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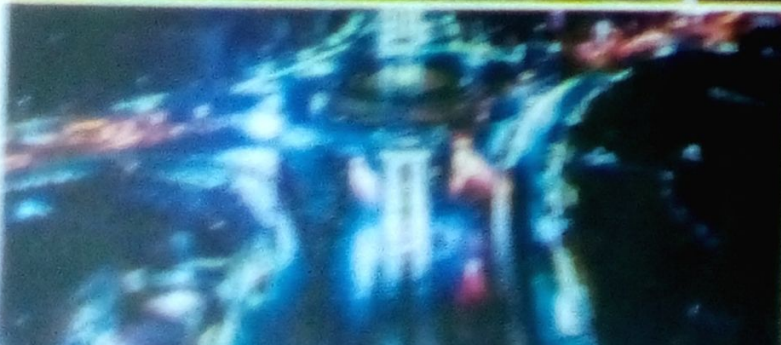
**NIGERIAN INSTITUTE OF
QUANTITY SURVEYORS**

**6th Research Conference-
NIQSRecon6**

26th - 27th October, 2022

PROCEEDINGS:

**Confluence of Research, Theory and
Practice in the Built Environment**



EDITORS:

A. C. Ogwuelka

S. B. Ekung

C. F. Asuquo

N. E. Udo

E. T. Adu

Proceedings of the 6th Research Conference of NIQS (RECON 6)



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Proceedings of the 6th Research Conference of the Nigerian Institute of Quantity Surveyors

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ISBN: 978-978-962-473-7

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Association of Quantity Surveying Lecturers/Educators

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PROCUREMENT METHODS SELECTION AND DECISION FACTORS IN PUBLIC CONSTRUCTION PROJECTS IN NIGER STATE

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ABSTRACT

Studies have established that the complex nature of procurement selection and their subsequent management pose great difficulties to clients and any failure to rise up to this challenge has often resulted in poor project performance. The study assessed procurement methods selection and decision factors in public construction projects in Niger State with a view to improving project performance. In order to achieve this, the study undertook a quantitative research approach using questionnaire survey administered to 22 respondents across Ministries, Agencies and Tertiary Institutions in Niger State. The analysis of data was undertaken with the use of frequency, percentage and Mean Item Score (MIS). The findings showed that the most important factor affecting the selection of procurement methods in public construction projects is time certainty (MIS = 4.55). The most important driver aiding decision making in the selection of procurement methods in public construction projects is fairness (MIS = 4.59) and the most effective strategy for enhancing better decision making in the selection of procurement method in public construction projects is E-procurement (MIS = 4.73). It was concluded that the adoption of research findings is capable of improving project performance

Keywords: construction projects, delivery, procurement methods, selection.

INTRODUCTION

Public procurement has largely been a public sector activity in Africa (Olanike *et al.*, 2020). Public Procurement is a means of acquiring goods, works or services by government (Public Procurement Act (PPA), 2007). The PPA (2007) brought a sense of regulation or framework to the procurement process in Nigeria (Olanike *et al.*, 2020). There are procurement systems and methods that have been introduced for efficient and effectiveness of procurement process. Procurement method is a flow of activities starting right from identification of the need to

completion of the project. There are many project procurement systems that have been introduced for effective, efficient and better performance and outcome of the system (Izhar *et al.*, 2019). The purchase of everyday items is relatively simple and usually involves some form of consideration, selection and payment. However, with the acquisition of a building or construction facility, there are significant factors associated with the choice of procurement method which will impact on the success of construction project.

The selection of the most appropriate procurement method is consequently critical for both clients and project participants, and is becoming an important and contemporary issue within the construction industry (SC Quantity Surveyors, 2012). The use of procurement methods varies from country to country. The procurement difference is based on cultural differentiation and reflects the relationship between procurement system and clients' interest (Zeljko, 2016). Project effectiveness and efficiency are greatly affected by the type of construction procurement method and it helps to handle the construction project.

Various researchers have made a lot of efforts on procurement method selection. For example, Love *et al.* (1998) concluded from empirical research finding that similar clients do not in general have similar needs in their procurement objectives which may of course be due to the different nature of their individual projects. The study approached the topic from the client, consultant and contractor's viewpoint. However, in its findings, contractor respondents were found to have a bias towards design and construction methods of procurement system and thus were excluded from the analysis. This is due to the fact that the perspective of client, contractor and consultants may vary when it comes to factors to be considered in choosing a procurement method. Thus, this study aims to narrow down its focus on clients only since an accurate identification of the client's requirement largely determines the procurement method to be used. In a similar study, Maizon *et al.* (2006) presented various factors influencing the selection of procurement systems by clients in Malaysia. The study took a holistic approach of these factors from client's perspective. However, clients can be divided into two types. There are the public clients and private clients (Maizon *et al.*, 2006). The public clients consist of Government Funded Agencies, Ministries and Local Authorities. The private clients consist of property developers, owner occupiers and investors. Thus, this study aims to narrow down its focus on public clients only because they by far represent the largest procurer of projects in the country (Chima and Ofong, 1999). This study also aims at assessing the various construction procurement methods available in the Nigerian construction industry with a view to evaluating the factors to be considered before employing any type of procurement method.

From the above background, it has been established that the selection of construction procurement method mostly affects construction project delivery due to difference in level of importance of different factors in the selection of procurement methods. In addition, it was established that the method used is a key factor that determines project success and satisfaction of both client and other contracting parties. Similarly, complex nature of procurement selection and their subsequent management therefore pose great difficulties to clients and any failure to rise up to this challenge has often resulted in poor project performance (Alaeddin and Nuhu, 2012). In view of this, it has become imperative to assess the procurement methods selection and decision factors in public

construction projects in Niger State with a view to improving project delivery. In order to achieve this aim, the study examined the factors affecting the selection of procurement methods in public construction projects; determined the level of adoption of procurement methods for public construction projects; examined the drivers aiding decision making in the selection of procurement methods in public construction projects; determined the effect of procurement method selection on the cost and time delivery of public construction projects; and proposed strategies for enhancing better decision making in the selection of procurement method in public construction projects in Niger State.

LITERATURE REVIEW

In order to achieve the aim and objectives of the study, this section undertook an extant review of related literature was undertaken. This also assisted in identifying the research variables required for data analysis, results, findings and conclusions of the study.

Factors affecting procurement methods in public procurement projects

Procurement method is a flow of activities starting right from identification of the need to completion of the project (Izhar *et al.*, 2019). Traditionally, construction projects start 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. In view of this, extant review of literature from past studies have identified thirteen factors affecting procurement methods in public procurement projects as shown in Table 1.

Table 1: Factors Affecting the Selection of Procurement Methods in Public Construction Projects

S/No.	Factors Affecting the Selection of Procurement Methods	Source(s)
1	Speed	Adenuga and Dosumu (2012);
2	Time Certainty	Ogunsanmi and Bamisile
3	Price certainty	(1997); Ogunsanmi <i>et al.</i>
4	Flexibility	(2012); Ng <i>et al.</i> (2002);
5	Quality	Naushad (2018)
6	Complexity	
7	Responsibility	
8	Price competition	
9	Risk allocation/avoidance	
10	Familiarity	
11	Government policies	
12	Simplicity	
13	Dispute resolution and arbitration	

Source: Researcher's compilation from the literature.

Drivers aiding decision making in the selection of procurement methods in public construction projects

The drivers aiding decision making in any procurement most especially for public procurement are to inspire the confidence and willingness-to-compete of well-qualified vendors. This directly benefits the procuring entity and its constituents, responsive contractors and suppliers, and donor agencies providing project finance. The characteristics of a good procurement system, as outlined in the Procedure Manual for Public Procurement in Nigeria of the Bureau of Public Procurement (2008), is highlighted in Table 2

Table 2: Drivers in the Selection of Procurement Method in Public Construction Projects

S/No.	Drivers in the Selection of Procurement Method	Source(s)
1	Economy	Bureau of Public Procurement (2008)
2	Efficiency	Bureau of Public Procurement (2008)
3	Fairness	Bureau of Public Procurement (2008)
4	Transparency	Bureau of Public Procurement (2008)
5	Accountability and ethical standards	Bureau of Public Procurement (2008)

Source: Researcher's compilation from the literature.

Effects of procurement methods selection on the cost and time delivery of public construction projects

Shan *et al.* (2019) ascertained that the procurement method has a great influence on the time performance when it comes to construction projects. A project which is driven by the different types of procurement methods always has a massive effect on time. Besides, Shan *et al.* (2019) affirmed that the procurement method that were being used were having major effects on cost and time overruns. Shan *et al.* (2019) further disclosed that the selection of procurement methods inappropriately was the major cause of construction industry's poor performance. This brings about the effect on project delivery when choosing a particular procurement method type for a project. In the light of this, a thorough review of literature from this study revealed the following effects of cost and time delivery of public construction projects as shown in Tables 3 and 4.

Table 3: Effects of Procurement Method Selection on the Cost Delivery of Public Construction Projects

s/no.	effects of procurement method selection on cost delivery	source(s)
1	accident/delay	doloi (2012); oladinrin <i>et al.</i> (2013); osanyinro and aghimien, (2017); shan <i>et al.</i> (2019)
2	claims	
3	contingencies	
4	cost related to environmental issues	
5	cost related to insurance	
6	disputes	
7	legal cost	
8	managerial cost (consultancies)	
9	variation between contract sum and final account	
10	variation in design / change orders	
11	retention	
12	rework	

Source: Researcher's compilation from the literature.

Table 4: Effects of Procurement Method Selection on the Time Delivery of Public Construction Projects

S/No.	Effects of Procurement Method Selection on Time Delivery	Source(s)
1	Increased competition	Paul <i>et al.</i> (2006); Onwusonye (2007); Rosli <i>et al.</i> (2007); Doloi (2012); Ogunsanya <i>et al.</i> (2012); Okunola (2012)
2	adverse changes in law, policy or regulations	
3	unanticipated inflation	
4	Adverse changes in tax	
5	Misunderstanding the role of stakeholders	
6	Defects in construction	
7	Failure/delay in commissioning test	
8	Change in Scope	
9	Force Majeure	
10	Unavailability of financing	
11	Lack of communication between stakeholders	

Source: Researcher's compilation from the literature.

Strategies for enhancing better decision making in the selection of procurement methods in public construction projects

With the increase in use of alternative procurement methods, a number of researchers have developed decision making charts in order to investigate the criteria for their selection and their rate of success in terms of time, cost and quality. However, over the years the selection process has become increasingly complex, mainly as a result of the continuing proliferation of different methods of procuring building projects, the projects' ever-increasing technical complexity and the client's need for a more value for money projects (Naoum and Egbu, 2015). From the work of Naoum and Egbu (2015) and extant review of literature from this study, the following strategies for enhancing better decision making in the selection of procurement methods in public construction projects, as summarised in Table 5, were identified.

Table 5: Strategies for Enhancing Better Decision Making in the Selection of Procurement Method in Public Construction Projects

S/No.	Strategies for Enhancing Decisions in Selecting Procurement Method	Source(s)
1	Buildability/ Constructability	Oladirin (2013); Swan and Khalfan
2	Innovation	(2013); Naoum and Egbu (2015); Reike <i>et al.</i> (2018); Woo <i>et al.</i> (2018); Rybakova <i>et al.</i> (2019); Olanike <i>et al.</i> (2020)
3	Supply chain (SCM)	
4	Lean Construction	
5	Sustainability	
6	Value Engineering	
7	E-procurement	

Source: Researcher's compilation from the literature.

RESEARCH METHODOLOGY

This study adopted a quantitative research approach with the use of questionnaire survey. Data analysis was undertaken with the use of descriptive statistical methods. The study considered government-funded organisations in Niger State that have Procurement/Project/Works Department or Section responsible for carrying out procurement of construction works within the organisation. Since the study was a pilot survey to on-going academic research, the sampling frame for the study was represented by in-house construction industry professionals working with such organizations. These organisations were made up of twenty (10) Ministries, eight (8) Agencies, and four (4) tertiary institutions in Niger State. This gave a to population size of twenty-two (22) organisations (see Table 6). The professionals were selected using purposive sampling technique based on years of experience and number of projects actively involved in. Therefore, only 22 of these professionals meet these criteria.

Table 6: Sample Frame of Respondents

CLIENT ORGANISATIONS	SAMPLE FRAME
Ministries	10
Local Governments	0
Agencies	8
Tertiary Institutions	4
Total	22

Since the population size of the study is small and can be conveniently covered within the time frame required for this study, it has been adopted as the sample size. Therefore, the sample size for the study is 22. Therefore, this study carried out a census of the entire population since the population size is small. This is in line with the assertion of Watson (2001) which stated that if the population size is small (200 or less), then it is preferable to take a census of the total population.

The instrument for data collection was structured questionnaire with closed-ended question format constructed using five-point Likert's Scale. The questionnaire was designed under six sections. The first section of the questionnaire dwelled on the background information of the respondents in order to check for the quality of data being analysed while the other five sections addressed each of the five research objectives that form the basis of this study. Analysis of data was carried out with the use of frequency count, percentage and Mean Item Score (MIS). Frequency count and percentage were used to analyse data on the profile of respondents, while MIS was used to analyse data collected in respect of the research objectives. The decision rule adopted for the MIS analysis is summarised in Table 7:

Table 7: Decision Rule for MIS Analysis

Scale	MIS	Level of Importance	Frequency of Usage	Level of Usage	Level of Significance	Level of Effectiveness
5	4.51 - 5.00	Extremely Important	Extremely Frequent	Extremely Easy	Extremely Significant	Extremely Effective
4	3.51 - 4.50	Very Important	Very Frequent	Very Easy	Very Significant	Very Effective
3	2.51 - 3.50	Moderately Important	Moderately Frequent	Moderately Easy	Moderately Significant	Moderately Effective
2	1.51 - 2.50	Slightly Important	Slightly Frequent	Slightly Easy	Slightly Significant	Slightly Effective
1	1.00 - 1.50	Not Important	Not Frequent	Not Easy	Not Significant	Not Effective

Source: Adapted and Modified from Shittu *et al.* (2021)

RESULTS AND DISCUSSION

This section presents the profile of respondents considered for data collection. The section also presents and discusses the results of data analysis carried out.

Presentation of respondents' profile

As shown in Table 8, the majority of the respondents were Quantity Surveyors (31.82%). This was followed by Architects who represent 22.73% of the respondents. Other relevant professionals in the procurement of public construction projects were also part of the study; these are Builders (18.18%); Civil Engineers (18.18%); and Structural Engineers (9.09%). It was also shown from Table 8 that the organisations considered predominantly engage in Building Works (54.55%). The organisations also engage in Civil Engineering (27.27%) and Heavy Engineering (18.18%) Works at a lesser rate compared to Building Works. It was also revealed that the majority of the respondents (40.91%) possess an MSc/MTech degree. Others also possess ND (18.18%); BSc/BTech/BEEng/HND (22.73%); and PGD (18.18%) qualifications. Finally, Table 8 revealed that majority of the respondents have 11 – 15 years and 16 – 20 years' experience (22.73% each); while others have 1 – 6 years; 6 – 10 years; and above 20 years' experience (18.18% each). This profile indicates that the respondents were qualified; experienced; and

knowledgeable enough to provide reliable information required for this study. Therefore, the profile of the 22 respondents considered for the study is presented in Table 8.

Table 8: Respondents' Profile

PROFILE	STATISTICS	
Designation of Respondents	Frequency	Proportion (%)
Architects	5	22.73
Builders	4	18.18
Civil Engineers	4	18.18
Structural Engineers	2	9.09
Quantity Surveyors	7	31.82
Types of Projects Procured	Frequency	Proportion (%)
Building works	12	54.55
Civil Engineering Works	6	27.27
Heavy Engineering Works	4	18.18
Highest Academic Educational Qualification of Respondents	Frequency	Proportion (%)
ND	4	18.18
BSc/BTech/BEng/HND	5	22.73
PGD	4	18.18
MSc/MTech	9	40.91
PhD	0	0.00
Years of Experience of Respondents	Frequency	Proportion (%)
1 – 6 years	4	18.18
6 – 10 years	4	18.18
11 – 15 years	5	22.73
16 - 20 years	5	22.73
Above 20 years	4	18.18
Total	22	100.00

Level of adoption of procurement methods

In order to examine the level of adoption of procurement methods in public construction projects in Niger State, the frequency of usage and ease of usage were examined in two (2) separate analyses. In view of this, MIS ranking of the opinions of respondents was used to assess the frequency of usage and ease of usage of procurement methods in public construction projects in Niger State.

It was revealed from Table 9 that the most frequently used procurement method in Niger State in public construction projects was traditional method (MIS = 4.64). Other procurement methods, ranging from PPP (MIS = 3.23) to joint ventures (MIS = 2.59) were used at a moderate frequency.

The direct labour (MIS = 2.18) and package deal (MIS = 1.59) were used at a slight frequency. The least frequently used methods is develop and construct (MIS = 1.36); design and build (MIS

= 1.23); and turnkey system (MIS = 1.23). On the average, all the procurement methods for public construction projects in Niger State were used at a moderate frequency (average MIS = 2.43). The results of the MIS analysis on the frequency of usage of procurement methods in public construction projects in Niger State are therefore summarised in Table 9.

Table 9: Frequency of Usage of Procurement Methods in Public Construction Projects

Code No.	Procurement Methods	MIS	Rank	Decision
B1.10	Traditional	4.64	1st	Extremely Frequent
B1.9	Public Private Partnerships (PPP)	3.23	2nd	Moderately Frequent
B1.1	Construction management	3.00	3rd	Moderately Frequent
B1.8	Partnering	2.95	4th	Moderately Frequent
B1.6	Management Contracting	2.73	5th	Moderately Frequent
B1.5	Joint Ventures	2.59	6th	Moderately Frequent
B1.4	Direct labour	2.18	7th	Slightly Frequent
B1.7	Package deal	1.59	8th	Slightly Frequent
B1.3	Develop and construct	1.36	9th	Not Frequent
B1.2	Design and build	1.23	10th	Not Frequent
B1.11	Turnkey system	1.23	10th	Not Frequent
<i>Average MIS</i>		<i>2.43</i>		<i>Slightly Frequent</i>

It was shown from Table 10 that the easiest procurement methods to use for public construction projects in Niger State were traditional (MIS = 4.68); direct labour (MIS = 4.45); and PPP (MIS = 4.27). The use of construction management (MIS = 2.86) and partnering (MIS = 2.77) were shown to be moderately easy. The use of five other methods, ranging from design and build (MIS = 2.41) to package deal (MIS = 1.59), was shown to be slightly easy. The least easy method was shown to be turnkey system (MIS = 1.41). On the average, the use of all the procurement methods for public construction projects in Niger State was moderately easy (average MIS = 2.84). The results of the MIS analysis on the ease of usage of procurement methods for public construction projects in Niger State are hereby summarised in Table 10.

Factors affecting the selection of procurement methods

Table 11 revealed that the most important factors affecting the selection of procurement methods in public construction projects in Niger State were time certainty; complexity; and speed with very high MIS values of 4.55; 4.14; and 4.09 respectively. The least important factor affecting the selection of procurement methods in public construction projects in Niger State was flexibility (MIS = 2.50). On the average, all the identified factors affecting the selection of procurement methods in public construction projects in Niger State were moderately significant (average MIS = 3.42). Findings of past studies are also in line with the finding of this study in this regard. This is because past studies revealed that the decision to select the appropriate procurement method to implement a construction project is crucial; though, it does not necessarily lead to a successful project but with other factors taken into consideration can influence the success of the project

(Adenuga and Dosumu, 2012; Shan *et al.*, 2019). Osanyinro and Aghimien (2017) found that the need for speed and time certainty in construction is a major factor that may influence the choice of a procurement system. The opinions of the respondents on the factors affecting the selection of procurement methods in public construction projects in Niger State were ranked with the use of MIS. The results of this MIS analysis are therefore presented in Table 11.

Table 10: Ease of Usage of Procurement Methods in Public Construction Projects

Code No.	Procurement Methods	MIS	Rank	Decision
B2.10	Traditional	4.68	1st	Extremely Easy
B2.4	Direct labour	4.45	2nd	Very Easy
B2.9	Public Private Partnerships (PPP)	4.27	3rd	Very Easy
B2.1	Construction management	2.86	4th	Moderately Easy
B2.8	Partnering	2.77	5th	Moderately Easy
B2.2	Design and build	2.41	6th	Slightly Easy
B2.6	Management Contracting	2.41	6th	Slightly Easy
B2.3	Develop and construct	2.23	8th	Slightly Easy
B2.5	Joint Ventures	2.14	9th	Slightly Easy
B2.7	Package deal	1.59	10th	Slightly Easy
B2.11	Turnkey system	1.41	11th	Not Easy
<i>Average MIS</i>		<i>2.84</i>		<i>Moderately Easy</i>

Table 11: Level of Importance of Factors Considered in Selection of Construction Procurement Methods

Code No.	Factors	MIS	Rank	Decision
C1.13	Time Certainty	4.55	1st	Extremely Important
C1.1	Complexity	4.14	2nd	Very Important
C1.12	Speed	4.09	3rd	Very Important
C1.7	Price certainty	3.95	4th	Very Important
C1.5	Government Policy	3.55	5th	Very Important
C1.8	Price Competition	3.45	6th	Moderately Important
C1.3	Familiarity	3.36	7th	Moderately Important
C1.6	Information	3.36	8th	Moderately Important
C1.9	Quality	3.27	9th	Moderately Important
C1.2	Dispute resolution/arbitration	2.86	10th	Moderately Important
C1.10	Responsibility	2.86	10th	Moderately Important
C1.11	Risk allocation/avoidance	2.55	12th	Moderately Important
C1.4	Flexibility	2.50	13th	Slightly Important
<i>Average MIS</i>		<i>3.42</i>		<i>Moderately Important</i>

Drivers aiding decision making in the selection of procurement methods

The study identified five major drivers aiding decision making in the selection of procurement methods in public construction projects in Niger State. As shown in Table 12, the most important driver aiding decision making in the selection of procurement methods in public construction projects in Niger State was fairness (MIS = 4.59). The least important driver aiding decision making in the selection of procurement methods in public construction projects was efficiency (MIS = 3.05). On the average, all the drivers aiding decision making in the selection of procurement methods in public construction projects in Niger State were moderately important (average MIS = 3.89). Past studies also support this finding by reporting that the drivers aiding decision making in any procurement most especially for public procurement are to inspire the confidence and willingness-to-compete of well-qualified vendors; and this directly benefits the procuring entity and its constituents, responsive contractors and suppliers, and donor agencies providing project finance (Bureau of Public Procurement, 2008). The results of the MIS ranking of the level of importance of these drivers, based on the perception of respondents, are therefore presented in Table 12.

Table 12: Drivers Aiding Decision Making in the Selection of Procurement Methods

Code No.	Drivers	MIS	Rank	Decision
D3	Fairness	4.59	1st	Extremely Important
D5	Accountability and ethical standards	4.23	2nd	Very Important
D4	Transparency	4.00	3rd	Very Important
D1	Economy	3.59	4th	Very Important
D2	Efficiency	3.05	5th	Moderately Important
<i>Average MIS</i>		<i>3.89</i>		<i>Moderately Important</i>

Effects of procurement method selection on the cost and time delivery of public construction projects

The effect of procurement method selection on the cost and time delivery of public construction projects in Niger State was assessed under two (2) analyses. The first analysis assessed the effects on cost delivery, while the second analysis assessed the effects on time delivery.

From Table 13, it was shown that the most significant effects of procurement method selection on the cost delivery of public construction projects in Niger State were variation between contract sum and final account (MIS = 4.73); claims (MIS = 4.27); and legal cost (MIS = 4.00). The least significant effects of procurement method selection on the cost delivery of public construction projects in Niger State were variation in design/change orders and retention (MIS = 2.82 respectively). On the average, all the effects of procurement method selection on the cost delivery of public construction projects in Niger State were moderately significant (average MIS = 3.50). The MIS results of the perception of respondents on the effects of procurement method selection on the cost delivery of public construction projects in Niger State are therefore summarised in Table 13.

Table 13: Effects of Procurement Method Selection on the Cost of Public Construction Projects

Code No.	Effects on Cost Delivery	MIS	Rank	Decision
E1.9	Variation between contract sum and final account	4.73	1st	Extremely Significant
E1.2	Claims	4.27	2nd	Very Significant
E1.7	Legal cost	4.00	3rd	Very Significant
E1.6	Disputes	3.73	4th	Very Significant
E1.3	Contingencies	3.59	5th	Very Significant
E1.4	Cost related to environmental issues	3.50	6th	Moderately Significant
E1.5	Cost related to Insurance	3.41	7th	Moderately Significant
E1.8	Managerial cost (Consultancies)	3.36	8th	Moderately Significant
E1.1	Accident/Delay	2.95	9th	Moderately Significant
E1.12	Rework	2.86	10th	Moderately Significant
E1.10	Variation in Design / Change orders	2.82	11th	Moderately Significant
E1.11	Retention	2.82	11th	Moderately Significant
Average MIS		3.50		Moderately Significant

The results presented in Table 14 revealed that the most significant effects of procurement method selection on the time delivery of public construction projects in Niger State were failure/delay in commissioning test (MIS = 4.50) and increased competition (MIS = 4.23). The least significant effects of procurement method selection on the time delivery of public construction projects in Niger State were defects in construction and change in scope (MIS = 3.05 respectively). On the average, all the effects of procurement method selection on the time delivery of public construction projects in Niger State were very significant (average MIS = 3.59). In support of the findings of this study on the effect of procurement method selection on the cost and time delivery of public construction projects in Niger State, past studies also revealed that in general, less expensive resources or technologies would result in longer project duration (Shan *et al.*, 2019). Past studies also reported that less expensive resources or technologies would result in longer project duration. Using productive resources or technologies may save time, but this causes an increase in the cost. On the other hand, reduction of either time or cost may decrease quality of construction projects. Consequently, the relevant construction projects such as highways, tunnels, and bridges may age or deteriorate faster than expected, increasing the maintenance and rehabilitation cost (Shan *et al.*, 2019; Olanike *et al.*, 2020). Schedule overruns (sometimes labelled time growth) are often very negative since they hinder the client to start using the end product as planned (Olanike *et al.*, 2020). The MIS results on the perception of respondents on the effects of procurement method selection on the time delivery of public construction projects in Niger State are therefore summarised in Table 14.

Table 14: Effects of Procurement Method Selection on the Time Delivery of Public Construction

Code No.	Effects on Time Delivery	MIS	Rank	Decision
E2.7	Failure/delay in commissioning test	4.50	1st	Very Significant
E2.1	Increased competition	4.23	2nd	Very Significant
E2.3	Unanticipated inflation	3.86	3rd	Very Significant
E2.2	Adverse changes in law, policy or regulations	3.77	4th	Very Significant
E2.5	Misunderstanding the role of stakeholders	3.77	4th	Very Significant
E2.4	Adverse changes in tax	3.59	6th	Very Significant
E2.11	Lack of communication between stakeholders	3.41	7th	Moderately Significant
E2.9	Force Majeure	3.14	8th	Moderately Significant
E2.10	Unavailability of financing	3.14	8th	Moderately Significant
E2.6	Defects in construction	3.05	10th	Moderately Significant
E2.8	Change in Scope	3.05	10th	Moderately Significant
<i>Average MIS</i>		<i>3.59</i>		<i>Very Significant</i>

Strategies for enhancing better decision making in the selection of procurement methods

It was revealed from Table 15 that the most effective strategies for enhancing better decision making in the selection of procurement method in public construction projects in Niger State were E-procurement (MIS = 4.73); innovation (MIS = 4.45); and sustainability (MIS = 4.14). The least significant strategies for enhancing better decision making in the selection of procurement method in public construction projects in Niger State were value engineering (MIS = 2.91) and buildability/constructability (MIS = 2.86). On the average, all the major strategies for enhancing better decision making in the selection of procurement method in public construction projects in Niger State were very effective (average MIS = 3.71). In support of the finding of this study, previous studies have adjudged that these strategies are very critical modern issues for enhancing better decision making in selection of procurement methods and enhancing project performance in terms of time, cost and quality delivery (Swan and Khalfan, 2013; Naoum and Egbu, 2015; Reike *et al.*, 2018; Olanike *et al.* 2020). The results of the MIS ranking on the strategies for enhancing better decision making in the selection of procurement method in public construction projects in Niger State, based on perception of respondents, are therefore summarised in Table 15.

Table 15: Strategies for Enhancing Better Decision Making in the Selection of Procurement Method in Public Construction Projects

Code No.	Strategies	MIS	Rank	Decision
F7	E-procurement	4.73	1st	Extremely Effective
F2	Innovation	4.45	2nd	Very Effective
F5	Sustainability	4.14	3rd	Very Effective
F3	Supply Chain Management (SCM)	3.50	4th	Moderately Effective
F4	Lean Construction	3.41	5th	Moderately Effective
F6	Value Engineering	2.91	6th	Moderately Effective
F1	Buildability/ Constructability	2.86	7th	Moderately Effective
<i>Average MIS</i>		<i>3.71</i>		<i>Very Effective</i>

CONCLUSION

The study established that the procurement method used for public construction projects is a key factor that determines project success and satisfaction of both client and other contracting parties. Therefore, the complex nature of procurement selection and their subsequent management pose great difficulties to clients and any failure to rise up to this challenge has often resulted in poor project performance. Therefore, the study assessed the procurement methods selection and decision factors in public construction projects in Niger State with a view to improving project performance. Findings from the analysis of data carried out led to vital conclusions and recommendations stated in this section.

The study revealed that the most important factors affecting the selection of procurement methods in public construction projects in Niger State are time certainty; complexity; and speed. It was also shown that the most frequently used procurement method in Niger State in public construction projects is traditional method. The study shows that the easiest procurement methods to use for public construction projects in Niger State are traditional method; direct labour; and PPP. It was revealed that the most important driver aiding decision making in the selection of procurement methods in public construction projects in Niger State was fairness. The most significant effects of procurement method selection on the cost delivery of public construction projects in Niger State are variation between contract sum and final account; claims; and legal cost. The most significant effects of procurement method selection on the time delivery of public construction projects in Niger State are failure/delay in commissioning test and increased competition. It was finally revealed that the most effective strategies for enhancing better decision making in the selection of procurement method in public construction projects in Niger State were E-procurement; innovation; and sustainability. It was therefore concluded that the procurement methods selection and decision factors in public construction projects in Niger State are significant and capable of improving project performance.

In view of the conclusions of this study, it was recommended that in order to enhance decision making in the selection of procurement method in public construction projects, fairness; accountability and ethical standards; transparency; time certainty, complexity, and speed of construction should be given more consideration. It was also suggested that in order to mitigate the negative effects of procurement method selection on the cost delivery of public construction projects in Niger State, more attention should be paid towards ensuring that variation between contract sum and final account is kept within the minimum allowable limit. In order to mitigate the negative effects of procurement method selection on the time delivery of public construction projects in Niger State, more attention should be paid towards ensuring that failure/delay in commissioning preliminary test is prevented. Finally, Government and all construction stakeholders should work together to develop an effective mechanism for enhancing good decision making in the selection of procurement methods in public construction projects in Niger State with the use of the strategies proposed in this study as a basis.

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