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Influence of Changes in the Price of Construction Materials and Labour

on Rate of Housing Development in Abuja



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**INFLUENCE OF CHANGES IN THE PRICE OF
CONSTRUCTION MATERIALS AND LABOUR ON RATE OF
HOUSING DEVELOPMENT IN ABUJA.**

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ABSTRACT

The ever increasing cost of building construction materials and labour in Nigeria has been a major source of concern to all the stakeholders in the industry, because of its overarching effects on infrastructure development. Therefore, the study aimed at analysing the effects of the prices of construction materials and labour on the rate of housing development in Abuja. In order to achieve this, data were sourced quantitatively using archival data and Geospatial techniques which involved the use of Remote Sensing and Geographical Information System (GIS) to determine the rate of housing development over the years. Some selected building materials and tradesmen were examined and compared with a rate of housing development. The rate of housing development for the period of the study was based on built-up area per square meter. The data were analysed using both descriptive (mean,

standard deviation, bar chart and pie chart) and inferential (analysis of variance, correlation and multiple hierarchical regression) statistical analysis, to test the hypotheses, establish the level association among the dependent and independent variables and determine the relationship as well as the effects of each dependent variables on the rate of housing development. The results of the research revealed that changes in the prices of building materials and labour have an effect on the rate of housing development at an average of 85% for materials and 99% for labour in the variation explained by the models. In conclusion, the resultant effects showed that materials and labour are good determinants of the rate of housing development. Based on the results and the conclusion drawn from the findings, indicated that any unit change in the prices of construction materials and labour would have an effect on the rate of housing development. The study provides models that can predict the rate of housing development in the study area.

Keywords: Material, Labour, rate of housing development and geospatial techniques.

INTRODUCTION

The construction industry is the main contributor to growth and drivers of the economy of any nation, this is largely due to the fact that other sectors like health, education, transportation and the likes depend on the industry for effective functioning (Dansoh, 2005). The construction industry's contribution to the economy is estimated to be 5% of the GDP growth. However, the successful conduct of the construction industry depends largely on the active participation of both the organised private sector and the government being the major client of the industry which makes a significant impact on every developing country (Bowen, *et al.*, 2007).

The rate of housing development in the context of this study encompasses urban growth which involves an increase in the urban population generally as well as the movement of people that populated the urban centres due to movement from rural areas. Urbanisation is on the rise in Nigeria and the upsurge of this phenomenon has been reported as well as its attending consequences such as inadequate urban

infrastructure (Oluwasola, 2007; Sanusi, 2011). Also, it has been established that increase in urban population exerts more pressure on infrastructure most especially housing because the response of the government to housing provision is not sufficient to balance the infrastructure deficit (Sanusi, 2011).

Hence, in order to make adequate provision for housing to be able to meet the demand and the goals of the teeming population of the country so as to guarantee their mental, physical, and social wellbeing by providing the secured and serene environment, labour and materials costs play a pivotal role.

This implies that the rate of housing development of any city or country is contingent on many factors chief among these factors; the high cost of building materials and labour for construction works. In fact, Israel and Basiru (2008) asserted that the challenge posed by the inadequacy of the building materials constitute obstacles which often lead to a hike in prices of the housing construction. Akanni (2006) and Taylor (2013) posited that building materials are an important component in housing

construction and another type of construction as well as supportive infrastructure. This is because the materials constitute about 60% of the total cost of building in the building construction sector, and as such remain an indispensable resource (Omange and Udegbe, 2000). Furthermore, construction is considered to be labour intensive (Agbo and Ayegba, 2014) and what contributes to the success of the construction industry is hinged on the performance of the labour and their productivity. Agbo and Ayegba (2014) reported that the cost of labour of construction projects is in the range of 30-50% of the total cost of the project.

In a similar research, Udegbe (2007) found that labour cost in any building construction project is circa 36% of the overall of the construction work.

Therefore, Udegbe (2007) opined that the persistent increase in the cost of construction is attributable to the high cost of materials and labour. In Udegbe's (2007) view, the cost of labour and building materials are very vital in realising housing project, as the cost of materials and

labour constitute the largest part of housing cost. Hence, there is a need to examine the influence of labour cost and materials on the rate of housing development with a view to improving housing delivery and understanding their significant effects on the rate of growth of Abuja.

Statement of the Problem

Urban growth and sprawl are a global phenomenon. Ever increasing urban development and continuous land use changes is been witnessed recently in Abuja due to the rising population and growth in the economy of municipal councils in the study area. However, inadequate provision of infrastructure is more apparent in the housing sector than other sectors of the economy (Sanusi, 2011). This is because the efforts made by both the public and private individuals in providing housing are greatly weakened by so many factors ranging from increase population, incessant hike in the price of building materials to continuous rise in the cost of labour. The prices of building materials and cost of labour constitute a major challenge to both the construction

industry as a whole and the prospective housing owners (Anosike, 2009; Mekson, 2008; Mohammed, 2008; Njoku, 2007). This is because of the continuous hike in the prices of building materials, which portends impending magnifying influences on the building industry that may consequentially lead to project abandonment or acrimonious relationship amongst the parties involved.

In more developed countries of the world, scarcity of labour often characterised their industry with relatively low cost of building materials. However, the reverse is the case in the developing countries, whereby the cost of materials outweighed the cost of labour (Omenge and Udegbe, 2000; Agbo and Ayegba, 2014). This is because larger percentage of the building materials been used are imported according to Omole (2001) whose resultant effects determines the availability and cost of building materials. The downward trend of the value of the Naira, unstable forex rate, money supply and galloping inflation amongst other factors have led to the increase in the cost of building

materials which is far higher than the modest increase in labour cost (Ojimelele; 1999).

In spite of the visible rate of housing development noticed in Abuja municipalities, there is still a huge housing deficit considering the urban growth noticeable in the capital due to the high cost of building materials and pervasiveness of unskilled or old labour (Okoruwa, 2014). Hence, the expected rate of development in terms of houses constructed cannot be achieved without a drastic reduction in the cost of building construction and its attendant costs which determines the cost of owning a house. Okoruwa (2014) assertion supported the argument of Udegbe (2007), who argued that labour and materials costs are indisputably the cause of the high cost of any building construction project.

Therefore, a careful examination and assessment of the salient effects of labour and materials input in terms of cost appraisal are required to provide a better understanding of the phenomenon that will alleviate

the burden of would be housing owners and which will invariably increase the rate of development in our urban cities.

Aim and Objectives

The aim of this study is to examine the influence of materials and labour cost on the rate of development (housing construction) with a view to understanding their significant effects on the rate of growth and improving housing delivery in Abuja.

The objectives of this study are to:

1. Determine the relationship between changes in the price of some selected building materials and rate of housing development.
2. Establish the relationship between changes in the prices of labour in some selected building trades and rate of housing development.
3. To model the comparison of changes in prices of materials, labour and rate of housing development.

Hypotheses

In order to examine the influence of changes in the price of materials and cost of labours on the rate of housing development in the six local area councils, the following hypotheses were tested.

H1: The rate of changes in the prices of building materials will positively relate to the rate of housing development.

H2: The rate of changes in the cost of labours will positively relate to the rate of housing development.

H3: The rate of changes in the prices of building materials and cost of labours will jointly relate to the rate of housing development.

Assumption

This research did not consider the effect of macro-economic variables on building materials, labour and the rate of development. Also, the study did not consider the actual number of houses constructed and vertical sprawl within the period. Abuja is considered because of its rapid growth over the years.

Justification of the Study

Globally, the construction industry has been acknowledged as the major driver towards economic sustenance of any nation because of its contribution to national development in bridging the gap in infrastructure deficit most especially housing (Bowen et al., 2007).

In spite of this recognition, previous research efforts has been on labour optimization or factors influencing their productivity (Udegbe, 2007; Agbo and Ayegba, 2014). In addition, those efforts channelled towards

the study of building materials in Nigeria focused on the causes of changes in price or the impact of haulage on building materials prices. For instance, Mogbo (2002) examined the effect of distance on the regional variation of the building materials and prices with the result that distance has a significant effect on material prices. Owoeye (2003) assessed the influence of forex rate on the prices of some selected materials in Nigeria within a period of 15 years and discovered that there is a significant influence. While Omole (2001) studied the factors that determined the cost of building materials with raw materials availability and discovered that imported building materials constitute a greater percentage of building components.

A few studies that examine the implications of the rise in the cost of building materials in the construction industry, mostly literature (Jagoro&Owoeye, 2004; Mekson, 2008; Njoku, 2007; Oladipo & Oni, 2012) have focused their efforts on identifying the causes with a little emphasis on the effect. Also, the importance of using Geographic Information System (GIS) in construction project management has

been recognised. For example, Dierkes and Howard (2008) employed geographical information system (GIS) in managing pipeline construction, project inspection and in the tracking of construction and testing throughout the entire life of the project. In spite of the importance of this information system in the field of construction, little or no research has been carried in the construction industry to establish the relationship between the rate of development, the cost of materials and labour most especially in the Nigerian construction industry.

Hence, this study intends to provide better understanding and required information on the salient effect of the persistent changes in the prices of building materials and labour on the rate of housing development in Abuja Municipalities using Geographical Information System (GIS).

Scope of the Study

The research covered all the six municipal local councils in Abuja, the Federal Capital of Nigeria. The study covers a period of 25years from 1990-2014; this the period assumed to have marked the beginning of

urbanization of the study area as result of relocation of Federal Capital to Abuja and the length of the period will allow the study to establish a concrete relationship between the selected construction materials and labour on rate of development. The study only focused on some selected building materials which include: cement, sand, aggregate, reinforcement, sandcrete blocks, aluminium roofing sheet and hardwood timbers. These materials constitute major construction materials on site. They mark-up about 90% of building materials on site and tradesmen for the same number of years.

Limitation of the Study

The research only investigates the effects of an increase in the price of selected construction materials and labour on the rate of development of six (6) area council in Abuja. The study did not consider the actual number of houses constructed within the period nor vertical sprawl but focused only on the built-up areas produced by the Geospatial Techniques.

RESEARCH METHOD

Research Design

The research design approach for this study was purely quantitative. Archival or secondary data were collected which comprises of a wide collection of empirical data compiled by some individuals for their own use and the use of geographical Information system (GIS) using satellite imagery. The study also makes use of existing literature on the subject matter from other secondary sources such as journals, magazines, periodicals, textbooks as well as internet materials. On the other hand, Creswell (2008) viewed quantitative research as a way of testing objective theories by assessing the association among variables.

This study involves the examination of effects of labour cost and material cost on the growth of an urban centre Abuja, hence, it requires a robust research design to unravel the significance of these factors on the urban sprawl.

Although many applied methods identified in literature have been used to measure urban growth such as landscape metrics, land use change analysis, and urban sprawl pattern recognition (Weijers, 2012), this study is conducted within the construction management domain; hence, the design is limited to the use of GIS techniques for measuring the growth of the study area.

This approach was employed in obtaining the data used for measuring the growth and testing the hypothesised statements proposed in this study.

Nonetheless, since labour and material costs are considered as the dependent variables for the study, the study only attempt to assess their effect on the independent variable (Urban growth), no transformation of variables is thus required.

The Study Population

A whole lot of misunderstanding has greeted the concept of urban sprawl. As a result, various definitions of the concept, as well as the vagueness of how to assess, measure and examine urban growth is in existence. However, many studies have examined and assessed urban growth only at one spatial scale with the aid Geographical Information System (GIS). This current study is not a departure from some of these studies as it is only aimed at measuring the compact development, which Weijers (2012) argued physically expresses itself by the adjoining development of built-up areas bordering on an existing urban area, without the creation of patches, and mainly in high density. This can be measured according to Tiwari, Saxena and Kazare (2012), in term of acres of land or in terms of percentage. Hence, this study measures the sprawl per square metres of the built-up area over a period of time. Therefore, this study is not only concerned with measuring the rate of growth of urban centre but also examining the influence of other

attending factors such as labour and material costs that may impact on the sprawl.

Hence, the target populations for this study are the six area councils of Abuja. However, it is necessary to emphasise that the main concern of this study is on the rate of growth of Abuja over the years and it is essential to re-state that the study area for this research is Abuja- the Federal capital territory of Nigeria.

Sampling

This study employs non-probability sampling technique in selecting the area council which the researcher considered to be a good population that will assist in the achievement of the study's objectives. This technique was considered appropriate considering the rate of growth of the peri-urban or the area council that make up Abuja as a city. This consideration will help in determining the extent of growth of Abuja

over the period of 25 years since it became the Federal Capital Territory and to measure the level of urban sprawl. This is supported by the assertion of Saunders et al. (2009) who viewed that purposive sampling technique helps the researcher in selecting cases that will best answer the study research question in achieving its objectives.

Procedure for Data Collection

For this study, the secondary data collected centres on the archival data on the prices of materials and labour cost and the satellite imagery obtained through the use of GIS. GIS was used in estimating the rate of growth in the study area over the period of study.

Methods of Data Analysis

The analysis of this study was performed with Statistical Package for Social Science (SPSS) version 16.0. Descriptive Statistics, Analysis of

variance, Correlation, and Multiple Heirarchical Regression.

Significant at 0.01 level of confidence.

RESULTS AND DISCUSSION

Rate of housing development

This section presents the data and the analysis on the rate of development of the area councils in Abuja. Most urban centres of any country are never static, it changes per time. An Urban centre such as Abuja is not an exception to this since it was created in 1976. As development began to take place such as movement of the Federal Capital Territory from Lagos to Abuja, it gave the city a new look with a promise performance and prospect. The urbanisation of Abuja also affects the surrounding towns and settlements by posing a threat to the limited available resources, thereby increasing the cost of living (Ekoh et al 2006).

Abuja Land Use Analysis and Classification

Classified Image representation of Land use change of Federal Capital Territory Abuja between 1990 and 2014 shown in Figure 1.1, 1.2 and 1.3. The greenish area coverage is more compared to pink colour area. The blue is concentrated in the North East corner of the image map. The state of land use coverage of Federal capital territory in 1990, which was generated from the supervised image classification of Landsat TM of 28.5 m resolution. The state of built-up coverage of Federal capital territory in 2014, generated from supervised image classification of Nigeria Sat 32 m resolution. This shows an increased in pink and ash colour area coverage as against greenish colour area. The Blue colour area is wide spread but not concentrated in the particular area.

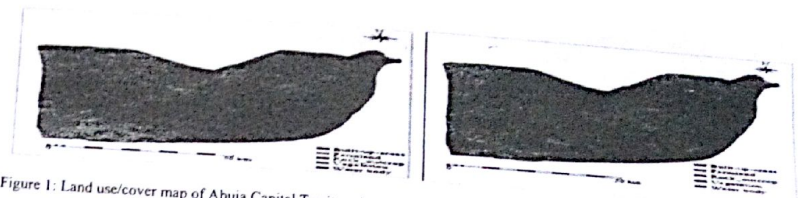


Figure 1: Land use/cover map of Abuja Capital Territory in 1990

Figure 2: Land use/cover map of Abuja Capital Territory in 2000

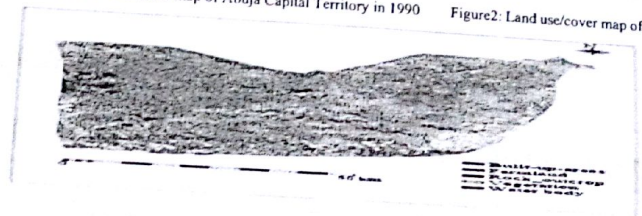


Figure 3: Land use/cover map of Abuja Capital Territory in 2014

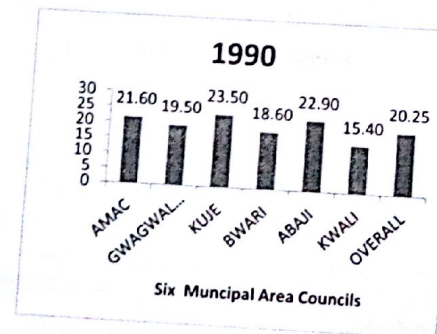


Figure 4: Initial Rate of Development in Abuja (1990)

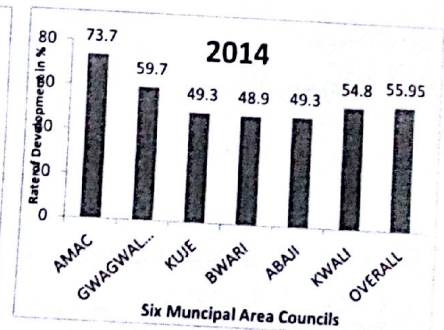


Figure 5: Current Rate of Development in Abuja (2014)

From Figure 4, as at 1990, Abuja, in general, had developed by 20.5%, the least developed area was Kwali (15.4%) while the most developed were Kuje (23.5%).

From Figure 5, the current rate of development in Abuja, in general, is 55.95% with the most developed area being AMAC (73.7%), followed

by Gwagwalada (59.7%). Least developed areas are Bwari with a percent (48.9%).

Evaluation of the research variables

Descriptive statistics was employed to examine the data in order to ensure that the underlying assumptions for inferential statistical analysis to be further conducted on the data are not violated. The measures of central tendencies (e.g. the mean), as well as a measure of dispersion (such as standard deviation), were used to develop a methodological understanding of the nature of data and give a summary of the data used as a sample. Table 1, 2 and 3 show a comprehensive list of the data variables and their means, the resultant analyses data consisted only of continuous variables because the categorical components used in their computation will henceforth be ignored.

Table 1: Mean and standard deviation and summary of Materials in the analysis

S/No	Variables	N	Minimum	Maximum	Mean	Std. Deviation
		Statistic	Statistic	Statistic	Statistic	Statistic
1	Cement	25	800	209517	82954.16	14703.81
2	Sand	25	19135	705392	171847.64	38021.48
3	Aggregate	25	5106	2088369	660754.6	157437.29
4	Reinforcement	25	12000	3483356	399923.88	175911.39
5	Block	25	7	17728	6103.8	1178
6	Aluminium	25	3576	689644	251398.2	50539.95
7	Timber	25	600	76013	28606	4192.98

Source: Author's Field Survey, 2015.

Table 2: Mean and standard deviation and summary of Rate of Housing Development in the analysis

S/No	Variables	N	Minimum	Maximum	Mean	Std. Deviation
		Statistic	Statistic	Statistic	Statistic	Statistic
1	Kuje	25	401154400	841570720	596684702	2562765.9
2	Bwari	25	143201400	376481100	237810432	1488254.5
3	AMAC	25	354760560	1210456170	790393388	5080795.4
4	Abaji	25	208135810	448082770	317496815	1371703.5
5	Kwali	25	202541800	724291600	366811060	3065696.6
6	Gwags	25	191016150	584803290	346022147	2452688.1

Source: Author's Field Survey, 2015.

Table 3: Mean and standard deviation and summary of Labour in the analysis

S/No	Variables	N	Minimum	Maximum	Mean	Std. Deviation
		Statistic	Statistic	Statistic	Statistic	Statistic
1	Manson	25	60	3500	1318.4	218.1
2	Carpenter	25	60	3500	1318.4	218.1
3	Bender	25	50	3000	1078.2	182.4
4	Electricians	25	100	5000	1793.8	293.3
5	Plumbers	25	100	5000	1793.8	293.3
6	Painter	25	60	3000	1102.6	185.4
7	Labour	25	30	1500	609	89.9

Source: Author's Field Survey, 2015.

Tests of hypotheses of the study

Various statistical methods were employed in this section to test the hypotheses proposed in Chapter 1. Correlation analysis, multiple regressions analysis (MRA) and hierarchical multiple regression analysis were used to examine the relationships between variables examined in the study.

OBJ. 1: Influence of changes in the prices of materials

- H1: The rate of changes in the prices of building materials will positively relate to the rate of housing development.

Table 4: Correlations between changes in the prices of materials and the rate of development (1990-2010)

	1	2	3	4	5	6	7	8	9	10
1	1									
2	0.12	1								
3	0.08	0.15	1							
4	0.05	0.10	0.12	1						
5	0.03	0.08	0.05	0.07	1					
6	0.02	0.05	0.03	0.04	0.06	1				
7	0.01	0.03	0.02	0.03	0.04	0.05	1			
8	0.01	0.02	0.01	0.02	0.03	0.04	0.05	1		
9	0.01	0.02	0.01	0.02	0.03	0.04	0.05	0.06	1	
10	0.01	0.02	0.01	0.02	0.03	0.04	0.05	0.06	0.07	1

Source: Author's Field Survey, 2012.

RELATIONSHIP BETWEEN CHANGES IN THE PRICES OF MATERIALS AND RATE OF HOUSING DEVELOPMENT

Table 5: Coefficients in the rate of development Model

	Kuje	Bwari	AMAC	Abaji	Kwali	Gwags
Variables in the equation	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
(Constant)	438969122.11**	11706382.54**	458612472.37**	232864114.97**	207052317.71**	197556590.07**
Cement	334.796	246.126	570.202	179.015	598.405	197.195
Sand	-147.651	44.415	-177.090	-78.779	-232.491*	-136.143
Agg	46.295*	9.331**	94.705*	24.800*	34.637	54.567**
Flint	1.333	7.131	8.439	.921	-4.504	1.399
Block	16958.02**	2722.38**	29990.66**	9043.71**	20233.19**	17204.76**
Alum	-10.230	30.208	52.450	-4.969	-2.717	15.634
Timber	813.023	359.289	1842.919	440.955	215.681	347.610
R	.946	.948	.936	.945	.944	.942
R Square	.895	.898	.876	.893	.892	.887
Adjusted R Square	.851	.856	.825	.849	.848	.841
F Change	20.596**	21.334**	17.143**	20.208**	20.055	19.135

Note: *p<0.05; **p<0.01

Source: Author's Field Survey, 2015.

**OBJ.2: Influence of changes in the prices of labour
H1: The rate of changes in the cost of labour will positively relate to the rate of housing development.**

Table 6: Correlations

	Kuje	Bwari	Amac	Abaji	Kwali	Gwags	Manson	Carpenter	Bender	Electricians	Plumbers	Painter	Labour
Kuje	1												
Bwari	.993**	1											
Amac	.983**	.977**	1										
Abaji	.974**	.992**	.984**	1									
Kwali	.973**	.961**	.935**	.972**	1								
Gwags	.990**	.989**	.978**	.989**	.972**	1							
Manson	.983**	.973**	.956**	.981**	.991**	.982**	1						
Carpenter	.983**	.973**	.956**	.981**	.991**	.982**	.983**	1					
Bender	.976**	.960**	.944**	.975**	.992**	.973**	.996**	.996**	1				
Electricians	.972**	.957**	.947**	.971**	.991**	.971**	.995**	.995**	.996**	1			
Plumbers	.972**	.957**	.947**	.971**	.991**	.971**	.995**	.995**	.996**	.997**	1		
Painter	.979**	.968**	.952**	.978**	.988**	.979**	.997**	.997**	.996**	.993**	.993**	1	
Labour	.988**	.982**	.971**	.988**	.975**	.988**	.987**	.987**	.981**	.981**	.981**	.988**	1

** Correlation is significant at the 0.01 level (2-tailed).

Source: Author's Field Survey, 2015.

RELATIONSHIP BETWEEN CHANGES IN THE PRICES OF LABOUR AND RATE OF HOUSING DEVELOPMENT

Table 6: Coefficients in the rate of development Model

Variables in the equation	Kuje	Bwari	AMAC	Abaji	Kwali	Gwagi
	Model 1	Model 2	Model 3	model 4	Model 5	Model 6
(Constant)	427498874.61**	139188472.75**	443493331.68**	226788873.49**	183558952.77**	185297586.01**
Carpenter	117716.487*	122100.499**	291772.808	63030.775*	71076.237	116475.886
Bender	101936.342	-2279.117	-109452.591	54885.470	107078.049	6254.055
Plumbers	-66127.695*	-48274.016*	-26870.265	-35130.957	24160.318	-34667.938
Painter	-125003.463	-63261.590	-247570.547	-69219.029	-63756.101	-47683.673
Labour	263594.951**	158371.372**	659129.290**	144120.633**	1727.983	211279.540**
R	.993a	.990a	.976a	.992a	.993a	.990a
R Square	.985	.980	.953	.983	.987	.980
Adjusted R Square	.981	.975	.940	.979	.983	.975
F Change	251.20**	185.38**	76.61**	224.22**	286.63**	189.16**

Source: Author's Field Survey, 2015.

OBJ. 3: Influence of changes in the prices of materials, labour and rate of development
H3: The rate of changes in the prices of building materials and labour will positively relate to the rate of housing development.

Table 7a: Coefficients in the rate of development Model

Variables	Kuje	Bwari	AMAC
	Model 1	Model 2	Model 3
(Constant)	427498874.6**	418186653.7	139188472.8**
Carpenter	117716.487*	67782.694	122100.5*
Bender	101936.342	128637.881	-2279.117
Plumbers	-66127.695*	-21879.993	-48274.016*
Painter	-125003.463	-156205.988	-63261.590
Labour	263594.951*	234812.770*	158371.372*
Cement		353.780*	-27.497
Sand		-38.950	5.610
AGG		5.142	13.535*
BLK		-3.098	-783
Block		-2702.994	2071.552
ALM		-27.187	-35.438*
Timber		609.540*	389.201*
R	.993	.997	.990
R Square	.985	.995	.980
Adjusted R Square	.981	.990	.975
F Change	251.196**	3.303**	185.381**

Source: Author's Field Survey, 2015.

Summary of findings

- The remote sensing instrument used has shown that there is tremendous growth in the study area.
- The analysis shows that changes in the prices of some selected building materials (cement, aggregate, blockwork and timber) exhibited positive and strong relationship with the rate of housing development in the study area and this can explain between 89-90% variations in the cost of housing construction
- The analysis which indicates that changes in the costs of all the labour exhibited strong relationship with the rate of housing development in the study area and this can explain between 95-99% variations in the cost of housing construction.

$$d. Y_{KUJE} = 438969122.108 + 334.80CMT - 147.651SND + 46.295AGG + 1.333RFM + 16958.024BLK - 10.230ALM + 813.023TIM \dots \dots \dots 4.1$$

(R = 0.95, R² = 90%, Adjusted R² = 85%)

$$e. Y_{AMAC} = 458612472.37 + 570.202CMT - 177.090SND + 94.705AGG + 8.439RFM + 29990.66BLK + 52.450ALM + 1842.919TIM \dots \dots \dots 4.2$$

$(R = 0.94, R^2 = 88\%, \text{Adjusted } R^2 = 83\%)$

$$f. Y_{KLUJ} = 427498874.61 + 117716.487CPT + 101936.342BND - 66127.695PLB - 125003.463PTR + 263594.951LBR \dots \dots \dots 4.3$$

$(R = 0.993, R^2 = 985\%, \text{Adjusted } R^2 = 98\%)$

$$g. Y_{AMAC} = 443493331.68 + 291772.808CPT - 109452.591BND - 26870.265PLB - 247570.547PTR + 659129.290LBR \dots \dots \dots 4.4$$

$(R = 0.976, R^2 = 95\%, \text{Adjusted } R^2 = 94\%)$

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study modelled the relationship between changes in the prices of building materials and labour cost on the rate of growth (housing development) of Abuja with specific attention on the six area councils between 1990 and 2014. The resultant effects show that materials and labour are good determinants of the rate of development and it also recognizes the fact that other variables could also be taken into account as the variations explained are not 100 per cent.

Recommendations

Based on the results and the conclusion drawn from the findings, the following recommendations were made to improve the effects of rate of development or urbanisation in the study area. The recommendations are:

1) The study also advocates for the need for Federal Capital Development to encourage another area council, not within the federal capital territory to partner with the National Centre for Remote Sensing in training of their staff in order to monitor the growth of the area council to prevent it from developing into a slum as shown on the satellite imageries.

2) The stakeholders should advocate for the integration of informal labour into industrial system in order to continually regulate the prices of labour

3) From the findings, the model's price trend for each materials and labour could be used by the Quantity Surveyors, Estimators or Budget Planners to estimates for the prices of construction materials and labour.

Implementation strategy.

The above mentioned recommendations can be implemented by the use of the following strategies:

a. There is various levels influence of the rate housing development have on the price of construction materials and labour cost, so to obtain a projected estimate of a building the project model of price trend obtained for each material and labour could be used by the estimators or budget planners to estimate the cost of materials and labour in such a project.

Relevance of the Study to Quantity Surveying Profession.

- a. The study will assist Quantity Surveyors in cost planning and budgeting for the future project that is cost appraisal.
- b. The study also allows the Quantity Surveyors to have an updated library for both materials and labour cost which can be referred to at any time for cost related issues.
- c. It affords the Quantity Surveyors to study the econometric theory of supply and demand to provide a useful perspective from which to view the issue of economic efficiency and the market. It helps to determine the logic behind the high cost of

construction materials and labour on the rate of development and price control measures can be adopted by the stakeholders to check the excessively high cost of construction materials and labour rates.

d. The study will assist the Quantity Surveyors lots of opportunities to stand in the affairs of policy making, or adviser to the government on materials and labour procurement problem.

Contribution to the body of knowledge.

- a. It provides general awareness that there is a positive relationship between the selected building material prices and labour on the rate of development. That is any unit change in the building material price and labour cost will have an effect on the rate of housing development in Nigeria.
- b. The study provides models that can be used to predicts the rate of housing development in the study area.

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