*Original article*

# EVALUATION OF CONSTRUCTION CONTRACT MANAGEMENT IN THE NIGERIAN CONSTRUCTION INDUSTRY

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**Abstract:** Construction projects in Nigeria are most of the time not completed within schedule, cost and quality specifications and at times project abandonment. In evaluating the construction contract management practice in Nigeria with the objective of ascertain the tendering methods, usage of construction document and the common techniques used in construction planning. One-way analysis of variance and multiple regression analysis were used in the analysis. The analysis of the respondent score relating to hypothesis for using regression model showed the regression equation as $Y=10.43983+0.7525x_1+0.3419x_2+0.5256x_3+0.1874x_4$. The coefficient of multiple correlation (R) was 0.909124 and this means that 91% positive correlation exist between the successful implementation of construction contract. The independent variables explain 83% of the variables in successful implementation of construction contracts and the remaining 17% could be attributed to other unspecified factors.

**Keywords:** client, construction, consultant, contract, client, project.

## 1. INTRODUCTION

The Nigerian construction industry occupies an important position in the structure of the Nigerian economy.

Ezeji (1999) stated that the industry is a major contributor of (GDP) Gross Domestic Product in Nigeria. The industry is made up of an organized formal sector and an unorganized informal sector.

Despite the noted contributions, the industry has maintained unimpressive track of performance, evidenced by numerous failed and abandoned construction projects, at every nook and corner of the country (Opara, 2018).

The aspect of the construction project which has attracted little or no evaluation is the management of construction contracts. The management process basically sees to the establishment of mutual agreement between the clients and contractors or contractors to subcontractors to create legally enforceable duties and obligations. It ensures that the established requirements of the contract are successfully achieved at least possible cost with stipulated time and quality by efficient job co-ordination and resource allocations. The construction contract has two phases, namely pre construction contract and post construction contract management (Aiyewalehinmi, & Nkumah, 2019).

The pre-construction contract management deals with the principles, methods and procedures of selecting competent contractors who have the capacity to successfully execute the contract. The post-construction contract



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management commences after the award of contract (Onwusonye, 2009).

Despite the concerted efforts the scenario has been that of project failure and abandonment. Competent contractors are not selected for construction work and there have been wrong application of tendering methods (Usman, 2000). There have been time and cost overrun and poor quality of construction work. Most construction projects done are not functional during operational phase. All these put together have misdirected efforts on construction project to a production of economic waste and social misdeeds.

This paper is aimed at evaluating the construction contract management in Nigeria so as to make recommendations.

## 2. OBJECTIVE OF STUDY

The aim of this study will be achieved with the following objectives

(i) To ascertain if the tendering methods have led to the selection of incompetent contractors.
(ii) To ascertain whether the construction contract document is considerably used in the construction contract management process.
(iii) To identify the common techniques used in planning and scheduling of construction contract management process and to find out if there is any significant difference in their effectiveness.
(iv) To ascertain if there exist any significant relationship between the role of management and successful implementation of construction contracts.
(v) To make all necessary recommendations based on the findings and conclusion.

## 3. LIMITATIONS OF STUDY

The limitations of this study include the following

(i) Data collection problem: There was the problem of collecting data because not much literature exist for secondary data. Some of the respondents were reluct5ant to fill the questionnaire.
(ii) Time and fund problem: The work is limited to the operators of the constructions industry in Imo and Abia states of Nigeria due to the limitations of funds and opportunity to reach out to all other part of the country.

## 4. CONTRACT DOCUMENTATION

Construction contract documentation is a major aspect of the contract formation. Every information is expected to be collected, presented and analysed with accuracy, simplicity and clarity so as to enhance better understanding of what is required from tenderers and ensure more accurate pricing so as to make the execution of the work at lower cost, stipulated time and quality (Sarhan, & Fox, 2013).

Opara (2020) highlighted the following contract documents:

i) Form of tender
ii) Condition of contract
iii) Specification
iv) Bill of Engineering Measurement and Evaluation (BEME)
v) Contract drawings
vi) Form of agreement
vii) Performance bond

The selection method depends on the policies or objectives of the organization or individual. In adition the contract principle, size and structure of the contract. The common methods of selection noticeable in the construction industry include open competition tendering, selective tendering and negotiated tendering as highlighted by Akinradewo and Aigbavoba (2019).

## 5. RESEARCH METHODOLOGY

The data used in the research work were both primary and secondary data. The secondary data was collected from the various documentary sources and formed the basis of the questionnaire (Mincks, & Johnson, 2011). This primary data was collected through the questionnaire distributed to the sample units.

The research work covered Imo and Abia States of Nigeria. The population of the study consists of the contractors, consultants and the clients.

The random sampling was used in the distribution of the questionnaire and sample size is sixty namely contractors, consultants and clients. The questionnaire was administered by hand with the help of a research assistant. The questionnaire was of two sections. Section A is the demographic information. section B of the questionnaire consists of questions on contract management. The Likert scaled questions, the respondents were asked to indicate Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree. A score of 5 points, 4 points, 3 points, 2 points and 1 point were assigned to them respectively. The rating of 3 points for instance showed that the respondent neither agree or disagree with the statement.

## 6. TECHNIQUES OF DATA ANALYSIS

The data collected through questionnaire were presented and analysed by the use of vigorous statistical tools. The questionnaire was edited for consistency and summarized in Tables. The statistical techniques for the analysis of data were analyses of variance (ANOVA) and the multiple regression analysis.

Regression analysis enables the prediction of relationship between one variable and the others. The dependent or unknown variables depends on the independent variable. a regression model can be simple or multiple. It is simple when one independent variable is involved while multiple when more than one independent variable is expressed (Onyeka, 1990).

Multiple regression analysis is used in the research work for hypothesis to test the relationship between successful implementation of construction contract (y) which is the dependent variable and the independent variable formed by classifying the roles of management during construction as ($x_1$, $x_2$, $x_3$, $x_4$).

The general multiple regression equation, is expressed as:

$Y_i = B_o + B_1 + B_2 + X_{i1} + \ldots + B_K X_{iK} + E_1$
For i = 1, 2, 3, …, n

The null hypothesis ($H_0$) that were tested are as follows:

1. $H_0$: The tendering methods have not led to the selection of incompetent contactors.
2. $H_O$: Construction contract document is not considerably used in the construction contract management process.
3. $H_O$: There is no significant difference in the effectiveness of the techniques used for planning\scheduling the construction contract management process.
4. $H_O$: There is no significant relationship between the role of management and successful implementation of construction contract at the execution period.

Where $B_0$, $B_1$, $B_2$,.....$B_K$ are the regression parameter or coefficient

$X_1$, $x_2$, .....$x_k$ are constants representing the observations on the independent variable.
Yi is the ith observation

In this work the equation below was used;
$Y=B_0+B_1x_1+B_2x_2+B_3x_3+B_4x_4+E$

Where Y=successful implementation of construction contracts.

E=the independent and normally distributed random error with mean 0 and constant $\sigma^2$.

$B_0$, $B_1$, $B_2$, $B_3$, $B_4$ are parameters.

$X_1$: setting of standard and goals.

$X_2$: provision of adequate work environment.

$X_3$: maintenance of efficient work behavior.

$X_4$: providing job support.

## A. MULTIPLE REGRESSION AND ANALYSIS OF VARIANCE

In the multiple regression model the analysis of variance enables us to test the significance of the regression and it is based on partitioning the variations into two components. Table 1 summarized the procedure.

Where SSR = Sum of squares of Regression
SST = Sum of squares of error
SST = number of Independent variable ($x_1$, $x_2$, $x_3$+, $x_4$)
N = number of observation

With the F* decision rule is, accept the null Hypothesis ($H_0$) if F* is less than Fα (K, n-k-1), if otherwise reject $H_0$ and accept the ($H_A$).

**Table 1:** The ANOVA table for multiple regression

| Source of Variation | Sum of Squares (SS) | Degree of Freedom (DF) | Mean Square (MS) | F-ratio |
|---|---|---|---|---|
| Regression | $SSR=\sum Y_i^2 - (\sum Y_i^2)^2/n$ | K | MSR = SSR/K | |
| Error | $SSR=\sum Y_i^2 - (\sum Y_i^2)^2/n$ | n-k-1 | MSE = SSE/n-k-1 | |
| Total | $SSR = \sum Y_i^2 - (\sum Y_i^2)^2/n$ | | | |

*Source: Onyeka (1990)*

## B. DETERMINATION OF THE SIGNIFICANCE OF EACH OF THE VARIABLE.

The T-test is used to carry out a significant test on each of the independent variables to determine the greatest contribution to the significance. The T-Test for multiple regression coefficient is necessary if the F-Test shows that a significant relationship exists between the dependent and independent variables.

$$t = \frac{bj - B_{jo}}{S_{bj}}$$

Where $S_{bj}$ (the standard error for bj) equals $\sqrt{MSE_{ijj}}$
MSE is the mean squared of error.
$C_{jj}$ is a constant.

The hypothesis shows a two-tailed test, therefore, the calculated t-value /t/ was compared with the t-tabulated; tα/2 (n-k-1) reject $H_0$ and accept $H_A$.
The computer output (SAS output) gives the P-value which can be used to determine the significance of each independent variable.

The P-value or prob value is the probability of getting a value farther from μHo. From it we can weigh the relevant factors and decide whether to accept or reject Ho without being bound by a pre-specified significance level. Therefore, we see that the prob-value is the largest significance level at which we could accept Ho. From another dimension the significance can be determined by comparing the p-value with a pre-determined level of significance. This method was used in this research work. If the P-value is greater than α (level of significance),the variable is not a significant explanatory variable. on the other hand, if the P-value is less than α (level of significance), the variable is significant explanatory variable.

## C. COEFFICIENT OF MULTIPLE DETERMINATION ($R^2$)

The coefficient measures the proportion of the total variation in the dependent variable Y that is attributed to the dependent of Y on all the independent variable $x_1$, $x_2$, …$x_6$ included in the regression.

$$R^2 = \frac{SSR}{SST}$$

## 7. DATA PRESENTATION AND ANALYSIS

A total of sixty (60) questionnaire were sent to the three categories of construction professionals namely client, consultant and the contractor. Fortythree responded to the questionnaire representing 72%.

The information in Table 2 shows the spread of the respondent with the contractors representing 46.5%, client 27.9% and consultant 25.6%.

**Table 2:** Spread of respondents

| Category | Number | Percentage (%) |
|---|---|---|
| Contractor | 20 | 46.5 |
| Client | 12 | 27.9 |
| Consultant | 11 | 25.6 |
| **Total** | **43** | **100** |

*Source: Author's field survey*

**TESTING OF HYPOTHESIS ONE**
**THE NULL HYPOTHESIS**

$H_o$: The tendering methods have not led to the selection nof incompetent contractors.
Formulation of hypothesis.
$H_o$: μ = no = μ = μ3
$H_A$: not all μjs are equal.

The level of significance =5% which is α = 0.05
Therefore computation of $F_1$-α (K-1)(N-K) from the statistical table is
K = 3, N = 43
:. K – 1 = 3-1 = 2
N-K = 43-3 = 40
$F_1$-α (K-1)(N-K) – $F_{0.95}$ (2,40) = 3.23

Computation of the total sum of squares (SST)

$$9^2 + 10^2 + 7^2 \ldots 10^2 - \frac{346^2}{43} = 103$$

Computation of the squares "between groups variation".

$$\frac{71^2}{8} + \frac{179^2}{23} + \frac{96^2}{12} + \frac{346^2}{43} = 7$$

Computation of sum of squares 'within – group variation' (SSW).
103 – 7 = 96
The MSB = 3.5, MSW = 2.4

$$\text{F – ratio} = \frac{3.5}{2.4} = 1.46$$

**Table 3:** Response on tendering methods in construction contracts

| Tendering Method | Contractor | Client | Consultant | Total | % |
|---|---|---|---|---|---|
| Open Tendering | 3 | 2 | 3 | 8 | 19 |
| Selective Tendering | 12 | 6 | 5 | 23 | 54 |
| Negotiated Tendering | 5 | 4 | 3 | 12 | 28 |
| Total | 2 | 12 | 11 | 43 | 100 |

*Source: Author's field survey*

**Table 4:** Fortythree respondents score on the assessment of the tendering methods

| Respondent | Open Competition | Selective Competition | Negotiated | |
|---|---|---|---|---|
| 1 | 9 | 10 | 6 | |
| 2 | 10 | 10 | 9 | |
| 3 | 7 | 7 | 10 | |
| 4 | 9 | 6 | 5 | |
| 5 | 10 | 10 | 7 | |
| 6 | 10 | 4 | 10 | |
| 7 | 6 | 7 | 7 | |
| 8 | 10 | 6 | 5 | |
| 9 | | 10 | 10 | |
| 10 | | 10 | 10 | |
| 11 | | 7 | 7 | |
| 12 | | 9 | 10 | |
| 13 | | 10 | | |
| 14 | | 8 | | |
| 15 | | 9 | | |
| 16 | | 5 | | |
| 17 | | 7 | | |
| 18 | | 7 | | |
| 19 | | 7 | | |
| 20 | | 8 | | |
| 21 | | 8 | | |
| 22 | | 7 | | |
| 23 | | 4 | | |

| | | | | |
|---|---|---|---|---|
| Total | 71 | 179 | 96 | |
| Mean $X_j$ | 8.9 | 7.8 | 8 | $T^2= 346^2$ |
| Sample unit $n_j$ | 8 | 23 | 12 | N = 43 |

*Source: Surveyed Data*

**DECISION RULE:**

If F* $\geq$ F1 α (K-1) (N-K) reject if otherwise accept. Since F-ratio < $F_1$-α (K-1)(N-K) i.e. 1.46 < 3.23 we accept the null hypothesis and conclude that the difference in the mean have occurred by chance.

**Table 5:** ANOVA table

| Source of Variance | Sum of Squares (SS) | Degree of Freedom (df) | Mean Square (MS) | F-ratio |
|---|---|---|---|---|
| Between groups | 7 | 2 | 3.5 | 1.46 |
| Within groups | 96 | 40 | 2.4 | |
| Total | 103 | 42 | | |

*Source: Summary of calculations*

**TESTING OF HYPOTHESIS TWO**
**THE NULL HYPOTHESIS**

**Ho:** Construction contract document is not considerably used in the construction contract management process.

**Formulation of Hypothesis**

$H_o$: $\mu = \mu_2 = \mu_3$

$H_A$: Not all $\mu_{js}$ are equal.

The level of significance = 5% which is α = 0.05.

Therefore, computation of $F_1$-α (K-1) (N-K) from the statistical table is:

K = 3, N = 43

:. K – 1 = 3 – 1 = 2

N – K = 43 – 3 = 40

$F_1$-α (K-1) (N-K) – $F_{0.95}$ (2, 40) = 3.23

Computation of the total sum of squares (SST)

$9^2 + 10^2 + 9^2 \ldots 10^2 - \frac{399^2}{43} = 27$

Computation of the squares "between groups variation".

$\frac{182}{20} + \frac{112}{12} + \frac{105}{11} - \frac{339^2}{43} = 1$

Computation of sum squares 'within – group variation (SSW).

27 – 1 = 96

MSB = 0.5, MSW = 0.65

F – ratio = $\frac{0.5}{0.65}$ = 0.77

**Table 6:** Frequency table of the response on the use of contract document

| | **CONTRACTOR** | | **CLIENT** | | **CONSULTANT** | |
|---|---|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **Strongly Agree** | **18** | **45** | **9** | **37.5** | **1.4** | **63.6** |
| **Agree** | **19** | **47.5** | **12** | **50** | **5** | **22.7** |
| **Undecided** | **-** | **-** | **2** | **8.3** | **1** | **4.5** |
| **Disagree** | **2** | **5** | **1** | **4.7** | **2** | **9** |
| **Strongly disagree** | **1** | **2.5** | **-** | **-** | **-** | **-** |

*Source: Survey Data*

**Table 7:** Form three respondents score on the assessment of the use of contract document

| Respondent | Open Competition | Selective Competition | Negotiated | |
|---|---|---|---|---|
| 1 | 9 | 10 | 9 | |
| 2 | 10 | 9 | 9 | |
| 3 | 9 | 9 | 10 | |
| 4 | 7 | 8 | 10 | |
| 5 | 8 | 10 | 9 | |
| 6 | 9 | 9 | 9 | |
| 7 | 10 | 8 | 9 | |
| 8 | 10 | 10 | 8 | |

| | | | | |
|---|---|---|---|---|
| 9 | 8 | 10 | 10 | |
| 10 | 10 | 10 | 10 | |
| 11 | 8 | 9 | 10 | |
| 12 | 9 | 10 | | |
| 13 | 10 | | | |
| 14 | 9 | | | |
| 15 | 10 | | | |
| 16 | 10 | | | |
| 17 | 9 | | | |
| 18 | 8 | | | |
| 19 | 10 | | | |
| 20 | 9 | | | |
| Total | 182 | 112 | 105 | |
| Mean $X_j$ | 9.1 | 9.3 | 9.5 | $T^2= 399^2$ |
| Sample unit $n_j$ | 20 | 12 | 11 | N = 43 |

*Source: Surveyed Data*

**DECISION RULE:**

If F* $\geq$ $F_1$-α (K-1)(N-K) reject if otherwise accept. Since F-ratio < $F_1$-α (K-1)(N-K) i.e. 146 < 3.23 we accept the null hypothesis and calculate that the difference in the mean have occurred by chance.

**Table 8:** ANOVA table

| Source of Variance | Sum of Squares (SS) | Degree of Freedom (df) | Mean Square (MS) | F-ratio |
|---|---|---|---|---|
| Between groups | 1 | 2 | 0.5 | 48 |
| Within groups | 26 | 40 | 0.65 | |
| Total | 27 | 42 | | |

*Sources: Summary of Calculations*

**TESTING OF HYPOTHESIS THREE**
**THE NULL HYPOTHESIS**

**$H_o$:** There is no significant difference in the effectiveness of the techniques used for planning/Scheduling in the construction contract management process.

**FORM OF THE HYPOTHESIS**

**$H_o$:** μ1 = μ2 = μ3
**$H_A$:** Not all μ*js* are equal.
The level of significance = 5% which is α = 0.05.
Therefore, computation of F1 – α (K – 1) (N-K) from the statistical table is: K = 3, N = 43.

:. K – 1 = 3 – 1 = 2
N – K = 43 – 3 = 40

$F_1 – α (K – 1) (N – K) = F_{0.95}$ (2, 40) = 3.23

Computation of the total sum of squares (SST)

$2^2 + 2^2 + 2^2 \ldots 5^2 - \frac{137^2}{43} = 67$

Computation of the squares "between-Groups variation" (SSB).

$\frac{68^2}{28} + \frac{39^2}{9} + \frac{30^2}{6} - \frac{137^2}{43} = 67$

Computation of the sum of squares "within-group variation" (SSW)

67 - 48 = 19

MSB = 24, MSW = 0.5

F – ratio $= \frac{24}{0.5} = 47$

**Table 9:** Frequency table of the respondents assessment on scheduling and planning techniques

| | Bar Chart | Network | Bar Chart / Network | Total | % |
|---|---|---|---|---|---|
| **Very Ineffective** | 4 | - | - | 4 | 9.3 |
| **Ineffective** | 16 | - | - | 16 | 37 |
| **Undecided** | - | 1 | - | 1 | 2.3 |
| **Effective** | 8 | 4 | - | 12 | 27.9 |
| **Very Effective** | - | 4 | 6 | 10 | 23.3 |
| **Total** | 28 | 9 | 6 | 43 | 100 |

*Source: Surveyed Data*

**Table 10:** Respondents score on the effectiveness of the techniques

| Respondent | BAR CHART TECHNIQUE | NETWORK TECHNIQUE | BAR CHART/NETWORK TECHNIQUE | |
|---|---|---|---|---|
| 1 | 2 | 3 | 5 | |
| 2 | 2 | 5 | 5 | |
| 3 | 2 | 5 | 5 | |
| 4 | 2 | 4 | 4 | |
| 5 | 4 | 4 | 5 | |
| 6 | 2 | 5 | 5 | |
| 7 | 1 | 4 | | |
| 8 | 2 | 4 | | |
| 9 | 2 | 4 | | |
| 10 | 2 | 5 | | |
| 11 | 4 | | | |
| 12 | 4 | | | |
| 13 | 2 | | | |
| 14 | 2 | | | |
| 15 | 1 | | | |
| 16 | 4 | | | |
| 17 | 2 | | | |
| 18 | 4 | | | |
| 19 | 4 | | | |
| 20 | 2 | | | |
| 21 | 1 | | | |
| 22 | 2 | | | |
| 23 | 2 | | | |
| 24 | 4 | | | |
| 25 | 2 | | | |
| 26 | 2 | | | |
| 27 | 1 | | | |
| 28 | 4 | | | |
| Total | 68 | 39 | | $T^2 = 137^2$ |
| Number of the sample units $n_j$ | 28 | 9 | 6 | N = 43 |

*Source: Surveyed Data*

**DECISION RULE:**

If F* $\geq$ $F_1$-α (K-1)(N-K) reject if otherwise accept. Since F-ratio < $F_1$-α (K-1)(N-K) i.e. 48 < 3.23 we reject the null hypothesis and conclude that there is significant difference in the mean.

**Table 11:** ANOVA table

| Source of Variance | Sum of Squares (SS) | Degree of Freedom (df) | Mean Square (MS) | F-ratio |
|---|---|---|---|---|
| Between groups | 1 | 2 | 0.5 | 0.77 |
| Within groups | 26 | 40 | 0.65 | |
| Total | 27 | 42 | | |

*Sources: Summary of Calculations*

**THE REGRESSION OF THE SUCCESSFUL IMPLEMENTATION OF CONSTRUCTION CONTRACT ON THE FOUR FACTORS OF MANAGEMENT ROLE**

The result of the multiple regression and correlation analysis from Table 12 and using computer is shown in Table 13.

Standard Error of Y estimate = 0.57694

Coefficient of multiple correlation (R) – 0.90912

Coefficient of Determination ($R^2$) = 0.82651

F – ratio = 5.4891

**PRESENTATION AND ANALYSIS RELATING TO HYPOTHESIS FOUR TESTING HYPOTHESIS FOUR**

**Table 12:** The respondents score on their assessment of the variables

| S/N | Y | $X_1$ | $X_2$ | $X_3$ | $X_4$ |
|---|---|---|---|---|---|
| 1 | 9 | 10 | 9 | 10 | 10 |
| 2 | 9 | 9 | 10 | 12 | 9 |
| 3 | 10 | 10 | 9 | 9 | 8 |
| 4 | 9 | 7 | 9 | 7 | 9 |
| 5 | 12 | 10 | 7 | 10 | 10 |
| 6 | 6 | 9 | 8 | 8 | 9 |
| 7 | 10 | 9 | 11 | 13 | 7 |
| 8 | 9 | 9 | 8 | 8 | 6 |
| 9 | 9 | 10 | 8 | 9 | 7 |
| 10 | 9 | 8 | 9 | 9 | 7 |
| 11 | 8 | 9 | 10 | 12 | 8 |
| 12 | 9 | 9 | 9 | 12 | 8 |
| 13 | 10 | 9 | 9 | 8 | 10 |
| 14 | 8 | 8 | 10 | 10 | 9 |
| 15 | 10 | 10 | g | 11 | 12 |
| 16 | 10 | 11 | 8 | 10 | 9 |
| 17 | 6 | 10 | 10 | 9 | 9 |
| 18 | 7 | 9 | 7 | 10 | 8 |
| 19 | 7 | 8 | 9 | 9 | 10 |
| 20 | 7 | 9 | 9 | 9 | 10 |
| 21 | 10 | 10 | 9 | 8 | 7 |
| 22 | 10 | 9 | 8 | lo | 9 |
| 23 | 8 | 10 | 8 | 11 | 8 |
| 24 | 9 | 9 | 8 | 11 | 8 |
| 25 | 10 | 9 | 9 | 9 | 7 |
| 26 | 8 | 9 | 9 | 9 | 10 |
| 27 | 8 | 9 | lo | 7 | 11 |
| 28 | 10 | 10 | 10. | 6 | 11 |
| 29 | 10 | 11 | 7 | 7 | 9 |
| 30 | 9 | 8 | 9 | 7 | 9 |
| 31 | 10 | 9 | 11 | 10 | 9 |
| 32 | 10 | 9 | 10 | 5 | 10 |
| 33 | 10 | 9 | 9 | 7 | 19 |
| 34 | 11 | 10 | 10 | 10 | 11 |
| 35 | 8 | 10 | 8 | 10 | 10 |
| 36 | 10 | 9 | 8 | 9 | 11 |
| 37 | 9 | 10 | 9 | 10 | 11 |
| 38 | 8 | 9 | 11 | 10 | 8 |
| 39 | 8 | 8 | 9 | 10 | 10 |
| 40 | 9 | 9 | 11 | 8 | 9 |
| 41 | 11 | 10 | 8 | 11 | 10 |
| 42 | 9 | 10 | 9 | 10 | 9 |
| 43 | 10 | 9 | 10 | 9 | 11 |
| **Total** | **389** | **398** | **388** | **400** | **392** |
| **AVG.** | **9.046512** | **9.255814** | **9.023256** | **9.302326** | **9.116279** |

From Table 13 the regression equation is = $Y = 10.43983 + 0.7525X_1 + 0.3419X_2 + 0.5256X_3 + 0.1874X_4$

The above result can be used to analyse the degree of dependence of the successful implementation of construction contract on the independent variables.

**Table 13:** Result of multiple regression and correlation analysis using computer

| Variables | Coefficient | Standard error | t-cal | p-value |
|---|---|---|---|---|
| $X_1$ | 0.7525 | 0.2684 | 2.8039 | 0.007909 |
| $X_2$ | 0.3419 | 0.2088 | 2.9476 | 0.582073 |
| $X_3$ | 0.5256 | 0.1176 | 3.9737 | 0.813777 |
| $X_4$ | 0.1874 | 0.1403 | 3.2867 | 0.000785 |

*Source: Summary of Calculations*

**TEST OF THE HYPOTHESIS**
**TO TEST THE SIGNIFICANCE OF THE INCLUSION OF ALL THE INDEPENDENT VARIABLES**

In other to test the significance of the inclusion of independent variables we formulate the hypothesis.
$H_0$: b = b = b = b = 0
$H_A$: b = b = b = b # 0

$H_0$ denotes that there is no significant relationship between the successful implementation of construction contract, and the role of management. $H_A$: says that, a significant relationship exist between the dependent and independent variables.

From the computer output the F-calculated at 5% level of significance (α-0.05) was 5.4891 while Fi-α (K, n-k-1) was 2.61.

**DECISION RULE**

The $H_0$ is rejected if the computed value of F-ratio (F*) is greater than the critical or tabulated F-value Fi-α (K, n-K-1); otherwise accept, therefore, since F* = 5.489.1 > $_{F0.95}$ (4.38) = 2.61 we reject the null hypothesis ($H_0$) and accept that there exists a significant relationship between, the successful implementation of construction contract.

**DETERMINATION OF THE SIGNIFICANCE OF EACH INDEPENDENT VARIABLES**

The H0: null hypothesis is the F-test is rejected showing that there is significant relationship between the Y and $X_1$ and $X_2$, $X_3$, $X_4$ variables. Therefore, we further examine the individual co-efficient to find out which ones contribute to the significance. The P-value in the computer sheet or Table 13 enables us to determine the significance of each of the explanatory variables.

**DETERMINING THE SIGNIFICANCE OF VARIABLES ONE ($X_1$)**

$H_0$: bi = - > 0 Xi not a significant explanatory variable.
$H_A$: bi # - > $X_1$ is a significant explanatory variable.

From Table 13 the P-value for XI is 0.007909. Since this two-tailed test the actual P-value will be 2(0.007909) = 0.02. Comparing the P-value with the level of significance which is 0.05 we could see that the P-value is less than α (the level of significance). Therefore, we categorically conclude that the inclusion of Xi variable s significant, that is the null hypothesis is rejected.

**DETERMINING THE SIGNIFICANCE FOR VARIABLE TWO ($X_2$)**

$H_0$: bi = 0 –>> $X_2$ not a significant explanatory variable. HA:
$H_A$: bi # 0v- >> $X_2$ is a significant explanatory variable.

The Table 13 shows the P-value for this variable as 0.582073. for a two-tailed test it becomes 2 (0.582073) = 116. The P-value is greater than (>) the level of significance (α), therefore we conclude that the inclusion of $X_2$ variable is not significant. That is to say, hypothesis one is accepted.

**DETERMINING THE SIGNIFICANCE FOR $X_3$ VARIABLE**

$H_0$: bi = - > 0 $X_3$ is not a significant explanatory variable.
$H_A$: bi # 0 - > $X_3$ is a significant explanatory variable.

From Table 13, the P-value for this variable is 0.813777. for the two tailed test the actual P-value is 2 (0.813777) which is 1.63. the P-value greater than the level of significance which is 0.05. therefore, we accept null hypothesis and conclude that the inclusion of variable $X_3$ is not significant.

**DETERMINING THE SIGNIFICANCE FOR VARIABLE $X_4$**

$H_0$: bi = - > 0 $X_4$ is not a significant explanatory variable.
$H_A$: bi # 0 - > $X_4$ is a significant explanatory variable.

The P-value for the $X_4$ as 0.000785 for the two-tailed test the accept P-value is 2 (0.000785) and that is 0.0016. The P-value is less than the level of significance which is 0.05. therefore, we conclude that the inclusion of variable $X_4$ is significant by accepting the null hypothesis.

## 8. DISCUSSION OF ANALYSED DATA

The information in table 2 shows that out of forty-three (43) that returned their questionnaire twenty (20) representing 46.5% are for contractors, twelve (12) are clients representing 27.9% and eleven (11) representing 25.6% are consultants.

The data presented in table 3 indicates that the common tendering methods adopted are the open tendering, selective tendering and the negotiated tendering. The details shows that eight (8) representing 19% adopt open tendering, twenty three (23) representing 54% adopt selective tendering and twelve (12) representing 28% adopt negotiated tendering method. It then means that means that the most corporations use selective competition method of tendering. Despite the noted advantages of the open tendering method, it is not mostly used in Nigeria as shown from the field survey. The decision rule for the hypothesis one with reference to Table 4 indicates there is no significant difference in the mean of the three methods, it then means that there is agreement in the opinions of the practitioners that the tendering method have uniformly resulted to the selection of incompetent contractors as shown in the summary calculations of Table 5. This is in accordance with Fagbenle et. al (2018) and Hansen (2021) views.

On the questions relating to contract document as shown in Table 6, eighteen (18) representing 45% and nineteen (19) representing 47.5% of contractors strongly agree and agreed that clients do not use the contract documents to provide all necessary information needed and that participants do not use it to measure their adherence to the contractual obligation. A greater percentage of clients and consultant consented to the view of these contractors. For clients nine (9) representing 50% strongly agreed and agreed respectively. While fourteen (14) representing 63.60% and 5 representing 22.7% of consultants strongly agreed and agreed. The conclusion of the hypothesis two using Table 7 shows that there is no significant difference in the mean score of the three categories of these practitioners in the construction contract management process. That is to say, the contractors, clients and consultants agree that contract documents is not considerably used in the construction contract management as indicated in the summary calculation of Table 8. This conforms to the opinion of Chizea (2002). In the public sector, the contract document is for formality.

The field survey shows that bar chart techniques and network techniques are the common techniques used in the construction contract management process for the purpose of planning and scheduling. Information from Table 9 shows that 28 representing 65.12% adopt bar chart. Only 9 respondents representing 20.93% and 6 representing 13.95%out of the 43 respondents use network and both bar chart and network techniques respectively. The data in Table 9 also shows that 20 representing 71% indicated that the bar chart which they use is ineffective. It was noted that the general preference for bar chart is due to its simplicity. Although there was a low number of the people that use network 9 representing20.93%, the technique was rated effective by 4 representing 44.4%. The six individuals that combine network and bar chart rated it very effective. The hypothesis three tested using table 10 resulted to the rejection that there is no significant difference in the mean of the three methods. This implied that there is significant difference in their overall effectiveness and this is attested to at Table 11. This in conformity with the opinion of Jibunoh (2001).

In testing hypothesis, the regression model was estimated and the equation is:

$$Y = 10.43983 + 0.7525x_1 + 0.3419x_2 + 0.5256x_3 + 0.1874x_4.$$

The values of the coefficients are $b_0$ = 10.43983, $b_1$ = 0.7525, $b_2$ = 0.3419, $b_3$ = 0.5256, $b_4$ = 0.1874 which implies that the successful implementation of construction contract increased by 0.7525 for every increased in setting of standards and goals (xi), when all the other variables were constant. In the same manner $b_2$ – 0.3419 implies that the successful implementation of construction contract increased by 0.3419 for every increase in provision of adequate work environment when other variables are held constant. Similar interpretation is given to $b_3$ and $b_4$.

The successful implementation of construction contract was found to be significant with a F-ratio of 5.4891 which is greater than the tabulated F-value at 0.05 level of significance which is 2.61. By this $H_o$ is rejected and we conclude that there is significant relationship between the successful implementation of construction contracts and factors of the role of management, at the significant level of 0.001373.

From the P-value variable $x_2$ and $x_3$ which are provision of adequate work environment and maintenance of efficient work behavior are not significant at the level of 0.05. this indication depicts that much emphasis should be on these two variables in proffering solutions to the identified problems. For variable $x_1$ and $x_2$ that are significant, variable $x_4$ which is providing job support is more significant with the t-calculated of 3.2867, followed by variable $x_1$ (setting of standards or goals) with t-calculated of 2.8039.

The coefficient of multiple correlation (R) was 0.909124 which means that 91% positive correlation exist between successful implementation of construction contract on the factors (roles of management) in the model. In addition, it shows that high level of agreement exists between the practitioners as to the impact of variable $x_1$, $x_2$, $x_3$ and $x_4$ to the realization of the set objectives of the construction contract.

Furthermore, the coefficient of multiple determination ($R^2$) was 0.8265 meaning that the independent variables, explain 83% of the variation in successful implementation of construction contract and the remaining 17% could be attributed to other factors.

## 9. MAIN FINDINGS OF THE RESEARCH

The information gathered and duly analyzed from the various firms shows that the type of tendering method adopted in selection of contractors are mainly open tendering, selective tendering and negotiated tendering. The result revealed that the selective tendering is preferred more for the selection of contractors for construction projects. The three methods from the findings correspondingly lead to the selection of incompetent contractors attesting to the opinion of Banwo et al. (2015).

The result also revealed that considerable use of contract document is not obtainable in the construction contract management, as attested by the three categories of participants, namely the contractors, clients and consultants.

The common techniques for planning/scheduling the construction contract management process are bar chart and network techniques. The analysis showed that bar chart is used more as a result of its simplicity while the usage of network scheduling is low. Reasons given for this trend include the complexities associated with the method and the lack of adequate skill to the techniques. In addition, the bar chart was noted to be ineffective while network adjudged effective and very effective. The combination of the two had a much more degree of effectiveness as all the respondents accepted that is very effective. This falls in line with the revealed result of the hypothesis that there is significant difference is their effectiveness as highlighted by Bamisile (2009).

Moreover, the data revealed that there is positive relationship between successful implementation of construction contracts and the roles of management. The performance is not significant on the provision of adequate work environment and maintenance of efficient work behavior according to the result in the computer analysis of the data.

## 10. CONCLUSION

The contributions of the construction industry to the national economy efforts to boast the sector has yielded less result. Analysis shows that tendering methods, namely open competition, selective competition and negotiated method has led to the selection of incompetent contractors. Construction contract document is not considerably used. There is significant different in the overall effectiveness of the common techniques used in determining of the construction contract management process. There is a positive relationship between the roles of management and successful implementation of construction contracts, but the provision of adequate work environment and maintenance of efficient work behavior did not contribute significantly. All these put together points to a firm conclusion that there is no effective construction contract management.

## 11. RECOMMENDATION

Open competitive tendering method should be adopted with attention given to checking the adverse effect of favouritism due to bribery, tribal sentiment and personal relationship in the selection of contractors.

There should be an establishment of a formal independent body with the assignment to evaluate and publish contractor's capabilities in carrying out categories of contract worked regularly.

There should be an effective monitoring and any failure should attract legal consequences.

Network techniques should be integrated to the resources planning, scheduling and controlling of construction contract work. Comprising of design, bill production, tender, selection of contractor, construction and final account.
The client/consultant management should perform its roles effectively and efficiently with emphasis to maintaining adequate work environment and work behavior factors.

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