

**EFFECTS OF BUILDING MATERIALS PRICE INSTABILITY  
ON SUCCESSFUL HOUSING PROJECTS DELIVERY IN  
OWERRI, IMO STATE.**

**BY**

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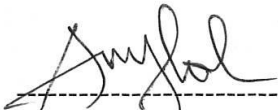
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**IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE  
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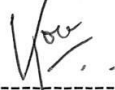
**DECEMBER, 2023**

**CERTIFICATION**

This is to certify that this work “Effect of Building Material Price Instability on Successful Housing Project Delivery in Owerri, Imo State.” was carried out by me, Nwachukwu Matthias Nnabuihe (Reg. No: 20174076328) in partial fulfilment for the award of **M.Sc.** in Project Management Technology in the Department of Project Management Technology(PMT), School of Logistics and Innovation Technology (SLIT), of the Federal University of Technology, Owerri (FUTO).

  
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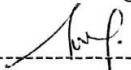
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## **DEDICATION**

This research work is dedicated to Almighty God.

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**December, 2023**

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## ABSTRACT

The study examined the Effects of Building Material Price Instability on Successful housing Project Delivery in Owerri Imo State. This was carried out to investigate the impact of unstable building material price situations on the successful housing project completion; in terms of cost, duration and quality of construction projects by Rast Engineering Ltd., Ebuzo Construction Services Ltd., and Bodos Contractor, all in Owerri, Imo State. After the background of the study and statement of the problem, three research objectives as well as research questions and two subsequent hypotheses were formulated. The research design used in this report is descriptive design, utilizing questionnaire method to obtain information from the respondents for this thesis. A total of seventy three (73) respondents were used for this study to represent the entire population of the study and a sample size of sixty two (62) was derived using the Yaro Yameni formula for sample size determination from a finite population. Primary data were collected from the primary source which questionnaire was used as an instrument of data collection while secondary data were sourced from journal, internet, textbook, etc. Data were presented in tables and analysed using the Microsoft Excel and IBM Statistical Package for Social Science (SPSS) Statistics. The findings from this study will provide solutions to the problems of building materials price instability in relation to successful housing projects delivery in Imo State. The result of this study can assist construction industry practitioners to focus attention on the identified determinants so as to control the prices of building material. This research will expand the knowledge of researchers on the nature of building material price instability and its adverse effect on successful housing project delivery and the economy of Nigeria. The study recommends that every organization should have strategies role out and agendas to ensure that the causes of building material price instability are solved to mitigate the lagging effect of price variations on project delivery. It was also recommended that the Government should formulate a standing policy that will discourage the use of imported building materials and also engage professionals in research and fabrication.

***Keywords:*** *Price instability, successful project, Housing, Building material*

## **.CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background information**

The concept of price instability refers to the idea that prices fluctuates considerably over time. Price instability reflects the disequilibria between supply and demand (i.e. when demand exceeds supply, thus existence of supply gap). Price instability can be viewed from two different perspectives, via inflation and deflation.

Inflation is a situation that occurs when there is consistent rise in the price of commodities. Deflation on the other hand refers to the situation where prices of goods keep falling. In the Nigerian construction industry, it is reported (business day) that price instability amounts to about 40% of the causes of delays in project delivery dates. Apart from being a major cause of delays in the successful completion of projects as contractually stated, price instability has also been linked to being one major factor of project abandonment and the like.

Over the years, there has not been any form of stability in the prices of building materials in the country.

From 2015 to 2020, the price of cement never remained the same for one complete month. In 2018, field survey reports have it that the price of cement fluctuated on average of every 48 hours (probable). Between 2018 and 2020 the price of cement reportedly rose from 2500 NGN to about 3500 NGN (Note the price was not stable, it was changing from rates to rates). Currently the price of cement is about 4500 NGN per bag. In 2018, 10mm rod was sold for 1750NGN per length, 12mm rod was sold for 2350 NGN per length and 16mm rod was sold for 3750 NGN per length. Within two months of the same year, the prices of these commodities had risen with an additional 200 to 300 NGN (probable) to the previous prices of the respective commodity.

More so, the price of roofing ceilings never remained constant. Between 2018 and 2020, the price per sheet of Emenite ceiling rose from 1200 NGN to 1500 NGN. The same was the case for Eternite ceiling rose which was sold at a lower price of 1000 NGN in 2015 and 1200 NGN in 2018 (Note for every one month, prices of these goods changed from one high price to another higher price for about 3 to 4 times). Other building materials such as roofing sheets, woods, nails, sands, etc. also experienced the problem of unstable price.

“Against the above background, there is the need to investigate the effect building material price instability on successful housing project delivery”.

## **1.2 Problem statement**

Building materials have been playing an important role in the construction industry, they are those materials put together in erecting or constructing structures, no field of engineering is conceivable without their use (Akanni, 2006; Udosen & Akanni, 2010). Building materials contribute immensely to the quality and cost of housing, from what is used in the foundation to the materials for roofing and finishes, while the building materials industry is an important contributor to the national economy of any nation as its output governs both the rate and the quality of construction work.

The cost of building materials poses a significant threat to both the construction industry and people aspiring to own houses (Anosike, 2009; Mekson, 2008; Mohammed, 2008; Njoku, 2007); for example, a bag of cement, which is valued at N1, 350.00 in 2006, goes as high as N1, 850.00 in 2009 (Anosike, 2009) depicting about 37% increment; the bag goes as high as N2,000.00 in 2015 during peak season (field survey 2015). Supporting this view, Jagboro and Owoeye (2004) earlier established that increase in the prices of building materials has multiplier effects on housing development while Idoro and Jolaiya (2010) affirmed that many projects were not completed on time due to the cost of materials, which have been on the increase.

Besides timely completion, high prices of building materials form a crucial constraint to improving housing conditions in Nigeria (United Nations Centre for Human Settlement [UNCHS], 1993).

In spite of the past studies on the cost of building materials in Nigeria, little is publicized about the implications of the rise in cost on the construction industry; most literature (Jagboro & Owoeye, 2004; Mekson, 2008; Njoku, 2007; Oladipo & Oni, 2012) has concentrated on identifying the causes with little emphasis on the implications; hence, the research seeks to provide information on the effect of cost of building materials on housing development in Nigeria.

In Nigeria, price instability is to a great extent like a natural occurrence. Price instability is a major threat to all the facets of the economy, be it Agricultural sector, oil sector, or manufacturing sector.

One of the important sectors affected by this problem is the Nigerian construction industry. Over the years, the construction firms (Rast Engineering Ltd, Ebuzo Construction Services and Bodos Contractor) have been experiencing the problems of;

- i. Total project abandonment due to cost overruns
- ii. Delay in project completion dates due to cost and time overruns
- iii. Use of inferior materials (as the contractors tries to cut corners), which may led to the collapse of structures.

Some authors of Economics textbooks reported that these problems can be traced to the problem of price instability situation of the country, which occurs as a result of the market structures of monopoly and oligopoly. Other authors listed the causes of price instability to include the following; existence of supply gap of a particular commodity, when there is persistent fall in productivity, during the periods of war and insurgency, when there is rapid growth in money supply etc.

The main causes of high prices of building materials, according to Oladipo and Oni (2012), are inflation, exchange rate, port charges, import duties, oil price fluctuations and money supply and demand.

### **1.3 Objectives of the study**

The major objective of this research work is to examine the effects of building materials price instability on successful housing projects delivery. The specific objectives were to;

- i. Examine the causes of building materials price instability on successful housing projects delivery
- ii. Determine the effects of building materials price instability on successful housing projects delivery
- iii. Evaluate the measures for handling the problems emanating from building materials price instability on successful housing projects delivery

## **1.4 Research questions**

The following research questions have been designed to help address the objectives of this research work.

- i. What are the causes of building materials price instability on successful housing projects delivery?
- ii. What are the effects of building materials price instability on successful housing projects delivery?
- iii. What are the measures used to address the problem of building materials price instability on successful housing projects delivery?

## **1.5 Research hypotheses**

The following research hypothesis has been formulated to guide this research work;

**H0<sub>1</sub>:** There is no significant relationship between the causes of building materials price instability on successful housing projects delivery

**HA<sub>1</sub>:** There is significant relationship between the causes of building materials price instability on successful housing projects delivery

**H0<sub>2</sub>:** There is no correlation between the effects of building materials price instability on successful housing projects delivery

**HA<sub>2</sub>:** There is correlation between the effects of building materials price instability on successful housing projects delivery

## **1.6 Justification for the study**

The following are the justification of this study;

- i. The findings from this study will expand the knowledge of researchers on the nature of building material price instability and its adverse effect on successful building project delivery and the Economy of Nigeria.
- ii. This study also is aimed at providing solutions to the problems of building material price instability in relation to successful building project delivery.
- iii. The academia is also likely to benefit from this research results as this will form a basis for teaching and further research results.
- iv. Finally, it will also serve as a reference material for researchers who may wish to carry out further studies on a related topic.

## **1.7 Scope of the Study**

### **1.7.1 Content Scope**

The study focused effects of building materials price instability on successful housing projects delivery and approved the variables of building materials price instability as the independent variable which affect successful housing projects delivery.

### **1.7.2 Geographical Scope**

The study was conducted in 3 selected construction firms within Imo State, known as; Rast Engineering Ltd; Teacher's House Ground, Plot 1/9 Port Harcourt Rd., Owerri Municipal, Ebuzo Construction Services; No 4 Odor Street, Owerri Municipal, and Bodos Contractor; B46/44, off InnoEjike Street, Area M Zone C, Owerri west.

### **1.7.3 Time Scope**

The study covered the period of one year, from February, 2021 to January, 2022 when the projects were implemented which emphasized strengthening functional units.

### **1.8 Limitation of the Study**

The major limitation in this study that could be addressed in future research is the limited access to data and frequent power failure.

**Limited Access to Data;** It was difficult to get respondents from our primary source of data. This involves the personal interview through questionnaire with most of the contractors and managers of the three organizations. Most of the times, when you want to see them. They will either not be available or the protocol which you will pass through before you will be given access to see them.

This limitation can be addressed in future research by redesign or restructure the research in a different way.

**Frequent Power Failure;** This made me to spend plenty money on fuel to ensure sustainable power.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Conceptual Review**

##### **2.1.1 Price instability**

Price instability can be viewed from two perspectives rising prices (inflation) and falling prices (deflation). The aim of most nations is the desire to maintain a stable price level (CBN, 1996). Oyediran (2003) supports this assertion, in addition surmising that charge stability is one of the important monetary desires in any economic system. Monye-Emina (2007) but argues that this appears to be a tall order given the occurrence of inflation currently ravaging economies of the world, especially the growing ones.

Melberg (1992) described inflation as a preferred upward thrust within the fee degree in a place over a positive time frame. Iyoha et al (2003) explained inflation to be a condition of popular and chronic rise in prices. An economic system is for this reason appeared as stricken by inflation if its miles undergoing duration of constantly rising expenses (Curwen, 1976). Inflation is measured during periods sufficiently lengthy sufficient to remove bias arising from short-time period.

In keeping with Wikipedia (n.d), the leader measure of inflation is the inflation fee that is the percentage charge of change of fee index through the years (CBN, 1996).

To the neo – classical economists at the University of Chicago, inflation is fundamentally a monetary phenomenon. In the words of Edwin E. A. (2007) a monetary, “inflation is always and everywhere a monetary phenomenon and can be produced only by a move rapid increase in the quantity of money than output” Edwin (2007). Most other economists do not agree that money supply alone is the cause of inflation. Consequently, such economists therefore try to define inflation in terms of continuous rise in prices. For instance, Edwin E.A (2007), defined inflation as a sustained rise in prices.

Brooman (2007) sees it as a continuous increase in the general price level. Shapiro shares the same view with Brooman by defining inflation as a persistent and appreciable rise in the general level of prices. Furthermore, Dernberg and Mcdougau (2007) tend to be more explicit in their view by maintaining that inflation refers to a continuing rise in prices as measured by an index such as consumer price index (CPI) or by the implicit price deflator for gross national product.

Inflation problem is associated with a situation in which there is a sustained upward movement in the prices of most goods and services. In most cases, highly price inelastic. It follows that an economy will be described to be inflationary if the prices of food items, clothing, footwear, fuel, medicaments, textbooks, transport fares etc. shoot up appreciably and there is also a rise in rent of all categories of houses to the extent that price level of these items does not settle but continues to rise year after year. It is worthy of note that during the period of inflation there is a continuous fall in the purchasing power of money. Each unit of money buys fewer goods. Since the value of money is determined by what one buys with it, it means that the value of money falls in exact inverse proportion to the increase in the overall level of prices.

If we let P represent the general price level and M stands for the value of a unit of money, the mathematical relationship between the value of money and the general price level can be stated thus

$$\text{Eqn } M = \frac{1}{P} \dots\dots\dots 1$$

The equation above indicates that the value of money falls when prices rise and vice versa. Money illusion occurs when people are enthusiastic about the amount of money in their pocket rather than what they can actually buy with their money.

Edwin Emenike Anuforo (2007) Introduction to Macroeconomics. According to Ocheoha (1975), inflation can be defined as a fall in the purchasing power of

money measured ordinarily by the index level of price. In other words, when the price index rises, the purchasing power of money is said to have fallen and an inflationary situation occurs. Conversely, a deflation obtains when the price index falls considerably. He went further to state that inflation is a persistent and an appreciable rise in the general level of average prices, and that inflation means rising prices, not high prices.

In the words of Ibe (1998), inflation is a situation of continuous rise in price. When there is too much money in circulation, people easily get much money by undertaking any form of economic activity. This means that people have enough money to spend. If there are not enough goods and services to meet demands of buyers, prices of available goods and services will rise. The degree of imbalance between the supply and demand for these goods will determine the extent of the rise in the price of these goods.

Inflation therefore arises when there is excess supply of money over supply of goods and services which money can buy. This is why today it is a common household expression that inflation arises when “too much money chases too few goods”. By inflation, according to Samuelson (2006), we mean a time of generally rising prices for goods and factors of production. By deflation we mean a time most prices and costs are falling.

According to Ocheoha (1975), an inflationary situation embraces the following three major elements

- i. There must be an increase in the volume of money and credit
- ii. This increase exceeds available goods and services as manifested in excessive demand for them.
- iii. This inevitably results in a substantial and continuous rise in the general level of prices

**2.1.2 Measurement of price instability on construction project delivery**

According to Anuforo (2007), there are three main measurement of price instability on construction project delivery, they include the following;

- i. Composite Consumer Price Index (CPI):** This is an index designed to measure the average change over time in the price paid by the final consume for a specific basket of goods and services.

The formula applied here is known as the laspeyre’s formula. The general formula in this approach is stated thus

Eqn      
$$CPI = \frac{\sum P_t Q_o}{\sum P_o Q_o} \dots\dots\dots 2$$

Where  $P_t$  = prices of the various goods and services in the current year t,

$P_o$  = prices of the various goods and services in the base year,

$Q_o$  = quantities of the various goods and services in the base yr.

**ii. The Wholesale Price Index (WPI):** This index is calculated from raw material prices and the manufacturers output prices. It serves as a guide on what is likely to be the trend of the consumer price index in the future.

**iii. The GNP Implicit Price Deflator:** This Index measures changes in the prices of all goods and services produced in the economy between one year and the other. It is the most accurate measure of inflation because it deals with the economy as a whole giving the difference between nominal GNP and real GNP.

### **2.1.3 Causes of Price Instability on Construction Project Delivery**

Anyanwu (2014); Iyoha et al (2017) identified some of sorts of inflation to include; call for-pull, price push, structural, monetary and imported inflation. The demand pull inflation is brought on via excessive call for now not matched with growth in deliver. Right here too much cash is chasing too few commodities .it as a result occurs while aggregate call for items and offerings is more than the mixture delivers. the fee push inflation arises from will increase within the cost of the elements of production, in particular growing wages emanating from alternate union activities-embodiment a social political view.

Johnson (2013); CBN (2016) discovered that imported inflation stand up from international trade wherein, inflation is transmitted from one country to any other and is extra so all through a duration of rising costs all around the world.

Rate consequences are transmitted by internationally traded items and offerings. According to Nagarajan (2015), inflation can occur when too few goods and services are available compared to the demand for them. He called this type of inflation ‘Demand Induced or Demand – Pull Inflation’. This is known as Demand – supply gap cause of inflation.

#### **2.1.4 Market Structure**

i. **Monopoly:** This is a market structure whereby the commodities are heterogeneous, there is restriction of new entry into the market, and the monopolist determines either the output or the price of his commodity, this is according to Ocheoha (1975).

ii. **Oligopoly:** In this type of structure, there are few firms or sellers that produce a substantial proportion of the entire industry’s output, the firms are interdependent, and there is lack of uniformity in the size of the firms in the market. This has the capacity of causing inflation in the sense that these firms, being the only producers of goods and services will tend to hike the price of these goods and services.

iii. **Trade Unions:** In the words of Ocheoha (1975), Wages are sometimes pushed up by the bargaining power of trade unions. They ask for higher wages to off-set the increase in the price of consumer goods and so, protect their real income.

Other causes of inflation are imported inflation, devaluation of the country's currency, war periods, import duties, port charges etc.

### **2.1.5 Effects Of Price Instability On Building Projects In Nigeria**

**i. Collapse of Building Due to Less Quality Materials:** The purchase of poor-quality construction materials possibly causes building collapse. The use of such materials causes building inadequacy and unexpected accidents. Dimuna 2010 and Amadi *et al.* 2012 observed that building collapse is caused either by a natural factor or a man-made factor. The researchers further stated that developing nations suffer frequent collapse of buildings. For example, a country like Nigeria suffers periodic collapse of buildings predominantly caused by man-made factors (Amadi *et al.* 2012). To buttress the above example, some studies were conducted few years ago to determine the key causes of building failure and collapse in Nigeria.

The findings attained showed that sub-standard building materials remained a major issue to building collapse. Aziz 2013 added that low quality building materials intensify the cost of construction above the actual projected cost due to the loss of material during the implementation phase. This could be termed as an effect of a lack of standards for materials.

**ii. Poor Quality of Workmanship:** According to Pacheco-Torgal, 2014, the quality output of a building is one of the attributes of a developed construction industry. The quality of workmanship in construction works is assessed in accordance with the requirement of the relevant standard, and marks are awarded if the workmanship complies with the standard. The study performed by Oladipo *et al.*, 2016 envisaged a great risk in the construction industry and the nation's economy through the interpretation of the trend indicated in the cost of building materials. The authors further stated that there were records of conflicts between clients and building contractors over upward review in contract sums (Oladipo *et al.*, 2016). The avoidance of conflicts led to the use of substandard or insufficient supply of materials for construction projects. This is because some contractors try to boycott conflicts in order to be more productive in project completion within the budgeted time. The most distressing part of this action is that it can possibly cause a building to collapse, and people's lives will be at risk.

Therefore, workmanship plays an important role in project quality (Iwaro *et al.*, 2012). Furthermore, Akanni *et al.* 2014 pointed out that low quality of workmanship and inhibited innovations in construction methods are part of the problems caused by the escalation in the price of building materials. Hence, the study revealed that the increase in the cost of building material contributes to the low and unreliable rate of the profitability of contractors (Akanni *et al.*, 2014).

**iii. Unemployment of Construction Workers:** The construction industry's workers are extremely varied, consisting of skilled and unskilled workers. Ayodele and Alabi 2012 discovered that the impact of inflation in the cost of purchasing building materials is frustrating the industry, because many contractors are finding it difficult to accurately forecast the expected profit on the project. Thus, this situation contributes to the laying-off of workers and closure of firms in some extreme cases. Oladipo and Oni 2012 mentioned that the effects of macro-economic indicators on the cost of building materials contributed to unemployment. Furthermore, Oladipo and Oni 2012 pointed out that employment reduction of workers in the construction industry may have an impact on a nation's GDP. In essence, the economical contribution of the construction industry to the nation's economy is decimated.

**iv. Total Project Abandonment:** It is known that prices of goods are high during inflation as a result of many factors including high demand versus insufficient supply. During this period of rising prices, a building project which is not properly planned may completely halt as a result of high cost of building materials.

**v. Cost and Time Overrun:** Cost overrun simply means a situation where actual cost of work exceeds budgeted cost of work. Time overrun on the other hand is a scenario where actual project duration exceeds calculated project duration which usually cause cost overrun. From the above definitions, it can be seen that increase in the prices of building materials adversely affects both cost and time overrun of the building project.

**vi. Effect on Finance:** During inflation period, prices of building materials go up and this in turn leads to overall project delay. When this happens, the expected investment cash inflows for rental buildings are affected.

**vii. Effect on Man Power:** When the prices of building materials go up, the contractor of a building project may decide to lay off some workers in order to survive the period. For example, a job which was supposed to be done by 7 men is done instead by 5 men; this will have an effect on the output.

### **2.1.6 The Roles of Construction Actors in Construction Cost**

There are numerous pastimes within the construction industry. The most important interest or actors within the construction industry are;

i. The Client

ii. The Consultant

iii. The Contractor

**i. The Client:** The client otherwise called the customer is, by using far, the single maximum critical member of the construction group. He's the initiator and financier of all of the projects. Omole (1986) noted that the predominant contribution the patron could make to successful operations of the construction enterprise lies in his skill in specifying his wishes previous to the instruction of the layout. It is also essential for the consumer to set cost limits of the project on the briefing. He must additionally ensure that good enough monetary provisions are made prior to the graduation of any task.

**ii. The Consultant:** Fee concerns are a few of the most important and primary issues that experts must address. Its miles essential to peer that tasks are contained within the client's finances and fee forecasts. Fee has the very last control over truly every project. Accurate price evaluation and manage is one of the necessary offerings the patron requires from the consultants (Omole, 1986).

**iii. The Contractor:** Omole (1986) shows that the most important task of contractors is to bring together and allocate the assets of labour, equipment and materials to the mission that allows you to reap finishing touch at most efficiency in phrases of time, satisfactory and cost.

### **2.1.7 Fee of Construction Factor**

An overview of literature well-known shows that there are several elements affecting construction charges for large buildings. In a look at the Nigerian construction enterprise, Omoregie and Radfort (2005) sampled the opinions of contractors, consultants and clients and they found 15 elements liable for project delays and production fee escalation in Nigeria.

Their survey revealed fee fluctuation because the most intense reason of venture fee escalation that is attributed to the challenge in exchange rate which in flip affects production material costs and well known rate degree.

In every other have a look at, Elinwa and Silas (1992) recognized 31 critical elements causing excessive price of homes with fraudulent practices and kickbacks ranking 2nd (second) most vital component in Nigeria. Hussain (1999) referred to that fraudulent practices and kickbacks occasioned by way of greed are perpetuated with the aid of some primary gamers in the production industry.

Frimpong, Oluwoye and Crawford (2003), in an overview of developing countries which includes Ghana identified a few elements as underlying causes of

put off and cost over runs in ground water creation initiatives. The 5 most important factors agreed by means of customers, consultants and contractors have been monthly charge problems from businesses, poor settlement control, fabric procurement, terrible technical performances and escalation of cloth fees.

Furthermore, an examination of the relative weight of ten important causes of business failure inside the USA, it was discovered that production cost related factors as frequently contributing to business failure. (kangari,1989). They consist of: horrific income, control incompetence, loss of revel in, inadequate income, loss of market and monetary decline.

## **2.2 Theoretical Review**

This research led to the review and research of previous works done by scholars from far and near, one of such is on the effect of petroleum price increase on cost of selected building finishing materials in the Nigerian construction industry carried out by Shittu, Idiake and Akamu (2012). It is shown that construction projects in Nigeria are prone to have an increase in price to a certain extent. Because the price of crude oil is dropping, the revenue of the country will also drop since it is the country's major revenue earner. The building materials market is exposed to constant changes in prices and some factors responsible for these are port charges, inconsistent government policies, exchange rate fluctuations,

haulage costs, less inflow of foreign finance, cost of diesel and fall in value of Naira. The data collected from the research done were based on three basic finishing materials, which are floor tiles, gloss/emulsion paints and ceiling boards, with different alternatives for each finishing material. Correlation and regression analysis were used to analyze these collected data, and they showed some level of high significance between the independent variable (regulated petroleum prices) and the dependent variables (finished materials) that is, coefficient determination of values ranging from 61% to 90%.

It was observed that increase in regulated price of petroleum products accounts for high cost of finishing materials in building projects, prices of all building materials selected respectively followed similar trend pattern with that of petrol except for price of PVC ceiling, which moves in opposite direction to the price of petrol, and it was discovered from the inferential analysis that the price of all building materials selected correlated positively and strongly with the price of petrol with coefficient of correlation (R) value ranging from 50 – 70% except ceiling board. The study further went to recommend that the federal government should embark on regulated price of building materials at fixed price especially for those foreign materials like China tiles since there is increase in price of finishing materials due to price of petroleum products, also, more quality input should be encouraged in locally processed building materials so that they have

long life span and can be recommended to all construction projects, like the use of Kuta tiles, Royal tiles and Asbestos ceiling board, models used in research should be reviewed at regular intervals in the light of changing environmental circumstances by any user of the model to stand the test of time. As stipulated by previous research review suggest that further research should be undertaken to study the effect of price of petrol on the cost of other important building materials apart from finishing materials.

Another research review on the macroeconomic factors impacting building material prices in developing countries using Nigeria as a case study by Oladipo F.O and Oni O.J (2012) has some speculations and noteworthy points that helped the aim of this thesis. The high price of building materials had form a crucial constraint to improving construction procurement in Nigeria. They further stated that the influence of Macroeconomic indicators on this problem cannot be ruled out. The study analyzed the macroeconomic indicators impacting the prices of building materials. Questionnaires were administered to respondents which included the Architects, Quantity Surveyors, Builders, Engineers, and Bankers/Economists. The study established that inflation, exchange rate, import, interest rate, Government Economic Policies, level of foreign currency demand and level of foreign currency supplied were all identified as causing a change in exchange rate while factors affecting inflation rate were variation in the value of

Naira, demand for goods, changes in real incomes leading interest and import tariffs. Recommendations were pointed so that there should be a reduction in import duties, bringing exchange rate to the barest minimum, reduction in interest rate on bank loans while government should maintain stable inflationary trend.

In another study, by Rasdaq A.D conducted in Lagos to analyze the impact of exchange rate volatility on the macroeconomic variables in Nigeria, it was found, with the help of correlation matrix, ordinary least square (OLS) and Granger Casualty test, that exchange rate volatility has a positive influence on Gross Domestic Product (GDP), Foreign Direct Investment rate in the country. It was thus suggested by the author, that there is the need for the country to improve their revenue base in term of increasing number of items meant for export and reduce the importation of nonessential items, so as to improve their term of trade. Also increase in domestic production will reduce the problem caused by exchange rate volatility.

Another study by Anjay *et al.*, 2017 investigated the effect of price fluctuation for improving the financial capacity of Nepalese contractors to enhance the performance of the industry. Questionnaire, scheduled and case studies were used to assess the contractor's perspective. The research result shows that the problem of price fluctuation occurs in an unpredictable manner.

At least 27 % price was escalated of the construction inputs. Contractors lose their at least 52 % of the expected profit. Few contractors are planned to address for the future price escalated situation and remaining others are not concerned about the future situation. Price adjustment clause is not favorable for the contractors. The price fluctuation system that is in place is limited to few construction inputs. Moreover, contractors get compensation only for portion of the price increase of inputs. Project delay was found to be one of the major effects of price increase and delay caused by the contractors is affecting them by making them vulnerable to effects of price increase.

Yet again in another study by Odiba E. O. et al, to investigate the effect of money supply on inflation in Nigeria between 1986 and 2009, the authors found with the help of data generated mainly from the Central Bank of Nigeria data base 2011 and analyzed using ADF test and multiple regression, that money supply and aggregate demand were the main determinants of inflation in Nigeria during the review period.

### **2.3 Empirical Review**

Bimpe *et al.*, 2010 studied the uses of a sequential mixed methods approach, wherein surveys were conducted among the construction professionals (project managers, site manager's architects, site engineers, quantity surveyors, contractors, building materials suppliers, and government workers) in the construction industry within Cape Town, South Africa, who were considered as the research participants. The qualitative data obtained from the survey exercise were analysed using content analysis, while the quantitative data were analysed using a descriptive statistical technique on SPSS. The findings attained show fluctuation in construction cost and a rise in maintenance cost (caused by poor workmanship) as significant effects in the cost increase of building materials for affordable housing delivery. Adequate application of the recommendations given in this study will minimise the effects of high cost of building materials and enhance affordable housing delivery. Appropriate handling of the findings given in this study will reduce the effects of the high cost of building materials and augment timely delivery of affordable housing and stakeholders' satisfaction.

Ufuoma *et al.*, 2019 examined the effects of building material cost on housing delivery in Akure. A total of 125 questionnaires was administered in the core area of the city using simple random sampling technique.

The findings from the study shows that some factors responsible for the rising cost of building materials are government policy, the present economic situation of the country as well as the attitude of the building material sellers. The study also showed that the rising cost of the building materials has high implication on affordable housing provision in the study area, risk of project abandonment due to delay in project completion, construction of substandard houses as well as increase in the price of rent. It was recommended that; the government should formulate policy that will play down the agitations on the use of imported building materials by encouraging research in the production of local building materials, government should make an impact by subsidizing the prize of building materials in order to increase the standard of building using adequate and efficient materials for building and the price of building materials should be checked and necessary policy put in place so as to encourage the construction of houses by developers and this in turn will also help them give a reasonable price for rent to tenants

Onyejiaka, *et al.*, 2018 examined the effects of high cost of building material on public housing delivery in Awka, Anambra State of Nigeria with a view to stimulating relevant agencies of government and other stakeholders into designing appropriate strategies for effective housing delivery in the state.

Thus, to achieve this aim, a total of One Hundred and Ten (110) was sampled from the total population using simple random sampling method. A well-structured questionnaire and oral interview were used as the major instruments for data collection. Data collected were presented in tables and analyzed using simple percentages and mean. Correlation analysis was employed for testing the research hypotheses. The result of the hypotheses test indicated that the calculated value was higher than the critical value. Hence, the null hypothesis was rejected while the alternative was accepted. This implies that the increase in the prices of building material has significant effect on the delivery of public housing in Awka, Anambra State.

It was discovered that Economic related factors, Human related factors, Stakeholder related factors and External factors are significant factors responsible for increase in the cost of building materials.

Amos *et al.*, 2018 analyzed causative factors, effects and inflationary trends of building materials price fluctuation in Adamawa state, Nigeria. Primary data on causes and effects of building materials price fluctuation were obtained through structured questionnaire administered to 210 respondents. Secondary data on building materials average annual inflation rate and all items monthly inflation rates between 2014 and 2016 were sourced.

Percentages and mean ratings were used to analyze the respondents' opinions on factors responsible for, and effects of materials price fluctuation and presented in charts, graphs and tables. Result shows general inflation increment between 2014 and 2016 due to recession in the country, and led to increase in building material prices. Inflation was high in 2016 at 15.7% in December, and aluminum roofing sheets has the highest annual inflation rate of 19.4% while 9 inches block has the least inflation rate of 17.5% in same year. Effect of price fluctuation of building materials resulting to low GDP ranked 1st with 3.81 mean rating. Other effects include increased unemployment, project abandonment. High exchange rate, cost of petrol, and transportation cost are the top three important factors responsible for building materials price fluctuation. It is recommended that the stability in naira exchange rate should be reinforced as instability in the naira will leads to instability in material prices and subsequently affects business prospect. Government should take drastic steps to reduce cost of production and transportation of materials for building, and also prioritize researches in the production of local building materials.

The issue of price control board should be reconsidered as well.

Ismail *et al.*, 2018 employed an informal procurement/pricing process to determine the variation in total price of standardized retail and bulk building materials for housing development in Lokoja and Minna (both in the North Central Nigeria). A market survey of 12 selected building materials for the construction of 2 and 3 bedroom flats was conducted on 214 major distributors and 226 wholesalers and retailers of the building materials in the two study areas. Findings from this present study provide evidence that differences in retail and bulk prices of building materials do not vary significantly across geographical locations. However, property type alone accounts for 89% of the variance in the retail and bulk price of building materials.

A plausible explanation for the significant effect of property type is that the prices of building materials seemingly compensate for the additional or extra bedroom or other extra housing attributes resulting from housing units of different size. The results of the empirical analysis further provide evidence that the type of purchase, geographical location and property type do not depend on the effect of the other in influencing the price of building materials for housing development, even at an intra-urban scale.

Bimpe *et al.*, 2021 conducted a sequential mixed methods approach, wherein surveys were conducted among the construction professionals (project managers, site managers, architects, site engineers, quantity surveyors, contractors, building materials suppliers, and government workers) in the construction industry within Cape Town, South Africa, who were considered as the research participants. The qualitative data obtained from the survey exercise were analysed using content analysis, while the quantitative data were analysed using a descriptive statistical technique on SPSS. The findings attained show fluctuation in construction cost and a rise in maintenance cost (caused by poor workmanship) as significant effects in the cost increase of building materials for affordable housing delivery. Adequate application of the recommendations given in this study will minimize the effects of high cost of building materials and enhance affordable housing delivery. Appropriate handling of the findings given in this study will reduce the effects of the high cost of building materials and augment timely delivery of affordable housing and stakeholders' satisfaction.

Abdulakeem *et al.*, 2021 examined the effect of rising in the cost of building material on real property development in Bariga area of Lagos state, Nigeria. A field survey research design was adopted for collection of primary data on the subject of study.

The target population comprises of forty (40) property developers, forty (40) contractors and 40 building materials dealers operating in Bariga area of Lagos state. The sample size of this project is 120; this comprises property developers, contractors and building materials dealers operating within Bariga area of Lagos state which were targeted for administration of questionnaire. Random sampling technique was used as appropriate sampling technique. The questionnaires were complimented by oral interview. Descriptive statistics was used in analyzing the collected data such as cross tabulation, frequency table. The paper revealed the cost of land acquisition, cost of building materials, professional charges and lack of capital are militating against property development in the study area. It is indeed unfortunate that the alarming increase in cost of building materials and labour does not only affect the rent passing on prospective tenant nor the market value of such property but also on the individual dream to build and owned a home in the study area. Besides timely completion, high prices of building materials form a crucial constraint to improving housing conditions in the low-income earning countries like Nigeria. Over dependent on imported materials and lack of instability in government policies and programme among other factors has a drastic effect on cost of building materials. Inhibited innovations in construction methods, quality of workmanship is affected, project abandonment, volume of

construction output is affected. The study recommends that incessant rising in cost of building materials be remediable through the development/use of alternative building materials, among others.

Muktar *et al.*, 2021 carried out a research on the effects of building materials cost on housing development in Maiduguri metropolis area of Borno State. Data on the prices of building materials were obtained by the researcher through market survey between the year 2019 and 2020. One hundred and Twenty Five (125) respondents were selected randomly. One hundred and twenty questionnaires were dully returned and were used for the analysis. The data were presented using chisquare statistics and theoretical analyses were used to analyse data that are not numerical in nature. The analysis revealed that the implication on building material cost could result in the downward effect on the Gross Domestic Product (GDP) in the nation's economy. The result also shows that rising cost of building materials was generated due to the exchange rate of the Nigerian Naira. It is recommended that the use of local building materials should be encourage by individuals, housing developers as well as contractors in order to produce houses at subsidize rate. Government at all levels should endeavour to play their own role in the control of prices of building materials in order to avoid further inflation in the country.

Nkeiruka Okwakpam *et al.*, 2022 investigated the effect of rising cost of building materials on construction industry in Port Harcourt. The study has three specific objectives and three research questions. The two variables of study are cost of building materials and housing delivery. Housing delivery depended on the cost of building materials. The area studied was Port Harcourt. The study was survey study mean that it sourced its data from primary sources through the use of structured questionnaire. The population of study was made up of 1125 participants (respondents), while the accessible sample size was 316 derived through the use of al-Sedairy method. A total of 316 questionnaires were distributed to respondents. The distribution was based on the population of each representatives, of the total number retrieved according to the respondents designate was 175 representing 55.38percent. The researcher adopter the use of simple mean and standard deviation to the extent to which the respondents responded a mean value of 3.90-4.90 was regarded as very high meaning that the respondents strongly agreed to the question as a cause of increase in price of building materials. The analyses showed that inflation, government policy, dual taxation, lack of capacity to produce were the key factors responsible for the incessant increase in prices. The study concluded that persistent increase in price will truncate government plan in providing shelter for the people.

The study recommended that government should create enabling environment to encourage private sector participation in the production of building materials in order to make supply competitive.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Research Design**

This study is an investigative one where judgment was obtained through sampling and field investigation. The research design adopted here is survey based method of research and as such primary and secondary data was used to get information on the effects of building materials price instability on successful housing projects delivery.

Primary data was collected by means of questionnaire administered to the selected sample, and through interview with some stakeholders including managers of construction industry, for example Architects, Builders, Quantity Surveyors and Engineers. The secondary sources data for this research was obtained from extensive literature review of journals, textbooks, newspaper and internet sources.

#### **3.2 Population of the Study**

The population of the study was made up of 73 staffs which was drawn from the following groups ; Architects, quantity surveyors, engineers, project managers and procurement officers in three companies, ( Rast Engineering Ltd = 30, Ebuzo Construction Services = 21 and Bodos Contractor = 22).

**The sampling frame** for the purpose of this study was made up of the following;

**Rast Engineering Ltd**

Civil Engineers.....12  
Procurement Officers.....5  
Project Managers.....5  
Quantity Surveyors.....8

**Ebuzo Construction Services Ltd**

Civil Engineers.....9  
Procurement Officers.....4  
Project Managers.....2  
Quantity Surveyors.....6

**Bodos Contractors**

Civil Engineers.....10  
Procurement Officers.....3  
Project Managers.....2  
Quantity Surveyors.....7

**Total.....73**

### 3.3 Population Sample Size

The sample size of the population of this study was determined using the yaro yameni sample size formula, which is as follows;

$$n = \frac{N}{1 + N(e)^2} \dots\dots\dots \text{equation 1}$$

Where; N = population of study

n = sample size

e = level of significance (margin error)

At 0.05 significance level, N = 73

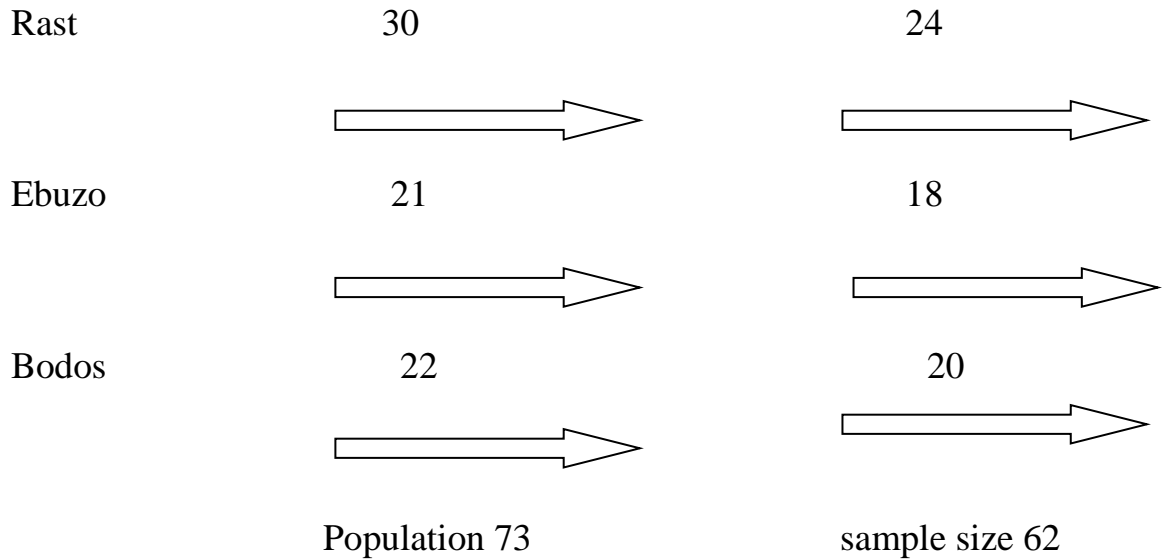
$$n = \frac{73}{1 + 73(0.05)^2}$$

n gives approximately 62

From the computation above, 62 members of the three construction companies constitute the respondents.

CAL

For the purpose of this study, stratified sampling technique will be adopted. The respondents are divided into three;



### 3.4 Sources of Data

A combination of questionnaire, interview and a study records was used to collect data from individuals, from resource materials and from the field. The use of questionnaire was indeed the primary source of data, interviews were conducted in the course of administration of questionnaire, they were both collected through interview a lot of data was however gather informally because of the fact that some of the people involved were not aware of their response in the course of our interaction during the administration of questionnaires. A part of the questionnaire was designed using the five point Liker Scale to collect data which are Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree

### **3.4.1 Primary Sources**

The primary sources were mainly from the personal interview and questionnaire with engineers, procurement officers, quantity surveyors and project managers to Rast Engineering Ltd, Ebuzo Construction Services and Bodos Contractor.

### **3.4.2 Secondary Sources**

Secondary data were collected through the review of literature comprising of textbooks, journals, technical reports, seminar/conference papers and unpublished works. The internet also offered an avenue where secondary data were sourced for this research work. The range of materials gathered from the above source came from professionals or trade journals, newspaper, publication and magazines, textbook, encyclopedia, bulletins, and so on.

### **3.5 Validity and Reliability of Method Used**

Some question in the questionnaire was repeated during the interview and discussion sessions laid out with the individual respondents. This was done deliberately as to ensure coherence of questionnaire data and interview data amongst others. However, the researcher believes the information given is reliable. Operational measures for the concept being studied was employed, this can also be referred to as construct validity. First, this study utilized multiple sources of evidence to increase construct validity. Secondly, the research

instrument was sent to a panel of experts familiar with the constructs to be measured to independently examine and validate the questionnaire constructs

### **3.6 Method of Data Analysis**

Collection of data was done majorly from the primary source of data which is the questionnaires. These data were organized and sieved out as a few were not worthy to be recorded. The questionnaires were segregated according to responses of respondents and used to test for validity and reliability of the instrument for data collection. Tables were generated and percentage of each response described analysis.

To ensure proper presentation of data and visual illustration of the responses from the questionnaire, Microsoft Excel was used amongst the Microsoft suite packages, the analysis tool of drawing charts such as bar chart, line chart and pie chart has proven helpful historically. This has aided this research to be as simple as possible, properly giving direct illustrations with few words, yet can be easily interpreted and remembered by just mere looking at the visual presentation. Microsoft Excel also referred to as MS Excel also does some calculations of data ranging from simple analysis to multi-level complex analysis. But for the purpose of this research, we will limit this to just the simple algebraic calculation and graph plotting.

Another analysis tool used during the course of this is the Statistical Package for Social Science owned by IBM and popularly referred to as IBM SPSS Statistics. Although it is a blind statistical tool we would be explaining step by step for the purpose of understanding for future references how we got about each stage of analysis and why we did so. Also we will explain what each tool used here in IBM SPSS Statistics does. This tool helps us to do complex statistical calculations and analysis of data gotten from the questionnaire and the field which is used in combination for judgment by the researcher. Here we made use of the correlation tools and descriptive function tools to analyze our data.

### **3.7 Model Information**

For the purpose of this research, statistical analysis was used. Of such are the Pearson, Kendall and Spearman correlations respectively. Correlation is a bivariate analysis that measures the direction of relationship between two variables. It also measures the strength of the association. The value of correlation coefficient varies between positive one and negative one, this tells about the strength of the correlation. Towards zero, the correlation (relationship) becomes weaker. The plus sign indicates a positive relationship while a negative sign indicates a negative relationship.

The value of 1 shows that the two variables are the same or exactly equal to each other. The Point-Biserial correlation wasn't used in this thesis.

**The Pearson r correlation:** This is the most widely used correlation method used in statistical analysis to measure the relationship between linearly related variables. This can be used to measure the relationships between different stocks in the stock market (a worthy example)

The formula for the Pearson correlation is as shown in eqn 3.1.

$$r_{xy} = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n \sum x_i^2 - (\sum x_i)^2} \sqrt{n \sum y_i^2 - (\sum y_i)^2}}$$

**Eqn 3.1 showing the Pearson r correlation formulae**

Where  $r_{xy}$  = Pearson r correlation coefficient between x and y

n = number of observations

$x_i$  = value of x (for  $i$ th observation)

$y_i$  = value of y (for  $i$ th observation)

Assumptions of Pearson correlation includes;

1. Both variables are normally distributed
2. There exist linearity and homoscedasticity between both variables
3. Data is equally distributed about the regression line

**Kendall rank correlation:** this is a non-parametric test that scales the relationship strength of dependence between two variables. Taking into recognition two variable samples a and b, with sample size n, we know that the total number of pairings with a b is  $n(n-1)/2$ .

The formula for the Kendall rank correlation is as shown in equation below

$$\tau = \frac{n_c - n_d}{\frac{1}{2}n(n-1)}$$

**Eqn 3.2 showing the Kendall rank correlation**

$n_c$  = number of concordant (ordered in the same way)

$n_d$  = number of discordant (ordered in differently)

**Spearman rank correlation:** spearman rank correlation is likewise a non-parametric test that is used to measure the level of relationship between two variables. Without assumptions about the data distribution, it earned a title of being the appropriate correlation analysis when the variables are measured on a scale that is at least ordinal.

The Spearman rank correlation formulae is as shown in equation 3.3

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

**Eqn 3.3 showing the Spearman rank correlation**

$\rho$  = Spearman rank correlation

$d_i$  = difference between the ranks of corresponding variables

$n$  = number of observations

Assumptions made by the Spearman rank correlation formulae;

- i.** Data must be at least ordinal
- ii.** The scores on one variable must be monotonically related to the other variable.

**Decision Rule**

The decision rule for correlation here is that. Each rank is between +1 and -1

- i.** Increasing towards +1 means a more positive significant correlation between the two variables
- ii.** A correlation of zero means absolutely no correlation.
- iii.** A decreasing towards -1 means a more negative significant correlation between the two variables

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

#### **4.1 Presentation of Questionnaire**

This chapter presents and analyzes the data collected during the entire field study. This chapter is majorly centered on presentation and analysis of data after they have been collected, vetted and made ready for further processing.

As mentioned earlier, administration of questionnaire is our primary source of data. These were classified, tabulated and processed for further reference, contractors in and outside Rast Engineering Ltd, Ebuzo Construction Services Ltd, and Bodos Contractor provide the data and information analyzed in order to arrive at a logical conclusion.

#### **4.2 Analysis of Questionnaire**

##### **4.2.1 Analysis of questionnaire section A**

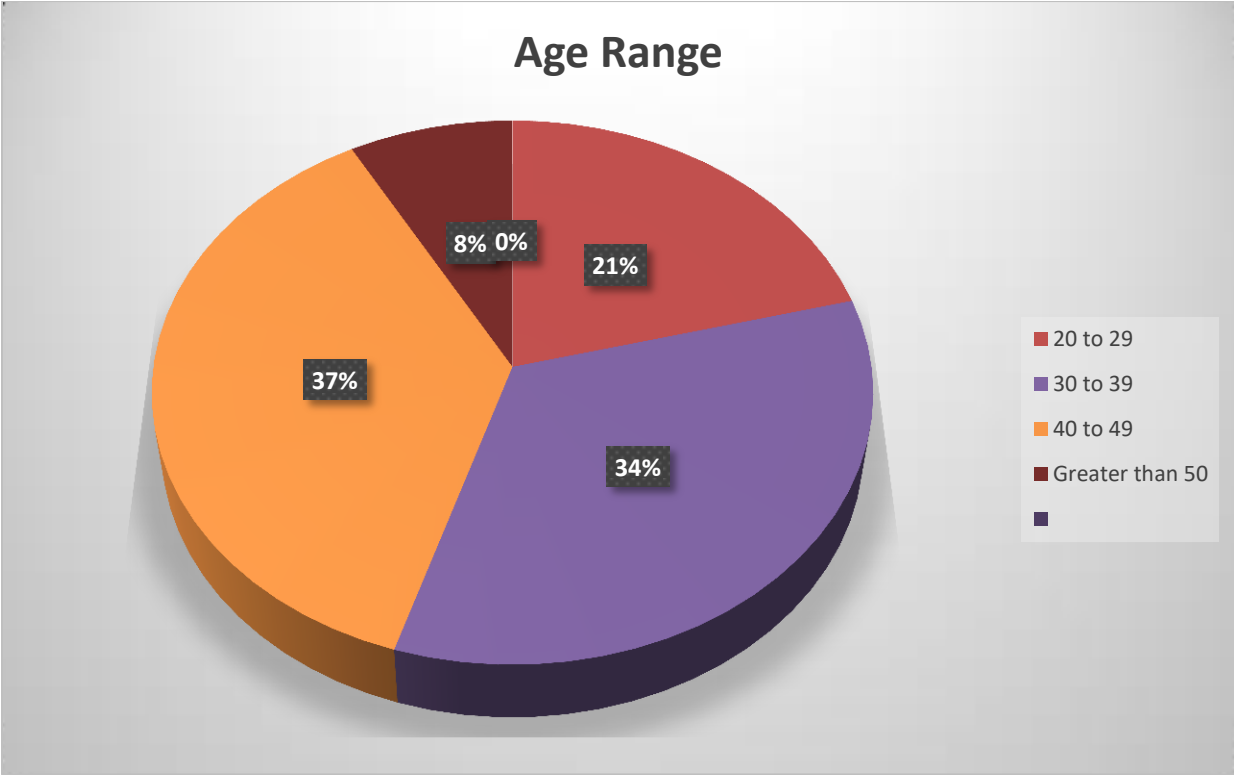
As to meet the objective of this thesis, the questionnaire was sectioned into different parts. With a total of 62 respondents which were dully completed.

To analyze section, we'll use 3Dimension Pie chart to analyze age range, gender, working experience and Bar chart for educational background of the respondents.

**Age Range:** Only staffs from the ages of 20 upwards were considered for this questionnaire

**Table 4.1: Showing the table for the age range of respondents to the questionnaire.**

| Age range       | Number |
|-----------------|--------|
| 20 to 29        | 13     |
| 30 to 39        | 21     |
| 40 to 49        | 23     |
| Greater than 50 | 5      |
| Total           | 62     |



**Fig 4.1: Pie chart showing distribution of age range of respondents.**

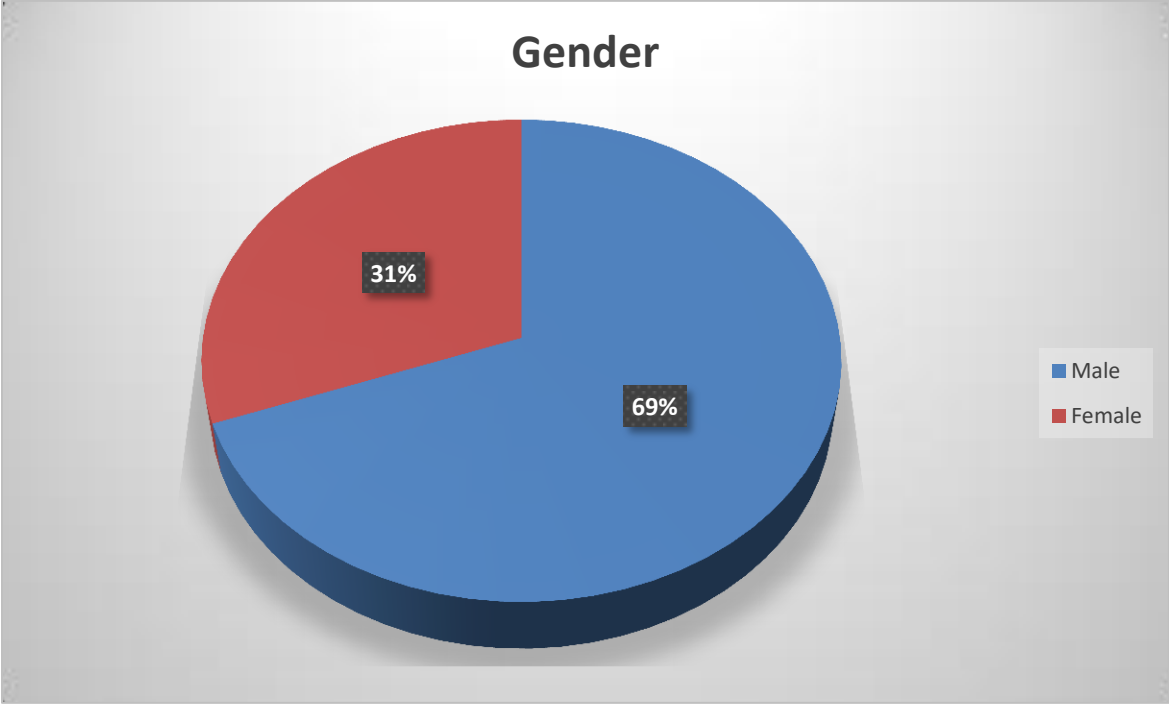
Source: MS Excel

Fig 4.1 shows that age range greater than 50 has the lowest percentage of just 8%, while age range of 40 to 49 has the highest percentage of 37%

**Gender:** The gender was between male or female. The questionnaire excluded the option of “rather not identify”.

**Table 4.2 Table showing the gender distribution of respondents**

| Gender | Number |
|--------|--------|
| Male   | 43     |
| Female | 19     |
| Total  | 62     |



**Fig 4.2: Showing pie chart of gender distribution of respondents**

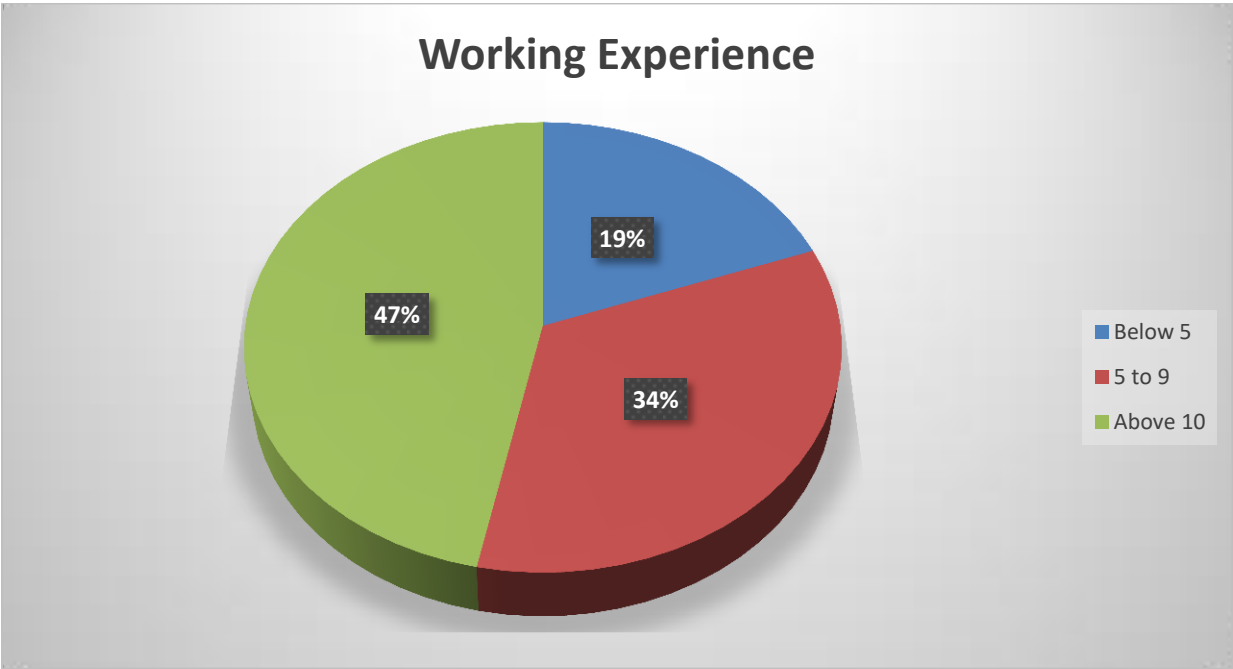
Source: MS Excel

Fig 4.2 shows the pie chart of gender distribution; it clearly shows that the male gender has a whopping percentage of 69% as against the female gender which has just 31%.

**Working Experience:** The working experience has options of below 5 years, between 5 to 9 years and above 10 years of age.

**Table 4.3 table showing the working experience distribution of respondents**

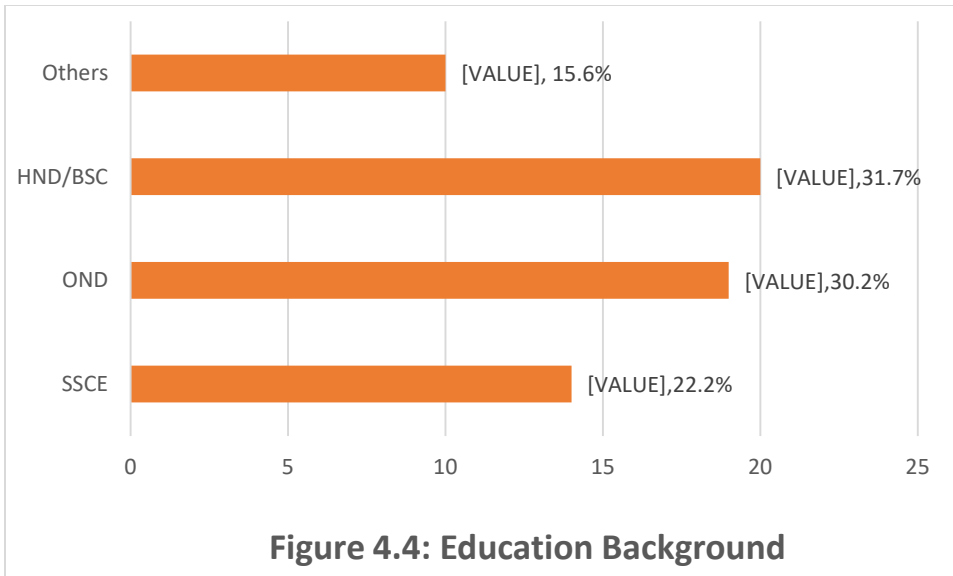
| Working Experience(years) | Number |
|---------------------------|--------|
| Below 5                   | 12     |
| 5 to 9                    | 21     |
| Above 10                  | 29     |
| Total                     | 62     |



**Fig 4.3 showing the pie chart showing the working experience of the respondents.**

Source: MS Excel

The pie chart showing the working experience of the respondents shows that those with working experience above 10 years has the highest percentage being 47% while the least goes to those below 5 years working experience with 19%.



The above result presents the distribution of the respondents' education background in a survey or study. The survey or study included a total of 63 respondents. The respondents had different levels of education backgrounds, and they were categorized into four main groups:

**SSCE** (Senior Secondary School Certificate Examination): There were 14 respondents who had an SSCE education background, comprising approximately 22.2% of the total respondents.

**OND** (Ordinary National Diploma): The majority of respondents, 19 individuals, had an OND education background, making up about 30.2% of the total respondents

**HND/BSC** (Higher National Diploma/Bachelor's Degree): There were 20 respondents who had either an HND or BSc education background, accounting for approximately 31.7% of the total respondents.

**Others:** There were 10 respondents who fell under the "Others" category, comprising about 15.9% of the total respondents. This category includes respondents with diverse educational backgrounds such as MSc, PhD.

#### **4.2.2 Analysis of questionnaire section B**

Over time the Likert scale has been used to evaluate data gotten from field responses over a questionnaire. A weighted scores based on the field responses represented in table 4.4. The data derived was extracted from part B of the Questionnaire to test the hypothesis stated in this thesis. Weighting of the ranking of each of the variables and addition of the weighted scores of each of the respondents.

In this analysis, the five point Likert scale is used, this scale comprises of five options of which two are extreme options and one is a normal option. Although, with history, the five point Likert scale has taken many form. Its advantages are;

- i.** It's easier for respondents to understand
- ii.** It's ideal for a larger study
- iii.** It tends to produce better distribution of data

Its disadvantage may include;

- i.** It's sometimes inaccurate
- ii.** It can't measure all attitudes towards an issue
- iii.** Its result might not be objective

**The variables are stated as follows;**

Q = Level of impact on effect of building material price instability on successful housing project deliver

A = Level of the causes of building material price instability on successful project delivery

B = Level of the effect of building material price instability on successful housing project delivery

C = Level of the measures used to address the problem of building material price instability on successful housing project delivery

**Table 4.4 Summary of weighted scores based on field responses**

| S/NO | Q  | A  | B  | C  |
|------|----|----|----|----|
| 1    | 14 | 13 | 21 | 17 |
| 2    | 25 | 15 | 28 | 30 |
| 3    | 11 | 9  | 20 | 15 |
| 4    | 23 | 20 | 28 | 28 |
| 5    | 20 | 17 | 26 | 25 |
| 6    | 20 | 17 | 26 | 25 |
| 7    | 17 | 16 | 25 | 22 |
| 8    | 13 | 10 | 14 | 13 |
| 9    | 27 | 21 | 28 | 33 |

|    |    |    |    |    |
|----|----|----|----|----|
| 10 | 25 | 15 | 27 | 26 |
| 11 | 11 | 10 | 20 | 15 |
| 12 | 18 | 15 | 23 | 19 |
| 13 | 10 | 11 | 20 | 22 |
| 14 | 22 | 17 | 26 | 25 |
| 15 | 27 | 15 | 26 | 32 |
| 16 | 23 | 17 | 27 | 25 |
| 17 | 22 | 17 | 26 | 25 |
| 18 | 25 | 18 | 15 | 26 |
| 19 | 20 | 16 | 10 | 22 |
| 20 | 15 | 14 | 20 | 16 |
| 21 | 14 | 10 | 10 | 15 |
| 22 | 15 | 13 | 20 | 16 |
| 23 | 13 | 14 | 19 | 16 |
| 24 | 25 | 22 | 23 | 25 |
| 25 | 20 | 11 | 16 | 13 |
| 26 | 22 | 19 | 28 | 27 |

|    |    |    |    |    |
|----|----|----|----|----|
| 27 | 19 | 18 | 27 | 24 |
| 28 | 25 | 20 | 16 | 27 |
| 29 | 22 | 17 | 26 | 25 |
| 30 | 27 | 15 | 26 | 32 |
| 31 | 23 | 17 | 27 | 25 |
| 32 | 15 | 12 | 16 | 15 |
| 33 | 29 | 23 | 30 | 35 |
| 34 | 27 | 17 | 29 | 28 |
| 35 | 13 | 12 | 22 | 17 |
| 36 | 23 | 17 | 27 | 25 |
| 37 | 18 | 15 | 12 | 18 |
| 38 | 25 | 18 | 27 | 25 |
| 39 | 6  | 6  | 13 | 12 |
| 40 | 13 | 10 | 15 | 13 |
| 41 | 20 | 10 | 22 | 16 |
| 42 | 11 | 10 | 16 | 14 |
| 43 | 15 | 12 | 20 | 16 |

|    |    |    |    |    |
|----|----|----|----|----|
| 44 | 15 | 13 | 21 | 18 |
| 45 | 23 | 20 | 21 | 23 |
| 46 | 18 | 9  | 14 | 11 |
| 47 | 20 | 17 | 26 | 25 |
| 48 | 20 | 17 | 25 | 21 |
| 49 | 12 | 13 | 22 | 24 |
| 50 | 22 | 18 | 28 | 25 |
| 51 | 10 | 11 | 20 | 22 |
| 52 | 20 | 16 | 26 | 23 |
| 53 | 17 | 14 | 22 | 18 |
| 54 | 17 | 14 | 12 | 15 |
| 55 | 14 | 17 | 25 | 21 |
| 56 | 19 | 14 | 24 | 19 |
| 57 | 18 | 15 | 23 | 19 |
| 58 | 18 | 15 | 13 | 16 |
| 59 | 15 | 18 | 26 | 22 |
| 60 | 20 | 15 | 25 | 20 |

|    |    |    |    |    |
|----|----|----|----|----|
| 61 | 23 | 17 | 23 | 20 |
| 62 | 19 | 14 | 20 | 17 |

Sources: Computed from field responses

**Table 4.5 showing the descriptive analysis of data shown in table 4.4**

| <b>Descriptive Statistics</b> |         |                |             |
|-------------------------------|---------|----------------|-------------|
|                               | Mean    | Std. Deviation | Sample Size |
| Q                             | 18.8387 | 5.16036        | 62          |
| A                             | 14.9677 | 3.48283        | 62          |
| B                             | 21.9194 | 5.29552        | 62          |
| C                             | 21.2742 | 5.64284        | 62          |

Source: Computed analysis of data using SPSS

With a sample size of 62, table 4.5 showing the descriptive statistics of the variables, it is shown that variable C (Level of the measures used to address the problem of building material price instability on successful housing project delivery) has the highest mean, while variable A (Level of the causes of building material price instability on successful housing project delivery) has the lowest mean amongst the dependent variables. While the variables with the least and highest standard deviations are variables A (Level of the causes of building

material price instability on successful housing project delivery) and C (Level of the measures used to address the problem of building material price instability on successful housing project delivery) respectively.

**Table 4.6 showing the Pearson correlation of data in table 4.4**

| <b>Correlations</b>  |                     | Q      | A      | B      | C      |
|--|---------------------|--------|--------|--------|--------|
| Q  | Pearson Correlation | 1      | .770** | .538** | .775** |
|  | Sample Size         | 62     | 62     | 62     | 62     |
| A  | Pearson Correlation | .770** | 1      | .594** | .784** |
|  | Sample Size         | 62     | 62     | 62     | 62     |
| B  | Pearson Correlation | .538** | .594** | 1      | .719** |
|  | Sample Size         | 62     | 62     | 62     | 62     |
| C  | Pearson Correlation | .775** | .784** | .719** | 1      |
|  | Sample Size         | 62     | 62     | 62     | 62     |
| **. Correlation is significant at the 0.01 level (2-tailed). |                     |        |        |        |        |

Source: Computed analysis of data using SPSS

According to Pearson correlation analysis from SPSS output of data in table 4.4, we observe that effect of price instability on successful project delivery is more correlated to level of price control measures on successful housing project

delivery as compared to the other variables. The least correlated according to Pearson correlation is the variable B (Level of the effect of building material price instability on successful housing project delivery) with respect to dependent variable Q.

**Table 4.7 showing the Kendall and Spearman correlation of data in table 4.4**

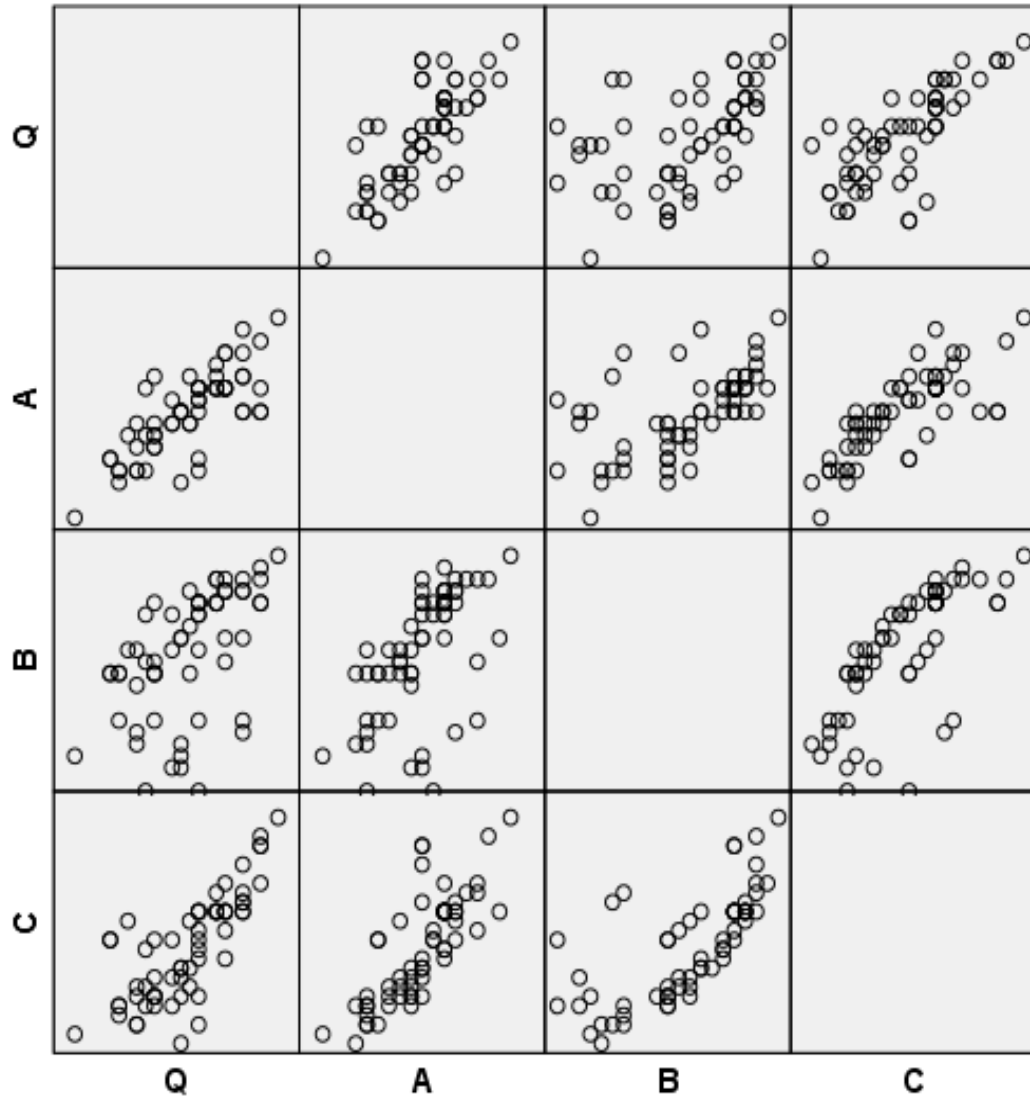
| <b>Correlations</b> |   |                         | Q      | A      | B      | C      |
|---------------------|---|-------------------------|--------|--------|--------|--------|
| Kendall's tau       | Q | Correlation Coefficient | 1.000  | .614** | .490** | .657** |
|                     |   | Sample Size             | 62     | 62     | 62     | 62     |
|                     | A | Correlation Coefficient | .614** | 1.000  | .539** | .661** |
|                     |   | Sample Size             | 62     | 62     | 62     | 62     |
|                     | B | Correlation Coefficient | .490** | .539** | 1.000  | .671** |
|                     |   | Sample Size             | 62     | 62     | 62     | 62     |
|                     | C | Correlation Coefficient | .657** | .661** | .671** | 1.000  |
|                     |   | Sample Size             | 62     | 62     | 62     | 62     |

|                |  |                         |        |        |        |        |  |
|----------------|--|-------------------------|--------|--------|--------|--------|--|
| Spearman's rho | Q  | Correlation Coefficient | 1.000  | .750** | .632** | .798** |  |
|                |  | Sample Size             | 62     | 62     | 62     | 62     |  |
|                | A  | Correlation Coefficient | .750** | 1.000  | .660** | .803** |  |
|                |  | Sample Size             | 62     | 62     | 62     | 62     |  |
|                | B  | Correlation Coefficient | .632** | .660** | 1.000  | .784** |  |
|                |  | Sample Size             | 62     | 62     | 62     | 62     |  |
|                | C  | Correlation Coefficient | .798** | .803** | .784** | 1.000  |  |
|                |  | Sample Size             | 62     | 62     | 62     | 62     |  |
|                | **. Correlation is significant at the 0.01 level (2-tailed). |                         |        |        |        |        |  |

Source: Computed analysis of data using SPSS

From table 4.7, it displays the SPSS results for Kendall and Spearman correlation. According to Kendall's correlation, independent variable C has the highest correlation with dependent variable Q which is 0.657 while independent variable B has the least correlation with dependent variable Q which is 0.490.

According to Spearman's correlation, independent variable C has the highest correlation with dependent variable Q which is 0.0.798 while independent variable B has the least correlation with dependent variable Q which is 0.632.



**Fig 4.5 showing the matrix scatter plot for the data in table 4.4**

From fig 4.4, the matrix scatter plot shows the graphical representation of correlation/strength of relationship between the independent variables A (Level

of the causes of building material price instability on successful housing project delivery), B (Level of the effect of building material price instability on successful housing project delivery) and C (Level of the measures used to address the problem of building material price instability on successful housing project delivery) and the dependent variable Q (Level of impact on effect of building material price instability on successful housing project delivery).

From the visual representation of the matrix scatter plot, it is seen that variable C and Q are the most correlated independent and dependent variables amongst others.

### **4.3 Discussion of Findings**

The results of variables Q, A, B, and C shows that variables A, B and C are independent variables as they depend on the judgment of the respondents and the researcher while variable Q depends on the statistical output from the IBM SPSS statistics analysis.

In Pearson correlation, Level of the measures used to address the problem of building material price instability on successful housing project delivery has a correlation of 0.775 with variable Q, Level of the causes of building material price instability on successful housing project delivery has a correlation of 0.770 with variable Q, while level of the effect of building material price instability on

successful housing project delivery has a correlation of 0.538 making it the least correlated.

In Kendall correlation, Level of the measures used to address the problem of building material price instability on successful housing project delivery has a correlation of 0.657 with variable Q, Level of the causes of building material price instability on successful housing project delivery has a correlation of 0.614 with variable Q, while level of the effect of building material price instability on successful housing project delivery has a correlation of 0.490 making it the least correlated.

In Spearman correlation, Level of the measures used to address the problem of building material price instability on successful housing project has a correlation of 0.798 with variable Q, Level of the causes of building material price instability on successful housing project delivery has a correlation of 0.750 with variable Q, while level of the effect of building material price instability on successful housing project delivery has a correlation of 0.632 making it the least correlated.

As a result of the correlations/strength of relationship analysis done on each of the variables it can be said that variable C is ranked the highest with respect to Q, A is ranked second, while B is ranked the least with respect to Q respectively.

Finally, in cognizance of the hypothesis earlier made hence impact of price instability on successful housing project delivery has the most correlation with

Level of the measures used to address the problem of building material price instability on successful housing project delivery, we accept hypothesis HA1 (There is significant relationship between the causes of building material price instability on successful housing project delivery) and discard hypothesis HO1 (There is no significant relationship between the causes of building material price instability on successful housing project delivery).

And with respect to the least correlated relationship between the impact of building material price instability on successful housing project delivery and the level of the effect of building material price instability on successful housing project delivery, we accept hypothesis HA2 (There is correlation between the effect of building material price instability on successful housing project delivery) and discard hypothesis HO2 (There is no correlation between the effect of building material price instability on successful housing project delivery).

## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATIONS

#### 5.1 Conclusion

Building materials are the main component in any construction project and instability in their prices can affect the whole projects. Despite innovation in technology, still most of the construction projects are facing budget overrun issue.

The rate of instability in the prices of building materials is one of the main factors of budget overrun, which deviates the building materials price over time. Based on the carried out analysis, the following conclusions have been drawn;

Economic factors such as the industrialization capability of a country affects the price instability of building material expenditure, as a country with a stable economy can be more stable in terms of project delivery.

- i. The result of this study can assist construction industry practitioners to focus attention on the identified determinants so as to control the prices of building material.
- ii. The findings from this study will provide solutions to the problems of building materials price instability in relation to successful housing projects delivery.

- iii. Economic factors such as the industrialization capability of a province or country also affects the price instability of building expenditure, as a country with a stable economy can be more stable in terms of accuracy of project delivery.

## **5.2 Recommendations**

A thesis (research) will be incomplete without the scholar in question providing intelligent recommendations based on the study. This study has attempted to establish the relationship between the effect of price instability and the success of housing project delivery.

The study recommended that every organization should have strategies role out and agendas to ensure that the causes of building material price instability are solved to mitigate the lagging effect of price variations on project delivery.

- i. I recommend firstly that every organization should have strategic role out and agendas to ensure that the causes of building material price instability are solved to mitigate the lagging effect of price variations on project delivery.
- ii. Secondly, I put my foot down in recommendation that the government and authorized agencies should role out pricing evaluation strategies to mitigate the effect of delayed project delivery caused as a result of retailer/wholesalers of building items hoarding and elevating the price of building materials thereby causing unprecedented price fluctuations.

### **5.3 Contribution to Knowledge/Research Gap**

- i. This research will expand the knowledge of researchers on the nature of building material price instability and its adverse effect on successful housing project delivery and the economy of Nigeria.
- ii. This study will also provide solutions to the problems of price instability in relation to successful building project delivery
- iii. Finally, it will serve as a reference material for researchers who may wish to carry out further studies on a related topic

### **5.4 Areas For Further Research**

The areas that require further research are;

- i. To investigate the effects of inflation on financial appraisal of building project.
- ii. To determine the control measures of increasing prices of building materials in Nigeria.

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## **APPENDIX I**

### **QUESTIONNAIRE**

My name is Nwachukwu Mathias Nnabuihe. I am a Master student of Project Management Technology (PMT), Federal University of Technology, Owerri Imo State. As part of meeting the requirements for the award of Master's Degree in Project Management, I am carrying out this research to examine the effects of building material price instability on successful housing project delivery. Your co-operation is therefore needed for the successful execution of this research. Any information provided shall be kept confidential and only be used for the purpose of this research. Thank you for your co-operation.

**Note:** This questionnaire is designed using the five point liker scale. Where;

**SA:** Strongly Agreed

**A:** Agreed

**N:** Neutral

**D:** Disagreed

**SD:** Strongly Disagreed

## SECTION A: Demographic Characteristics

### 1) Professions of the Respondent

project manager

Quantity surveyor

Procurement manager

### 2) Education Background

SSCE

OND

HND / BSC

Others

## SECTION B: Factors responsible for price instability of building materials

| S/N | Variables                               | SA | A  | N  | D  | SD |
|-----|---|----|----|----|----|----|
| 1   | Inflation                               | 18 | 10 | 9  | 13 | 12 |
| 2   | Manufacturing cost                      | 13 | 12 | 16 | 10 | 11 |
| 3   | Exchange rate                           | 17 | 10 | 12 | 14 | 9  |
| 4   | Lack of locally produce materials       | 18 | 14 | 12 | 8  | 10 |
| 5   | Cost of transportation and distribution | 16 | 11 | 13 | 12 | 10 |
| 6   | Shortage of construction materials      | 14 | 9  | 17 | 10 | 12 |

|    |   |    |    |    |    |    |
|----|---|----|----|----|----|----|
| 7  | Increase demand for construction materials                        | 13 | 10 | 16 | 11 | 16 |
| 8  | Government policies and legislations                              | 17 | 13 | 11 | 9  | 12 |
| 9  | Lack of competition/substitute                                    | 14 | 10 | 16 | 9  | 13 |
| 10 | High import duty on imported materials                            | 15 | 11 | 14 | 10 | 12 |
| 11 | Demand for building materials in other sectors                    | 18 | 10 | 9  | 13 | 12 |
| 12 | Inadequate infrastructural facilities                             | 14 | 10 | 11 | 15 | 12 |
| 13 | Distance between the distribution location and source of material | 16 | 13 | 14 | 9  | 10 |
| 14 | Excessive reliance on importation of materials                    | 14 | 11 | 15 | 12 | 10 |
| 15 | Political interference/instability                                | 17 | 10 | 12 | 14 | 9  |
| 16 | Cost of labour and plant  | 15 | 14 | 11 | 12 | 10 |
| 17 | Cost of raw materials   | 14 | 10 | 16 | 13 | 9  |
| 18 | Corruption  | 12 | 14 | 11 | 15 | 10 |
| 19 | Limited capacity to produce                                       | 12 | 9  | 17 | 10 | 14 |
| 20 | Shipping and handling costs                                       | 16 | 9  | 14 | 12 | 11 |
| 21 | Timing of construction activity                                   | 18 | 12 | 13 | 10 | 9  |

## SECTION C: Effects of price increase of building materials

| <b>S/N</b> | <b>Variables</b>                                 | <b>SA</b> | <b>A</b> | <b>N</b> | <b>D</b> | <b>SD</b> |
|------------|--|-----------|----------|----------|----------|-----------|
| 1          | Increase in construction cost                    | 18        | 16       | 7        | 10       | 11        |
| 2          | Contractual claim                                | 14        | 10       | 11       | 15       | 12        |
| 3          | Reduction of profit margin                       | 16        | 13       | 10       | 12       | 11        |
| 4          | Inability to deliver value for money             | 17        | 12       | 14       | 9        | 10        |
| 5          | Lower demand for infrastructure                  | 15        | 10       | 12       | 11       | 14        |
| 6          | Compromise of quality                            | 13        | 11       | 16       | 10       | 12        |
| 7          | Reduction of construction activities             | 15        | 11       | 14       | 12       | 10        |
| 8          | Higher rental/lease costs or prices              | 14        | 10       | 17       | 12       | 9         |
| 9          | Difficulty in forecasting and planning           | 16        | 9        | 14       | 10       | 13        |
| 10         | Poor quality of workmanship                      | 17        | 8        | 10       | 11       | 16        |
| 11         | Extension of time                                | 16        | 10       | 13       | 12       | 11        |
| 12         | Insolvency of the contractor                     | 10        | 17       | 9        | 14       | 12        |
| 13         | Friction among client, consultant and contractor | 14        | 10       | 16       | 13       | 9         |
| 14         | Project abandonment                              | 16        | 10       | 17       | 8        | 11        |
| 15         | Project failure                                  | 18        | 11       | 8        | 12       | 13        |
| 16         | Reduction in rate of employment                  | 10        | 16       | 17       | 8        | 11        |

|    |   |    |    |    |    |    |
|----|---|----|----|----|----|----|
| 17 | Inhibited innovations in construction methods | 15 | 13 | 11 | 14 | 9  |
| 18 | Decrease in service production                | 13 | 11 | 16 | 10 | 12 |
| 19 | Bad reputation                                | 17 | 10 | 16 | 11 | 8  |
| 20 | Decrease in the rate of national growth       | 14 | 10 | 12 | 11 | 10 |

#### **SECTION D: Frequency of proposed mitigation measures**

| <b>S/N</b> | <b>Variables</b>                         | <b>SA</b> | <b>A</b> | <b>N</b> | <b>D</b> | <b>SD</b> |
|------------|--|-----------|----------|----------|----------|-----------|
| 1          | Effective material management            | 17        | 9        | 12       | 13       | 11        |
| 2          | Executing a long term supply agreement   | 15        | 14       | 10       | 11       | 12        |
| 3          | Bulk purchase from manufacturer          | 16        | 11       | 8        | 14       | 13        |
| 4          | Appropriate contractual strategy         | 13        | 9        | 17       | 11       | 12        |
| 5          | Bid contingency                          | 12        | 14       | 16       | 9        | 11        |
| 6          | Employment of value engineering          | 14        | 9        | 18       | 10       | 11        |
| 7          | Good financial backing                   | 11        | 13       | 16       | 10       | 12        |
| 8          | Early material purchase                  | 8         | 10       | 17       | 12       | 15        |
| 9          | Use of sustainable construction material | 10        | 14       | 12       | 11       | 15        |
| 10         | Improved project communication           | 10        | 13       | 16       | 12       | 11        |
| 11         | Selecting a qualified supplier           | 12        | 14       | 10       | 15       | 11        |