Factors Affecting the Selection of Procurement Method According To the Clients and Their Contractors in Enugu State

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Abstract: - This study examined the factors affecting the selection of procurement method according to the clients and their contractors in Enugu state. In order to achieve this, the study, identified and ranked the most important key factors affecting the selection of procurement method according to the clients and their contractors in Enugu state, Nigeria. The study being a survey research was effected through literature review, a well-structured questionnaire and interview. The study was conducted in Enugu State, Nigeria for a period of % months. Being a survey research, 84 questionnaire containing information relating to procurement methods were randomly administered to the procurement manager, procurement assistant, projects manager, construction managers, director or vice director, consultant and others, as they have a practical experience in procurement and construction industry in Enugu state of Nigeria within the last five years. Accordingly, 68 copies of the questionnaires were completed, retrieved and found useful for this study. The data were analyzed using Relative importance index and ranked appropriately. The study found out that factors related to client group contributes most to the factors affecting the selection of procurement method according to the clients and their contractors in Enugu state. The study concluded that both procurement specialists and consultants generally agree on the ranking order of the factors affecting the selection of procurement method. This agreement confirms the influential effect of those factors on the selection of procurement system which provide a level of validation for this research. The study recommends that clients and consultants should monitor the quality and performance of procurement methods which are used in their organizations in terms of hiring a qualified procurement staff in order to obtain the true decision related to the selection of procurement method.

Key Words: — ***Procurement, Construction management, Procurement methods, Construction management procurement method.***

I. INTRODUCTION

The construction industry plays an important role in the economy, and the activities of the industry are also vital to the achievement of national socio-economic development goals of providing shelter, infrastructure and employment. It is clear that construction activities affect nearly every aspect of the economy (Oladinrin, Ogunsemi and Aje, 2012). It is axiomatic of construction management that a project may be regarded as successful if the building is completed as scheduled, within budget and quality standards as well as achieving a high level of client satisfaction. Increasingly, the fulfillment of these criteria has been associated with the problem of procurement method for construction. In short, the selection of the appropriate method can shape the success of the project.

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Procurement methods for construction industry can be defined as the organizational structure adopted by client for the management of the design and construction of a building project (Masterman, 2002).

However, procurement methods define the management, functional and contractual arrangement and relationship amongst project team. Different procurement methods are used for different construction projects and the correct choice may help to avoid problems and be the key to the attainment of project specific goals (Eyitope 2012). The selection of an appropriate procurement method can reduce construction project costs by an average of 5%. While an appropriate procurement system may enhance the probability of project success (Naoum, 1994; Luu, Thomas, and Chen, 2003). A wrong procurement method often leads to project failure or client's dissatisfaction (Love, Skitmore, and Earl, 1998).

Nowadays, there are several types of project procurement method for client to choose based on their own needs. According to Building (2011), the construction procurement method can be classified into four types, which are

traditional/conventional method, design and build method, management contracting and construction management.

Traditional/conventional method also known as separated and co-operative system. The main characteristic of traditional method is design and construction works are separate and will responsible by different firm. In this type of system, architect will full responsible for design work of the project and design will be done before tender process for contractor begins. Other than that, architect also will act as consultant of client in supervise the construction process and protect the interest of client (Masterman, 1992). The main characteristic of design and build method is one organization/firm is responsible for both design and construction work, while, Management contracting method and construction method can be categorized into management-oriented procurement system. The entire process of this system will be managed by contracted consultant. Normally, consultants will performed their function or responsibility under the supervision of client. The consultants will manage the overall process of the project by focus on the construction aspects (Masterman, 1992)

As far construction industry is concerned, project procurement seems to be one of the key areas which have to be developed to a great extent. From the researcher points of view, majority of factors exists and effects the selection of procurement method according to the clients and their contractors in Enugu state. Therefore, there is a need to examine these factors and as well proffer solutions towards mitigating these factors and its effects on the construction projects in Enugu State Nigeria.

II. LITERATURE REVIEW

A. Procurement Method

Mathonsi and Thwala (2012) stated that „Procurement method" is a contemporary term, which is known to many practitioners and researchers of the construction industry by different terms; these include terms such as project approach, procurement systems, procurement delivery methods or project delivery systems, etc.

Masterman (2002) argues that there is a need to accept that contemporary procurement methods can now embrace not only design and construction, but also financing, operating, facilities management etc. The following definitions best define a procurement method.

- It is an organizational structure adopted by the client for the implementation and at times eventual operation of a project.
- It is a key means through which the clients create the pre-conditions for the successful achievement of project-specific objectives.

A procurement method (or sometimes known as procurement system) "is an organizational system that assigns specific responsibilities and authorities to people and organizations, and defines the various elements in the construction of a project".

B. Types Of Procurement Methods

Traditional Procurement Method (Separated):

Mathonsi and Thwala, (2012) stated that this method is called "traditional" because it has been in existence for a long time and has been the only choice available for most clients of the construction industry for many years. Using this method, the client enters into an agreement with the design consultant (an architect or engineer) to actually carry out the design work and prepare contract documents. Following the completion of this phase, the contractor is then appointed based upon the owner's criteria and the owner enters into a contract with the successful contractor for the assembly of the project elements. In essence, the client is under two contractual obligations; the design professional and the contractor. Larmour (2011) argues that this method is used to describe procurement which involves the client's design team producing a full construction design. The contractor will then tender for the construction of this package. Traditional procurement method usually results in maximum cost certainty for a project with a fully defined project, but a long programme as design and construction are sequential. It is also inflexible in terms of design changes, which will can result in excessive cost and programme implications.

Davis et al., (2008) stated that in the traditional approach, the employer accepts that design work will generally separate from construction, consultants are appointed for design and cost control, and the contractor is responsible for carrying out the works. This responsibility extends to all workmanship and materials, and includes all work by subcontractors and suppliers. The contractor is usually appointed by competitive tendering on complete information, but may if necessary be appointed earlier by negotiation on the basis of partial or notional information.

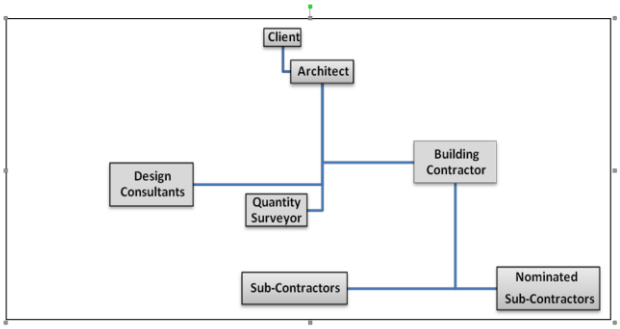

Fig.1. Traditional procurement method, source: Davis et al., (2008)

The Chartered Institute of Building CIOB report, (2010) illustrated that traditional method, has its weaknesses, as all other methods of procurement do. However, the construction industry has used the traditional process for so long that it has become the most understood. Indeed, it is likely that the simplicity involved in understanding traditional is its greatest strength – the designer is responsible for design and the contractor for execution, so responsibility for co-ordination of subcontract packages lies firmly with the contractor. While complications will inevitably arise, as with any procurement system, the traditional method sees each party knowing where they stand, and who has responsibility for what. Weaknesses with traditional are, however, apparent. The nature of separating the design and construction processes means disputes are common, and those delivering the project (i.e. the contractor) do not have much of a say in the design, cost and allocation of risk. Indeed, some may say that traditional goes against the requirement for the industry to integrate further.

Davis et al., (2008) argues that the traditional procurement method, using two-stage tendering or negotiated tendering, is sometimes referred to as the "Accelerated Traditional Method" – this is where the design and construction can run in parallel to a limited extent. Whilst this allows an early start on site, it also entails less certainty about cost. There are three types of contract under the traditional procurement method.

- *Lump sum contracts*: where the contract sum is determined before construction starts, and the amount is entered in the agreement.
- *Measurement contracts*: where the contract sum is accurately known on completion and after re-measurement to some agreed basis.
- *Cost reimbursement*: where the contract sum is arrived at on the basis of the actual costs of labour, plant and materials, to which is added a fee to cover overheads and profit.

Management Procurement Method (Packaged):

Larmour (2011) stated that this method is used to describe procurement which involves a contractor providing management services. The two main variants of this are Management Contracting and Construction Management, which are both very different approaches. In Management Contracting, the contractor provides management services to control and coordinate all site activities, subletting works to suitable contractors on a competitive basis. In Construction Management the client enters into separate contracts with the construction manager, designers, and trade contractors. Construction Management is generally associated with programme savings, and a higher degree of control for the client in terms of design quality, but less cost certainty.

Mathonsi and Thwala, (2012) stated that under a management-oriented procurement system, the management of the project is carried out by an organization working with the designer and other consultants to produce the designs and manage the physical operations which are carried out by contractors. When using systems within this category, the client will need to have a greater involvement with the project than when employing any of the other methods.

Davis et al., (2008) stated that several variants of management procurement forms exist, which include; management contracting, construction management and design and manage. There are some subtle differences between these procurement methods. In the case of management contracting, the contractor has direct contractual links with all the works contractors and is responsible for all construction work. In construction management, a contractor is paid a fee to professionally manage, develop a programme and coordinate the design and construction activities, and to facilitate collaboration to improve the project"s constructability.

Management Contracting Procurement Method:

The CIOB report (2010) stated that management contracting works by having a contractor managing a series of „works" contractors or subcontractors. Advantages include early involvement in the project, and the management contractor can also appoint trusted subcontractors they have worked with previously rather than risk an unknown factor. Disadvantages include the lack of a single point of responsibility for both design and construction phases, which opens the possibility for disputes to arise. The client appoints an independent professional team, and also a management contractor. Their involvement at pre-construction stages will be as adviser to the

team, and during construction, they will be responsible for executing the works using direct works contracts. With this type of contract, it is possible to make an early start on-site and achieve early completion. Because of its flexibility, it allows the client to change the design during construction because drawings and matters of detail can be adjusted and finalized as the work proceeds.

For a management contract to be successful there must be trust and good teamwork on the part of the client, the design consultants and contractor. The contractor should preferably be appointed no later than the outline design stage. The contractor can advise on the design programme, tender action, delivery of materials and goods, and construction programmes.

The management contractor is selected after a careful selection process and is paid a management fee. The basic difference is that works contracts, although arranged and administered by the management contractor, are direct between the client and works contractor. Although in a sense this gives the client a greater measure of control, it also means that the client accepts a considerable amount of risk. The management contractor is simply an agent, and usually cannot guarantee that the project will be finished to time and cost.

The management contractor will normally make a written submission which includes a proposed management fee, and will be appointed after interviews with the client and the design team. The fee will include for the total management service, expressed as a percentage of the total project cost, and for a service to cover pre-construction stages should the project not proceed to site.

The management contractor undertakes the work on the basis of a contract cost plan prepared by a quantity surveyor, project drawings, and a project specification. The client accepts most of the risk because there is no certainty about costs and programme. Competitive tenders for works packages follow later and they will usually, though not always, will be lump sum contracts with bills of quantities.

Construction Management Procurement Method:

The CIOB report (2010) stated that construction management is not a widely used procurement method – its main reason for existence is for use on large and/or very complex construction works. The system works by having a construction manager as a point of contact, who will typically be head of a design team, who co-ordinates the project in terms of the various construction operations on site. Construction management is generally considered to be the least adversarial form of procurement, and is often used when design needs to run in tandem with construction.

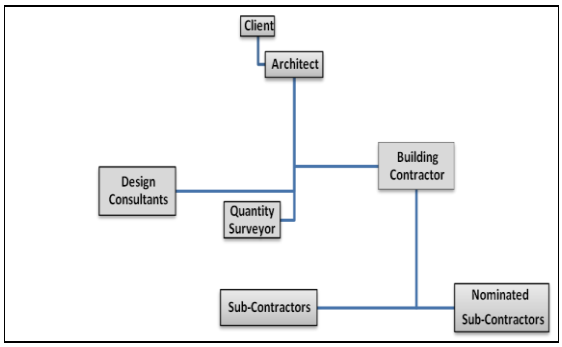

Fig.2. Construction Management Procurement Method, Source: Davis et al., (2008)

Design and Manage Procurement Method:

Turner (1990) stated that a design and manage procurement method is similar to management contracting. Under a design and manage contract, the contractor is paid a fee and assumes responsibility, not only for works contractors, but also for the design team.

III. METHODOLOGY

This study was carried out in Enugu State, Nigeria (see fig 4), using a survey method. The population covers a total of 84 procurement managers, procurement assistants, projects managers, construction managers, director or vice directors, consultants and others., as they have a practical experience in procurement and construction industries fields which covers only registered professionals who are currently involve in construction projects in Enugu state as at when this study was carried out (Source: Official Nominal Registered Roll from the associations in Enugu State).

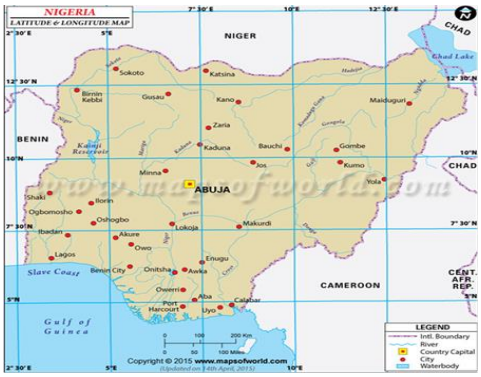

Fig.3. Map of Nigeria showing Enugu

Source: Department of surveying, NAU (2021)

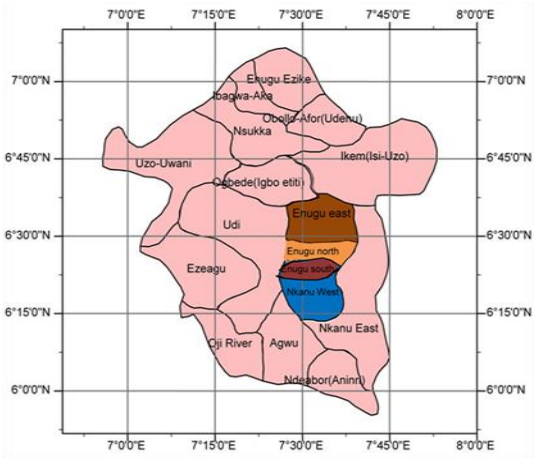

Fig.4. Map of Enugu Showing the Study Area

Source: Department of surveying, NAU (2021)

The study adopted the whole population as the sample size since the size is manageable. Being a survey research, data were collected through structured questionnaire administered to the selected respondents or their representatives. Relative importance index (RII) was used for data analysis and the result presented in tables. RII was computed using:

$$RII = \sum Fx / A*N$$

Where:

$\sum Fx$ = Weight given to each statement by respondents and ranges 1 – 5

A = Higher Response Integer

N = Total Number of Respondents

IV. Results And Discussion

Table.1. RII and the rank for "Factors related to client"

The mean is significantly different from 3

No.	**Paragraph**	**Mean**	**RII (%)**	**P-value**	**Rank**
1.	Client's financial capability	4.29	85.88	0.000*	**1**
2.	Client's experience in procurement methods	4.25	85.00	0.000*	**2**
3.	Availability of qualified personnel (procurement staff)	4.24	84.71	0.000*	**3**
4.	The degree of desired client involvement	3.72	74.41	0.000*	**4**
5.	Accountability	3.69	73.82	0.000*	**5**
6.	Flexibility for changes and variations	3.66	73.13	0.000*	**6**
7.	Client reputation	3.63	72.65	0.000*	**7**
8.	Client's trust in other parties	3.62	72.35	0.000*	**8**
9.	Client's nature and culture (public or private)	3.24	64.78	0.018*	**9**
	Average	**3.82**	**76.33**		

Source: Field Survey (2020)

Table.2. RII and rank for "Factors related to cost"

The mean is significantly different from 3

No.	Paragraph	Mean	RII (%)	P-value	Rank
1.	Price competition	4.49	89.80	0.000*	1
2.	Price certainly prior to commencement	3.90	77.94	0.000*	2
3.	Design cost	3.59	71.76	0.000*	3
4.	Cost control	3.40	67.94	0.000*	4
5.	Consultant fees	3.10	62.06	0.141	5
	Average	3.69	73.82		

Source: Field Survey (2020)

Table.3. RII and rank for "Factors related to time"

*****The mean is significantly different from 3

No.	**Paragraph**	**Mean**	**RII (%)**	**P-value**	**Rank**
1.	Time constrains of project	4.35	87.00	0.000*	**1**
2.	Minimize design time	3.72	74.41	0.000*	**2**
3.	Speed	3.56	71.18	0.000*	**3**
4.	Time control	3.35	67.06	0.002*	**4**
5.	Delay in the project completion time	3.35	67.06	0.009*	**5**
6.	Delivery time schedule	2.81	56.18	0.097	**6**
7.	Delays in obtaining environmental approval	2.71	54.12	0.013*	**7**
	Average	**3.41**	**68.21**		

Source: Field Survey (2020)

Table.4. RII and rank for "Factors related to risk"

*The mean is significantly different from 3

No.	Paragraph	Mean	RII (%)	P-value	Rank
1.	Risk avoidance/allocation	4.16	83.28	0.000*	**1**
2.	Responsibility allocation	4.03	80.60	0.000*	**2**
3.	Disputes & arbitration	3.53	70.61	0.000*	**3**
4.	Geotechnical investigation	2.75	54.93	0.021	**4**
	Average	**3.62**	**72.44**		

Source: Field Survey (2020)

Table.5. RII and Rank for "Factors Related to Project Characteristics"

*The mean is significantly different from 3

No.	Paragraph	Mean	RII (%)	P-value	Rank
1.	Degree of project complexity	4.43	88.53	0.000*	**1**
2.	Project size	4.31	86.18	0.000*	**2**
3.	Project type and nature	4.10	82.00	0.000*	**3**
4.	Project completion at estimated cost	3.85	77.01	0.000*	**4**
5.	Constructability of design	3.84	76.76	0.000*	**5**
6.	Quality level of project	3.78	75.52	0.000*	**6**
7.	Project completion at estimated time	3.61	72.24	0.000*	**7**
8.	Funding method	3.57	71.47	0.000*	**8**
9.	Available resources of project	3.50	70.00	0.000*	**9**
10.	Project payments modality	3.31	66.18	0.007*	**10**
11.	Expected performance of project	3.22	64.41	0.009*	**11**
12.	Project site location	3.04	60.88	0.261	**12**
13.	Project methodology	2.97	59.39	0.371	**13**
	Average	**3.66**	**73.30**		

Source: Field Survey (2020)

Table.6. RII and rank for "Factors Related to External Environment"

*The mean is significantly different from 3

No.	Paragraph	Mean	RII (%)	P-value	Rank
1.	Availability of procurement system in the local market	4.07	81.47	0.000*	**1**
2.	Procurement policy	4.00	80.00	0.000*	**2**
3.	Legal issues/factors	3.99	79.71	0.000*	**3**
4.	Market competitiveness	3.78	75.59	0.000*	**4**
5.	Other parties involvement/role/participation	3.35	67.06	0.000*	**5**
6.	Political considerations	3.31	66.18	0.005*	**6**
7.	Market completion/structure	3.15	62.94	0.196	**7**
8.	Economic conditions	3.12	62.35	0.162	**8**
9.	Number of competitors	3.10	62.06	0.437	**9**
10.	Commercial conditions	3.03	60.59	0.350	**10**
11.	Worker conditions	3.00	60.00	0.280	**11**
12.	Technology	2.90	57.94	0.313	**12**
13.	Material availability	2.81	56.18	0.072	**13**
14.	Stakeholder integration	2.74	54.71	0.028*	**14**
15.	Environment impact	2.66	53.24	0.001*	**15**
16.	Social factors	2.57	51.47	0.001*	**16**
	Average	**3.23**	**64.51**		

Source: Field Survey (2020)

Table.7. RII and Rank for the Main Factors for all Responses

No	Factor groups	Mean	RII (%)	P-value	Rank
1.	Factors related to client	3.82	76.33	0.000	**1**
2.	Factors related to cost	3.69	73.82	0.000	**2**

3.	Factors related to project characteristics	3.66	73.30	0.000	**3**
4.	Factors related to risk	3.62	72.44	0.000	**4**
5.	Factors related to time	3.41	68.21	0.000	**5**
6.	Factors related to external environment	3.23	64.51	0.025	**6**
	Mean Value	3.52	70.49	0.000	

Source: Field Survey (2020)

Table 7 shows the summary all the factor groups studied. From the table, it could be seen that factors related to client ranked topmost with RII of 76.33. This was closely followed by factors related to cost and project characteristics with RII of 73.82 and 73.30, thereby ranking 2nd and 3rd respectively. However, with RII of 72.44, 68.21 and 664.51, the respondents believed that factors related to risk, time and external environment are the least contributing to the factors affecting selection of procurement methods in the study area. The implication of this is that much emphases should be placed on these high ranking factors in order to reduce to the barest minimum the effects of these factors in construction projects to the barest minimum.

V. CONCLUSION

Based on the results obtained from this research, the following research conclusion are drawn: A total of 54 factors affecting the selection of procurement method were synthesized in the main six groups in the survey, which were shown to be reliable. Data were collected from a representative sample of professional procurement staff and consultants in the Enugu State. The findings from the empirical survey of this study show that there are twelve most influential factors/criteria affecting the selection of procurement method in construction projects in Enugu State. The study recommended that clients and consultants should monitor the quality and performance of procurement methods which used in their organizations in terms of hire a qualified procurement staff in order to obtain the true decision related to the selection of procurement method.

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