APPRAISING THE STATE OF PROCUREMENT OF MECHNICAL AND ELECTRICAL SERVICES ON SELECTED PUBLIC BUILDING PROJECTS IN DELTA STATE, NIGERIA

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Abstract

Failure to select an appropriate procurement option and assess the inherent challenges facing selected options can impact negatively on the achievement of the project objectives. This has been the bane of services procurement in Delta State. Thus, the research appraised the procurement of mechanical and electrical services installations in selected building projects in Delta State, with a view to determining the common procurement methods adopted by clients and identifying the factors affecting the choice of procurement methods. Two selected public institutions and some selected approved private buildings in Uvwie local government area of Delta state formed the study area/projects. The research was carried out through a structured questionnaire on sectional basis in consonance with the objectives of the study. Both purposive sampling was applied on a population of 91 professionals in the study area. Data collected were analyzed with statistical package for social sciences (SPSS) version 16 via frequencies, percentages and mean score. Results from the analysis showed that design and install followed by traditional method are the procurement methods mostly used by clients for M&E services in the study area while short project duration, quality of end product, and cost effectiveness constitute major reasons why clients use procurement methods. In addition to this, technical complexity of the project, financial capacity of the client, the financial requirement of the project, economic factors and size or magnitude of the project are key factors that influence the choice of procurement method for M&E services, although at varying degrees. It was concluded and subsequently recommended since that design and install method of procurement is mostly adopted by clients for M&E services in building projects and thus should be adopted by clients since they lead shorter project delivery time, better quality of end products and are cost effective.

Keywords: Procurement, mechanical services, electrical services, building projects, Delta State

Introduction

Selecting an inappropriate procurement approach is often regarded as one of the primary causes of project failure in the construction industry (Ogunsanmi, 2003). There has been an increase in procurement options in

Nigeria over the past few decades and each of the available options has its own strengths and weaknesses, which make it more appropriate under specific circumstances. Selecting a wrong procurement route can therefore have a significant effect on the project outcome.

Clients have been seeking ways to procure their building services in the most profitable and economic ways. The issue of proper selection of appropriate procurement system for mechanical and electrical services in building project has since been a matter of concern for investors, clients and practitioners in the building industry. This is due to the specialist, discrete and complex nature of such projects. Al Khalil (2002) asserts that the capital and installation costs of building services in modern buildings can take up to 50% of the total construction budget. For highly serviced buildings such as sport centers, this figure can easily exceed 75%. They further stated that services can also take up to 15% of a building volume. Hence, the importance of building services cannot be ignored considering the cost implication involved in improper appreciation of all inputs and poor procurement.

In Delta State, anecdotal evidence suggests that the state (project duration, quality, cost) of mechanical and electrical services is not encouraging which has been attributed to the nature or type and problems facing their procurement. Hence, the study was restricted to the two selected public institutions, Petroleum Training Institute (PTI) and Federal University of Petroleum Resources (FUPRE) and some selected private buildings in Uvwie, Local Government Area of Delta state to evidence these claims. It is in view of the aforementioned that the study sought to appraise the current state of procurement of mechanical and electrical services for selected buildings in Delta State.

Purpose of the study

The purpose of this study is to appraise the state of procurement of mechanical and electrical services in Delta State with a view to determine the common procurement methods adopted by clients and identify the factors affecting the choice of procurement methods

Overview of procurement of mechanical and electrical services

The proliferation of procurement methods in the industry tends to create significant problems of understanding the circumstances suitable for each approach. However, to adopt a single procurement approach for all projects is to ignore the differing inherent characteristics that exist in clients, projects and consultants (Hibberd and Djebarni, 1998). A procurement route has been defined as an organizational structure that assigns specific responsibilities and authorities to individuals and organizations, and defines the relationship between the various elements of construction projects (Alabi, 2000). The selection for a procurement approach is therefore more than simply deciding on how the various parties involved in a project will be appointed. It affects the allocation of risk, the design strategy, as well as, the

way in which the client and the various design consultants, contractors and suppliers work together as a team.

Alhazmi and McCaffer (2000) indicate that procurement selection, particularly those involving multiple stakeholders, is a difficult and complicated process dependent upon the interaction of many variables and incorporating a high degree of subjectivity and in many cases intuitive judgment. This situation has led to a demand for systematic and objective methods for selecting appropriate procurement routes.

According to Fred and Roger (2003), Building services are an important aspect of building; hence the design and installation requires a critical examination. However, these services, (mechanical and electrical services) cannot be designed and installed independently, but have to be integrated with other building elements. In addition, the procurement requires adequate coordination towards effective building products delivery. Wardani, Messner, & Horman, (2006) state the significance of intimate working relationship between all designers and contractors. To this end, it is essential to produce a building product in which all the services and structural elements are fully integrated, planned, and organized. These indicate that adequate integration of mechanical and electrical services are paramount towards successful building project delivery. Consequently, inappropriate selection of procurement system often cause delay in building services installation, cost overrun and claims, and a significant maintenance difficulty in the aftermath. Thus, to ensure adequate design and installation of building services, it is essential that the design and installation team work mutually, and in alignment to the procurement approach chosen.

Methodology

Date for the study was obtained via structured questionnaire administered to construction professionals involved in the procurements of mechanical and electrical services in building projects in Uvwie LGA, 91 professionals from two selected public institution (Petroleum training institute and Federal University of Petroleum Resources) both in Effurun Uvwie local govt. area of Delta State and some selected approved public building which have mechanical and electrical drawings.

The populations of these professionals were obtained from the records available at the town planning office and the procurement and maintenance department of the two selected institution in Uvwie local government area of Delta state. The population figure for the study is 91 which is broken down as follows. Petroleum Training Institutes (PTI) has 30 professionals which comprises of 3 Architect 5 Builders 3 Quantity Surveyors 5 Civil Engineers 7 mechanical Engineers and 7 Electrical Engineers. In Federal University of Petroleum Resources (FURE) has 30 professionals which comprises of 3 Architect 5 Builders 3 Quantity Surveyors 5 Civil Engineers 7 mechanical Engineers and 7 Electrical Engineers while in private buildings has 41 professionals which comprises of

4 Architect 6 Builders 4 Quantity Surveyors 5 Civil Engineers 6 mechanical Engineers and 6 Electrical Engineers.

From the population, Taro Yamane sample size method was employed to determine the appropriate sample size in this study.

Yamane's 's formula is expressed as:

i.e. $n = \frac{n}{1+n(e)2}$ (1)

Where "n" is the sample size, "N" is the population (91) and "e" is the level of confidence (i.e. 95%).

Thus, the sample size

i.e. $n = \frac{91}{1+91(0.05)2} = 70$

The sample size of 70 was adopted for the study.

Table 1 shows the population distribution of the respondents and calculated sample size

Table 1. Population distribution of respondents

S/NO	Professionals	Population	Sample size
1	Architects	10	7
2	Builders	16	13
3	Civil Engineers	15	12
4	Mechanical Engineers	20	16
5	Electrical Engineers	20	15
6	Quantity Surveyors	10	7
	Total	91	70

Source: Researchers' field survey (2018)

4. Results and Discussion

Table 2: Questionnaire Responses

Questionnaire	Number	Percentage (%)
Returned	53	75.71
Not returned	17	24.29
Distributed	70	100

Table 2 Show that out of seventy questionnaires that were administered to the respondents, fifty three were returned representing (75.71 %), While seventeen representing (24.29 %) where not returned.

Table 3: Professional affiliation of respondents

Items	Frequency	Percent
Architecture	5	9.4
Builders	8	15.1
Civil Engineers	7	13.2
Mechanical Engineers	16	30.2
Electrical Engineers	10	18.9
Quantity Surveyors	7	3.2
Total	**53**	**100.0**

Table 3 shows that 9.4% of the respondents are Architects 15.1% Builders, Civil Engineers 13.2%, 32.2% Mechanical Engineers and Electrical Engineers with 18.9% while 13.2% are Quantity Surveyors. This shows that the appropriate professional were selected for the study.

Table 4: Working experience of respondents

Items	Frequency	Percent
<5 years	6	11.3
5 – 10 years	21	39.6
11 -15 years	8	15.1
15 – 20 years	6	11.3
20years above	12	22.6
Total	**53**	**100.0**

Table 4 shows the respondents have between 5 – 10years of experience in the construction industry which present a percentage of 39.6% and 11.3% of the respondent have experience below 5years, 15.1% of the respondents have experience between 15 and 20years while 22.6% have practice experiences above 20years. This shows that the respondents are experienced enough in their various fields.

4.1 Assessment of Procurement Methods

Table 5. Services procurement methods used in the study area

S/N	Items					(ΣF)	ΣFx	Mean	RII	Rank
		Not used 1	Slightly used 2	Used 3	Mostly used 4					
1	Traditional method	4	13	20	16	53	154	2.91	0.73	2nd
2	Design and install method	0	13	29	11	53	157	2.96	0.74	1st
3	Direct labour method	6	17	15	15	53	145	2.74	0.69	4th
4	Labour only method	6	19	20	8	53	136	2.57	0.64	6th
5	Management contracting method	5	10	24	13	53	139	2.62	0.70	3rd
6	Project management	8	15	19	11	53	149	2.81	0.66	5th

	method									
7	Modern method	9	21	13	6	53	114	2.15	0.54	7th

From Table 5, it can be observed that design and build method with RII of 0.74 ranked first in term of procurement method mostly used for M&E services in building project, closely followed by traditional method (0.72) and management contracting (0.70). In the same vein modern method (0.54) and labour only method (0.64) were the least on the list. Thus, design and build, traditional and management contracting method have become the most used method of procurement in the study area whereas the use of modern method and labour only method is becoming outdated. Based on this result, the researchers went further to interview some of the respondents. From their responses, design and build is cost effective and time saving, traditional method provide a better quality and cost effective and management contracting saves time and better quality.

4.2. Factors influencing choice of procurement methods

Table 6: Factors influencing procurement methods in the study area

S/N	Items					(ΣF)	ΣFx	Mean	RII	Rank
		No Influence 1	Partial Influence 2	Some influence 3	Full Influence 4					
1	Technical complexity of the project	1	2	22	28	53	183	3.45	0.86	2nd
2	Nature of the project	0	3	22	18	53	144	2.72	0.68	8th
3	The financial capacity of the client	0	5	22	26	53	180	3.40	0.85	3rd
4	The financial requirement of the project	0	10	22	26	53	190	3.58	0.89	1st
5	The gestation period or time frame required for completion	1	10	31	11	53	158	2.98	0.75	7th
6	The varieties of M & E Services required in the building	0	9	26	17	53	164	3.09	0.77	5th
7	Economic factors/consideration	3	11	17	21	53	160	3.02	0.76	6th
8	Aesthetics or prestige	5	18	18	11	53	139	2.62	0.66	9th
9	Size or magnitude of the project	0	4	28	20	53	172	3.25	0.81	4th
10	Controllable variations	9	13	24	7	53	135	2.55	0.64	10th

Table 6 shows the common factors that influence the choice of procurement method for mechanical and electrical services in building projects in the study area. From the responses, the most prevalent factor that influenced the choice of procurement method for mechanical and electrical services in building projects is the financial requirement of the project (0.89). Others are technical complexity of the project (0.86), the financial capacity of the client (0.85) Size or magnitude of the project (0.81) and the varieties of M & E Services required in the building (0.77).

Interestingly, all the variable examines scored 60% and above. This means that all variables examined are relatively critical in the study area.

Summary of Findings

The findings from the study can be summarized as follows: Design and install followed by traditional method are the procurement methods mostly used by clients for M&E services in building projects. Quick completion of project, quality of end product, and cost effectiveness constitute major reasons why clients use procurement methods for M&E services. In addition to this, technical complexity of the project, financial capacity of the client, the financial requirement of the project, economic factors or consideration, size or magnitude of the project, varieties of M&E services required in the building are all factors that influence the choice of procurement method for M&E service, although to varying degree. Aesthetics or prestige has little influence on the choice of procurement method for M&E services in building projects.

Conclusion

Based on the result of this study as shown in the analysis, the following conclusions were drawn:

Traditional, design & install are mostly used by both public and private clients for M&E services in building projects excluding government projects where direct labour procurement method is prevalent. Shorter project duration, quality of end products and cost effectiveness are the major reasons for selecting the type of procurement methods to be use for M&E services.

Recommendations

Based on the findings, the study advances the following:

- Private clients should employ project management and labour only procurement method respectively in procuring their M&E services because of the inherent benefit while public clients should consider design and install in their priority list in situations where circumstances demand.
- The required professionals should be brought in at each stage of the procurement process because this has great impacts on the performance of the procurement method.
- Each of the procurement method should be critically considered to ensure that it is applied in appropriate situation so as to derive optimum performance.

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