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Assessment of the Effect of the Rise in Cost of Building Material on Housing Development in Benin City, Edo State

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ABSTRACT

The effects the rise in cost of building materials have on housing development cannot be overemphasized. The contribution of adequate housing to a nation include the attainment of physical and moral health, stimulating social stability, work efficiency and the development of the populace. Building materials and the cost of acquiring them is among the vital factors affecting housing and the construction sector. This paper aims at investigating the effect of rise in building material cost on housing development in Benin City Edo State. A total of 100 questionaires was shared to construction professionals in the study area. The Data collected from the questionaires were presented in tables and analyzed using relative important index and percentage descriptive analysis. Market prices of 16 selected building materials were collected from building materials salers sales book from 2020 to 2024 and their percentage increase was calculated. the prices of majority of the selected building materials have increased by over 100 percent in the last five years with Aluminium roofing sheet having the highest percentage increase in price by 483 percent. The findings from these study showed that the most influential factor responsible for rise in the cost of building materials is inflation. Other factors responsible include naira exchange rate, Market conditions, government policies and regulations, material wastage on site, alterations in designs, fluctuation construction cost. deficiency in the delivery of housing to the populace rise in project abandonement and a rise in maintenance cost. The study recommended that the identified economic related factors can only be halted through tough national economic policies, hence Government should develop and implement economic policies that are favourable which will reduce inflationary rate, improve naira exchange rate and market conditions hence encouraging research in the production of local building materials while reducing the overdependence on imported materials.

Keywords: Building materials, Housing delivery, Rise in cost.

1. INTRODUCTION

In building construction, building materials constitute the largest single input of which housing is one part. In the construction industry, building materials plays an essential role in that they are materials put together in erecting buildings. It commonly includes wood, concrete, steel, cement, aggregates, bricks, clay, metal, and so much more. Without the inclusion of building materials, construction project is not practicable. In the olden times, people have been using pure bricks, wood or straw. But in this modern age, engineers have learned to mix and match the accurate materials to come up with better quality structures. According to Gbadebo (2014), the cost of building materials and components is known to constitute about 60 – 70 % of the cost of buildings. This means that high cost of building materials will similarly result to high construction cost. Adedeji (2012) discovered that the cost of building materials has been one of the factors prohibiting successful housing delivery. In his findings, Agulaka (2003) cited that availability on a sustainable basis of relatively cheap, locally produced and tested building materials and technologies is the palpable anti-dote to high cost of housing construction in Nigeria.

The price instability of building materials is caused by high taxes which in turn impacts accommodation cost in major cities in the country; and as opined by Arayela (2005) many completed housing estates has remained virtually unoccupied because of high rental and sale prices attached to them as against the paltry income of average Nigerian workers.

As precisely observed by Adedeji (2002), one main barrier to the realization of effective housing in Nigeria as revealed in successive government efforts has been the cost of housing in the country.

In recent times the rise in the cost of building materials has served as a hindrance to housing development in the country. Though people still build, there have been a decrease in the number of buildings constructed due largely to the deteriorating economy. This study provides information on the effects of the rise in the cost of building materials and its consequent effect on housing development in Benin City.

1.1 Statement of Problem

One of the many challenges Housing development in Benin City faces is the rise in building materials cost. Compared to neighboring towns, it has been observed that building materials price is on the high side in Benin City. A research by Obaedo (2024) and Obaedo and Abumere (2024) revealed that in 2020 cement was sold for 3600 in Benin City while it was sold for 3000 in Ekpoma. The fast rise in prices of necessary building construction materials like cement, steel, laterite, granite and timber in Benin City has impacted negatively on both the affordability and availability of housing in the study area. As Olatunji et al. (2018) asserted, the Nigerian construction industry is relies heavily on imported materials, making it vulnerable to fluctuations in foreign exchange rates and global market conditions. This dependency exacerbates the cost burden on local housing projects.

According to the report by The National Bureau of Statistics (2020), cost of building materials constitutes a huge portion of the total construction expenditure, accounting sometimes for over 60% of the overall construction budget. Consequently, the shortage of affordable housing has reached a critical level, contributing to the proliferation of informal settlements and slums in urban areas.

Given these challenges, this research wishes to examine the specific ways in which material costs affect housing development in Benin metropolis.

1.2 Aim and Objectives

The aim of this research is to investigate the effects of rise in material cost in housing development in Benin City Edo State. In order to achieve the aim of this research, the following objectives have been set:

1. To examine the factors that are responsible for rise in building materials cost in Benin City Edo State.
2. To ascertain the effects the rise in building materials cost have in housing development in Benin City.
3. To offer solutions that will reduce the rise in building materials cost to ensure adequate housing development in Benin City Edo State.

2. LITERATURE REVIEW

2.1 The Building Construction Industry

The Building construction industry contributes significantly in terms of scale and share in the development process for both developed and developing countries. The construction products provide the necessary public infrastructure and private physical structures for many productive activities such as services, commerce, utilities and other industries. Uwakweh (2005) agrees that the construction sector makes undeniably important contribution to the socio-economic expansion process in developing countries by contributing meaningfully to the gross domestic product. The National Bureau of Statistics (NBS) put Nigeria's post-re-basing contributions of the construction sector to Gross Domestic Product at N5.7 billion in three years. NBS, in its summary report of 2010, 2011 and 2012 fiscal years on the Construction industry and disclosed that in 2010, the sector contributed N1.570 billion, a value which leaped by 21.30 per cent to reach N1.905 billion in 2011.The industry's contributions closed at N2.188 billion in 2012, bringing the total contribution of the sector to GDP to N5.7 billion and 2017 report shows that the sector recorded a 13 percent growth.

2.2 Building material and Housing Development in Nigeria

Building materials play a important role in the construction industry as they are those materials put together in erecting buildings; construction project is not feasible without the inclusion of building materials (Akanni et al., 2014). That is, building materials play an undeniable significant role in the housing industry as it is the most substantial input in project development. Building materials play a crucial role in enhancing sustainability of buildings and contributing to economic wealth of the nation. Nevertheless, Donyavi and Flanagan (2011) observed that in order to reduce construction costs, and to improve productivity, quality and timely project delivery, material management effectiveness must be a main concern. In their research Karana, Hekkert and Kandachar (2010) disclosed that appropriate use of the building materials, in respect of the expertise involved in the building construction process, determines the strength, functionality and quality of the building.

2.3 Factors Responsible for Rise in the Cost of Building Materials

According to Akanni et al *(*2014), the cost of building materials has presented a formidable challenge to the construction industry. Windapo and Cattell (2013) elucidated that the preminent challenge affecting the performance of the construction industry and projects in Nigeria is primarily the rising cost of building materials. As revealed by Alabi (2017), local currency devaluation was a factor surging the cost of building materials up. Also, Idoro and Jolaiya (2010), and Mojekwu, Idowu, and Sode (2013); from their research findings listed factors responsible for the rise in the cost of building materials. These factors include change in government policies and legislations, fluctuation in the cost of fuel and power supplies, scarcity of raw building materials, insufficient infrastructural facilities, fluctuation in the cost of plant and labour, unfortunate corruption, and weather.

Alabi (2017) categorized the factors responsible for rise in the cost of building materials into four namely Economic related factors, Building production related factors, External factors, and Stakeholder related factors.

2.3.1 Economic related factors

2.3.1.1 Inflation

According to Adamu (2013), inflation is an upsurge in general price level in any economy. Inflation is a sustained increase in the price level of goods and services in an economy over a period of time. It reflects a reduction in the purchasing power per unit of money, a loss of real value in the medium of exchange and unit of account within the economy. Obviously, any other factor that delays a project will further expose the project to the risk of inflationary cost increases.

2.3.1.2 Exchange rates

According to Windapo & Cattel (2012), exchange rate is the amount for which one currency is exchanged for another currency, used in determining the strength of one currency against another. Nigeria produces its own strategic materials and yet relies on imported equipment. Hence, increases in materials cost within the industry are a cause for concern Windapo & Cattell (2013). Furthermore, The ratio to which building material costs are affected by exchange rates depends on the type and quantity of material being imported by a country at a specific time, the need to import the raw materials used in the production of building materials locally, and on whether or not local materials (such as copper, timber and steel) are internationally traded commodities Windapo & Cattell (2012).

2.3.1.3 Fluctuation in the cost of building materials

Constant fluctuation of building materials is the most severe cause of rise in project cost. For both the client and project contractors, maintaining steady cost projection on construction projects had been a cause for concern. According to Azhar, Farooqui, and Ahmed (2008), the basic reason of cost overruns is that most contractors quote prices based on their projected estimates; regrettably, the prices change so quickly that the initial budget figures become totally unrealistic.

2.3.1.4 Supply and demand of building materials

Supply and demand of materials will decide the price of building materials (Oladipo & Oni 2012). According to Windapo et al. (2012), the demand for more housing and delay in supplying the building materials or lack of materials will add to the trends in the price of building materials where the law of supply and demand can be related. Furthermore, they admitted that building materials cost increases are dependent on the market conditions under which they are manufactured. For example, the researchers noted that material cost will increase if only one or two companies are manufacturing building materials as compared to those for which many manufacturers compete for the same market. This is true as certain brands enjoy monopoly in the building materials sector and their demands are usually higher than others.

2.3.2 Building production related factors

2.3.2.1 Site related factors

A universal concern faced by construction stakeholders is Construction waste. As opined by Nagapan et al., *(*2012), waste generated during construction activities on site can affect delivery of a construction project significantly, specifically on construction cost, construction time, productivity and sustainability aspects. Nagapan et al. (2012) pointed out that the majority of waste generated during construction is materials waste, primarily as a result of the use of un-reusable materials, leftovers and debris. Unfortunately, this material waste amounts about 9% of the weight of materials purchased Azis et al., (2012). Material mismanagement during construction can lead to an increase in costs of construction, whereas effective management of materials can bring extensive savings to project costs Rajaprabha et al., (2016).

2.3.2.2 Design related factors

According to Olawale & Sun (2010), a construction project performance is inevitably impacted by design changes. Design change is a kind of change that impacts the method of work as was originally planned budgeted or scheduled Abdul-Rahman et al. *(*2015). Nevertheless, researchers revealed that changes do frequently arise at any stage of a project due to a variety of reasons stemming from diverse sources – with significant impact. Abdul-Rahman et al. (2015) highlighted that design change orders resulting in additional work can account for as much as 50% of project cost overrun – quite substantial. Possibly, all these factors impinge significantly on the cost of materials.

2.3.3 External factors

2.3.3.1 Government policies

Government policies on importation, taxation, interest rate, relief to local producers, budget etc. impact on how building materials affect housing delivery. According to Mansfield et al. (1994), governments may also invoke their powers to initiate or halt projects on political, social and environmental grounds.

It is worth noting that no construction work happens in a single space; rather it is subject to a group of powers from regulatory control to political intervention.

2.3.3.2 Force majeure

Force majeure, as defined by the international chamber of commerce as an event or situation which is beyond the control of the party affected. furthermore, it is a term that covers a range of events, including revolution, war, riot, earthquake, landslide, fire, political and economic instability and other such risks (Nega 2008).

2.3.3.3 Weather conditions

Though building materials are a significant component of any building project, climate change directly or indirectly will also have an effect on the use of building materials before or during building construction. As posited by Windapo & Cattell (2013), climate changes contribute a vast challenge to global warming emission of CO2 by buildings under construction and in use. For instance, a research by Rajaprabha et al. (2016) showed that heavy rainfall has an effect on the concreting works for structures, which no doubt will then require extra materials and time.

2.4 Effects of Building Materials Cost on Housing Development

Akanni et al. (2014) acknowledged some possible effects that increase the cost building materials have on delivery of housing. They include completion at the expense of other projects, delay in progress of project works, other valuable projects not being commissioned, low quality local materials, and hindered implementation of innovation in construction.

Other effects are as follows;

2.4.1 Increase in Final Cost of Building Products

According to Ikechukwu et al. (2017), the increase in the final cost of building product to end-users is as a result of impact of cost overruns in public building construction projects delivery. Unavoidably, this effect gives rise to increase in project cost, caused by hike in cost of construction materials (Ikechukwu et al. 2017).

2.4.2 Rise in project abandonment.

According to Nwachukwu (2016), project abandonment is the unplanned suspension of the work progress especially at the execution stage such as the refusal or failure to complete a contract after practical completion time. Numerous construction projects are temporarily or even permanently abandoned and as Nwachukwu (2016) opined, the predominance of many uncompleted and abandoned projects was as a result of finance related crises and material related factors. Furthermore, Ayodele and Alabi (2011) and Idoro and Jolaiya (2010) identified inflation and high cost of building materials as major factors that lead to uncompleted and sub-standard buildings. It is reported that project abandonment promote negative environmental impacts. In his words, Aluko (2008) stated the effects of abandoned project on environment and acknowledged such effects as the problems of flooding, traffic jamming, air and water pollution, drug addiction and health hazards in the neighborhood. Furthermore, an upward review of contract sum leads to conflicts between contractors and clients, most likely leading to cases of abandonment where investments are tied down, since such project will not be put to use at the expected time (Akanni 2014).

2.4.3 Unemployment of Construction Workers

As stated by Akanni et al (2014), workers in the construction industry are extremely diverse, comprising of skilled and unskilled personnel . According to Ayodele and Alabi (2011), the impact of inflation in the cost of purchasing building materials is frustrating the industry, this is due to the fact that many contractors are finding it difficult to forecast correctly the expected profit on a project. Hence, this situation contributes to sack of workers and in various severe cases shutting down of the firms (Ayodele and Alabi 2011).

3.0 METHODOLOGY

3.1 Population size and Study Area

This research is limited to the effects of material cost on housing development in Benin City Edo state. A mixed methods design was employed. This approach combines quantitative methods which provides numerical data and statistical analysis with qualitative methods which offer insights through interviews of sellers of building materials. The target population are Construction professionals including; Quantity surveyors, Engineers, Architects, Builders in the building construction industry in Benin City Edo State. One hundred (100) questionaires was designed and distributed to the respondents randomly selected. 80 questionaires were duly returned and were used for the analysis. A regression model will be adopted for data analysis.

3.2 Sampling Techniques and Sample Size

This research employed stratified sampling techniques bearing in mind the heterogenous nature of respondents (professionals) and the complexity of building construction industry as it relates to operations, management, geographical distribution and the frequent hectic schedule of these construction stackholders. The respondents for these study consisted of 100 respendents. The sample sizes for different professionals are architects 35, Builders 20, quantity Surveyors 17 and structural engineers 28.

3.3 Method of Data Collection

The information used in this research was obtained from primary and secondary sources of data The primary data was collected through administering of questionaires to survey respondents. By reason of limited time frame and the number of respondents to be visited, this research adopted descriptive survey. In the effort to the objectives of this research, this model was used to identify the effects of material cost on housing development in Benin city.

The secondary data are data obtained by the researcher from textbooks, journals and conferences proceedings, thesis, National Bureau of Statistics (NBC) and Building material sellers.

3.4 Method of Data Collection

The data collected were analyzed using relative important index and percentage descriptive analysis

4.0 DATA PRESENTATION AND ANALYSIS

4.1.1 Economic related factors responsible for rise in cost of building materials

Table 4.1 shows the ranking from respondents responses of economic related factors responsible for the rise in the cost of building materials based on their professional experience using relative importance index, the greater the index score the higher the rank. Respondents were requested to indicate the extent to which each of the identified factors were responsible for increase in cost of building materials using a five (5) point Likert scale with values as follows: 5 = Strongly agree, 4 = Agree, 3 = Undecided, 2 = Disagree, 1=Strongly disagree. Inflation was ranked 1st with RII of 0.84 as the most significant economic factor identified to be responsible for rise in cost of building material, Naira exchange rate ranked 2nd with RII of 0.83. Market conditions ranked 3rd with RII of 0.81, Fluctuation in the cost of raw materials ranked 4th with 0.80 and inadequate production of building materials ranked 5th with RII of 0.74. Local Taxes ranked 6th with RII of 0.73, Supply and demand of building materials ranked 7th with RII of 0.72 while scarcity of building materials ranked 7th with RII of 0.70

Table 4.1 Respondents responses on economic related factors responsible for rise in the cost of building materials

Economic related factors	**Frequency of response**					**RII**	**Rank**
	5	**4**	**3**	**2**	**1**		
Inflation	40	30	6	4	0	0.84	1
Naira exchange rate	36	32	4	6	2	0.83	2
Market conditions	34	30	7	6	3	0.81	3
Flunctuation in the cost of raw materials	36	25	8	7	2	0.80	4
Inadequate production of building materials	30	20	15	9	6	0.74	5
local taxes	32	14	18	7	9	0.73	6
Supply and demand of building materials	31	15	13	14	8	0.72	7
Scarcity of building materials	29	16	14	11	10	0.70	8

Source: Researcher's field survey, 2024

4.1.2 Building production related factors responsible for the rise in the cost of building materials

Table 4.2 showed the respondents responses on building production related factors responsible for rise in the cost of building materials. The table shows that Under site related factors, materials wastages of on site ranked 1st with RII of 0.82, poor site planning leading to uneasy movement of materials ranked 2nd with RII of 0.79, Building materials shortage on site ranked 3rd with RII of 0.78, insufficient site facilities ranked 4th with RII of 0.71, fuel cost ranked 5th with RII of 0.70, Stealing of materials on site ranked 6th with RII of 0.66. For design related factors; Alterations in design ranked 1st with RII of 0.80, closely followed by complexity of construction design which ranked 2nd with RII of 0.79, additional works due to errors ranked 3rd with RII of 0.76, erroneous estimation by quantity surveyor ranked 4th with RII of 0.72, experience of design team ranked 5th with RII of 0.69, while lack of cordination among design team' ranked 6th with RII of 0.68.

Table 4.2 Respondents responses on building production related factors responsible for the rise in the cost of building materials

Building production related factors	**Frequency of response**					**RII**	**Rank**
	5	**4**	**3**	**2**	**1**		
Site related factors							
Materials wastage on site	39	26	3	9	3	0.82	1
Poor site planning leading to uneasy movement of materials	35	29	0	12	4	0.79	2
Building materials shortage on site	37	19	8	13	3	0.78	3
Insufficient site facilities	25	26	5	17	7	0.71	4
Fuel cost	19	32	3	23	3	0.70	5
Stealing of materials on site	18	28	5	20	9	0.66	6
Design related factors							
Alterations in design	38	25	4	7	6	0.80	1
Complexity of construction design	31	30	5	12	2	0.79	2
Additional works due to errors	29	27	7	16	1	0.76	3
Erroneous estimation by quantity surveyor	31	16	5	28	0	0.72	4
Experience of design team	23	28	2	19	8	0.69	5
Lack of cordination among design team	26	18	10	16	10	0.68	6

Source: Researcher's field survey, 2024

4.1.3 External factors responsible for rise in the cost of building materials

Table 4.3 shows the response of respondents on external factors responsible for rise in the cost of building materials. The table showed the most significant external factor responsible for rise in cost of building materials is Change in government regulations and policies which is ranked 1st with RII of 0.78.

Poor nature of construction with RII of 0.78 ranked 2nd, level of technological advancement ranked 3rd with RII of 0.75, Condition of weather ranked 4th with RII of 0.71, lack of alternative for products ranked 5th with RII of 0.69, force majeure ranked 6th with RII of 0.67. finally, political interferences ranked 7th with RII of 0.61.

Table 4.3 Respondents responses on external factors responsible for rise in the cost of building materials

External factors	**Frequency of response**					**RII**	**Rank**
	5	**4**	**3**	**2**	**1**		
Change in government regulations and policies	32	29	4	12	3	0.78	1
Poor nature of construction	34	23	7	10	6	0.77	2
Level of technological advancement	32	25	2	15	6	0.75	3
Condition of weather	28	23	3	17	9	0.71	4
Lack of alternative for products	29	18	3	20	10	0.69	5
Force majeure	26	19	4	19	12	0.67	6
Political interference	19	21	8	21	11	0.61	7

Source: Researcher's field survey, 2024

4.1.4 Effects of rise in the cost of building materials on housing development

Table 4.4 presents ranking of respondents response regarding the effects of rise in building materials cost on housing development. Flunctuation in construction cost was ranked 1st as the most significant effect of rise in the cost of building materials on housing development with RII of 0.85. Deficiency in the delivery of housing to the populace and high maintenance cost due to poor workmanship was ranked 2nd and 3rd respectively with RII of 0.83 and 0.82. Rise in project abandonment was ranked 4th with RII of 0.81. Furthermore, Low volume of construction product 5th with RII of 0.77 followed by building collapse due to use of materials ranked 6th RII of 0.74. Other important effects include; Rise in the cost of Maintenance due to inferior materials used which ranked 7th with RII of 0.73, Poor workmanship and unemployment of construction workers which ranked 8th and 9th with RII of 0.72 and 0.70 respectively, Low income earners are priced out of house ownership due to high building materials cost ranked 10th with RII of 0.69, conflicts between clients and contractors due to upward review of contract sum ranked 11th with RII of 0.65, rise in the final cost of building products; final cost higher than budgeted cost ranked 12th with RII of 0.64, Affect Gross Domestic Product(GDP) contribution to the economy ranked 13th with RII of 0.62, rise in fraudulent practices of contractors ranked 14th with RII of 0.61, hindered sufficient implementation of innovation in construction ranked 15th with RII of 0.59, Return on investment on construction projects are delayed ranked 16th with RII of 0.55, while Completion at the expense of other products which ranked 17th with RII of 0.52

Table 4.4 Respondents responses on the effects of rise in the cost of building materials

Effects	Frequency of response					RII	Rank
	5	4	3	2	1		
Flunctuation in construction cost	43	27	1	8	1	0.85	1
Deficiency in the delivery of housing to the populace	45	22	1	4	8	0.83	2
High maintenance cost due to poor workmanship	46	18	3	6	7	0.82	3
Rise in project abandonment	38	24	9	3	6	0.81	4
Low volume of construction product	33	30	2	4	11	0.77	5
Building collapse due to use of poor materials	25	37	3	2	13	0.74	6
Rise in the cost of Maintenance due to inferior materials used	33	22	2	10	13	0.73	7
Poor workmanship	29	24	4	14	9	0.72	8
Unemployment of construction worker	30	19	5	13	13	0.70	9
Low income earners being priced out of home ownership due to high cost of building	32	19	3	5	21	0.69	10
Conflicts between client and contractor due to upward review of contract sum	28	18	1	15	18	0.65	11
Rise in the final cost of building products; final cost higher than	29	16	2	9	24	0.64	12

Source: Researcher‘s field survey, 2024

Table 4.5 Prices of selected building materials in benin City Edo State between the year 2020 and 2024

S/N	Description	Unit	Year 2020 (₦)	Year 2021 (₦)	Year 2022 (₦)	Year 2023 (₦)	Year 2024 (₦)	percentage increase (%)
1.	cement	50kg	3600	3800	5200	8500	9500	163
2.	granite	20 tonnes	170000	180000	195000	225000	400000	135
3.	Sandcrete hollow blocks (9 inches)	Per unit	600	600	750	750	1000	66

4.	Sandcrete hollow blocks (6 inches)	Per unit	400	450	500	650	800	100
4.	Sandcrete solid blocks (5 inches)	Per unit	300	350	350	400	600	100
5.	laterite	20 tonnes	50000	60000	70000	80000	100000	100
6.	16mm reinforcement bar	Per length	8200	8900	12500	13000	15000	82
7.	12mm reinforcement bar	Per length	5200	6000	6000	7600	9000	73
8.	10mm reinforcement bar	Per length	2800	3000	3000	4200	7500	167
9.	8mm reinforcement bar	Per length	1950	2000	2400	3000	5200	166
10.	3 inches bag of nails	Per bag	8000	12000	18000	22000	40000	400
11.	4 inches bag of nails	Per bag	8000	12000	18000	22000	40000	400
12.	Aluminium roofing sheet	m^2	1800	2100	5500	6500	10500	483
13.	0.3m x 0.3m tiles	m^2	3500	4800	4800	5000	6500	85
14.	0.6m x 0.6m tiles	m^2	4500	5800	6000	6500	8000	77
15.	20mm Pvc pipe	Bundle	8500	10000	15000	16500	20000	135
16.	25mm Pvc pipe	Bundle	13500	15500	17000	19500	22000	62
17.	Casement 1.2m x 1.2m	Per unit	40000	42000	60000	80000	120000	200
18.	Casement 0.6m x 0.6m	Per unit	22000	25000	40000	50000	75000	240
19.	Twyford wc complete set	Per unit	38000	42000	47000	52000	70000	84
20.	Wash hand basin	Per unit	13500	15000	17000	19500	25000	85
21.	Timber plane soft	Per length	2800	3000	3800	4800	6000	114
22.	Binding wire	Per roll	8000	12000	18000	22000	32000	300

Source: researcher's field work and Building Materials merchants, 2024.

Table 4.5 presents the prices of selected building materials between the year 2020 to 2024 as collected from the various building materials merchants in Benin city Edo State. The selected building materials were believed to be basic and common materials for building construction in Nigeria and their percentage increase for 5 years was calculated using;

$$\text{Percentage increase} = \frac{x^2 - x^1}{x^1} * 100$$

where x^2 = Original value and x^1 = New value

From the table, the prices of majority of the selected building materials have increased by over 100 percent in the last five years with Aluminium roofing sheet having the highest percentage increase in price by 483 percent.

4.2 Discussion of Results

4.2.1 Factors behind the rise in the cost of building materials.

To achieve the aim of the study, One of the objectives set is to examine the factors behind the rise in the cost of building materials impeding housing development in the study area. Three categories were used to evaluate the factors; Economic related Factors, Building production related factors which include Site and Design Related factors and External factors. Relative importance index was used to rank these factors as categorized.

4.2.1.1 Economic related factors

From the findings, Inflation with RII of 0.84 was revealed as the most significant economic factor responsible for the rise in the cost of building materials. Other very significant factors include Naira Exchange rate, Market condition, Fluctuation in the cost of raw materials, and Inadequate production of building materials. Local taxes, Supply and demand of Building materials, Scarcity of building materials, were found to be significant as well. From the foregoing inflation contributes enormously to high building materials cost in the todays market. As stated by Oghenekevwe et al., (2014), the construction industry is exposed to inflation in cost of building materials since it involves a truly excessive use of building materials for erecting building. As Oyediran

(2003) opined, one of the principal goals in any economy is price stability Nevertheless, with the rate at which inflation is presently ravaging global economies, particularly in developing countries like Nigeria, this seems to be an arduous task (Monye-Emina, 2007).

4.2.1.2 Building production related factors behind for the rise in the cost of building Materials

4.2.1.2.1 Site Related Factors

It was gathered from the research findings that Materials wastage on site, Poor site planning leading to uneasy movement of materials, Building material shortage on site were found to be very significant. whereas Insufficient site facilities, Fuel cost, Stealing of materials on site, were found to be significant. According to the study embarked on by Gulghane et al., (2015) material waste has been recognized as the most important problem in the construction industry with significant consequences both for the productivity of the industry and for the environmental impact of construction projects. Also, The lack of planning of construction activities contributes to material waste (Polat and Ballard, 2004).

4.2.1.2.2 Design Related Factors

This study explored the insight of construction professionals regarding design related factors responsible for rise in the cost of building materials. The findings gathered that alterations in design, complexity of construction design, additional works due to errors were very significant. whereas erroneous estimation by quantity surveyor, experience of design team, lack of coordination among design team, were found to be significant. Change in construction design is unavoidable and can occur for a number of reasons. But, these design changes do require extra time, extra cost and extra materials. This is in agreement with the study of Al-Dubaisi (2000) who determined that a change in design will have an influence on the material cost, schedule and cost of labour.

4.2.1.3 External Factors responsible for rise in the cost of building materials

This study gathered that the most important external factor responsible for rise in the cost of building materials is change in government regulation and policies. As clarified by Adekoya (2003), government fiscal policies are one of the factors affecting the cost of building materials. Also Poor nature of construction, Level of technological advancement, weather condition, lack of alternative for products, were found to be significant. However, other factors like Force majeure and political interferences were found to be fairly significant.

4.2.2 Effects of rise in the cost of building materials on housing development.

The review of literature and quantitative data analysis collected for this research showed that rise in the cost of building materials has an effect on affordable housing delivery in the Benin city, Edo State. The research findings reveal that Flunctuation in construction cost is the most remarkable effect of rise in the cost of building materials on housing development in Benin City Edo State. Other effects were found to be very significant. they include; Deficiency in the delivery of housing to the populace, High maintenance cost due to poor workmanship, rise in project abandonment, low volume of construction product, building collapse due to use of poor materials. The findings of the study also showed rise in the cost of Maintenance due to inferior materials used, poor workmanship, unemployment of construction workers, low income earners are priced out for house ownership due to high cost of building, conflicts between client and contractor due to upward review of contract sum, products; Increase in the final cost of building final cost higher than budgeted cost as significant effects of rise in cost of building materials on housing development in Benin City Edo State. finally, affect Gross Domestic Product (GDP) contribution to the economy, rise in fraudulent practices by contractors , hindered adequate implementation of innovation in construction, return on investment on construction projects are delayed, completion at the expense of other products are other effects found to be equally significant.

5.0 SUMMARY OF FINDINGS

1.The findings from these research revealed that Inflation, Naira Exchange rate, Market condition, Fluctuation in the cost of raw materials, and Inadequate production of building materials are the main economic related factors which is responsible for rise in building materials cost.

2. Materials wastage on site, Poor site planning leading to uneasy movement of materials, Building materials shortage on site, Alterations in design, Complexity of construction design, additional work due to errors are main production related factors responsible for rise in building material cost in Benin city.

3. It was discovered from the research findings that Change in government regulations and policies, Poor nature of construction, Level of technological advancement, Condition of weather are the significant external factors responsible for rise in Building Materials cost.

4. The findings of the study show that the cost of building materials plays a significant role in housing developments, with fluctuation in construction costs and deficiency in the delivery of housing to the populace, High maintenance cost due to poor workmanship, rise in project abandonment, low volume of construction product, building collapse due to use of poor materials, rise in the cost of Maintenance due to inferior materials used, poor workmanship, unemployment of construction workers, low income earners are priced out for house ownership due to high cost of building as the main effects. Other effects identified in this study include Conflicts between client and contractor due to upward review of contract sum, increase in the final

cost of building products; final cost higher than budgeted cost, rise in fraudulent practices of contractors, hindered adequate implementation of innovation in construction, return on investment on construction projects are delayed, completion at the expense of other products.

5. The prices of basic and common materials for building construction in Nigeria have increased by over 100 percent with Aluminium roofing sheet, 3 and 4 inches bag of nail, binding wire, 1.2 x 1.2 and 0.6 x 0.6 casement window having the highest percentage increase in price between 2020 and 2024.

5.1 Conclusion

Factors responsible for increase in cost of building materials was identified. Every identified factors had above a 50% agreement rate from respondents. Consequently, it is safe to conclude that the majority of the identified economic related, building production process related factors, and external factors are significant factors responsible for rise in the cost of building materials that hinder adequate and quality housing developments. Nevertheless, the most important factors responsible for rise in cost of building materials should be noted, if progress in cost effectiveness is to be achieved in the provision of housing in Benin City. The effects of rise in Building material cost was identified and scrutinized in so doing fulfilling one of the objectives of the research. Flunctuation in construction cost stood out as the most important effect of rise in building material cost on housing development in Benin City compared to other factors that was identified and assessed.

5.2 Recommendation

Following the summary, it is recommended that:

1. The factors responsible for rise in building materials cost should be effectively considered by professionals and stakeholders during the processes building production steming from from the design stage through the construction and finally the completion stage to guarantee affordable housing are delivered to the populace.

2. Many of the identified economic related factors can only be halted through tough national economic policies, hence Government should develop and implement economic policies that are favourable which will reduce inflationary rate, improve naira exchange rate and market conditions hence encouraging research in the production of local building materials while reducing the overdependence on imported materials.

3. Building materials wastage by workers was identified as a site related factor responsible for increasing costs of building materials. This might be caused by nonexistence of communication between the involved stakeholders and site workers and absence of material management. Its important that Construction Stakeholders and professionals always integrate practical knowledge acquired in the industry and good management skills for effectively communication about the project with site workers. Furthermore, to avoid building materials wastage during the process of building production, effective material procurement management is essential.

4. Alterations in design is the recognized highest design related factor that is responsible for increase in the cost of building materials. This could be caused by design specification obscurity, errors, oversights and changes ordered by client. It can be avoided through engaging experienced architects and engineers at the conceptual phase of the project. In other to achieve effective design, objectives must be visibly set out by the client to the designer at the conceptual phase, ensuring that client requirements are met while still conserving timely project delivery.

5. Research and development into local building materials should be encouraged by the government, fund should be provided for such research in the fiscal budget. The findings from such research should be implemented.

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