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The Planning Implications for Changing the Use of Residential Buildings in Auchi, Nigeria

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A B S T R A C T

Residential use has an indisputable influence on the spatial distribution of all other urban subsystem with a dominant emphasis on the built environment. Its modification and conversion is viewed in two ways: the positive and negative effects explained from physical, economic and social perspective. But the change of residential use especially to commercial use in speed and scope has presented negative consequences of housing shortage, traffic congestion, insecurity, and social vices. Uneven cost of residential accommodation as well as the reduction of environmental qualities such as noise and air pollution is well associated with this development. Consequently, the conversion of residential use has not been adequately addressed; this is important because of its effects on the zoning principles, density and spatial interaction of the various land uses. To identify and examine the planning implications of residential conversion in Auchi, A well-structured questionnaire was administered to 259 respondents with valid responses of 97.74% of the targeted household. Stratified random sampling technique was used to elicit information on the socio-economic life style of the respondents from five zones which represents the five quarters of Auchi. The result of the analysis reveals a significant effect of change of use of residential buildings on the emerging landuse pattern, which includes housing shortage, traffic congestion, and reduction of environmental quality, insecurity and social vices, unsanitary condition and pollution, and uneven cost of residential accommodation at 0.01% level of the zero-order correlation matrix. 58.7% of the respondents claimed that change of use has actually occurred, while 41.3% of the respondents refused this claim. Mitigation measures such as provision of comprehensive master plan with adequate allocation for commercial use, strict monitoring of physical development by the Local Planning Authority in compliance with building standards-regulations and approval should be sought prior to any change of use

Key words: *Residential use, Mitigation, Commercial use, Respondents, Accommodation, Approval*

Introduction

The evolution of man has witnessed a dramatic change in the use of land, as a result of the unprecedented rapid technological innovations, which has created emerging demands for more landuse Obateru (2005). The variety of forms created emanate from forces which prevailed during the successive periods of history. Achi (2004) emphasized that the fabrics of the city is seen to consist of the general texture of buildings and other feature that all together create the city character and embody the memory of the city.

The system of the city represents a cluster of complementary activities within the residential, commercial, industrial, institutional and recreational landuses, which enhances the urban socio-economic sector(Omuta ,2006) . The existence of these cities is predicated upon the standard of satisfaction derived socially, economically and politically by mutual interaction made possible by the access to the various landuses; but the difficulty in the location of mutually exclusive activities within same space has made sorting of all activities with respect to various uses impossible.

Land is a basic factor of production and the foundation of all forms of human activities. As the competition for the core of the city increases uncontrolled and unplanned urban sprawl is capable of negating the environment. Obateru (2005) viewed landuse as the science and art of space use organization involving the location and allocation of urban and rural land as classified into Residential, Industrial, Commercial, Recreational (open space) for the purpose of creating physical environment that is orderly, economically, functionally efficient and aesthetically pleasing for living, working, recreation and circulation. Consequently, the change of use of residential buildings has not been adequately addressed; this is important because changes in residential landuse affect the zoning principles, density and spatial interaction (Olotuah, 2000) . Of course, one of the negative effects is incoherent pattern of landuse within the built environment. The residential use has an indisputable influence on spatial distribution of all other urban subsystem with a dominant emphasis on the built environment. The changes in the use of Residential buildings especially to commercial use in speed and scope have presented new dimensional problems (Onibokun, 1990). Residential use changes include the integration of all components to which land is put, it is on this basis that Smith (1992) explained that landuse conversion is as a result of the complex interaction between the physical, socio-economic and legal setting within a geographical context. Hence Omuta (2006) observed that the interpretation of the concept of the built environment may change in its specific emphasis, but its context remain essentially unaltered.

Land uses have been converted from their initial use to other uses depending on the availability of space and the intention of use (Onibokun, 1990). This is not an exceptional trend in Auchi especially along the major transportation routes within the city centre, where most residential buildings have been changed from their original use as dwelling units to predominantly commercial buildings and as mixed-use buildings. Obateru (2005) defined mixed landuse as situation where a building is put to more than one use, such as residential-commercial, residential-industrial use etc. This may occur horizontally on the same site or floor of a building or vertically on the different floor of buildings.

In most Nigerian urban centers and Auchi in particular, residential buildings have been altered to other uses in view of immediate needs and demand; Auchi thus represents the resultant effect of urbanization. The increasing populations as an institutional town, administrative headquarter, and transportation nexus has simulated the increasing demand for commercial activities. This has overtly led to contraction at the city centre and spillage across its fringes like Jattu, Ibie, and Aviele etc. In view of this, this research study is aimed at investigating the effect of changing the application of residential building for commercial, industrial and other purposes which negated initial intended usage.

Materials and Methods

Description of study area

Auchi as the study area is the administrative headquarter of Etsako West Local Government. It is situated between latitude $0^{0}50$-$0^{0}59$ North and longitude $6^{0}16$-$0^{0}30$ East (Microsoft Encarta, 2006) with a total population of 42,610 (Census, 2006). Auchi is strategically located, both as an administrative headquarter, an institutional town as well as transportation nexus linking other parts of Nigeria. It is located along the major Benin-Abuja expressway of about 130km from Benin City its state capital, and 350km to the Federal Capital Territory, Abuja. It is well serviced with good and adequate road network that connects it to the surrounding towns and villages in and outside the local government and the country at large. This influenced her socio-economic development. At any point in a city's development process, their activity patterns determine the transportation need, while the provision of new transport facilities affect the subsequent growth and pattern of the city (Basorun, 2004).

Auchi is bounded at the north by Uzairue community, Aviele to the south, Ibie and Owan East to the East and West respectively as shown in Figure 1(a), (b) and (c). The topographic is undulating, which has made development extraneously difficult. The soil formation is sandy soil and highly susceptible to erodobility.

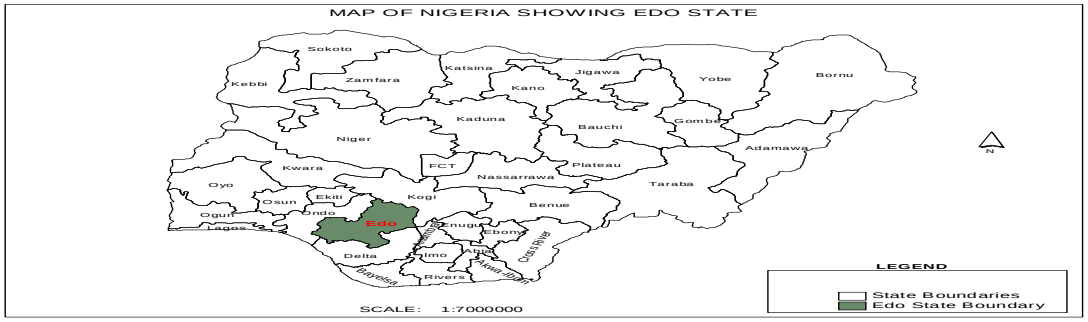


Figure. 1a: MAP OF NIGERIA SHOWING EDO STATE
Source: Ministry of Lands, Surveying and Housing, Edo State,2008

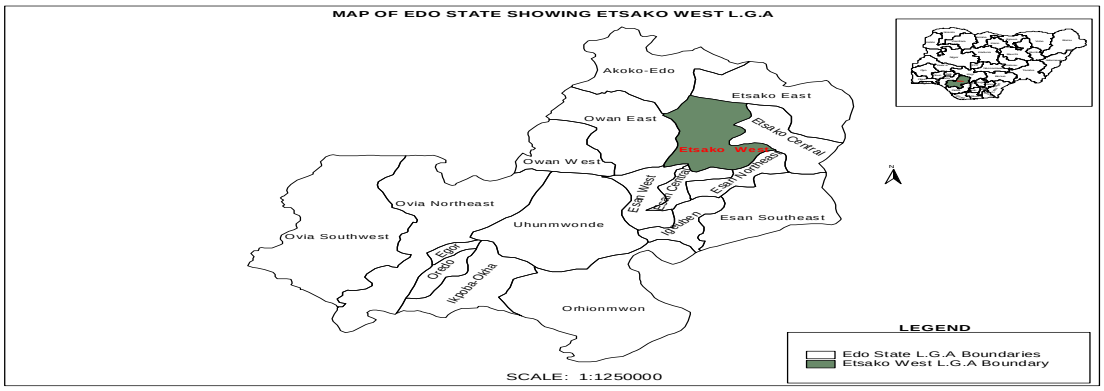
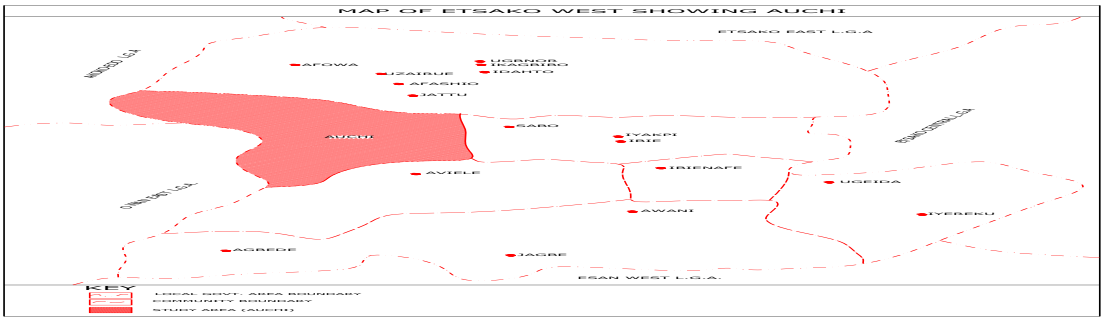


Figure.1b: MAP OF EDO STATE SHOWING ETSAKO WEST LOCAL GOVT. AREA
Source: Ministry of Lands, Surveying and Housing, Edo State, 2008.



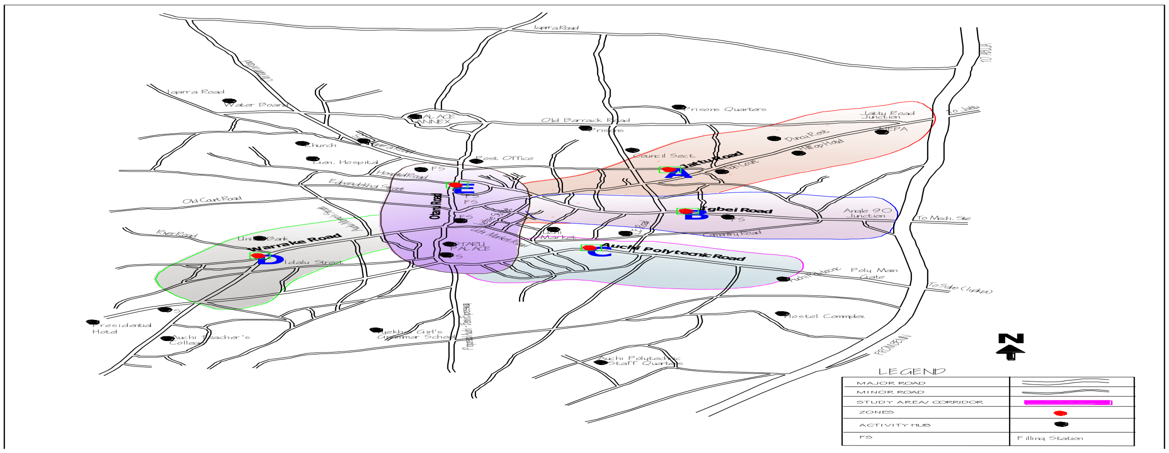
Scale 1: 100 000
Figure. 1c: MAP OF ETSAKO WEST LOCAL GOVT AREA SHOWING AUCHI
Source: Ministry of Lands, Surveying and Housing, Edo State,2008

Auchi is divided into five quarters namely as follows:
Igbhe-Igbei;
Ogun-Usogun;
Ekpe-Akpekpe or Afkpe;
Ortse-Aibortse; and
Ekhei-Iyekhei.

It grew and spread to their present locations of Igbei to the East, Usogun to the West, and Akpekpe to the North, Aibortse to the North-East and Iyekhei to the South as shown in figure 1c.

Afemai is the major language of the people, although pidgin and English are used extensively as communication means because of the infiltration by non-indigenes. Administratively, Auchi has a rotational stool of: The OTARU OF AUCHI between the Momoh, Ikharo and Kadiri lineage. Each of the quarters also known as villages are administered by a DAUDU as the traditional leader; he co-ordinates the affair of his domain and make report to the OTARU in-Council where necessary. The Daudus are appointed by the OTARU.

Thus the general aim of this study is to investigate and evaluate the trend and planning implication of the changes that have occurred, which has resulted in the current emerging pattern and character of the physical environment of Auchi. Investigations were carried on the residential buildings along some affected major roads in Auchi as shown in Figure 2 and Table 1 where the roads stated below were identified respectively in each zone:



Scale 1: 50 000
Figure 2: AUCHI ROAD NETWORK
Source: Ministry of Lands, Surveying and Housing, Edo State, 2008

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Table 1: Description of affected Zones/Roads in the study area

S/ No	Zone	Name of Road	Description
1	A	JATTU	African Petroleum(AP) junction to Jattu junction along the Benin/ Abuja express
2	B	IGBEI	Oleleh junction to Angle 90 along the Benin/ Abuja express
3	C	OTARU	Igelesor junction to old Igarra road junction by up garage
4	D	POLY/ IYEKHEI	Igelesor junction to Poly (west) gate
5	E	WARRAKE/ CONSTANCE MOMOH	Central Mosque junction to Warrake garage

Source: Field Survey, 2008

Data collection

Two sources of data were used for this research work; which include primary and secondary sources

Primary Sources

The primary source of data comprised of data collected directly by the researcher from the field through surveys. In Urban and Regional Planning, there are wide range techniques and methods suitable for research. Hence various research instruments were employed to source information from the people of the study area. This study was carried out by the use of questionnaires, personal interview, and direct personal observation and participation with the aid of on the spot photographs.

Secondary Sources

The secondary data comprised of those information extracted from published and unpublished materials such as books, journals, newspaper, reports and government documents. This method was supported by data collected from other secondary sources such as the Town Planning Office and the ministry of Lands, Surveys and Housing in Auchi.

Sample size

Sampling is based on the fact that while we may be interested in a large population, we cannot observe all the people in the population; but a variety of sampling method makes it possible to observe only a portion of a study and still draw unbiased conclusion about the larger population from which the sample is selected.

For this study, the targeted population is the total number of buildings in Auchi with a population of 42, 610 people (census 2006) and a total number of 5, 327 buildings (Auchi updated base map, 2007). The sample frame considered is the total number of buildings on both corridors of the selected roads from the five zones/quarters with a total number of 529 buildings. Similarly the sample size was taken from the sample frame as the total number of buildings whose owners were administered questionnaires. Fifty percent (50%) of each corridor of the respective roads were taken independently, which amounted to a total of 265 buildings as the sample size of building in the study area on whose owners and residents were administered the questionnaires as shown in Figure 4 and Table 2. Officials of the Local Planning Authority (Development

Control Unit) in Auchi were also administered five (5) questionnaires to examine the trend, character and pattern of the emerging land use resulting from the change of use.

The basic principle of the selection of sample size is that the smaller the population, the bigger the sampling ratio has for an accurate sample, while the larger population allow for smaller sampling ratio for equally good samples (Morenikeji,2006). Therefore, the rationale for this sample size was based on personal reconnaissance survey. This was to ensure unbiased and accurate conclusion to achieving optimum significant level of deductions and inference. Table 2 shows the sample frames and sample sizes.

Table .2: Sample frame and sample Size

S/ No	Zone	Road Name	Sample Frame (No of Buildings)		Total	Sample Size (No of Buildings)		Total
			Right Corridor	Left Corridor		Right Corridor	Left Corridor	
1	A	JATTU	74	70	144	37	35	72
2	B	IGBEI	109	64	173	55	32	87
3	C	OTARU	53	49	102	26	25	52
4	D	POLY/ IYEKHEI	34	24	58	17	12	29
5	E	WARRAKE/ CONSTANCE MOMOH	25	27	52	12	14	26
Total					529			265

Source: Field Survey, 2008

Sampling process

The population of the buildings was reduced to a manageable size without losing their identity. This was achieved through the application of a systematic random sampling of the sample size, which enables the researcher obtain a proportional representation of the different categories of buildings of selected roads within the zones. Systematic random sampling is a method which involves the probability of selecting every item in a population. Morenikeji (2006) and Cochran (1977) remarked that random sampling is a selecting the 'n' units out of the N such that every one of the distrust samples has an equal chance of being drawn. Okoko (2001) emphasized that this involves the case of a random table from where a series of random numbers between 1 and N are drawn. That any draw, the process must give an equal chance of selection to any number in the population not already drawn. Okoko (2001) argued further that systematic sampling entails a procedure by which items are selected at some regular interval such that N units in the population are numbered 1 to N in some order; and then to select a sample of 'n' units at random from the first K units. Every K^{th} unit thereafter the selection of the first unit is more or less a random process and it determines the whole sample. In this case, K is 2 and the first unit drawn is number 2, and in subsequent order. Therefore as shown on Table 2, 50% of the population of buildings on the corridors of the selected roads was systematically sampled at random. The On the pattern and character of the physical environment, the opinion of the supervising agency known as the Town Planning Authority was sought to ascertain the trend of changes that have occurred in the last 10 years (1998-2007) in Auchi.

Questionnaire administration

Since the expected respondents were the building residents (owners, occupants or users) and the officials of the Town Planning Authority. Trained field assistants were engaged in the administration of the questionnaires. The Town Planning Authority officers were allowed to attend to the questionnaires administered on them as well as the literate respondents. But the 'illiterate' respondents were attended to by the field assistants by asking questions. These administered questionnaires were collected immediately except in some rare cases, where respondents were too busy to attend to the field assistants. In such cases, the questionnaires were dropped and picked up the next day. A questionnaire was administered on a building (either the house owner or any resident of the building). This was done for all the corridors of the selected roads respectively using the systematic random sampling approach as shown in Table 3.

Table 3: Questionnaire administration and distribution

S/ No	Zone	Road Name	No of Questionnaires Administered	No of Questionnaires Returned	Response Rate (%)
1	A	JATTU	72	68	94.4
2	B	IGBEI	87	85	97.7
3	C	OTARU	51	51	100.0
4	D	POLY/ IYEKHEI	29	29	100.0
5	E	WARRAKE/ CONSTANCE MOMOH	26	26	100.0
Total			265	259	97.7

Source: Field Survey, 2008

Data analysis

Collected data were analyzed using both descriptive and inferential statistics. The descriptive statistics include tables, figures, charts and digitalized photographs. The descriptive statistics were used to describe characteristics of the variables. The inferential statistical method on the other hand was employed to examine the relationship between the factors and effects of change of use as determinant variable and the trend of change of use in relation to the pattern and character of the emerging landuse. Bivariate correlation test was used to ascertain the association between pairs of variables to test hypotheses. The multi-variate (stepwise) regression analysis, gives the actual rate of change of one variable (dependent) when the other variable (predictor) is increased or decreased at a given rate (Okoko, 2000). This was employed to test the actual rate of change of residential buildings as the independent variable to commercial use with respect to the predictor variables. Similarly, the chi-square (x^2) test of independence was used to examine the relationship between the observed and the expected attributes of a variable. In order to obtain accurate value for the various analyses, software known as Statistical Packages for Social Scientist (SPSS) version 15 and Microsoft Excel were employed to generate the descriptive and inferential statistics.

Results and discussion

Study locations and zones

Table 4 shows the location (categorized in zones) of the study area. Zone two has 32.8% of the total respondents with zone one having 26.3% respondents. Similarly, zone three has 19.7% respondents while zone four and zone five have 11.2% and 10.0% (26) respondents respectively. Zone two is more populated with the highest frequency and percentage. Fig.4 revealed that zone one and two has the highest residential population and accommodate higher numbers of 68 and 85 buildings, which made the change of use high and common.

Table 4: Location of study zones

Zones	Frequency	Percent (%)
One	68	26.3
Two	85	32.8
Three	51	19.7
Four	29	11.2
Five	26	10
Total	259	100

Source: Field Survey, 2008

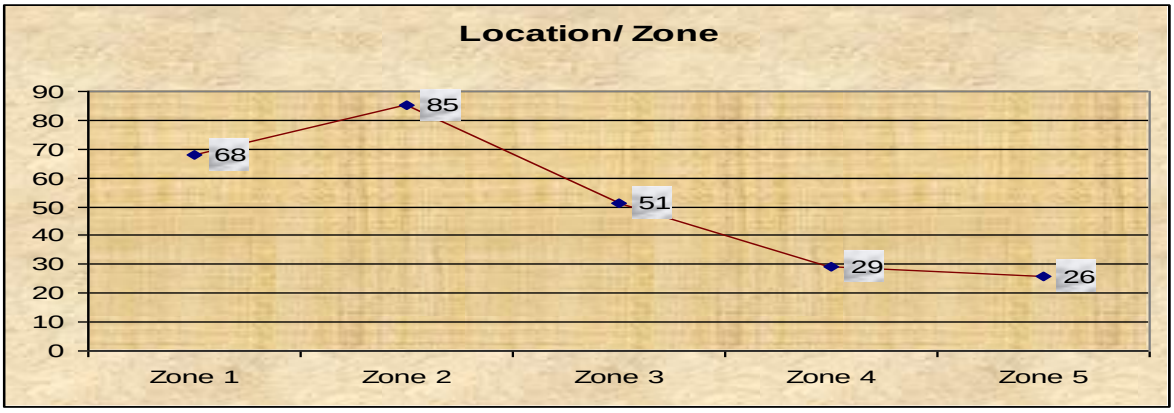

Figure 3: A line graph showing location-zone of study areas

Change of use

259 (58.7%) respondents indicated that change in use of building, while 41.3% of the respondents disclaimed any change in residential use (Fig.3).

Table 5: Change of use

Variables	Frequency	Percent (%)
Yes	152	58.7
No	107	41.3
Total	250	100.0

Source: Field study, 2008

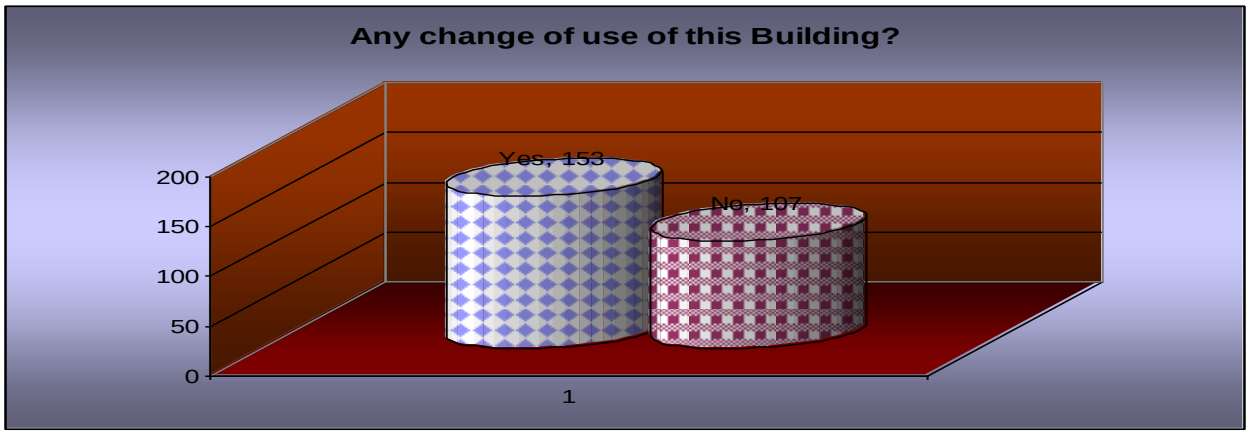

Figure. 4: Illustration of change in use of residential house

Change of use and its effects on the built environment

Table 4.2.2 presents a significant correlation between the effects of the change of use on the environment and the application for change of use from the Planning Authority with a positive relationship of 0.137at 0.05 significant level. This indicates that as the application for the change of use from the Planning Authority increases. The effects of change of residential use on the environment also increase. The Null Hypothesis **(H_0)** that there is no significant relationship between change of use and its effect on the built environment is rejected. Alternatively, the **H_1:** There is significant relationship between change of use and its effects on the built environment is accepted.

Table 5: Correlations of the change of use and its effects on the built environment

			The effects of change of use on the environment	Application for change of use from the Planning Authority
Spearman's rho	The effects of change of use on the environment	Correlation Coefficient	1.000	.137(*)
		Sig. (2-tailed)	.	.028
		N	259	259
	Application for change of use from the Planning Authority	Correlation Coefficient	.137(*)	1.000
		Sig. (2-tailed)	.028	.
		N	259	259

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

Table 5 shows the chi-square test was used to determine the difference between the observed and the expected use of residential buildings. The result of the test indicates a critical value of 7.819 at 0.005 (0.01) significant levels found to be greater than the table value of 0.0001567. Therefore the null hypothesis **H_0:** There is no significant difference between the observed and expected use of the building was rejected and the **H_1:** There is significant difference between the observed and expected use of the building is accepted**.** The conclusion therefore is that there is a significant relationship between the observed and the expected change of use in the Auchi.

Table 5: Descriptive Statistics of a Chi-Square Test

	N	Mean	Std. Deviation	Minimum	Maximum
Change of use of buildings	259	1.4131	.49335	1.00	2.00

Source: Field Survey, September 200

The Multi-variate linear regression model that was employed in predicting the current use of the building after conversion (CUBAC) as the criterion variable accommodated five (5) significant predictor variables. These significant variables are: the initial use of buildings before conversion (Vx_1); change of use of building (Vx_2); reasons for the change of use (Vx_3); rent paid/collected on the building monthly before conversion (Vx_4); difference between the rent of residence and shop (Vx_5). The variables had significant T-test value at less than 0.05% confidence level and the other insignificant variables were excluded from the analysis using the step-wise regression techniques (Table 6). To determine the degree of independence of the predictor variables, spearman rank correlation co-efficient were obtained and presented inform of a zero-order matrix.

Table 6: Zero-order Correlation Matrix

	CUBAC	V_{x1}	V_{x2}	V_{x3}	V_{x4}	V_{x5}
CUBAC	1.00**	0.260**	-0.441**	0.411**	-0.205**	-0.261**
V_{x1}		1.00	0.074	0.190**	-0.077	-0.004
V_{x2}			1.00	-0.163**	0.062	0.253**
V_{x3}				1.00	-0.082	-0.095
V_{x4}					1.00	0.084
V_{x5}						1.00

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

The zero-order matrix (Table 6) reveals that there is high and significant (both + and -) association between the variables and the current use of buildings after conversion (CUBAC). It further reveals that there was no significance case of pair-wise collinearity and multi-collinearity between the predictor variables.The matrix further explain that there is a positive association between the initial use of a building before conversion (Vx_1) and the current use of the building after conversion (CUBAC) at r=0.260. This means that the higher the initial use of the buildings before conversion, the higher the current use of the building after conversion; in other words, the quantity of buildings determine the extent of change of use. The same positive association was observed on the reasons for the change of use (Vx_3) and the current use of buildings after conversion (CUBAC) with a correlation coefficient of r=0.411, which means that the reasons for change of use of buildings are positive determinant of the current use of the buildings after conversion.

Conversely, the association between the change of use of a building (Vx_2) and the current use of the building after conversion (CUBAC) had a negative correlation of r= -0.441. This implies that as the change of use of the buildings increase, the current use of the buildings after conversion (CUBAC) decreases. Similarly, there is also a negative correlation between the rent and collected/paid before conversion (Vx_4) and current use of the buildings after conversion (CUBAC); as well as the difference between the rent of residence and shop (Vx_5) and the current use of the buildings after conversion (CUBAC) at r=-0.205 and r=-0.261 respectively. This means that as the rent collected paid before conversion increases, the current use of the building after conversion (CUBAC) decreases. More so, as the difference between the rent of residence and shop increases, the current use of the building after conversion (CUBAC) of residential building also decreases.

Conclusion

The sight of the built environment due to unprecedented change of use without recourse to planning regulation has negated the townscape, its aesthetics, balance and the proportionality effects of the environment as well as the principles of urban design. The change of use is common around the activity core, especially the corridors of transportation route. This is because of insufficient provision for commercial use, which has forced the people to convert residential use to meet the demand for commercial uses. It is therefore pertinent for the Planning Authority to be more proactive to regulate the incidences of incautious conversion without adequate Planning provisions. The implementation strategy should be based on the assessment of local conditions, policies, and legislature. The role of private actors and also the planners should be defined in the landuse decree.

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