

# **FACTORS AFFECTING COST OF CONSTRUCTION IN NIGERIA**

**BY**

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## 1.0

### CHAPTER ONE

#### 1.0 Background of the study

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 (1996) 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 cost: 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 non-

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.

## **1.1 Statement of the Problem**

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.

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.

## **1.2 Aim and Objectives of the study**

The aim of the study is to find out the factors affecting construction cost in Nigeria and proffer solutions to how construction cost can be minimized.

The objectives of the study are as follows:

1. To identify the main factors affecting construction cost in Nigeria.
2. To determine the severity rank of the factors amongst clients, consultants and contractors.
3. To determine the agreement ranking factors between clients, consultants and contractors.
4. To proffer solutions on how to minimize construction cost in Nigeria.

### **1.3 Research Hypotheses**

To test the hypothesis:

1 (a). Ho: Contractors and Clients do not generally agree on the severity rank of the factors affecting construction cost in Nigeria

1 (b). H1: Contractors and Clients generally agree on the severity rank of the factors affecting construction cost in Nigeria

2 (a). Ho: Clients and Consultants do not generally agree on the severity rank of the factors affecting construction cost in Nigeria

2. (b) H1: Clients and Consultants do not generally agree on the severity rank of the factors affecting construction cost in Nigeria

3. (a) Ho: Consultants and Contractors do not generally agree on the severity rank of the factors affecting construction cost in Nigeria

3. (b) H1: Consultants and Contractors generally agree on the severity rank of the factors affecting construction cost in Nigeria

### **1.4 Significance of the study**

An assessment of the study would enable Clients, Contractors and Consultants give an economic approach to construction work such that they would be able to identify the dominating factors leading to high construction cost in Nigeria.

The application of the solutions proffered to minimizing construction cost would restore client's confidence in consultants, reduce investment risks, and generally boost the viability and sustainability of the industry

## **1.5 Scope and Delimitations**

The scope of this research is limited to identification of essential factors affecting construction cost and proffering solutions on how to reduce construction cost in Nigeria.

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 this study are the principal actors in the construction industry namely: the Client, the Consultant and the Contractor.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter looks at a review of relevant literatures that give a background of the Nigerian construction industry, the challenge of high construction cost, the factors affecting construction cost and the solutions on how to minimize construction cost.

#### **2.1 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 (1988) the construction industry accounts for about 60 percent of the Nation's capital investment and 30 percent 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, 1987).The industry also generates employment opportunities which place it second to the Government in the employment of labour (Husseini, 1991).

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, 1988).

Buhari (1991) 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 have further aggravated the situation.

One obvious implication of this development is that the cost of imported raw materials and subsequently of the finished products has substantially increased (Husseini, 1991).

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.



## **2.2 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:

### **2.2.1 The Client**

### **2.2.2 The Consultant**

### **2.2.3 The Contractor**

#### **2.2.1 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 (1986) noted that the major contribution 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 the commencement of any project.

#### **2.2.2 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, 1986).

### **2.2.3 The Contractor**

Omole (1986) 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.

## **2.3 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 (2005) 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. Hussain (1999) 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,1989). They include: Bad profit, management incompetence, lack of experience, inadequate sales, loss of market and economic decline.

These factors are combined into one uniform list arranged alphabetically in the table below.

Table 2. 1 Construction Cost Factors in alphabetical order

<b>Construction Cost Factor</b>	<b>References</b>
1.Absence of construction cost data	Elinwa and Silas (1993) AL– Khaldi (1990)
2.Additional work	Mansfield,Ugwu and Doran (1994) Elinwa and Silas (1993)
3.Bureaucy in tendering method	Elinwa and Silas (1993)
4. Contractor’s cartel	Omole (1986)
5.Contract management	Mansfield ,Ugwu and Doran(1994) Ogunlana, Krit and Vithool (1996 )
6.Contractual procedures	Elinwa and Silas (1993) AL– Khaldi (1990)
7. Cost of materials	Elinwa and Silas (1993)
8.Currency exchange	AL– Khaldi (1990)

9.Disputes on site	Aibinu and Jagboro (2002)
10.Duration of contract period	Aibinu and Jagboro (2002)
11.Economic stability	Elinwa and Silas (1993)
12.Fluctuation of prices of materials	Omoriegie and Radford (2005)
13. Fraudulent practices and kickbacks	Hussain (1999), TELL (2002)
14.Frequent design changes	Asamoah (2002)
15. Government policies	Omole (1986)
16. High cost of labor	Elinwa and Silas (1993)
17. High cost of machinery	Elinwa and Silas (1993)
18. High cost of machinery maintenance	AL– Khaldi (1990)
19.High cost of transportation	Elinwa and Silas (1993)
20. High interest rates charged by banks	AL– Khaldi (1990)
21.Inadequate labor availability	Elinwa and Silas (1993) AL– Khaldi (1990)
22.Inadequate production of raw materials	Eyo – Ita – Eyo (2001)
23.Incorrect Planning	Elinwa and Silas (1993)
24. Insurance cost	AL– Khaldi (1990)
25.Labour nationality	AL– Khaldi (1990)
26.Lack of coordination between designers and contractors	AL– Khaldi (1990)
27.Lack of productivity standard	AL– Khaldi (1990)
28.Level of competitors	AL– Khaldi (1990)
29.Long period between design and	Elinwa and Silas (1993)

tendering time	
30. Mode of financing bond and payments	Frimpong Oluwoye and Crawford (2003)
31.Number of competitors	AL– Khaldi (1990)
32.Number of construction going on at the same time	Elinwa and Silas (1993)
33.Previous experience of contractor	AL– Khaldi (1990)
34. Political interferences	Omole (1986)
35.Poor financial control on site	Ogunlana, Krit and Vithool (1996)
36. Relationship between management and labour	Elinwa and Silas (1993)
37. Social and cultural impacts	AL– Khaldi (1990)
38. Supplier and cultural impacts	Manavazhi and Adhikari (2002)
39. Supplier manipulation	Elinwa and Silas 1993)
40. Wrong method of estimation	Mansfield ,Ugwu and Doran (1994)

Some of the factors are highlighted in the following paragraphs:

### **2.3.1 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 (Frimpong, Oluwoye and Crawford, 2003)

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

Ogunlana, Krit and Vithool (1996) 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 except Egypt and that the 100 % raw materials required for cement production, is readily available in Nigeria (Eyo -Ita - Eyo, 2001)

In another development, Makoju (2000) 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.

### **2.3.3. Supplier manipulation**

The major reasons for this factor as observed by Manavazhi and Adhikari (2002) 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.

### **2.3.4. Government policies**

Aibinu and Jagboro (2002) 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.

### **2.3.5. Contractor's cartel**

According to Omole (1986), 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.

### **2.3.6. 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.

### **2.3.7. Fraudulent practices and kick backs**

This factor was the second most important factor affecting construction cost in Nigeria as noted by Elinwa and Silas (1993). Hussein (1999) 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 as evident from the report published by TELL (2002).

TELL (2002) also revealed that there were verifiable cases of corruption in the execution of some of the contracts awarded by the Petroleum (Special) Trust Fund (PTF). The Interim Management Committee (IMC) set up by President Obasanjo found that of the total 181.8 billion naira that accrued to PTF for the three years it operated, as much as

25.6 billion naira was wrongly paid to contractors. These include inflated contracts, fraudulent over payment of contractors by some of the agency officials and undue receipts of interest on funds placed in banks by the agencies.

#### **2.3.8. Design Change**

This problem arose from inadequate project planning and management of the design process. A quite distinctive example is the progress of West African Gas Pipeline (WAGP). Asamoah (2002) reported that WAGP project has suffered a number of setbacks, culminating in the escalation of its cost from an initial US \$500 million. One of the problems includes the changing of the initial plans to lay the pipeline offshore to an onshore configuration.

#### **2.3.9. Political Interference**

Omole (1986) reveals that 80 percent of the contractors in Nigeria are indigenous companies. The government agencies, in most cases are teleguided 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.

#### **2.3.10. 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.

### **2.3.11. 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, 1994).

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.

### **2.3.12. 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.

### **2.3.13. 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.

#### **2.3.14. 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, 1994).

#### **2.3.15. 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.

#### **2.3.16. 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.

#### **2.3.17. Fluctuation of prices of materials**

Omoriegbe and Radfort (2005) 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.

### **2.3.18. 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, 1997)

### **2.3.19. 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 (1994)

### **2.3.20. 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, 1993)

### **2.3.21. 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.

### **2.3.22. 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.

### **2.3.23. 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.

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

Ogunlana et al (1996) 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, 1986)

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, 1994).

## **2.4 WAYS OF MINIMIZING COST**

There are several ways in which cost of construction can be minimized. Fisk (1997) 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.

## **2.5 SUMMARY**

In summary, 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 cost. 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.

## **CHAPTER THREE**

### **3.0 RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Sequel to the obvious problem of high cost of construction, the aim of this study is to identify the factors affecting construction cost in Nigeria and also to proffer solutions on how this escalating cost can be minimized. In achieving the above, the following steps were followed:

1. Identification of the problem
2. Definition of the problem
3. Delimitation of the problem
4. Analysis of the problem
5. Deduction of the problem

#### **3.2 Restatement of the research objectives and hypothesis**

The objectives of this study are:

1. To identify the main factors affecting construction cost in Nigeria.
2. To determine the severity rank of the factors amongst clients, consultants and contractors.
3. To determine the agreement ranking factors between clients, consultants and contractors.
4. To proffer solutions on how to minimize construction cost in Nigeria.

The research also aims to test the hypothesis that:

1. Contractors and Clients generally agree on the severity rank of the factors affecting construction cost in Nigeria
2. Clients and Consultants generally agree on the severity rank of the factors affecting construction cost in Nigeria
3. Consultants and Contractors generally agree on the severity rank of the factors affecting construction cost in Nigeria

### **3.3 Research Design**

The research design for this work is cross – sectional survey design.

### **3.4 Study Area**

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 in 1967 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, estates ,government establishments, all kinds of private developments, 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.



### **3.5 Characteristics of the study population**

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

### **3.6 Sampling design and procedures**

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.

### **3.7 Data collection instrument**

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.
- (e) 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.

### **3.8 Administration of the data collection instrument**

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

### **3.9 Statistical tools for data analysis**

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.

### **3.9.1 Spear man rank order correlation**

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.

### **3.10 LIMITATIONS OF THE STUDY**

The major limitation of this study was the reluctance of some of the respondents in finding time to complete and return the questionnaires even after persuading them to do so.

## CHAPTER FOUR

### 4.0 RESULTS AND DISCUSSION

#### 4.1 Introduction

This chapter focuses on the analysis of the various responses from the administered questionnaires and deductions made from the analysis.

#### 4.2 Analysis and presentation of descriptive data

##### 4.2.1 Survey responses

Seventy questionnaires were randomly administered (Twenty two to Consultants, Thirty two to Contractors and Sixteen to Clients). As at the time of compiling this report, a total of fifty two usable responses were received, representing 74.29% effective response rate.

The maximum responses from each sampling frame are shown in table 4.2.1

**Table 4.1 Response Rate**

	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%

N = 70

#### 4.2.2 Respondents' role in construction

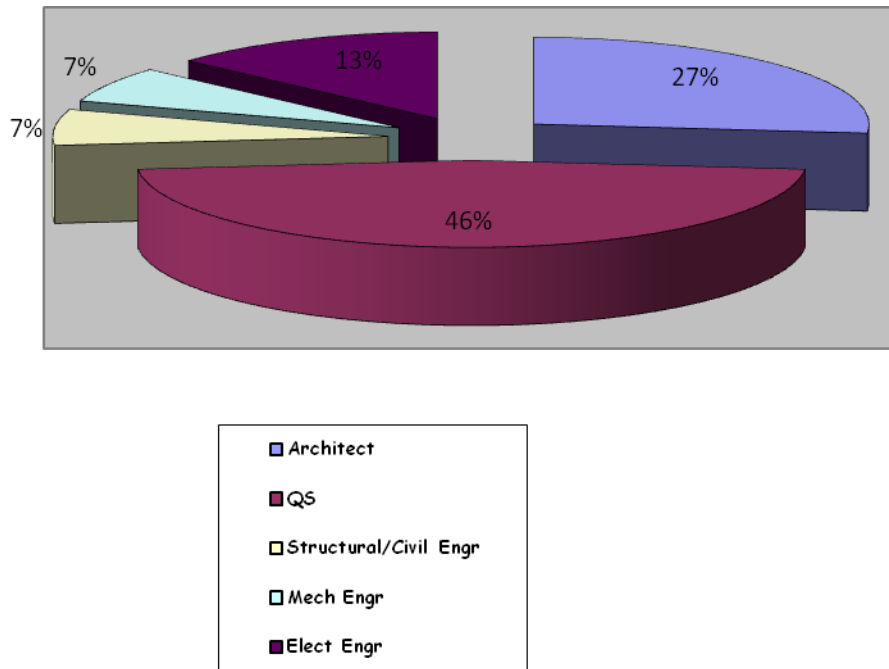
**Table 4.2 Respondents' role in construction**

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

N = 52

The demographic profiles of the respondents in table 4.2.2 above show that 17.3% were in the Client category, 28.8% in the Consultant category and 58.8% in the Contractor category.

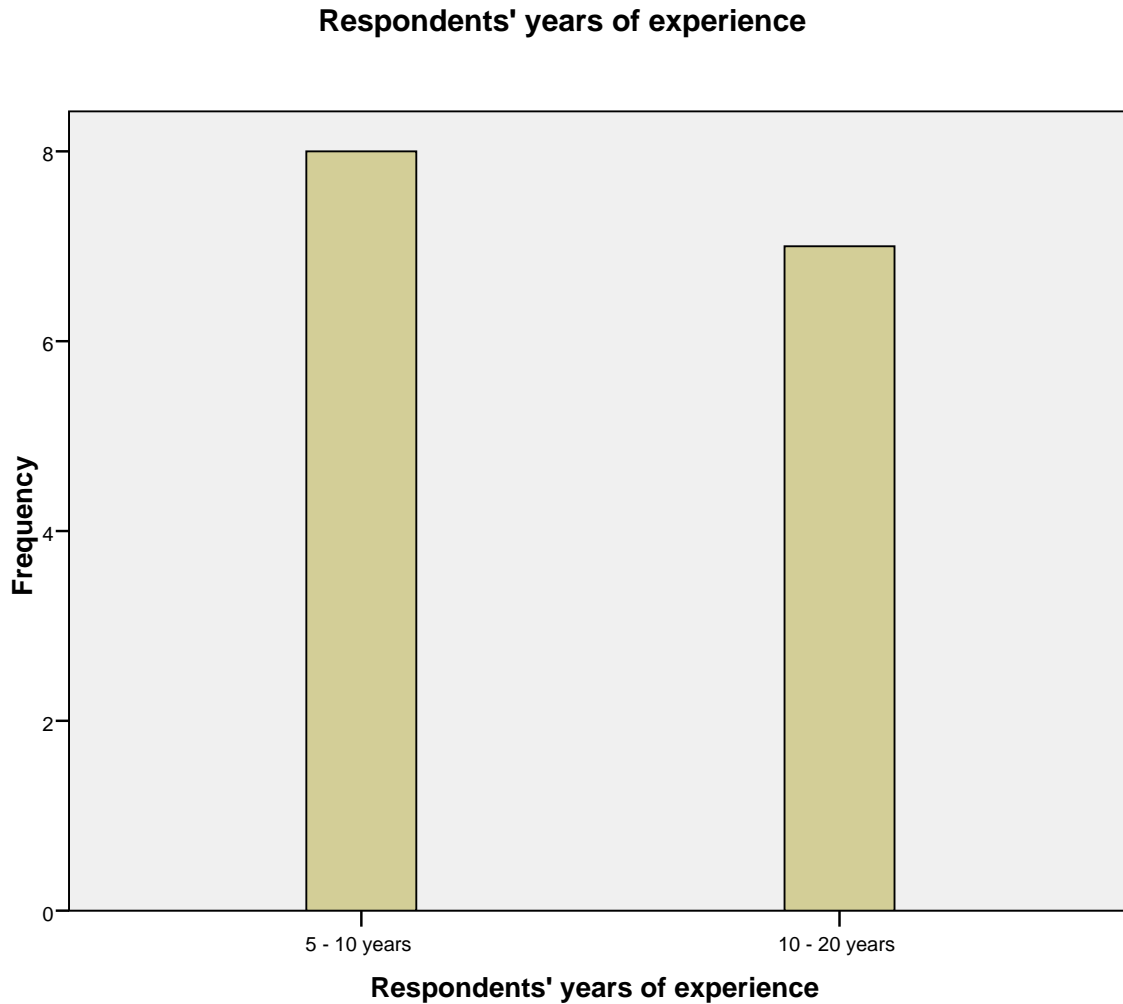
#### 4.2.3 Respondents' Role in construction



**Fig. 4.1 Respondents' professional background**

It is obvious from the figure 4.2.3 above that Quantity surveyors make the largest chunk of consultants for this research with 46%.Architects are next with 27%, followed by Electrical Engineers accounting for 13% .Mechanical and Structural engineers both represent 7 %.

#### 4.2.4 Respondents' years of experience



**Fig. 4 .2.4 Respondents' professional background**

Figure 4.2.4 show that most of the respondents possess a working experience ranging from five to twenty years. However, those in the five to ten years category are more. This period is relatively long enough to provide a reliable data.

### 4.3 Data presentation, analysis and discussion of findings in respect of stated objectives

Table 4.1 Identification of the main factors affecting construction cost in Nigeria.

	N	Mean	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	52	2.52	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	52	2.37	20
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	52	2.13	29
Lack of coordination between designers and contractors	52	2.13	29
Long period between design and tendering time	52	2.08	31
Contractor's cartel	52	2.04	32
Mode of financing bond and payments	52	2.02	33
Political interferences	52	1.92	34
Number of competitors	52	1.87	35
Lack of productivity standard	52	1.83	36
Number of construction going on at the same time	52	1.79	37
Level of competitors	52	1.71	38
Insurance cost	52	1.71	38
Labour nationality	52	1.50	40

Valid N (list wise)



Table 4.1 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 costs 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.

#### **4.3.2. Determination of the severity rank of the factors among clients, consultants and contractors.**

Table 4.2 shows the 15 most important factors 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 4.2 Mean score and rank for the 15 most important factors affecting construction cost as reported by the different groups.**

Factors Affecting Construction cost	Average		Client		Consultant		Contractor	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
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 of estimation	3.23	3	2.56	6	3.73	2	3.25	4
Contract management	3.00	4	2.56	6	3.13	4	3.54	3
Fluctuation of prices of materials	2.75	5	2.78	5	3.07	6	2.93	6
Previous experience of contractor	2.75	5	3.22	4	2.60	9	3.07	5
Absence of construction cost data	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	2.54	10	2.33	8	2.27	14	2.68	12
Poor financial control on site	2.52	11	3.33	3	2.53	11	2.79	11
Economic stability	2.50	12	2.33	8	2.33	13	2.82	10
Fraudulent practices and kickbacks	2.44	13	2.11	13	2.40	12	2.89	7
Supplier manipulation	2.44	13	2.11	13	2.27	14	2.64	14
Currency exchange	2.42	15	2.22	12	2.68	8	2.68	12

### 4.3.3 TEST OF HYPOTHESES

**Table 4.3 Test of agreement on the severity rank of the factors affecting construction cost**

Stakeholder	Rs	t – cal	t – tab	Accept Ho	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/Contractors	0.59	3.29	1.38	Yes	< 0.05

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 4.3

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 4.3 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 materials, incorrect planning and contract management.

#### 4.4. Minimizing construction cost in Nigeria

	N	Mean	Rank
Ensure efficient time management through proper resource planning, duration estimation and schedule development and control.	52	4.03	1
Ensure adequate site supervisions to minimize poor quality workmanships and idle times	52	3.92	2
Hire and motivate experienced and qualified workforce to improve productivity and quality of workmanship	52	3.71	3

Select suitable contractors not only on the basis of price and time offerings, but also in experience, financial standing, capacity and expertise	52	3.69	4
Ensure realistic estimates through proper resource cost studies	52	3.67	5
Allow sufficient time for feasibility studies, design, planning and tender submission.	52	3.67	5
Minimize propensity for late changes by ensuring a holistic assessment of client real and stated needs.	52	3.65	7
Aim at the economy in design by exploring alternatives and doing detailed investigations and analyses.	52	3.34	8
Ensure comprehensive articulation and communication of own and end - user needs and requirements during briefing sessions	52	3.63	9
Minimize conflicts with subcontractors, which could undermine onsite productivity and progress of work	52	3.61	10
Provide comprehensive information required for easier interpretation of drawings and setting out of the works.	52	3.57	11
Provide adequate and comprehensive details and specifications as needed by the contractor	52	3.51	12
Cross check design calculations and detailing to eliminate errors.	52	3.46	13
Adopt effective and efficient material management policy and practices to minimize on site material waste.	52	3.40	14
Consider contractors input on alternative workable and cost effective designs, materials and construction methods.	52	3.38	15
Clients should fulfill contractor's obligations, especially as regards to payment of contractor's work duly executed, or settlement of consultants' fees.	52	3.38	15
Adopt a computerized and design detailing approach to ensure speed and more efficient management of client changes.	52	3.34	17
Ensure accurate load estimation and structural analyses and designs that are founded on correct assumptions	52	3.30	18
Valid N (list wise)	52		

Table 4.4 reveal a general view of all the three parties on the most effective ways of reducing cost of construction. The ten most effective measure of minimizing construction cost are:

1. Ensure efficient time management through proper resource planning, duration estimation and schedule development and control.
2. Ensure adequate site supervision to minimize poor quality workmanship and idle times.
3. Hire and motivate experienced and qualified workforce to improve productivity and quality of workmanship.
4. Ensure realistic estimates through proper cost studies.
5. Allow sufficient time for feasibility studies, design, planning and tender submission.
6. Minimize propensity for late changes by ensuring a holistic assessment of client real and stated needs.
7. Aim at the economy in design by exploring alternatives and doing detailed investigations and analyses.
8. Ensure comprehensive articulation and communication of own and end – user needs and requirements during briefing sessions.
9. Minimize conflicts with subcontractors, which could undermine onsite productivity and progress of work.
10. Provide comprehensive information required for easier interpretation of drawings and setting out of the works.

## **DISCUSSIONS AND 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 management through effective motivation, and project tracking involving discerning early what area or paths are leading to dead ends and applying early corrective actions.

## CHAPTER FIVE

### 5.0 CONCLUSION AND RECOMMENDATIONS

#### 5.1 Conclusion

Conclusively, the main factor affecting cost of construction as opined by the three key players in the construction industry is cost of materials. 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.

#### 5.2 Recommendations

The following recommendations are deduced from this study:

1. Much focus should be placed on the major factors affecting construction cost in order to reduce the cost of construction cost, enhance construction performance and generate confidence within the construction industry.
2. Quantity Surveyors should become more alive to their responsibilities as cost experts ensuring that they make use of correct estimation methods.
3. There should be thorough crosschecking of estimates based on updated price information in order to avoid any wrong estimation.



4. Clients should clearly identify their requirements and needs, whether they are able to achieve them with their financial capability in order to reduce payment problems.
5. There should be proper coordination and communication among various parties working on the project in order to improve management, control problems and reduce any avoidable delay.
6. Contractors should come up with a clear plan and strategy before starting a project. Early project planning and scheduling of labour, equipment and cash, combined with a good bidding strategy, will help to obtain efficient work at a proper price.
7. Since Contractors and Consultants generally agree on the severity rank of the factors affecting construction cost, they should work together to ensure that they give the Client quality for his money without exceeding the contract sum.
8. All parties should take responsibility to make use of the proffered solutions to minimizing cost of construction.

## REFERENCES

1. Aibinu, A.A. and Jagboro, G.O. (2002) The Effects of Construction Delays on Projects delivery in the Nigerian Construction Industry. *International Journal of Project Management* 20, 593 – 599
2. Asamoah, J. (2002) Satisfying the Energy Hunger in West Africa: A Progress on West Africa Gas Pipeline. *African energy*, Brooke Patrick Publications, Johannesburg, <http://www.africanenergy.co.za>
3. Buhari I.B. (1991) Inflation and the Nigerian economy. *The Nigerian Quantity Surveyor*. 8-9
4. Cooke, B. and Williams P. (2003) Construction Planning, Programming and Control, 2<sup>nd</sup> edition. Palgrave, New York.
5. Elinwa, U., and Buba, S., (1993): Construction Cost Factors in Nigeria. *Journal of Construction Engineering and Management*. 119, (4) 698-714.
6. Eyo - Ita – Eyo, (2001) Nigerian Cement Industry is Pathetic. *THISDAY People*, Leaders and company limited. <http://www.thisdayonline.com>
7. Fisk, E.R. (1997) *Construction Project Administration*, 5<sup>th</sup> Edition. Prentice Hall, New Jersey
8. Frimpong, Y., Oluwoye, J. and Crawford, L. (2003) Causes of Delays and Cost Overruns in Construction of Ground water Projects in Developing Countries; Ghana as a case study. *International journal of project Management* 21, 321 – 326
9. Hussein A.A. (1991) Construction and the National Economy. *The Nigerian Quantity Surveyor*. 20 – 21
10. Isiadinso, E.I.; (1988) ‘The needs and Problems of the Building industry in Nigeria – A Quantity Surveyor’s View. *Research Institute Seminar, Nigerian Building and Road Research Institute*.
11. Kangari K. (1989): Business failure in Industry. *Journal of Construction Engineering and Management*. 115 (2) 173 – 187.
12. Makoju, J. (2000) Challenges of Investing in Nigeria’s Power Sector. *THISDAY Online.com*, *THISDAY People*, Leaders and Company Limited. <http://www.thisdayonline.com>

13. Manavazhi, M.R. and Adhikari D.K. (2002) Material and equipment procurement delays in Highway projects in Nepal. *International Journal of Project Management* 20, 627 – 632.
14. Mansfield, N.R. , Ugwu, O.O. and Doran, T.(1994) Causes of delay and cost overruns in Nigeria construction Projects. *International Journal of Project management* 12 (4) 254 – 260.
15. Mbachu J.I.C. and R.N. Nkado. (2004) Reducing Building Construction Costs; the Views of Consultants and Contractors. COBRA
16. Mendelson, S. and Greenfield, H. (1996): Taking value engineering into the twenty- first century. *International Journal of Cost Estimation, Cost/Schedule Control and Project Management*, 37 (8)
17. Olaloku, F.A. (1987) ‘The Quantity Surveyor, the second tier Foreign Exchange Market and the Construction Industry in Nigeria; Options and Challenges’, *Construction in Nigeria. Journal of the Federation of Building and Civil Engineering Contractors in Nigeria* 4 (1) 4-8
18. Olowo – Okere, (1988) E.O.: Problems of Construction Management in Nigeria’, *Paper presented to the workshop on National Construction Policy, ASCON, Badagry - Lagos, Nigeria.*
19. Omole A.O. (1986): Causes of the High Cost of Building and Civil Engineering Construction in Nigeria. *The Nigerian Quantity Surveyor.* (6) 1-2
20. Omoregie A. and Radford D. (2006) Infrastructure Delay and Cost Escalations: Causes and Effects in Nigeria, School Of Architecture, De Montford University, Leicester, LE 1 9BH England.
21. Ogunlana, S., Krit, P. and Vithool, J. (1996) Construction delays in a fast growing economy; comparing Thailand with other economies. *International Journal of Project Management* 14 (1) 37 – 45
22. TELL (2002) The Rot that was PTF. *Nigeria’s independent weekly magazine* number 43, Special Report. TELL communications limited.

