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Assessment of the Relationship Between Cost of Building Materials and Property Development in Abia State, Nigeria: Evidence from Trends in Cost of Building Materials and Property Development

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Abstract: Building materials contribute immensely to the quality and cost of any construction project. It is therefore pertinent for stakeholders in the construction industry to understand the implication of the rise in price of building materials and its influence on property development. The poor performance of the construction industry in terms of project delay and abandonment has been linked to incessant increase in the price of building materials. This study therefore, aims to assess the relationship between cost of building materials and property development in Abia State in order to address the challenges of building deficits in Nigeria. The study employed a quantitative research approach through a questionnaire survey that was conducted among the various construction professionals and material dealers. A total of one hundred (100) questionnaires were distributed, resulting in 77 valid responses, which is considered adequate for analysis. The study revealed that cost of building materials has a positive and statistically significant relationship with property development, with a p-value of <.022. This indicate that cost of building materials determines the level of property development. Thus, in order to overcome the challenges of project delay, project abandonment and housing deficits resulting from the incessant rise in cost of building materials, the study recommended that urgent attention should be given to the various factors influencing the cost of building materials. Also, adequate and functional price control agencies and policy should be put in place in order to regulate and checkmate the unnecessary price hike on building materials in the country.

Keywords: *Building materials, Construction industry, Cost, Nigeria, Property development, Relationship*

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1. Introduction

Property development is an essential part of the construction industry, which is crucial to the economic growth of any nation. The construction industry makes a significant contribution to the GDP of developing nations by impacting their socioeconomic growth and development (Chen et al., 2017; Ihedigbo & Jimoh, 2022). Hence, it is imperative that the industry comprehend how the cost of building materials influence property development. Building materials are essential resources for infrastructural, commercial and residential building projects. Building materials are the materials used to erect or construct structures (Akanni, 2018). Building materials plays a significant role in the national economy of any country, as the quality and rate of construction are determined by its output. Building materials have a significant influence on both the cost and quality of housing, ranging from foundation materials to roofing and finishing materials (Akanni, 2018; Amina et al., 2022). However, the price of building materials can change due to factors such as supply and demand, inflation, world market circumstances, and government regulations.

According to Amina et al. (2022) as one of the top three requirements of humans, property development, or housing, is essential to human existence. Man has always been in dire need of its provision. The health, effectiveness, social behaviour, contentment, and overall well-being of a community are all significantly impacted by housing as a component of the environment. One of the best historical examples of a nation's culture, it reflects the social, cultural, and economic values of that society. Although having decent housing is a fundamental need for every individual, family, and community at large, as well as a sign of one's social standing, achievement, and acceptance, its actualization remains a wish due to the unavailability of such housing due to rising building material costs (Amina et al., 2022).

Adedeji (2010) asserted that approximately sixty percent (60%) of all housing expenditure are spent on building materials. Building materials have been crucial to the growth of real estate in the building sector. Idoro and Jolaiya (2010) revealed that the rising cost of materials was the reason behind many construction projects not being finished on schedule. A significant barrier to improving housing quality in low-income nations, like Nigeria, is the high cost of building materials in addition to the issue of timely completion (Akanni et al., 2014). In a related development, Arayela's (2019) revealed that building material costs account for roughly 65% of the total cost of construction. Hence, the construction industry, real estate developers, and individuals who want to own homes are all seriously threatened by the rising cost of building materials. Amina et al. (2022) stated that the rising cost of building materials has multiplier effects on property development.

The cost of building materials in the construction industry has been severely challenged by the demand for all kinds of housing, inflation, and strict monetary supply (Esohofonie, 2008; Amina et al., 2022). Moreover, the problem of insufficient housing persists in developing countries (Du Plessis, 2012). In Nigeria, the construction industry is characterized by significant project risk for all stakeholders due to the fluctuating market value of building materials (Doloi et al., 2012; Amina et al., 2022). Alabi and Fapohunda (2021) revealed that the construction industry faces significant challenges in delivering high-quality projects on schedule due to the continuously rising cost of building materials. Also, the poor performance of the construction industry in terms of project delay and abandonment has been linked to incessant increase in the price of building materials and the consequence of not tackling the problem has result into the ever-increasing cost of property development. Therefore, it is imperative that better sustainable housing be delivered on schedule, within budget, and with the desired quality while also taking into account the cost of building materials and stakeholder satisfaction (Alabi & Fapohunda, 2021; Adibe et al., 2022). Despite several studies on factors responsible for increase of building cost and property development in Nigeria, but very few have given attention to their statistical relationship in the study area. Thus, this is a significant knowledge gap that must be filled. Thus, this study therefore, sought to bridge the knowledge gap by establishing the relationship between change in cost of building material and property development.

2. Literature Review

2.1. Cost of building materials

Achuenu and Ujene (2006) stated that there is variation in the cost of construction materials in Nigeria. Despite the region's abundant mineral resources, they found that the cost of building materials is comparatively greater in the southern part of the country. They linked this to the lack of manufacturing businesses in the area to convert the region's raw riches into final goods. Any country's infrastructure development is based mostly on building and construction. The number and quality of building materials that are available determine how much we build. In addition, the quality and longevity of a building are contingent upon the quality of the materials used. But the price of building materials influence both the quantity and quality of material used (Njoku, 2007; Alabi & Fapohunda, 2021; Adibe et al., 2022). The term "cost of building materials" describes the financial outlay for each building item, as well as the labour and material acquisition costs. One apparent issue impeding Nigeria's building industry's capacity to provide high-quality, reasonably priced homes and structures is the high cost of building materials (Adibe et al., 2022). The development is a serious danger to those who want to be home owners. The expense of building materials makes it difficult for people to construct houses. The building sector is now perplexed by the issue. To combat the uncontrollably rising cost of building materials, a few proactive steps have been taken in the past (Adibe et al., 2022).

2.2. Property development

The process of creating a usable home in a suitable neighbourhood that is backed by long-term upkeep of the built environment for people's daily activities as individuals and families live there is known as property development (National Housing Policy 2015). Property development also known as housing is considered as the second most basic human need. All of housing's implications go beyond simple shelter since they include all the utilities and social services needed to create a liveable community or neighbourhood. The sum of ideas and opinions outlined the two distinct elements of dwelling. Housing is viewed as both a social symbol and an economic process and product (Jinadu, 2016). Any nation must ensure that there is enough housing available since it boosts the national economy. Housing are a type of long-lasting property that make up a large amount of a nation's wealth and are the primary source of income for households. These factors have led to housing's frequent appearance in discussions of politics, economics, and society—often with intensely emotive undertones

(Adedeji & Abiodun, 2018). Ajibola et al. (2018) stated that Nigeria has a serious housing shortage as a result of years of neglect, underdeveloped housing finance systems, a lack of long-term financing options, low household income, high unemployment, high inflation, high interest rates on mortgages, expensive land and building materials, poor planning and execution of housing policies and programs, the presence of administrative bottlenecks that make it difficult to process and secure approvals for building plans, problems obtaining certificates of occupancy and other required government permits (Ademiluyi & Raji, 2019).

The main issue with property development, according to Olotuah (2014), is the discrepancy between the amount and cost of housing available, and the number of households and their financial capacity to pay these costs. Affordability is mostly determined by the price at which homes are brought on the market. In areas where housing costs are extremely high, only a small number of individuals can afford it. According to Okupe and Windapo (2017), there is a significant disparity in housing costs and income in Nigeria. Because of this, low-income individuals are virtually non-existent in the housing market. Cooperative societies and commercial developers' contributions to housing finance, especially in tertiary institutions, are a solution to the problem.

Table 2: Summary of Identified Effects of Cost of Building Materials

S/N	Categories	References
1	Fluctuation in construction costs	Jagboro and Owoeye (2004); Azhar *et al*. (2008); Ali and Kamaruzzaman (2010); Windapo and Cattell (2012); Akanni *et al*. (2014); Alabi and Fapohunda (2021); Omede and Saidu (2021)
2	Increase in final cost	Glaeser *et al*. (2005); Aziz (2013); Lukale (2018); Alabi and Fapohunda (2021)
3	Increase in project abandonment	Aluko (2008); Haseeb *et al*. (2011); Ayodele and Alabi (2011); Ghoddousi and Hosseini (2012); Windapo and Cattel (2012); Akanni *et al*. (2014)
4	Poor quality of workmanship	Lam *et al*. (2007); Construction Industry Development Board (2011); Oladipo and Oni (2012); Iwaro and Mwasha (2012); Pacheco Torgal (2014); Akanni *et al*. (2014)
5	Low volume of construction output	Fagbenle *et al*. (2004); Windapo *et al*. (2004); Anosike (2009); Ganiyu (2016)
6	Building collapse	Dimuna (2010); Amadi *et al*. (2012); Aziz (2013) Hamma-Adama and Kouider (2017); Alabi and Fapohunda (2021)
7	Increased unemployment rate	Ayodele and Alabi (2011); Oladipo and Oni (2012); Akanni *et al*. (2014)
8	Higher rates fraudulent practice	Akanni *et al*. (2014); Alex (2019)
9	Poor project delivery	Ruskin (2012); Meng (2012); Smith *et al*. (2016)

2.3. Relationship between cost of building materials and property development

Idoro and Jolaiya (2010) revealed that cost of building materials has a substantial influence on level of property development. As many construction 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 significant barrier to improving housing conditions (Akanni et al., 2014). According to Adedeji (2010), approximately sixty percent (60%) of all housing expenses are spent on building materials. Building materials have been crucial to the growth of property development in the building sector.

In a related development, Arayela's (2019) revealed that building material costs account for roughly 65% of the total cost of construction. The building sector, property developers, and individuals aspiring to own a house are all seriously threatened by the rising cost of building materials. Amina et al. (2022) asserted that the rising cost of building materials has multiplier effects on property development. Building materials continue to be the most significant input in property development and are crucial to the completion of construction projects, according to studies by Ibn-Homaid (2002) and Adibe et al. (2022).

According to Windapo et al. (2004), conditions brought on by the sharp rise in building material prices could result in severe housing shortages, pricing out millions of middle-class and lower-class households from the market for home ownership throughout Nigeria. Ibrahim (2014) asserted that the industry is subject to multiplier effects from rising building material prices, which result in fluctuating construction costs and project abandonment. The rate of employment of construction workers, the completion of projects at the expense of other projects, delays in project work, the commissioning of other valuable projects, subpar workmanship resulting from the use of subpar local materials, and the inhibition of

innovations in construction methods are other potential effects of rising material costs (Amina et al., 2022; Akanni et al., 2014).

Building materials alone, according to Idoro and Jolaiya (2010), govern roughly 80% of a project's schedule and fifty to sixty percent of its cost. Many of the factors that contribute to the rising cost of building materials in Nigeria, according to Mojekwu et al. (2010), include changes in government policies and legislation, a shortage of building raw materials, fluctuations in the cost of fuel and power supplies, inadequate infrastructure, corruption, fluctuations in the cost of plant and labour, seasonal changes, fluctuations in the cost of transportation and distribution, political interference, local taxes and charges, fluctuations in the cost of raw materials, fluctuations in the cost of financing and interest rates, inflation, and fluctuations in the Naira exchange rate. Adibe et al. (2022) revealed four categories of elements that account for variations in the cost of building materials: those linked to economics, those connected to building production, those related to stakeholders, and external factors. The construction materials sector operates under an economic environment determined by government policies. In Nigeria's construction industry, one of the variables influencing building material costs is government fiscal policy.

Thus, in order to established the relationship between the cost of building materials and property development. The study tested the following hypotheses:

Ho: there is no statistically relationship between cost of building materials and property development.

H1: there is a statistically relationship between cost of building materials and property development

3. Research Methodology

A descriptive research design was used in the study. A descriptive study conveys information on the nature of people as well as a range of goals or categorizations of events (Creswell, 2014). According to Jimoh et al. (2023), quantitative methodology provides the essential data to meet the objectives and assess the hypotheses through analytical techniques such as regression analysis and correlation. In order to methodically investigate and establish the relationship between the two variables, a quantitative research strategy was chosen for the study. Both primary and secondary sources of data were used in the data collection process in order to achieve the study's objectives. Primary data are first-hand results from surveys, whilst secondary data are previously published results that were further used in the study (Ifediora & Keke, 2019; Ihedigbo, 2023). Thus, the population for the study comprises of construction professionals in the ministry of works who are involved in property development and material dealers in the study area. A total of one hundred (100) questionnaires were distributed, out of the one hundred (100) distributed questionnaires, seventy-seven were returned, making it 77 percent of the returned questionnaires which were used for the analysis. All data collected were sorted, classified and organised and were subsequently subjected to statistical and inferential analysis with the use of Microsoft Excel and SPSS.

4. Results and discussion

The results for each of the four variables are presented in details in Table 3 below. Regarding the gender, the highest percentage of the respondents (76.6%) were male while (23.4%) of the respondents were female. On the highest academic qualification, many of respondents had at least B.Sc/BTech degree in relevant fields (55.8%), followed by (22.1%) of the respondent with HND. Regarding the year of experience, the highest percentage of respondents (46.8%) have 6-10 years of experience, followed by (32%) of the respondents with 11-15 years of experience. Also, the table showed the organisation categories of the respondents, 61.0% of the respondents are under contracting firms, followed (23.4%) of the respondents who are material suppliers. Hence, these revealed that the responses from the respondents could be considered valid to provide answers to the questionnaires based on the academic qualification and year of experience of the respondents.

Table 3: Demographic Profiles of the Respondents

	Frequency	Percentage	Cumulative
Gender			
Male	59	76.6	76.6
Female	18	23.4	100
Academic qualification			
HND	17	22.1	22.1
BSC/B.Tech	43	55.8	77.9
PGD	9	11.7	89.6
M.Sc/M.Tech	8	10.4	100

Year of experience				
	1-5yrs	2	2.6	2.6
	6-10yrs	36	46.8	49.4
	11-15yrs	25	32.5	81.8
	16-20yrs	14	18.2	100.0
Type of organisation				
	Consulting	12	15.6	15.6
	Contracting	47	61.0	76.6
	Material supplier	18	23.4	100.0

4.1. Trends in cost of building materials

Table 4 below showed the trends on the cost of building materials from the year 2018 to 2023. The results indicated that there is a constant increase in price of building materials such as cement, 12mm reinforcement bar, emulsion paints, sandcrete block and long span aluminium roofing sheets. Also, the table showed that the price of timber is relatively lower in year 2018 and 2019 while got higher in year 2020, the price remains constant in 2021 where it also increases higher in year 2022 and 2023 respectively.

Table 4: Trend in Cost of Building Materials

S.N.	Materials	YEAR (#) 2018	2019	2020	2021	2022	2023	2024
1	Bag of Cement		2500	3000	3500	3850	4500	5000
2	12mm Reinforcement Bar		3000	3500	3800	4200	4700	5200
3	20 litre Emulsion Paint		6500	7000	8000	9000	10500	11000
4	Timber							
	2*3 Hardwood		250	250	300	300	350	500
	2*4 Hardwood		400	400	450	450	550	700
	2*6 Hardwood		600	600	650	650	700	1400
5	Sandcrete Blocks							
	6inch		115	120	130	170	200	270
	9inch		150	150	160	185	230	340
6	0.45 Long Span Aluminium		1900	2700	2800	3200	3500	5000

Source: Authors field survey

4.2. Trends in property development

In order to represent the trends in property development, a bar graph was employed. Figure 1 showed the result of the trend on property development from the year 2018 to 2023. From the graph it revealed that there is 1.4%, 1.98% to 2.39% decrease in property development between year 2018, 2019, 2020 and 2021 respectively. Also, 12.49% and 14.57% decrease between 2022 and 2023 respectively. This indicated that there is a decline in property development in the study area recently due to the constant increase in price of building materials.

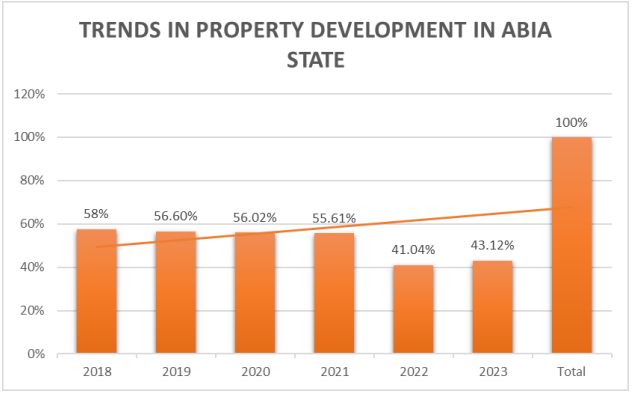

Figure 1: Trends in Property Development from 2018 to 2023

4.3. Cost of building materials and property development

Table 5 showed the correlation test to determine the relationship between cost of building materials and property development. The result revealed that there is positive significant relationship between cost of building materials and property development at rho = .880; n = 6; P < .021. These denoted a perfect relationship by measuring it on Cohen (1988) and Pallant (2011) criteria which asserted that a correlation of 0 means no relationship, and a correlation of 1.0 means a perfect positive correlation. A value of –1.0 means a perfect negative correlation. Therefore, cost of building materials has an influence over property development. These are consistent with Akanni et al. (2014) and Amina et al. (2022) who stated that there is a substantial relationship between cost of building materials and property development. Building material costs determines the level of increase in the economic and infrastructural development in the study area and Nigeria generally. Hence, when there is a constant hike in price of building materials building both the clients, property developers, contractors and the building occupants are affected thereby leading to rise in building deficits.

Table 5: Relationship Between Cost of Building Materials and Property Development

		Cost of Building Materials	**Property Development**
Cost of Building Materials	Correlation Coefficient	1.000	.880*
	Sig. (2-tailed)		.021
	N	6	6
Property Development	Correlation Coefficient	.880*	1.000
	Sig. (2-tailed)	.021	
	N	6	6

*. Correlation is significant at the 0.05 level (2-tailed).

Also, a linear regression analysis was carried out to determine the effects of cost of building materials on property development. Table 6, 7 and 8 showed the results of the regression model. The model tested how cost of building materials can predict property development. The model offers a predictive power of 76.6% (R = .875; R2 = .766; F = 13.067 [with p = .022], with beta values (beta = .875). This outcome revealed that cost of building materials had a significant effect on property development. Therefore, the regression model implied that cost of building materials has a significant unique contribution to the model measuring it on Pallant (2011) criteria which stated that variables are making significant contributions to a prediction of dependent variables when the significant value is less than .05. But if the significant value is greater than .05; then, the variables are not contributing significantly to the prediction of the dependent variable. Therefore, the null hypothesis is rejected because there is a statistically relationship between cost of building materials and property development.

Table 4.6

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.875[a]	.766	.707	.280

a. Predictors: (Constant), Cost of Building Materials

Table 4.7 ANOVA[a]

Model	Sum of Squares	Df	Mean Square	F	Sig.

1	Regression	1.021	1	1.021	13.067	.022[b]
	Residual	.313	4	.078		
	Total	1.333	5			

a. Dependent Variable: Property Development

b. Predictors: (Constant), Cost of Building Materials

Table 4.8 Coefficient[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.875	.419		4.472	.011
	Cost of Building Materials	.438	.121	.875	3.615	.022

a. Dependent Variable: Property Development

5. Conclusion

Building materials significantly contribute to both the quality and cost of construction projects. It is therefore essential for stakeholders in the construction industry to understand the implications of rising building material prices and their influence on property development. This study examined the relationship between cost of building materials and property development in Abia State using descriptive and quantitative analysis. The findings revealed a significant positive relationship between cost of building materials and property development, showing that cost of building materials have a substantial influence on development development. Specifically, the continuous increase in building material prices has led to a decline in property development, affecting clients, developers, contractors, and occupants, and contributing to a housing deficit as well as a reduction in economic growth in the country.

To address challenges such as project delays, abandonment, and housing deficits resulting from rising material costs, the study recommends that adequate attention be given to the factors influencing these costs. Additionally, appropriate building material price control agencies and policies should be established to regulate unnecessary price hikes.

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