

# **Minimising Variations and Fluctuations in Housing Delivery in the Developing Economy of Nigeria**

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## **ABSTRACT**

Housing is unarguably one of the basic necessities of man. It is ranked second after food in the hierarchy of man's needs. The housing need in Nigeria increases by the day, whereas the vast majority of the population lacks the wherewithal to make effective demand on housing. It is estimated that Nigeria has a housing deficit of 22 million units. The private sector, which is the major supplier of housing in Nigeria, faces a number of problems inhibiting it from meeting the ever increasing needs. The complex nature of construction compound even the most intricate management systems. This organizational characteristic of the construction industry makes construction projects complex and prone to changes or variations during the construction phase. Variations are inevitable on building and civil engineering projects and may range from small changes having little consequential effects to major revisions, which result to inconsiderable delay, and/or disruption to the project. Fluctuation of prices of materials and delays in project completion are common problems in the construction industry not only with an immeasurable cost to society but also with debilitating effects on the contracting parties.

This paper analyses the nature and causes of both Variations and Fluctuations in housing project delivery with their resultant effects and concludes that although changes in the construction–housing projects can sometimes be inevitable, all parties and stakeholders should strive to reduce them to the barest minimum in order to minimise variations and Fluctuations in housing delivery.

The paper concludes that although changes (variations and fluctuations) in the construction – housing projects are inevitable, all parties and stakeholders should strive to reduce it to the barest minimum in order to give the client value for money.

**Keywords:** Housing, variations, fluctuations, projects delivery, developing economy

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## INTRODUCTION

Housing is unarguably one of the basic necessities of man. It is ranked second after food in the hierarchy of man's needs (Ugonabo & Emoh, 2013). Ebie (2009) argued that housing is the first and most important of all rights due to humans. Olotuah and Taiwo (2015) observed that housing need in Nigeria increases by the day, whereas the vast majority of the population lacks the wherewithal to make effective demand on housing. The private sector, which is the major supplier of housing in Nigeria, faces a number of problems inhibiting it from meeting the ever increasing needs.

Housing problem is peculiar to both rich and poor nations as well as developed and developing countries (Festus & Amos, 2015). Nigeria has a population of about 174 million people and faces a housing deficit of about 17 million units (Emiedafe, 2015). According to Emiedafe (2015), the implication of this housing deficit is that tenants in rented apartment pay as high as 60% of their average disposable income which is far higher than the 20-30% recommended by the United Nation. In additions, expert believe that it is only 10% of those who desire owing a home in Nigeria can actually afford it either by way of purchase or personal construction as against developed countries like 72% in USA, 78% in UK, 60% in China, 53% in Korea, 92% in Singapore.

Figure 1: Percentage of purchase or personal construction of houses in some countries

A World Bank study projects that the cost of bridging this 17 million housing deficit is ₦59.5 trillion, indicating the vast and untapped investment potential of Nigeria real Estate sectors.

Meanwhile, currently our housing and construction sector account for only 3.1% of our rebased GDP while the total current housing production is at about 100,000 units per year for a country of about 190 million now. Therefore, Emiedafe (2015) suggested that we need at least about 700,000 additional units each year to have a change of bridging this huge gap.

According to World Bank report (2008), the contribution of mortgage finances of Nigeria's Gross Domestic Product (GDP) is close to negligible with real estate contribution less than 5% and mortgage loans and advance at 0.5% of GDP.

For example, let's take a look at the size of the mortgage finance (as a share of GDP) of various countries. In the UK, mortgage finance to GDP ratio is about 80%, in the US it is 77%. For Hong Kong, this ratio is 50%. Across Europe the average is about 50%, and for Malaysia it is 23%. In Africa, South Africa is the outlier with mortgage finance at 31% of GDP. For many 4 African countries, this ratio is low: it is only 2% for Botswana, 2% for Ghana, and only 0.5% for Nigeria.

Figure 2: Percentage of mortgage finance to GDP ratio of in some countries

## **FACTORS RESPONSIBLE FOR HOUSING DEFICIT IN NIGERIA**

The problem of housing deficit can be narrowed down to two key areas – rural and Urban. The problem in the rural areas has to do with qualitative housing while the problem of in the urban centre is quantitative in nature. Other factors include:

Poverty / Affordability Gap

In effective Housing Finance

High Population Explosion

High Rate of Urbanization

High Cost of building materials

Shortage of Infrastructural Facilities

Bureau curacies in Land Acquisition

High cost of Land Registration and Titling

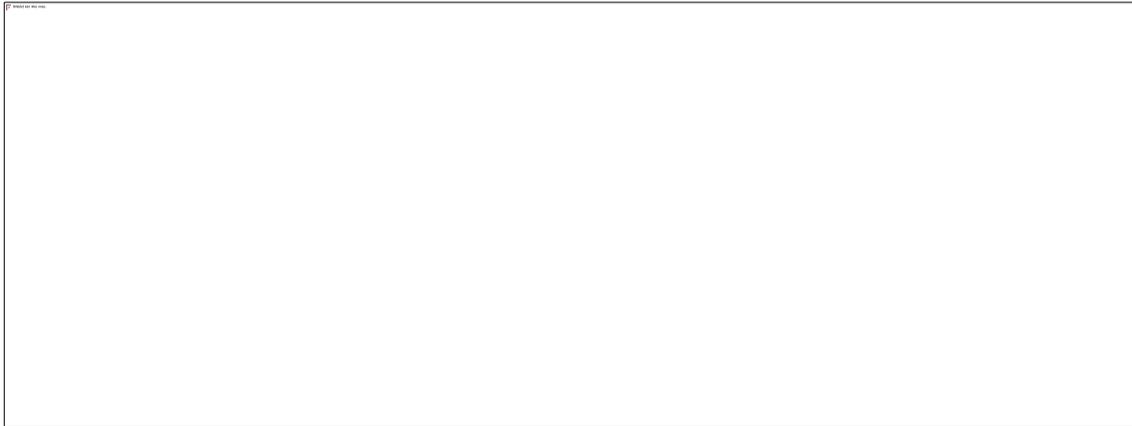


Figure 3: A slum in Makoko, Lagos State (Source: google)

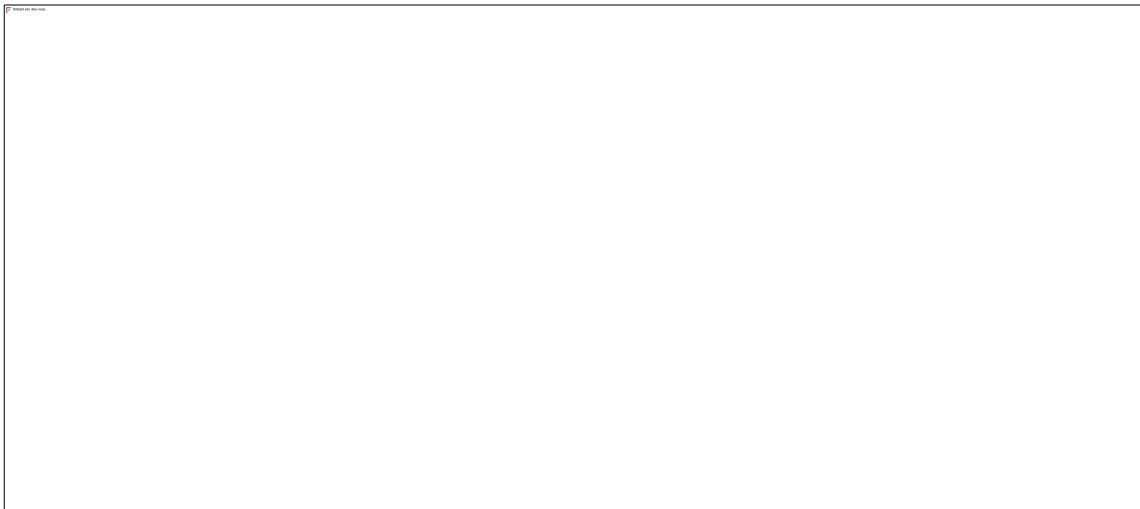


Figure 4: A slum in Makoko, Lagos State (Source: google)



Figure 5: Organised housing scheme in Abuja(Source: google)

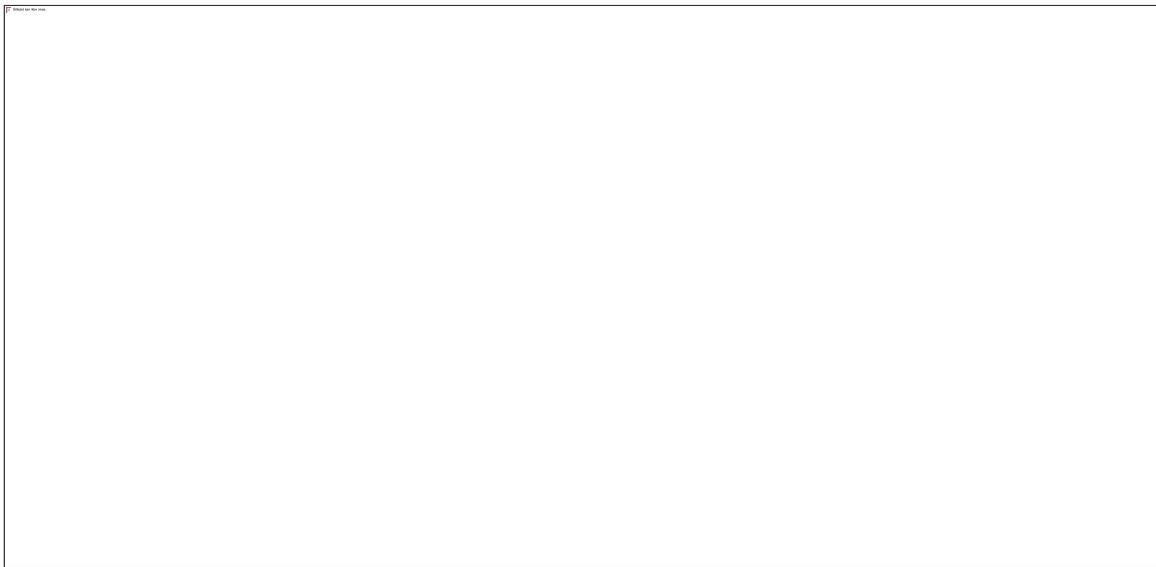


Figure 6: Organised housing scheme in Abuja (Source: Google)

## HOUSING DELIVERY AND VARIATIONS AND FLUCTUATIONS

According to Cheung, Tam, Ndekugri and Harris (2000), the complex nature of construction can confound even the most intricate management systems. The design and production function in construction projects are conventionally separated and are performed by different professionals or organisations working independently making it different from manufacturing (Ojo, Adeyemi & Fagbenle, 2007). This organisational characteristic of the construction industry makes construction projects complex and prone to changes or variations during the construction phase (Oladapo, 2007). Revay (2002) as cited in Alsuliman, Bowles and Chen (2012) concluded that change is “a fact of life” for construction projects.

The changes that occur in construction projects according to Murdoch and Hughes (2008) usually has a resultant effect on the price for the work which is typically referred to as the contract sum, contract price or tender total. They grouped the variety of reasons for which the contract sum may be changed into three groups as follows:

- i. Reimbursement of the contractor for certain expense caused by the contract administrator, employer, or certain events outside the control of the contractor.
- ii. Payment for extra work brought about by a contract administrator’s instruction.
- iii. Reimbursement of extra expense brought about by market fluctuations affecting the contractor’s inputs.

From the above groups, it can be clearly seen that variations and fluctuations constitute about two-third of the reasons for changes in the contract price.

Variations and conflicts in a construction projects, at work, and even in our daily lives are very common (Arain & Low 2006). Variations are inevitable on building and civil engineering projects and may range from small changes having little consequential effects to major revisions, which result in considerable delay, and/or disruption to the project (Potts, 2008). Variations have a certain level of impacts on the project outcomes of cost, time and productivity. Schedule and cost overrun, rework, productivity degradation, claims and disputes, poor working relationship and quality degradation just to name a few (Arain & Low 2005).

Fluctuation of prices of materials and delays in project completion are a common problem in the construction industry not only with an immeasurable cost to society but also with debilitating effects on the contracting parties (Ramata, 2017). According to Ramus, Birchall and Griffiths (2006) ‘fluctuations’ includes both increases and decreases and that they may lead to payments becoming due to the contractor from the Employer and vice versa. In Cartlidge (2009) fluctuations or, as it is often referred to, increased costs is the mechanism by which the contractor is reimbursed for increases in the cost of labour, materials, plant, etc. that occur during the contract period. Murdoch and Hughes (2008) observed that the purpose of a fluctuations clause is to provide a mechanism for reimbursing contractors for changes in input prices over which they have no control at all.

If the construction world were ideal, there would be no change orders, however, in the real world change is inevitable situation in construction projects (Kolawole, Kamau & Munala,2015).

## VARIATIONS

In order to change the specification of the work, a contract would, in principle, have to be re-negotiated. To avoid this, most contracts include a clause enabling the employer's design team to vary the specification. Such provisions are usually called variations clauses (Murdoch & Hughes, 2008).Construction contract is a business agreement that is subjected to variability (Enshassi, Arain & Al-Rae, 2010).

Various standard forms of contract have adopted different definitions for the term "variation" The Joint Contracts Tribunal (2011) defines variation in section 5 as follows

*"5.1. The term 'Variation' means: \*

- 1. the alteration or modification of the design, quality or quantity of the Works including: the addition, omission or substitution of any work;*
- .2 the alteration of the kind or standard of any of the materials or goods to be used in the Works;*
- .3 the removal from the site of any work executed or Site Materials other than work, materials or goods which are not in accordance with this Contract;*
- 2 the imposition by the Employer of any obligations or restrictions in regard to the matters set out in this clause 5-1-2 or the addition to or alteration or omission of any such obligations or restrictions so imposed or imposed by the Employer in the Contract Bills or in the Employer's Requirements in regard to:*
  - 1 access to the site or use of any specific parts of the site; ·*
  - .2 limitations of working space;*
  - 3 limitations of working hours; or*
  - 4 the execution or completion of the work in any specific order.*

Chappell, Powell-Smith and Sims (2005) observed that the use of the word 'variations' in building contracts usually refers to a change in the works instructed by the architect, contract administrator or the employer as the case may be.

## **TYPES OF VARIATIONS**

Variation of works – This is a change in the specification/design, quality and quantity of the works, For example, a change in the specifications of the doors from soft wood to hard woods would be a variation of the quality.

Variation of the contract – This is the change on the terms of the contract. For example, a change in the date for possession stated in the contract particulars. Variations of the terms of contract can only take place if both employer and contractor agree. Others include when the employers imposes or change obligations or restrictions

## **NATURE AND CAUSES OF VARIATIONS IN HOUSING PROJECT DELIVERY**

The nature of variation orders can be determined by referring to the reason of occurrence and its effects (Ndiokubwayo & Haupt 2008). Variations are inevitable in even the best-planned contracts simply because, in a matter as complicated as the construction of a building, it is virtually impossible for the building owner and his design team to foresee every eventuality (Chappell, et al 2005).

According to Murdoch and Hughes (2008) there are three ways in which a variation might occur:

1. Clients may change their minds about what they asked for before the work is complete.
2. Designers may not have finished all of the design and specification work before the contract was let.
3. Changes in legislation and other external factors may force changes upon the project team.

Potts (2008) in reference to Gray *et al.*, (1994) observed that there are a number of reasons for the introduction of changes on building works including: inadequate briefing from the client, inconsistent and late instructions from the client, incomplete design, lack of meticulous planning at the design stage, lack of coordination of specialist design work and late clarification of complex details. March (2009) identified unexpected ground conditions resulting in extra excavation or foundation design changes ;a change of requirement by the client and a design error as the typical reasons for variations

While, according to the JCT (2011), variations may originate from:

A discrepancy or divergence between the contract drawings, contract bills, architect's instructions or any drawings or documents issued by the architect (2.3). Compliance with statutory requirements (6:1:2). Alterations or modifications of the design, quality or quantity of the works (13.1.1). Restoration work in making good damage resulting from fire or other

causes (22B.3.5). Instructions relating to the finding of the antiquities or other objects of interest or value on the site (34.2).

## **NATURE AND CAUSES OF FLUCTUATIONS IN HOUSING PROJECT DELIVERY**

Inflation has become a chronic problem whose effects permeate the entire construction industry. Contractors are faced with severe uncertainty in bidding and financing work on projects. Owners are not only paying for the increased costs of facilities and capital but also for premiums on construction prices because of the uncertainties of inflation and its side effects. (Mishra & Regmi, 2017). They stated further that the primary problems of the construction sector can be classified into two main categories. The first according to Mishra and Magar, (2017) is related to the consequences of integrated planning and implementation whilst the second problem as opined by Paulos, (2002) is related to deficiencies and market price fluctuation of the inputs required for the construction.

Fluctuations are the third mechanism by which the contract sum may validly be adjusted. The purpose of a fluctuations clause is to provide a mechanism for reimbursing contractors for changes in input prices over which they have no control at all (Murdoch & Hughes, 2008). According to Anunike (2015) in most construction contracts, provisions are made for the contractor and employer to enjoy the benefits of increases or decreases in the price of basic resources arising from inflation or deflation respectively. Price fluctuation can generally be defined as the rise or fall of price of goods, materials and services on the markets. Price fluctuation can occur at any market, i.e. at international markets, local market and/or at the labour market (Mishra & Regmi, 2017).

The Joint Contracts Tribunal (2011) sets out fluctuations in clause 4.11 and 4.22 with further details in schedule 7 where three alternative options A, B and C are spelt out for dealing with fluctuations. It goes ahead to identify option A as contributions, levy and tax fluctuations, option B as labour and materials cost and tax fluctuations and option C as use of price adjustment formulae. According to Murdoch and Hughes (2008) fluctuations that fall under options A are also referred to as limited fluctuations while those that fall under options B and C are referred to as full fluctuations.

Anunike (2015) summarised the set down rules which claims for fluctuations should follow especially in Nigeria:

The contract must be of over twelve (12) months duration for Federal ministry of works conditions.

The materials to be considered will be those listed in the schedule of basic prices enclosed in the appendices

The basic prices contained in the contract are based on prevailing market prices of materials, labour, taxes, levies etc. as at the date of tender which shall mean ten (10) days before the date fixed for the receipt of the tenders by the employer.

## **EFFECTS OF VARIATIONS AND FLUCTUATIONS IN HOUSING PROJECT DELIVERY**

The effect of variations and fluctuations is most often times lead to claims. The effects of claims include

Claims generally could increase the overall cost of the contract.

Claims may lead to abandonment of the project particularly if there is no immediate re-compensation to the contractor. The contractor might be forced to suspend their works usually and eventually determine such contracts (Ojo, 2009).

It could also lead to further delay of the project if not properly handled.

Serious disputes could emerge which might involve the input of a third party i.e. arbitration or litigation.

It could amount to contractor insolvency if not resolved for whatever reasons.

## **MINIMISING VARIATIONS AND FLUCTUATIONS IN HOUSING PROJECT DELIVERY**

Due to the inevitability of variation orders, as well as their potential impact on the planning, design, progress and completion of any given construction project, it is not uncommon for the literature to devote considerable time and effort to the experimentation and theorization of how such orders can best be managed (Alsuliman, *et al*, 2012). They argued further that several strategies have been acknowledged as useful in managing variation orders both in theory and in practice.

Ibbs, Wong and Kwak (2001) state that identifying variation orders prior to their occurrence can assist the project team in managing variations better and earlier. Charoengam, Coquince, and Hadikusumo (2003) concluded that creation of good communication and cooperation among project team members was amongst the various strategies used to manage variations. According to Arain and Pheng (2007) if the project team established a knowledge-base of similar past projects, they would be capable of planning efficiently before conducting a project and during the design and construction stages, in orders to minimise variation orders and avoid their negative impact

In summary, after review of relevant literature on the nature and causes of variation and fluctuations, the following have been harmonised both from literature and practice as the most likely methods of minimising variations and fluctuations in construction projects of which housing is a key component

## **Proper and adequate planning and preparation of contract documents**

There is need for all consultants particularly the Architect to consider the cost implications of design variable such as plan shape, size of building, perimeter/floor area ration, circulation space storey height and total height of the buildings adequately to reduce or minimize the issuance of Architect instructions during the execution of the project. Architect to ensure adequate briefing from the client at the on set.

Complete removal and avoidance of provisional sums in bills of quantities. Consultants must ensure that the items of work, goods, plant and services are adequately specified. Thorough analysis done at the onset by the Quantity Surveyor must ensure that all these items of work, goods, plants and services are priced (no assumptions).

The Quantity Surveyor must ensure that the contractors price adequately and include the schedule of basic prices list for materials, labours and plant in the contract bills of quantities.

There is need to ensure that soil test are carried out at the on set to ascertain the ground conditions prior to the design of the buildings.

## **Effective cost control of projects**

The aims of cost control according to Seeley (2010) are:

To give the building client good value for money

To achieve a balanced and logical distribution of the available funds between the various parts of the building

To keep the total expenditure within the amount agreed by the client.

To achieve these points, there is need for strict cost discipline throughout all the stages of design and execution to ensure that the initial estimate, tender figure and final account sum are all closely related

**Administration of advance payments for projects.** The release of such advance payment should of a necessity be backed by a list from the contractor showing the major material, she intends to use the sum to procure. This would go a long way to reduce fluctuations. However, extant rules governing the application of advance payments must strictly be followed and backed up by an advance payment guarantee (APG).

**Minimal contingency sums in projects.** This is to discourage unnecessary changes in specification, designs and materials of construction projects.

**Consultants should also shun corrupt practices**

**Proper contract administration of construction projects through:**

Frequent site visits by consultants

Regular site meeting

Proper administration of the conditions of contract

Adequate record of site activities and supplies.

**Adequate and proper coordination of specialist design work**

**Early clarification of complex details**

## **CONCLUSION**

This paper concludes that although changes (variations and fluctuations) in the construction – housing projects are inevitable, all parties and stakeholders should strive to reduce it to the barest minimum in order to give the client value for money.

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