An Appraisal of Project Procurement Methods in the Nigerian Construction Industry

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Abstract: The aim of every client at the beginning of any project is to have at the end of the day a quality structure delivered on time and within budget. However, researches have shown that in most cases this aim is not met. The aim of the study that formed the basis for this paper was to identify and assess procurement methods in use in the Nigerian construction industry and identify the factors that affect the choice of the variants under the traditional and the non-conventional procurement methods. Data were collected using well-structured questionnaires administered to professionals in Lagos metropolis. Data collected were analyzed using descriptive and inferential statistics. The study reveals that the variants of traditional method of contract procurement are the most adopted in project execution in Nigeria. In making choice of procurement method, the study reveals that project completion at estimated time ranks as the highest factor considered for traditional method, while quality assurance ranks highest with non-conventional method.

Keywords: project procurement, construction industry, project execution

Introduction

The variants of procurement methods available today metamorphosized from the need to improve construction project delivery, that is, project completion within budget and time. According to Daniel [1], the emphasis of procurement methods is on optimizing all parameters involved in project delivery namely, time, cost and quality. Procurement of projects within these constraints has continued to be a challenge to the design team, the contractors, and managers of investments [2]. Traditionally, construction projects starts with the client's brief on which designs are based. The Architect and engineers prepare designs, in collaboration with quantity surveyor who advises on the cost implications of design variables. Tender process afterwards produces the contractor for the execution of the work. On the award, the successful contractor executes the work as designed under the supervision of the consultants. Thus, the approach separates the design, tendering process and construction as separate tasks. This separation of activities also led to sequencing of activities in which design is completed before construction commences.

This became the 'traditional' sequence and it is now referred to as Design-Bid-Build [1]. Other variants of procurement method not following this format became the 'non-conventional' procurement method. According to Daniel [1], new concepts of project delivery have been developed to compress the time required to realize a constructed facility which focuses on simplifying the project delivery process, with emphasis on optimizing the parameters (e.g. quality, cost, time of completion, meeting market needs, and safety among others) [1]. Researches have also established that the major requirement of time and cost reduction in project delivery have resulted in the evolution of the several variants of procurement method, and at present, there are more than a handful of procurement methods, all with the major aim of meeting a quality product delivery at economical cost and time.

In non-conventional procurement methods, the grounds are gradually shifting from just meeting clients' needs into apportionment of risk, as the contractors are gradually taking their stance as business organizations with the aim of making optimum profits at the minimum risk, and this has led to the development of integrated methods of procurement which are hybrids of both traditional and non conventional procurement methods [3]. The study identified the rationale behind the development of an integrated process as to improve project efficiency that has being constrained by separated conventional processes, that is bringing the teams of designers, contractors, and suppliers together through series of projects; continuously developing the product and supply chain; eliminating waste in the delivery process; and innovating and learning from experience.

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Brief Overview of Types of Procurement Method

Ogunsanmi and Bamisile [4]; and Ashwort and Hogg [5] defined procurement method as the management of the total process involved in construction project delivery. According to Ashwort and Hogg [5], different variants of procurement are available for meeting different clients' needs and projects specifics. Researchers, however, often differ in these classifications of procurement methods. Ramus [6], showed that classification commonly used, in practice, often combine the characteristics of two or more types. Nonetheless, studies including Seeley [7], Turner [8], and Ashwort and Hogg [5] among others, classified construction procurement methods into two broad categories as: traditional procurement method, and non-conventional procurement method. The traditional method as the name implies, is a project procurement method where the three sequential phases of design, bid and build are identified as separate tasks. It is traditionally referred to as the competitively bid contract. This method allows for all contractors that fill competent to bid for projects in a free and competitive atmosphere similar to competitive market environment.

Traditional Procurement Methods

The main variants of traditional procurement method as identified by Seeley [7]; and Kadiri and Odusami [9] are: bills of firm quantities; bills of approximate quantities; drawings and specification; schedule of rates; cost reimbursement; and labour only.

Non Conventional Procurement Methods

These are identified by Turner [8], Ashwort and Hogg [5] as:

Design – Build

The Design-Build approach gives the client a single point of contact. However, the client commits to the cost of construction, as well as the cost of design, much earlier than with the traditional approach. In this method, the contracting organization is responsible for design and construction [8]

Types of Design and Build

The variants of design and build common in most literatures include:

Develop and Construct: Where the client has the design prepared to concept or scheme design stage and the contractor takes on 'finishing off' the design and construction. The contractor may re-employ the original designers to complete the design.

Package Deal: Where the contractor provides an 'off-the-shelf building'. The building type is often modular so that its size can be adjusted.

Management Contracting: According to Oyegoke [10], in a management contract, the permanent works are constructed under a series of construction contracts placed by the management contractor after approval by the client.

Construction Management: Contractors are contracted directly to the client and the construction manager manages the process for the client on a simple consultancy basis. Construction Management requires constant involvement by the client so it is really only suitable for experienced clients.

Public Private Partnership (PPP)

The public private partnership is an attempt by government to tap from the enormous private resources by way of diversification and letting private hands partake in the provision of fundamental government responsibility of providing basic social and infrastructural amenities.

Options

Different options of Public Private Partnership (PPP) have continued to emerge in the recent. The classifications that are common in literature are:

DBFT (Design , Build, Finance and Transfer)**:** In this system, the developer develops the structure using his own generated finance, after construction and a certain agreed period of ownership transfers the whole facility back to the government.

BOT (Build, Operate and Transfer): This system allows the developer a use of the project for a certain period of time before transferring the project to the government.

BOO (Build, Operate and Own): In this format the ownership is not transferred.

DBFO (Design, Build, Finance and Operate): In this system, the government owns the project but leases it to the consortium.

BRT (Build, Rent, and Transfer): This system allows for the consortium to obtain payment from the government before the actual transfer of the project.

BOOST (Build, Own, Operate, Subsidize, and Transfer): In this system, government provide incentives to users of the completed project in other to make it financially viable for the private consortium.

BTO (Build, Transfer, Own): This variation relieves the consortium of the insurance cost for operation.

BOOT (Build, Own, Operate and Transfer): Under this variation, the developer is allowed full unalloyed ownership of the completed structure for a specific period of time at the end of which he relinquishes his full right to the actual owner, while the building is still in completely functional state.

ROT (Renovate Operate and Transfer): Under this variation, the developer renovates an a already existing building which he is henceforth permitted to operate so as to recoup his investment before transferring it back to the original owner This variant is relatively different from others in that the structure in question is already in existence as against other variants in which the structure is developed by the developer.

BLT (Build, Lease and Transfer): Under this variation, the developing firm or consortium is allowed to lease out the completed facility out and recoup her money before transferring the completed facility to the owner at an agreed time.

IM/IS (Investment Management and Investment Services): - This variation allows a development firm to complete the construction of the facility while independent investment management firm manages the facility on behalf of both parties for the period of occupancy by the developer for the purpose of recouping the capital invested by the developer and for ensuring that the facility is in good standing by the time of handing over to the owner at the expiration of the lease.

Data and Methodology

Data for this study were collected with the aid of structured questionnaires which were administered to actors in the construction industry in Lagos state, Nigeria. Lagos state was chosen for the study because of its characteristic as the major hub of construction activities in Nigeria [11]. The questionnaires were administered to 100 randomly selected construction practitioners including architects, builders, engineers and quantity surveyors from construction companies, consulting firms, government establishment/public institutions. The questionnaires were of two parts: the first part identified the demographic features of the respondents, and the second part related to the variants of procurement methods available in the Nigerian construction industry and factors that affect the choice of the procurement methods. Fifteen major factors relating to projects delivery were identified from literatures and the respondents were

asked to rank how these factors affect the choice of the variants of both the traditional and the conventional procurement methods. The respondents were asked to rate on a 5-point Likert scale rating with 5 being the highest of the rating, for example 1= negligible, 2= very low, 3= low, 4= high 5= very high. Out of total of 100 questionnaire administered, 52 (fifty two) representing 52% of the total were returned and found appropriate for the analysis. The data were presented in tables and analyzed using percentage and relative importance index.

Relative Importance Index, RII was calculated from the formula given below:

$$RII = \frac{\sum_{1}^{5} ni \cdot ki}{N \cdot Rh} \tag{1}$$

Where,
Ni is the number of respondents choosing ki = 1- 5 on the Likert scale
N is the total of questionnaire collected, and
Rh is the highest value in ranking order.

Table 1. Type of Organization of Respondents

Type of organization	Frequency	Percentage (%)
Public institutions	22	42.3
Consulting firms	20	38.5
Contracting firms	10	19.2
Total	**52**	**100**

Table 1 shows the percentage representation of the respondents' organization as 42.3%, 38.5%, and 19.2% for public institutions, consulting and contracting firms respectively. The authors are with this result convinced of the adequate representation of every stakeholder of the construction industry in the study area.

Table 2. Designation of Respondent

Respondent	Frequency	Percentage (%)
Quantity surveyors	28	53.84
Architect	9	17.31
Builders	3	5.76
Service engineers	4	7.69
Civil/structural engineer	6	11.54
Combination of two or more	2	3.80
Total	**52**	**100**

Table 2 shows the percentage representation of the respondent as 53.84% for quantity surveyors, 17.31% for architects, 5.76% builders, 7.69% service engineers, 11.54% civil/structural engineer, and 3.8% of the respondents have two or more disciplines combined together. The result expressed the generation of adequate opinion of the construction industry in the study area as the entire construction professionals are represented.

Table 3. Respondent's Academic Qualification

Academic qualification	Frequency	Percentage (%)
HND	23	44.2
PDG	3	5.8
B.Sc/B.Tech	16	30.8
M.Sc	10	19.2
Total	**52**	**100**

Table 3 shows that 44.2% of the respondents are holders of Higher National Diploma (HND); 5.8% obtained Post Graduate Diploma; 30% holds a Bachelor of Science or a Bachelor of Technology; and 19.2% holds Master of Science. The result shows that all the respondents possess the minimum registration requirement of their various professional bodies in Nigeria and adequate academic training to supply reliable data for the study.

Table 4. Professional Qualification of Respondents

Professional Qualification	Frequency	Percentage (%)
Nigerian Institute of Quantity Surveyors (NIQS)	24	46.15
Nigerian Institute of Building (NIOB)	3	5.77
Nigerian Institute of Architects (NIA)	9	17.31
Nigerian Society of Engineers (NSE)	7	13.46
Non-Professionally Qualified	9	17.31
Total	**52**	**100**

Table 4 shows the professional qualifications of the respondents. The result shows the respondents as either associate or corporate members of their various professional bodies or possess some other professional qualifications, thus expressing their position as able to supply reliable data for the study.

Table 5. Respondents Years of Experience

Years	Mid value (X)	Frequency (F)	Fx
0—5	2.5	21	52.5
6—10	8	17	136
11—15	13	5	65
16—20	18	6	108
Over 20	20	3	60
Total		**52**	**421.5**

Mean = 8

Table 5 shows the respondents mean year of experience estimated at approximately eight years. With this average working experience of eight years, respondents are deemed experienced enough to supply reliable data for the research.

Table 6. Nature of projects undertaking by respondents

Type of project undertaking by respondents	Frequency	Percentage (%)
Office buildings	6	11.5
Residential buildings	8	15.4
Industrial buildings	2	3.8
Civil engineering projects	7	13.5
Combination of above	29	55.7
Total	**52**	**100**

Table 6 indicates that at least 55.7% of the respondents have undertaken a combination of building (office, and residential among others) industrial and civil engineering works. The results indicate that the respondents have accumulated experience on all classes of construction projects where the different variants of the procurement methods would have being employed. This would guarantee the supply of adequate data on the frequencies of use of each of the variants of the procurement methods on different categories of projects which this study intends to investigate.

Table 7. Variants of Procurement Methods used by Respondents

Type of procurement method	Frequency	Percentage (%)
Traditional method	25	48.08
Design and build variants		
Design and construct	5	9.62
Package deal	3	5.77
Management contracting	-	-
Construction management	2	3.85
Public Private Partnership variants		
DBFT	1	1.92
BOT	9	17.30
BOO	2	3.85
DBFO	-	-
BOOT	3	5.77
ROT	2	3.85
BLT	-	-
Total	**52**	**100**

Table 7 shows that 48.08% of the respondents are familiar with the variants of traditional procurement method, and a total of 19.24% are familiar with design and build method. Among the design and build variants, design and construct option has the highest percentage of 9.62% followed by package deal with 5.77%. The construction management has the lowest percentage of 3.85% while none of the respondents had adopted management contracting option. A total of 32.69% of respondents are familiar with public private partnership. Under public private partnership, build-operate and transfer

Table 8. Factors Generally Considered in Making Choice of Traditional Procurement Method

Factors	1	2	3	4	5	Freq	RII	Rank
Project completion at estimated cost	2	7	7	19	17	52	0.76	2
Project completion at estimated time	2	4	8	21	17	52	0.78	1
Quality assurance	0	11	9	16	16	52	0.74	4
Minimization of construction time	2	9	10	20	11	52	0.71	4
Minimization of design time	3	7	13	21	8	52	0.69	6
Cheapest cost	4	12	15	11	11	52	0.66	11
Financial arrangement	4	10	10	20	7	52	0.65	14
High degree of control	3	7	12	23	7	52	0.69	6
Complexity of design	6	8	14	12	12	52	0.66	11
Flexibility to entertain change for clients requirement	4	5	20	18	5	52	0.66	13
Consultancy service offered	6	5	20	14	7	52	0.64	15
Technical complexity of construction	3	6	14	19	10	52	0.70	5
Availability of information at project inception	1	3	14	23	11	52	0.75	3
Risk avoidance	1	8	18	18	7	52	0.68	10
Nature of the project	1	5	21	20	5	52	0.69	8
Nature of the client	2	2	18	22	6	52	0.68	9

Table 9. Factors Generally Considered in Making Choice of Non conventional Procurement Method

Factors	1	2	3	4	5	Freq	RII	Rank
Project completion at estimated cost	1	9	16	11	15	52	0.71	4
Project completion at estimated time	1	5	14	16	15	52	0.73	2
Quality assurance	0	2	9	25	16	52	0.81	1
Minimization of construction time	2	5	17	17	11	52	0.71	4
Minimization of design time	2	5	17	17	11	52	0.71	4
Cheapest cost	6	10	12	17	7	52	0.63	15
Financial arrangement	3	3	18	21	6	52	0.68	10
High degree of control	5	10	15	11	11	52	0.65	15
Complexity of design	5	5	15	17	10	52	0.68	9
Flexibility to entertain change for clients requirement	6	16	15	13	2	52	0.55	17
Consultancy service offered	4	8	17	15	8	52	0.65	12
Technical complexity of construction	4	7	8	23	10	52	0.70	7
Availability of information project inception	3	9	8	24	8	52	0.69	8
Risk avoidance	5	9	14	15	9	52	0.65	13
Nature of the project	2	6	10	24	10	52	0.73	3
Nature of the client	4	7	12	25	4	52	0.66	11

option (BOT) has the highest percentage of 17.30%, followed by build- own- operate and transfer option (BOOT) with 5.77%. The design- build- finance and transfer option (DBFT) has the lowest percentage of 1.92%. The table generally shows that traditional procurement method has the highest percentage of 48.08%, followed by public private partnership of 32.69% while design and build method has the lowest percentage of 19.24%. The results give a general indication that the variants of both the traditional and non-conventional procurement methods are embraced in Nigeria. The results, however, show that the variants of procurement methods in use are still much of traditional method. This may be presumably due to long age existence of the traditional procurement systems. It could be noted that despite the fact that almost all variants of the non-conventional methods have been applied to construction contracts (except management contracting, DBFO and BLT), the percentages of the use of design and build are still significantly low, indicating that stakeholders are still not well familiar with the method or are yet to appreciate their advantages.

Table 8 shows the factors that influence the choice among the variants of traditional procurement method. Project completion at estimated time ranks highest with RII of 0.78, followed by project completion at estimated cost with RII of 0.76. Availability of information at project inception was

ranked third with RII of 0.75. Both the consultancy service offered and financial arrangement were ranked low with RII of 0.64, and 0.65 respectively. This results indicate that the variants of the traditional procurement system is made in order of consideration of project completion at estimated time (ranked highest); project completion at estimated cost; and availability of information at project inception. The fact that consultancy service offered and finance arrangement were ranked low does not, however, implied that stakeholders do not consider these as important factors affecting projects delivery.

Table 9 reveals the factors that influence the choice among the variants of non conventional procurement method. Quality assurance ranks highest with RII of 0.81, followed by project completion at estimated time and nature of the project with both having RII of 0.73. Project completion at estimated cost; minimization of construction time; and minimization of design time were also all ranked equal with RII of 0.71. Flexibility to entertain the clients to change his requirement ranked lowest with RII of 0.55, followed by cheapest cost with RII of 0.63. These results indicate the variants of the non-conventional procurement system are majorly made in consideration of quality assurance; and a consideration of either project completion at estimated time or the consideration of the nature of the project. Project completion at estimated cost; minimization of construction time; minimization of design time were also all ranked high by the respondents. This results show that much more factors are considered in making choice of the variants of the non conventional procurement method.

Conclusion

This study reveals approximately half (48.08%) of construction projects are executed using variants of traditional procurement method; 32.69% are through variants of public private partnership (PPP); and 19.24% are executed through design and build method in Nigeria. The results give a general indication that both the traditional and non conventional procurement methods are currently embraced in Nigeria. The results, however, show that the procurement methods in use are still much of variants of traditional method. This may be presumably due to long age existence of the traditional procurement systems. It could be noted that despite the fact that almost all variants of the non-conventional method have been applied to construction contracts (except management contracting, DBFO and BLT), the percentages of the use of design and build

method is still significantly low, indicating that stakeholders are still not well familiar with this variant of non-conventional procurement system, or are yet to appreciate their advantages. The results of the study further indicate that the choice of variants of the traditional procurement system is made in order of consideration of project completion at estimated time; project completion at estimated cost; and availability of information at project inception. The choice of variants of the non-conventional procurement system is made in order of consideration of quality assurance; and a consideration of either project completion at estimated time or the consideration of the nature of the project. Project completion at estimated cost; minimization of construction time; minimization of design time are also considered as major factors in making choice of the variants of the non-conventional procurement method, indicating that much more factors are considered in making choice of the variants of the non conventional procurement method than the variants of traditional procurement methods in Nigeria.

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