contract, etc.

In Nigeria, Gidado(1996) observed the use of some of the alternative procurement methods to implement projects and concluded that they are used without any apparent recognition of /or adjustment for the local needs. Ojo(2009) further observed that this is as a result of the facts that clients and contractors in Nigeria do not have a specific manner or procedure in selecting a particular procurement method. Ogunsanmi(2000) comparatively studied the performance of labour subcontracting and direct labour systems in three states of Nigeria and concluded that labour subcontracting performed better than the direct labour approach. The management of labour-only contracts in the Nigerian construction industry was investigated by Adenuga(2003) and concluded that the system is becoming an increasing prominent feature of the construction labour market. Dada(2003) studied the perceptions on measures of contracting/contractors' performance, taking a case study of Lagos State's indigenous contractors. His result indicated that there are no significant differences in the assessment and ratings of the identified measures of contractors' performance/needs.

All the research efforts, no doubt, provided good information on the several factors affecting construction projects on sites. However, they did not touch the vital issues of contractors' needs in the selection of subcontractors in Nigeria. Qualitative analysis showing the identified needs are therefore necessary. The research is also premised on the fact that there is a collection of better selection criteria of construction subcontractors apart from cost and time which are being frequently adopted.

1.1 Merits and Demerits of Subcontracting

The critical importance of subcontracting to the success of construction projects has been recognized (Dainty, et al., 2001). For instance, Debrah and Ofori (1997) concluded that subcontracting enables general contractors to keep a limited nucleus of full-time employees, maintaining costs and yet being able to engage the necessary skilled craftsmen. Ofori and Debrah (1998) reviewed the rationale and demerits of subcontracting in construction industry in various countries and maintained that in Singapore, construction companies rely on labour subcontracting in response to some features. These include: the predominance of labour-intensive construction techniques; the acute shortage of labour; the industry's poor social image and hence, its inability to attract local personnel; the uncertain work environment; and, acceptance of and familiarity with a system which has become entrenched owing to a long history.

Gray and Flanagan (1989) noted that in the United Kingdom, over 90% of project work is now subcontracted in response to the volatility of changes such as technology and economic development. Beardsworth, et al. (1998) opined that by subcontracting portions of the work, the main contractor is freed of the administrative tasks relating to the recruitment, deployment and supervision of workers. Debrah and Ofori (1997) argued that subcontractors facilitate the work of the general contractors through the provision of quotations for the subcontracted works. Kale and Arditi (2001) stressed that big construction firms now prefer to be flexible rather than maintaining a large organization to undertake the entire construction process as a rational response to the instability of demand in the construction market. Wong (1990) submitted that subcontractors could work faster than directly employed labour because their profit is only realized if they complete the work with expedition.

Subcontracting is fraught with pitfalls. For example, many subcontractors lack qualifications or proper training (Loh and Ofori, 2000). They reiterated further that it is difficult to identify their workers and properly train them and to endeavour to enhance their welfare and safety. Lee (1997) posited that it is difficult to estimate overall construction productivity and efficiency and also undertake industry-wide manpower planning. Many subcontractors are not registered, operated with a minimum of paid up capital and are largely incommunicado (Adams, 1997). Teng (1994) discovered that their fluidity causes inconsistency in skills and work quality. In addition, they can evade taxes and foreign workers' levies. Gray and Flanagan (1989) concluded that subcontracting led to problems including unsatisfactory time and cost performance.

2. Research Methodology

Data were collected from primary sources by administering structured questionnaires on 120 contractor organizations in six major states from each of the six geopolitical regions of Nigeria. The six geopolitical regions of the country and the states covered are: Southwest (Lagos), Southeast (Abia), South-south (Rivers), Northwest (Sokoto), Northeast (Borno) and North-central (Plateau). 78 questionnaires were filled and returned by the respondents from these distributions.

As a prelude to identifying the contractors' needs in the selection of construction subcontractors for project executions, four traditional parameters were considered important by the respondent organizations and in the literature. They are: cost, time, quality and functionality. The relative importance of each of the parameters were then compared to each other to produce the required weights. To achieve this, a pair-wise comparison technique was

applied as shown in Table 5 (Krishnan, et al., 1993, cited by Serpell, 1999). This technique is based on constructing a matrix with the same factors in rows and columns. All the elements in the rows (i elements) were compared to the elements in the columns (j elements) by using a scale of 1 to 7. As a general convention, if the I element is more important than the j element, then a number between 1 and 7 is assigned. If the j element is more important than the I element, the number assigned is the inverse of the assigned number in the first instance. After all the cells are filled, the matrix is normalized by dividing each number in the cells by the sum of the corresponding column. Finally, the normalized cells for each row are summed up and the total is normalized again on base 1 to obtain the weight of each goal. These weights were also used to fathom out the weighting of contractors' micro needs.

The weighting of these parameters, otherwise referred to as clients' goals, were then brought forward to perform another evaluation process. This process involves evaluating the relationship between the clients' goals and the contractors' selection needs, using an appropriate scale of influence. The scale used in this context is:

·No influence 0
·Low influence 1
·Medium influence 3
·High Influence 5

The selection of a not continuous scale is to reinforce the difference in evaluation in order to achieve a better comparison at the end of the calculations. In the same vein, the following needs were considered important for the selection of subcontractors and were therefore adopted for the analysis.

·Subcontractors' past experience (i.e. type and size of projects completed)
·Nature of contracts to be executed
·Prior relationship with the contractor organizations
·Subcontractors' organization (age, size, health and safety policy, turn-over history availability)
·Management Resource (plant resource availability, formal training of owners/operatives)
·Financial consideration
·Project fast-tracking
·Current workload
·Other issues.

After filling the cells with the influence numbers, evaluations for each of the performance needs were then combined by multiplying each number of the corresponding column by the weight associated to each goal to obtain a weight. These weights were again normalized on base one as indicated in the matrix table (Table 6).

3. Results And Discussions

Prior to the identification and prioritization of contractors' needs in this selection, contractors were asked to indicate some background information regarding their organizations. These include: field of specialization, nature of business set-up, number of permanent employees and the registration categories with the Federal Registration Board of Nigeria. This is intended to shed light on the subject matter.

In an attempt to be convinced that the target population has direct relevance to the research work, respondent contracting organizations were asked to indicate their fields of specialization. Table1 showed that 24 (30.8%) of the contractors specialized mainly in building works, 10 (12.8%) of the firms major in civil engineering works while majority of the respondent firms (44(56.4%)) specialized in both building and civil engineering works. This is not unconnected with the competitive nature of the construction industry and the compelling need for the firms to remain in business. The respondent firms were also asked to indicate the nature of their works. Results in Table 2 showed that 3 (7.7%) of the firms were operating sole proprietorship outfit, 19 (24.4%) of them were into partnership while 53 (67.9%) were operating public/limited liability organizations.

Studies (Adeyemi, 2004 and Fagbenle, 2000) have affirmed that two of the main criteria that are used to measure the size of construction firms (whether large, medium or small size) are the number of permanent employees in the organization and their registration categories with the relevant registration board. Respondent firms were therefore asked to indicate the frequency counts of their permanent employees and their registration categories with the registration board earlier mentioned. Results (Table 3) showed that a vast number of the contracting organizations (48(61.5%)) keep employees within the range of employees within the range of thirty to one hundred, 19(24.4%) of the firms have less than thirty permanent operatives in their organizations while 11(14.1%) organizations have over one hundred permanent employees in their payroll. The dwindling figures of permanent employees, as indicated in the table, might be as a result of the large use of labour-only subcontractors on sites. This lends credence to the submission of Kale and Arditi (2001) that large construction firms now prefer to be flexible rather than maintaining a large nucleus of

employees to undertake the entire construction process. The results in Table 4 also indicated that majority of the main contractors (71(91.0%)) are registered within category D of the Federal Registration Board of Nigeria while 7 (9.0%) contracting firms had category C registration. The monetary values attached to the other two registration categories (categories A and B) are rather too low to attract main contractors of a large/medium nature. This might therefore account for not recording any contracting firms in these categories.

Based on this prelude, attempts were made to identify and prioritize the contractors' needs in the selection of subcontractors and which were hinged on four main parameters otherwise referred to as clients' goals (cost, time, quality and functionality). The results in Table 5 were therefore generated from the procedures described in the methodology.

The results of the matrix in Table 6 showed that going by the clients' goals of project delivery, contractors' most important needs in the selection of subcontractors is subcontractors' past experience (NW = 0.17). This is followed by the nature of contract to be executed (NW = 0.16) and prior relationships with the contractors' organizations (NW = 0.14). The higher premium attached to subcontractors' past experience might not be unconnected with the need for contractors not to fall into wrong hands since main contractor's success on sites is hinged on the subcontractors' delivery capabilities. It also seems to suggest that many contractors may have experienced challenges steaming from engaging subcontractors who had taken projects that were too vast for them to handle or might just be incompetent to handle such tasks. The arguments support the views of Loh and Ofori (2000) and Lee (1997) that cautions must be exercised in the subcontractors' selection because many subcontractors lack qualifications or proper training and it is difficult to estimate their overall construction productivity/efficiency.

The second best rating accorded to the nature of contract to be executed also stem from the compelling need for specialization and prompt project delivery. The need for prior relationships might be to ensure that subcontractors with good qualifications are selected and also to forestall incommunicado. This assertion also corroborated the view of Adams (1997). Other rankings of contractors' needs in Table 6 include: subcontractors' organizations (NW = 0.12); current workload (NW = 0.11); management resource (NW = 0.09); financial consideration (NW = 0.08); project fast-tracking (NW = 0.08); and, other issues (NW = 0.05). Embedded in the subcontractors' organizations are features such as size, age, image, health and safety policy as well as litigation tendencies. Age, size and image of any organization go a long way in determining the maturity/experience of such organization. Little wonders that this need was ranked fourth by the respondent contractors. Current workload was also

attached a considerable importance by the respondents, bearing in mind the main contractors' fear of not being able to meet the projects' delivery periods as a result of subcontractors' commitments in other project sites. Management resource such as plant/equipment resource availability, qualification of owners and formal training were also given a fair ranking by the respondent contractors. The implication of this is that subcontractors with the full complements of this resource might be an asset to the main contractors to fulfill clients' goal of project delivery. Other issues such as home or office location, weather consideration and form of contract were ranked last by the main contractors in this regard. The reason for this low rating might not be unconnected with the fact that there is no direct relationship between home/office location and project performance. Also, weather is considered not to be an important criterion to determine performance. In addition, clients/contractors decide on what form of contract to be put in place and therefore bears no relevance with project performance.

Table 1: Field of Specialization of Respondent Firms

S/N	Field of Specialization	Frequency Counts	% Response
1.	Building	24	30.82
2.	Civil Engineering	10	12.8
3.	Both Building and Civil	44	56.4
	TOTAL	**78**	**100**

Table 2: Nature of Business Set-Up of Contracting Firms

S/N	Field of Specialization	Frequency Counts	% Response
1.	Sole Proprietorship	6	7.7
2.	Partnership	19	24.4
3.	Public Liability	53	67.9
	TOTAL	**78**	**100**

Table 3: Frequency Counts of Permanent Employees in the Contractors' Organizations

S/N	Number of Permanent Employees	Frequency Counts	% Response
1.	Less than 30	19	24.4
2.	Between 30 and 100	48	61.5
3.	100 and above	11	14.1
	TOTAL	**78**	**100**

Table 4: Registration Categories of Contracting Organizations

S/N	Registration categories	Frequency Counts	% Response
1.	Category A (Up to ₦ 2m)	-	-
2.	Category B (Up to ₦ 25m)	-	-
3.	Category C (Up to ₦ 100m)	7	9.0
4.	Category D (Above ₦100m)	71	91.0
	TOTAL	**78**	**100**

Table 5: Pair-Wise Comparison Matrix for Client Goals

		Normal Values				**Normalised Values**					
		Cost	**Quality**	**Time**	**Functionality**	**Cost**	**Quality**	**Time**	**Functionality**	**Total**	**Weights**
Clients' Goals	**Cost**	1.0	4.0	4.0	7.0	0.61	0.39	0.74	0.37	2.11	0.53
	Quality	0.25	1.0	0.2	5.0	0.15	0.10	0.04	0.26	0.55	0.14
	Time	0.25	5.0	1.0	6.0	0.15	0.49	0.19	0.32	1.15	0.28
	Functionality	0.14	0.2	0.17	1.0	0.09	0.02	0.03	0.05	0.19	0.05
		1.64	**10.20**	**5.37**	**19.00**	**1.00**	**1.00**	**1.00**	**1.00**	**4.00**	**1.00**

Table 6: Identification and Neighing of Contractors' Needs

		Contractors Performance Needs										
		Weights	**Subcontractor's past Experience**	**Nature of Contracts to be Executed**	**Prior Relationship with the Contractor Organization**	**Subcontractors' Organization**	**Management Resource**	**Financial Consideration**	**Project Fast-tracking**	**Current Workload**	**Other Issues**	
Clients' Goals	**Cost**	0.53	5.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	1.0	
	Quality	0.14	5.0	3.0	3.0	3.0	3.0	3.0	1.0	1.0	3.0	
	Time	0.28	5.0	5.0	3.0	5.0	1.0	1.0	1.0	5.0	1.0	
	Functionality	0.05	3.0	3.0	3.0	1.0	5.0	3.0	5.0	3.0	5.0	
weights			**4.9**	**4.6**	**4.1**	**3.5**	**2.5**	**2.4**	**2.3**	**3.3**	**1.5**	**29.1**
Normalised Weights			**0.17**	**0.16**	**0.14**	**0.12**	**0.09**	**0.08**	**0.08**	**0.11**	**0.05**	**1.0**

Conclusion

The paper has considered some variables (needs) that were considered to be critical to subcontractors' selection on construction sites by main contractors. These needs were then weighted with a view to knowing their levels of importance to the main contractors. The weighting of these needs indicates the following: subcontractors' past experience in terms of type and size of projects completed; nature of contracts to be executed; prior relationships with the contractors' organizations; subcontractors' organization such as age, size, health and safety policy as well as turn-over history; current workload; management resource in terms of plant/equipment availability, qualification of owners and formal training; financial

consideration; project fast-tracking; and, other issues such as home/office location, weather consideration and form of contract.

Based on the premium attached to these needs, it is suggested that priority attention should be accorded to some of these needs for an enhanced performance of subcontractors on construction sites. Though, the study has concentrated on contractors' needs for subcontractors' selection on construction sites in Nigeria, research efforts in other parts of the globe and for other stakeholders in the construction industry may be encouraged as a basis for comparison. Also, other criteria might be explored with a view to making better selections and improving overall construction productivity.

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