

# FACTORS AFFECTING COST OF CONSTRUCTION IN NIGERIA

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**Abstract:** This research work is on factors affecting cost of construction in Nigeria. The construction industry is a vital part of the Nigerian economy. The sector is often used as an indicator of socio-economic development of the nation and therefore it is indispensable in the process of development. The cost of construction projects delivery in Nigeria is very high. This research work is therefore aimed at determining the nature and factors affecting the cost of construction in Nigeria, their possible effects in the country and finding out ways of reducing it. The work began with a look into works on the topic by various authors. Then, seventy (70) copies of the questionnaire were randomly administered to various stakeholders: twenty-two to consultants (22); thirty-two (32) to contractors and sixteen (16) to clients. A total of fifty-two (52) usable responses were received, representing 74.29% effective response rate. Data gathered were quantitatively and qualitatively analyzed. It was observed that the main factors affecting cost of construction are cost of materials, which rank top on the list; others include wrong method of estimation, incorrect planning, and so on. In order to reduced the cost of construction project delivery, the research made some recommendations which include the fact that Quantity surveyors as cost experts, are in the unique position to examine these factors and take care of estimates, including contingencies in the budget, plan for, and mitigate the adverse effects of these factors on project cost. The study therefore recommends that special attention should be paid to the construction project delivery process.

**Keywords:** construction industry, consultant, client's, contractors, and cost.

## I. INTRODUCTION

The growing need for construction of all types coupled with a tight monetary supply has provided the construction industry with a big challenge to cut cost. According to Mendelson and Greenfield (2009) the remaining part of the twentieth century would involve corporations, institutions and government in a race to survive. The attendant dwindling economic fortune of nations economies around the World have geared up the participant in these sectors (the client in particular) to take up the challenge of ensuring efficient use of their resources to obtain value for money in terms of performance.

The total cost of construction in normal circumstances is expected to be the sum of the following costs: Materials, Labour, Site Overheads, Equipment/Plant, Head office Cost and Profit but in many parts of the world particularly in Nigeria, there are other costs to be allowed for. These costs according to Mbachu and Nkado (2004) have obvious negative implications for the key stakeholders in particular, and the industry in general. To the client, high cost implies added costs over and above those initially agreed upon at the onset, resulting in less returns on investment. To the end user, the added costs are passed on as higher rental / lease costs or prices. To the consultants, it means inability to deliver value - for - money and could tarnish their reputation and result in loss of confidence reposed in them by clients. To the contractor, it implies loss of profit through penalties for none completion, and negative word of mouth that could jeopardize his/her chances of winning further jobs, if at fault. The proposed work will investigate and report the other costs to be allowed for, which are the basic factors affecting construction cost in Nigeria and also proffer solutions to how construction cost can be minimized.

The demand for more construction of all types, coupled with a tight monetary supply has provided the construction industry with a big challenge to cut costs. The problem of high contract costs of all aspects of construction is becoming obvious. Consequently, substantial increases are being observed in projects all over Nigeria. This substantial increase has brought about loss of client confidence in consultants, added investment risks, inability to deliver value to clients, and disinvestment in the construction industry in Nigeria.

The aim of the study is to examine the factors affecting construction cost in Nigeria and proffer solutions on how the cost can be minimized. To achieve the aim, the following objectives were to be carried out:

- i. To identify the main factors affecting construction cost in Nigeria.
- ii. To determine the severity ranking of the factors amongst clients, consultants and contractors; and
- iii. To determine the agreement ranking of the factors between clients, consultants and contractors.
- iv. To proffer solutions on how to minimize construction costs in Nigeria

The following questions were considered in carrying out the research work:

1. What are the main factors affecting construction costs in Nigeria?
2. Which of the factors are more severe than the others, according to the opinions of the clients, consultants and contractors?
3. Does the consultant, the client and the contractor agree with the severity ranking of the factors that affect cost of construction in Nigeria?

The scope of this research is limited to identification of essential factors affecting construction cost in Nigeria and proffering solutions on how to reduce the costs. The study is limited to projects in the Lagos metropolis of Nigeria because there is easy access of information in the Lagos metropolis by the researcher. Target respondents for the study were the principal actors in the construction industry namely: the Clients, the Consultants and the Contractors.

## II. LITERATURE REVIEW

### A. The Nigerian Construction Industry

In Nigeria, like most developing countries, the construction industry plays a dominant role in the economic activities of the country. According to Olowo - Okere (2008) the construction industry accounts for about 60% of the Nation's capital investment and 30% of the Gross Domestic Product (G.D.P)

Furthermore, the construction industry is said to have contributed about half of the total stock of fixed capital investment in the Nigeria economy (Olaloku, 2007). The industry also generates employment opportunities, which place it second to the Government in the employment of labour (Husseini, 2012).

When the construction industry was booming in the 1970's, the country's economy experienced similar effects during that period. However, from early to mid 1980's, the industry experienced a jolt and its effect was felt in all spheres of national life (Isiadinso, 2008).

Buhari (2010) reported that the lull in construction of early 80's was not limited to Nigeria alone. The lull also occurred in Western Europe and America. But the parent companies of these big timers in our midst were not only able to stay afloat the stormy ocean but were able to expand their sales. They were able to do this by initiative, creativity and research. Consequently, the Federal and State governments resorted to taking foreign

loans as a quick solution to the problem. However, some of the measures taken by Government in order to revitalize the economy further aggravated the situation.

One obvious implication of this development is that the cost of imported raw materials and subsequently of the finished products substantially increased (Husseini, 2012). These substantial increases as reported by Mbachu and Nkado (2004) have obvious negative implications for the major players and the industry; undermining the viability and sustainability of the industry.

## **B. THE ROLES OF CONSTRUCTION ACTORS IN CONSTRUCTION COST**

There are diverse interests in the construction industry. The principal interest or actors in the construction industry are the clients, the consultants and the contractors:

### **The Client**

The Client is, by far, the single most important member of the construction team. He is the initiator and financier of all the projects. Omole (2012) noted that the major contributions of the client can make to the successful operations of the construction industry lies in his skill in specifying his needs prior to the preparation of the design. It is also important for the client to set cost limits of the project at the briefing. He should also ensure that adequate financial provisions are made prior to commencement of any project.

### **The Consultant**

Cost considerations are among the most important and basic considerations that Consultants must deal with. It is essential to see that projects are contained within the client's budget and cost forecasts. Cost has the final control over virtually every project. Accurate cost analysis and control is one of the necessary services the client requires from the consultants (Omole, 2012).

### **The Contractor**

Omole (2012) further reveals that the major task of Contractors is to assemble and allocate the resources of labour, equipment and materials to the project in order to achieve completion at maximum efficiency in terms of time, quality and cost.

## **C. CONSTRUCTION COST FACTORS**

A review of literature reveals that there are several factors affecting construction costs for large buildings. In a study of the Nigerian Construction Industry, Omoregie and Radfort (2006) sampled the opinions of Contractors, Consultants and Clients and they discovered 15 factors responsible for project delays and construction cost escalation in Nigeria. Their survey revealed price fluctuation as the most severe cause of project cost escalation which is attributed to the limitation in exchange rate which in turn affects construction material prices and general price level. In another study, Elinwa and Silas (1992) identified 31 essential factors causing High Cost of Buildings with fraudulent practices and kickbacks ranking second (2<sup>nd</sup>) most important factor in Nigeria. Husseini (2012) noted that fraudulent practices and kickbacks occasioned by greed are perpetuated by some major players in the construction industry. Frimpong, Oluwoye and Crawford (2003), in a review of developing countries such as Ghana identified some factors as underlying causes of delay and cost over runs in ground water construction projects, The five most important factors agreed by Clients, Consultants and Contractors were monthly payment difficulties from agencies, poor contract management, material procurement, poor technical performances and escalation of material prices.

Furthermore, a study of the relative weight of ten major causes of business failure in the United States of America revealed construction cost related factors as mostly contributing to business failure. (Kangari,2010). They include: Bad profit, management incompetence, lack of experience, inadequate sales, loss of market and economic decline.

Some of the factors are highlighted in the following paragraphs:

#### **Effects of weather**

Weather is the most uncontrollable factor amongst the other variables considered. Temperature and humidity affect productivity of workers. If the temperature and humidity are high, workers feel lethargic and lose physical coordination (Frinpong, Oluwoye and Crawford, 2003).

#### **Inadequate production of raw materials by the country**

Ogunlana, Krit and Vithool (2013) noted that the reason for shortage of materials could be the defective supply of materials occasioned by general shortages in the industry, poor communication amidst sites and head office, poor purchasing, planning and materials coordination. Nigeria still imports cement when her cement production potentials surpass any other African country's own, except Egypt and that the 100 % raw materials required for cement production, is readily available in Nigeria (Eyo -Ita - Eyo, 2011)

In another development. Makoju (2010) observed that 90% of the aggregate components for production and delivery of electricity in the country still depends on other developed countries because of incessant supply of electricity.

#### **Supplier manipulation**

The major reasons for this factor as observed by Manavazhi and Adhikari (2012) are monopoly control of the market by some suppliers, work stoppages in factories, lack of industrialized materials, fluctuating demands forcing suppliers to wait for accumulation of orders and difficulty in importing raw materials from other countries.

#### **Government policies**

Aibinu and Jagboro (2010) revealed that Government deregulation policies aimed at liberalizing the economy since 1986 are responsible for the instability in prices. It is therefore not surprising that fluctuation claims during these periods contribute significantly to additional cost.

#### **Contractor's cartel**

According to Omole (2012), the major projects like heavy engineering, super highways and general infrastructure can only be undertaken in Nigeria by a few contractors. These contractors know themselves and therefore an indirect cartel is formed. The contractors on tendering are in a vantage position to decide amongst themselves who gets which contract and at what price. What appears on tendering to be the lowest tender may be over 20% - 30% above the actual value of the job.

#### **Incorrect planning**

Incorrect planning is one of the most important factors that affect cost of construction. Contractors must be aware of all resources that he might need for any project. The contractors, also, should utilize all resources in an efficient manner. Proper scheduling is the key to utilizing project resources, if not, the project cost will increase.

#### **Fraudulent practices and kick backs**

This factor was the second most important factor affecting construction cost in Nigeria as noted by Elinwa and Silas (1992). Hussein (2012) also noted that fraudulent practices and kick backs occasioned by greed are perpetrated by some major players in the construction industry. The perpetrators of this act in the industry are predominantly found within the rank and file of contractors, consultants and public clients.

#### **Political Interference**

Omole (2012) reveals that 80 percent of the contractors in Nigeria are indigenous companies. The government agencies, in most cases are tele-guided by the political heavy weight to award contract to party stalwarts at very high prices. The consultants estimates are disregarded in most cases when awarding contracts and where possible manipulated. It is a general knowledge that governments and parastatals particularly during the last political era give a very short time to consultants to prepare contract document for tender purposes.

#### **Relationship between management and labour**

There is always a gap between the project management and labour. This gap should be kept as small as possible, so that the relationship between management and labour may be strengthened. They should work as a team to build a project with minimum cost. If the relationship between management and labour is bad the morale of the labourers will decrease and production will decrease leading to increased project cost.

#### **Contract Management**

Poor contract could be attributed to the manner in which contracts are awarded. In most cases projects are awarded to the lowest bidder (Mansfield, Ugwu and Doran, 2011).

Some of these low bidders may lack management skills and have less regard for contract plans, cost control, over all site management and resource allocation. As we know in the case of Nigeria, contracts are usually awarded to politicians and well connected individuals irrespective of the apparent deficiencies in their relevant delivery potentials. Accordingly, Frimpong et al (2003) observed that most contractors in Sub - Saharan African are entrepreneurs who are in the business of making money at the expense of good Management. Consequently, they pay low wages, submit very low bids and have very little, if any ability to plan and coordinate contracts.

#### **Lack of coordination between designers and contractors**

Contractors construct the project according to the project design. Normally, if the design has any mistakes, the contractors may apply the mistakes without knowing there are mistakes or without notifying and coordinating with the designer or the client. Implementing designs with mistakes obviously costs a lot of money.

#### **Cost of materials**

Material price is subject to supply and demand and is affected by many other things, including quality, quantity, time, place, buyer and seller. Other factors affecting material cost include: currency exchange, low or high demand, material specification, inflation pressure and availability of new materials in the country.

#### **Additional Work**

Additional work is related to design changes, which is due to lack of detailed briefing on the functional and technical requirements of the projects by the clients (Mansfield et al, 2011).

#### **Poor Financial control on site**

Controlling the project financially on site is not an easy task .All resources need to be controlled: labour productivity, material availability, material waste, good and effective methods, using effective tools, equipment, good project planning and scheduling.

Project management should therefore be aware of all those factors in order to achieve better financial control on site.

#### **Disputes on site**

Dispute is a major obstacle for any project. Normally disputes will exist if work does not match the contract document or if work is not included in the contract document. Any dispute will eventually delay the project and increase project cost.

#### **Fluctuation of prices of materials**

Omoriegbe and Radfort (2006) surveyed contractors, consultants and public clients and revealed price fluctuation as the most severe cause of project cost escalation in Nigeria. This could be attributed to the limitation in exchange rate which in turn affects construction materials prices and the general price level. Another factor is the unstable inflationary trend in Nigeria which is a result of demand exceeding supply, creating a scarcity of goods which in turn leads to escalation of the goods.

#### **Contract procedure**

The contract document is the ground rule between all parties (contractors, consultants and clients). One part of the contract document is the contract procedure. The contract procedure shows the type of contract, payment procedure constraints and regulations within the contract. The type of contract affects the projects because of the risk involved in some types of contract (i.e. lump sum). Unclear contract procedures will lead to disputes, project delay and cost overrun (Fisk, 2009)

#### **Wrong method of estimation**

This factor could be attributed to the unpredicted inflationary trend, lack of adequate training and experience at the senior management level, and fraudulent practices Mansfield et al (2011).

#### **Waste on site**

It seems that the little waste of construction material on site should have a very minor effect on the total material cost. However, this minor effect can reach up to 50 % of the total material margin of a project. So waste on site has to be considered on tendering any project (Elinwa and Silas, 1992)

#### **Transportation cost**

As the government increases the price of fuel, transportation companies raise the cost of their services to cover the fuel increase and that obviously translates to an increase in transportation cost.

#### **Duration of contract period**

Usually the longer the duration of the contract the more resources will be put into the project. Any delay to a project will lead to an increase in the project cost. If the delay comes from the contractors, the project owner will lose the opportunity to invest in the project earlier. Also, if the cause of the delay is the client, the contractor may lose the opportunity to win other projects or suffer from the non-utilizing the full resources.

#### **Equipment cost**

Equipment cost becomes more expensive as new technology or special equipment is requested. Most heavy equipment run by diesel fuel and the price of diesel fuel has increased significantly.

#### **Mode of financing bonds and payments**

Ogunlana et al (2013) reported that financing and payment of completed works is responsible for cost escalation in Nigeria. Generally, contractors are sometimes not paid in accordance with the contract conditions. There are cases where clients fail to honour Architect's certificate of payment for up to 6 months or more whereas the contract conditions, in most cases stipulates about 28 days . Most contractors when preparing their tenders make allowance for partial financing of the project. They charge the clients for payments of interests and bank charges on moneys they anticipate to borrow from the banks to finance these projects (Omole, 2012) The irregular financing of public projects is a major cause of liquidity problem for contractors: however, contractors can be paid in accordance with the contract agreement if clients can generate the availability of adequate funds before the project commences (Mansfield et al, 2011).

#### **D. WAYS OF MINIMIZING COST**

There are several ways in which cost of construction can be minimized. Fisk (2009) reveals two cost reduction measures. The first is the application of a value engineering concept, which aims at a careful analysis of each function and the elimination or modification of anything that adds to the project cost without adding to its functional capabilities. He argues that by carefully investigating costs, availability of materials, construction methods, procurement costs, planning and organizing, cost / benefit values and similar cost influencing items, an improvement in the overall cost of project can be realized. The second is to provide comprehensive and error free designs and specifications to avoid misinterpretations by the contractor or delay due to missing details. According to Cooke and Williams (2003) recommended as cost reduction measures the elimination or minimization of design / specification, delivery and site wastes through the formulation and implementation of effective material policy and material management.

In addition, Ashworth (2000) observed that profitable firms may be generating their revenues from the elimination of waste at both professional and trade practice levels. Cost reduction measures also include: establishing firmly the requirements and features of the project at the onset before getting started, preparing the project team to do its best by getting members to sign off on capabilities and responsibilities, staying diligent about keeping the project the project on the right path through contract clauses that disallow significant changes once the project is underway, effective human resource management through effective motivation, and project tracking involving discerning early what area or paths are leading to dead ends and applying early corrective actions.

### **III. RESEARCH METHODOLOGY**

#### **Research Design**

The aim of this study was to identify the factors affecting construction cost in Nigeria and also to proffer solutions on how this escalating cost can be minimized.

The research design for this work is a cross-sectional survey design.

The study area for this research is Lagos state a metropolitan city in western Nigeria. The choice of Lagos as the study area is because since the creation of the state and in spite of the movement of the nation's capital to Abuja, it has never ceased to be the center of the country's economy, commerce and 'power'; coupled with its highest population next to Kano, it naturally enjoys the benefits of being the fulcrum of the nation. Lagos is a relatively 'built -up ' environment with many infrastructures like roads, bridges, skyscrapers, estate, government establishment, all kinds of private development, schools, hospitals, theaters, cinemas, shopping

malls to mention a few. All these infrastructures are the handiwork of construction. As such there cannot be a better place to obtain data for this study

The population of the study consisted of clients, consultants and contractors in Lagos, western Nigeria.

Having identified clients, consultants and contractors as the target groups for the effective conduct of this research, seventy respondents comprising of sixteen clients, twenty - two consultants and thirty - two contractors were randomly selected using stratified random sampling technique as a type of probability sampling in order to give everyone that falls into any of these identified target groups equal and independent chance of being included in the sample.

Two sets of data were identified as being relevant to the effective conduct of this research namely primary and secondary. The primary data which refers to field data were obtained through the use of well structured questionnaire developed from the initial identification of likely factors affecting construction cost in Nigeria and solutions to minimizing same. The questionnaire was designed to elicit information on the following:

- a) The respondent's role in construction
- b) The respondent's professional background (for consultants and engineers only)
- c) How long the respondent has been in construction
- d) An assessment of the severity of likely factors affecting construction cost from not severe to extremely severe. See appendix for list of factors affecting construction cost.

An evaluation of the effectiveness of proffered solutions to minimizing construction cost from not effective to very effective. See appendix for list of proffered solutions to minimizing cost of construction. Secondary data through the review of various relevant literatures were also used in the course of carrying out the research. Generally, the scales of the variables were nominal and ordinal scales. The questionnaire was validated by my supervisor before its administration.

The questionnaires were delivered by hand to the various target groups.

The descriptive survey method was used, where seventy well structured questionnaires were distributed among the principal actors in the construction industry namely: the client, the consultant and the contractor. Frequency and percentages were used for the descriptive data. Coded broad sheets were thereafter used for extracting data from the returned questionnaires. These were analyzed by SPSS (Statistical Package for Social Science) having carefully completed the variable view and imputed the extracted data appropriately on the data view. Mean score, standard deviation and spearman rank order correlation was used to achieve the stated objectives.

It is a non - parametric statistic with the following advantages:

1. Its use is not restricted and its chances of being used improperly is minimal
2. It can be effectively used even when the data are measured on weak measurement scales.
3. It is easy to compute and interpret.

#### **IV. DATA ANALYSIS AND FINDINGS**

##### **A. Survey responses**

Seventy questionnaire were randomly administered (Twenty two to Consultants, Thirty two to Contractors and Sixteen to Clients). A total of fifty two usable responses were received, representing 74.29% effective response rate. The maximum responses from each sampling frame is as shown in table 4.1 below:



**Table 4.1 Response Rate**

Questionnaire Distribution	Clients	Consultants	Contractors	Total
No. Distributed	16	22	32	70
No. Received	9	15	28	52
Percentage	56.25%	68.18%	87.5%	74.29%

**Source:** Field Survey, 2017

In table 4.1 above, the profiles of the respondents show that 56.25% of the clients responded to the questionnaire while 68.18% of the Consultant also responded to the questionnaire. 87.5% of the contractors which were the highest also responded to the question.

**Table 4.2 Respondents' role in construction**

Stakeholders	Frequency	Percent	Cumulative percent
Client	9	17.3	17.3
Consultant	15	28.8	46.2
Contractor	28	53.8	100.0

**Source:** Field Survey, 2017

The demographic profiles of the respondents in table 4.2. above show that 17.3% were in the Client category, 28.8% in the Consultant category and 58.8% in the Contractor category. A detailed breakdown of the composition of the consultants showed that Quantity surveyors are 46%, Architects 27%, Electrical Engineers 13% and Mechanical and structural engineers 7%.

## **B. DATA PRESENTATION AND ANALYSIS WITH RESPECT TO STATED OBJECTIVES**

Table 4.3: Identification of the main factors affecting construction cost in Nigeria.

	N	Mea	Rank
Cost of materials	52	3.90	1
Incorrect planning	52	3.73	2
Wrong method of estimation	52	3.23	3
Contract management	52	3.00	4
Fluctuation of prices of materials	52	2.75	5
Previous experience of contractor	52	2.75	5
Absence of construction cost data	52	2.73	7
Additional cost	52	2.60	8
Project financing	52	2.56	9
High cost of transportation	52	2.54	10
Poor financial control on site	57.	7.57	11
Economic stability	52	2.50	12
Fraudulent practices and kickbacks	52	2.44	13
Inadequate labour availability	52	2.44	13
High cost of machinery	52	2.42	15

Inadequate production of raw materials	52	2.40	16
Contractual procedures	52	2.40	16
High cost of machinery maintenance	52	2.40	18
Bureaucracy in tendering method	52	2.38	19
Duration of contract period	59	7.37	70
Supplier manipulation	52	2.37	20
Disputes on site	52	2.35	22
High cost of labor	52	2.33	23
Government policies	52	2.27	24
Relationship between management and labour	52	2.19	25
Currency exchange	52	2.19	25
Frequent design changes	52	2.17	27
High interest rate charged by banks	52	2.17	27
Social and cultural impacts	57	7.13	79
Lack of coordination between designers	52	2.13	29
Long period between design and tendering	52	2.08	31
Contractor's cartel	57	7.04	37
Mode of financing bond and payments	52	2.02	33
Political interferences	57	1.97	34
Number of competitors	52	1.87	35
Lack of productivity standard	52	1.83	36
Number of construction going on at the same	52	1.79	37
Level of competitors	52	1.71	38
Insurance cost	57	1.71	38
Labour nationality	52	1.50	40

**Source:** Field Survey, 2017

Table 4.3 shows that cost of materials (3.90), Incorrect planning (3.73), wrong method of estimation (3.23), contract management (3.00) and fluctuation of prices of materials (2.75) are the five most important factors affecting cost of construction. The table also reveals labour nationality as the least factor affecting cost of construction in Nigeria. This is likely since a good proportion of labour in the Nigerian construction industry is indigenous especially (unskilled) labour which is locally sourced as such this factor does not have any significant effect on the cost of construction.

### **C. DETERMINATION OF THE SEVERITY RANK OF THE FACTORS AMONG CLIENTS, CONSULTANTS AND CONTRACTORS.**

Table 4.4 shows the 15 most important factor affecting construction cost as perceived by clients, consultants and contractors. They all rank cost of materials (3.67, 4.00, 4.00 respectively) as the most important factor affecting cost of construction. Clients and contractors ranked incorrect planning (3.44, 3.89 respectively) as the second most important factor affecting construction cost. Consultants ranked wrong method of estimation (3.73) as the second most important factor. There was also a difference in the third most important factor as perceived by the three parties. It was poor financial control on site (3.33), incorrect planning (3.47) and contract management (3.54). When the overall averages of the groups were taken, cost of materials came first followed by incorrect planning and wrong method of estimation.

For a complete representation of the numerical ranking for all the factors, refer to appendix.

Table 4.4 Mean score and rank for the 15 most important factors affecting construction cost as reported by the different groups.

Average	Client	Consultant	Contractor
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Factors	Mea	Ran	Mea	Ran	Mea	Ra	Mea	Ra
Cost of materials	3.90	1	3. 67	1	4. 00	1	4.00	1
Incorrect planning	3.73	2	3. 44	2	3. 47	3	3.89	2
Wrong method	3.23	3	2. 56	6	3. 73	2	3.25	4
Contract management	3.00	4	2. 56	6	3. 3	4	3.54	3
Fluctuation of prices	2.75	5	2. 78	5	3 07	6	2.93	6
Previous experience	2.75	5	3. 22	4	2. 60	9	3.07	5
Absence of construction	2.73	7	2. 33	8	3. 13	4	2.61	15
Additional cost	2.60	8	2. 33	8	2 73	7	2.86	8
Frequent design change	2.56	9	2. 11	13	2. 60	9	2.86	8
Inadequate raw materials	7.54	10	2. 33	8	2. 27	14	2.68	19
Poor financial control	2.52	11	3. 33	3	2. 53	11	2.7	11
Economic stability	2.50	12	2. 33	8	2. 33	13	2.8	10
Fraudulent practices	2.44	13	2. 11	13	2. 40	12	2.89	7
Supplier manipulation	2.44	13	2. 11	13	2 .27	14	2.6	14
Currency exchange	2.42	15	2. 22	12	2 .68	8	2.6	12

**Source:** Field Data, 2017

Table 4.5 Test of agreement on the severity rank of the factors affecting construction cost.

Stakeholder	Rs	t - cal	t - tab	Accept	P value
Contractors/Clients	0.46	2.38	1.38	Yes	< 0.05
Clients/Consultants	0.36	1.73	1.38	Yes	< 0.05
Consultants/Contract	0.59	3.29	1.38	Yes	< 0.05

**Source:** Field Data, 2017

Rs - Spearman rank order correlation, T - cal t - calculated, T - tab t - tabulated,

Ho - null hypotheses, P- value probability that rejects null hypotheses wrongly. The hypotheses was set up to test if there is any agreement on the severity rank of the factors affecting construction cost in Nigeria as opined by the different groups. Table 4.5 shows the result of the computation of Spearman's rank correlation coefficient, the t- values, and the decision rule of rejection of null hypotheses for the severity rank of the factors affecting construction cost in Nigeria by the different groups in the construction industry. Table 4.5 reveals that t - cal 2.38, 1.73, 3.29 are greater than t - tab of 1.38 with 39 degrees of freedom at  $p < 0.05$  significance level, hence acceptance of the null hypotheses and rejection of the alternative hypotheses.

It can be concluded that there is a general agreement between the different groups i.e. clients, consultants and contractors with respect to their perceptions of the severity rank of the factors affecting construction cost in Nigeria. However, in the ranking of the important factors there were minor differences; clients rated the three most important factors in the following order of severity: cost of materials, incorrect planning and poor financial control on site. Consultants opinion were in the following order: cost of materials, wrong method of estimation and incorrect planning while contractors perception were in this order: cost of material, incorrect planning and contract management

#### **D. MINIMIZING CONSTRUCTION COST IN NIGERIA**

The ten most effective measures of minimizing construction cost as revealed by the data analysis are:

- i. Ensure efficient time management through proper resource planning, duration estimation and schedule development and control.
- ii. Ensure adequate site supervision to minimize poor quality workmanship and idle times.

- iii. Hire and motivate experienced and qualified workforce to improve productivity and quality of workmanship.
- iv. Ensure realistic estimates through proper cost studies,
- v. Allow sufficient time for feasibility studies, design, planning and tender submission.
- vi. Minimize propensity for late changes by ensuring a holistic assessment of client real and stated needs.
- vii. Aim at the economy in design by exploring alternatives and doing detailed investigations and analyses.
- viii. Ensure comprehensive articulation and communication of own and end - user needs and requirements during briefing sessions.
- ix. Minimize conflicts with subcontractors, which could undermine onsite productivity and progress of work.
- x. Provide comprehensive information required for easier interpretation of drawings and setting out of the works.

#### **V. DISCUSSION OF FINDINGS**

All three parties are of the opinion that cost of material is the most important factor affecting cost of construction in Nigeria. This is in consonance with the findings of Abdulaziz and Al - Juwairah (2002) about the factors contributing to construction cost in Saudi Arabia.

Consultants rank wrong method of estimation second. This is anticipated since they are more aware of different methods, accuracy and precision of estimating. The same factor was ranked fourth by contractors. However, it was not in the top five factors in the client rankings. Consultants rank Incorrect planning as the third most important factor affecting construction cost in Nigeria. It was however ranked second by both Contractors and Clients. These findings are also similar to those of Abdulaziz and Al - Juwairah (2002) about the factors contributing to construction cost in Saudi Arabia.

Clients believe that fluctuation of prices of materials also have a very significant effect on the cost of construction. They rank it fifth most important factor. Omoregie and Radfort (2005) came to the same conclusion after they studied the factors responsible for project delays and construction cost escalation in Nigeria. Although their survey revealed price fluctuation as the most severe cause of project cost escalation which they attributed to the limitation in exchange rate which in turn affects construction material prices and general price level.

Contractors are of the opinion that poor contract management will affect cost of construction. Kangari (1989) calls it management incompetence. Contractors rank it third most important factor. Since contractors depend on their Quantity Surveyors for reliable estimates, they can be severely affected by any wrong method of estimation. They rank it fourth most important factor. The three parties do not generally agree in the ranking order of factors affecting construction costs.

There is a higher agreement between contractors and consultants than between the others. This supports the findings of Abdulaziz and Al -Juwairah (2002). The most effective method of minimizing cost of construction in Nigeria as perceived by the three parties is ensuring efficient time management through proper resource planning, duration estimation and schedule development and control This is similar to

recommendations of Ashworth (2000) where he observed that profitable firms may be generating their revenues from the elimination of waste at both professional and trade practice levels. He recommended cost reduction measures including: establishing firmly the requirements and features of the project at the onset before getting started, preparing the project team to do its best by getting members to sign off on capabilities and responsibilities, staying diligent about keeping the project the project on the right path through contract clauses that disallow significant changes once the project is underway, effective human resource it fourth most important factor.

The three parties do not generally agree in the ranking order of factors affecting construction costs. There is a higher agreement between contractors and consultants than between the others. This supports the findings of Abdulaziz and Al -Juwairah (2002). The most effective method of minimizing cost of construction in Nigeria as perceived by the three parties is ensuring efficient time management through proper resource planning, duration estimation and schedule development and control This is similar to recommendations of Ashworth (2000) where he observed that profitable firms may be generating their revenues from the elimination of waste at both professional and trade practice levels. He recommended cost reduction measures including: establishing firmly the requirements and features of the project at the onset before getting started, preparing the project team to do its best by getting members to sign off on capabilities and responsibilities, staying diligent about keeping the project the project on the right path through contract clauses that disallow significant changes once the project is underway, effective human resource management through effective motivation, and project tracking involving discerning early what area or paths are leading to dead ends and applying early corrective actions.

## **VI. CONCLUSION**

The main factor affecting cost of construction as revealed by the three key players in the construction industry are cost of materials, wrong method of estimation, incorrect planning, and so on. High construction costs have obvious negative implications for the major actors in particular, and the industry in general. Project abandonment, drop in building activities, bad reputation and inability to secure project finance are all implications of high construction costs. However, an application of the proffered solutions would restore clients' confidence in consultants, reduce investment risks and generally boost the viability and sustainability of the industry. Since Quantity Surveyors are cost experts they are in the unique position to examine these factors and take care to estimate, include contingencies in the budget, plan for, and mitigate the adverse effects of these factors on the project cost. Clients, Contractors and Consultants should give an economic approach to construction work such that they would be able to identify the dominating factors leading to high cost of construction in Nigeria and apply the proffered solutions to minimizing same so as to restore client's confidence in consultants, reduce investment risks, and generally boost the viability and sustainability of the industry.

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