Original Research Article

A Fuzzy Synthetic Evaluation Analysis ofthe Drivers of Urban Expansionon Peri-Urban Lands in Ilorin, Nigeria

ABSTRACT

Aim: To examine the drivers of urban expansion on peri-urban areas in Ilorin, Kwara State, Nigeria.

Study design: Cross-sectional survey research.

Place and Duration of Study: Eyenkorin, Kwara State 2022.

Methodology: The study conducted a structured questionnaire survey to collect the opinions of the household heads dwelling in the study area. Weighted mean score, factor analysis and fuzzy synthetic evaluation were used to analyze the factors driving urban expansion in the study area.

Results: From study, Occupation and living related factors with a criticality index of 3.12 are the most critical drivers of urban expansion towards the periphery in the study area. This is followed byAccessibility comfort and Land speculation factors with a criticality index of 2.96; and Religious and Institutional factors with a criticality index of 2.72. However, in the study area, Socio-Cultural related factors with a criticality index of 1.22 are not significant drivers of urban expansion towards the periphery in the study area.

Conclusion: The study revealed that there has been exponential spatial urban land use expansion in the peripheral area considered for the study. The study revealed that the factors driving urban expansion to the peripheral area centered around job/occupation related factors, housing and living factors, accessibility factors, religious and institutional factors.For the purpose of environmental preservation and a structured land use, attention should be given to the pace and pattern of urban expansion to achieve a sustainable land use. Hence, urban expansion should not be restricted to the interaction of forces of population growth, market demand and supply alone but subject to an institutionally defined benchmark on the area of land expansion should cover periodically.

Keywords: [Peri-Urban, Land Use, Spatial Structure, Drivers of Urban Expansion}

1. INTRODUCTION

Urban areas have grown enormously over time across the world, with population expansion being one of the most apparent contributors of this growth. According to (1), the world population as at 2019 was about 7.7 billion, of which more than 50% are living in urban areas. By 2030, it is expected that the proportion of people residing in urban areas will surpass 60%, with developing nations projected to experience the greatest proportion of this growth. (2; 3; 4). Nigeria in particular is increasing in the population growth of its urban areas which was recorded to increase from 43.48% in 2010 to 51.96% of the entire population of the country as at 2020 (5).The prospects of urban areas include: industrialization, large and small scale economic and commercial activities, availability of infrastructural facilities, availability of medical facilities etc. (6). These prospects offer better livelihood opportunities, thus, reducing counter-urbanization and increasing migration to urban areas. According to (7), large amounts of land are used by urban areas for infrastructures, commercial and residential buildings. As a consequence, this leads to an increase in land use and land use succession within the urban area and also urban expansion towards the periphery.

Peripheral neighbourhoods which are in most cases known for less economic activities, high agricultural practices especially subsistence practices are being pushed by urban expansion much beyond their previous extents (8). The peripheral lands close to major cities are prime locations for city expansion as they are exposed to the fastest urban features developments (9).(10) discovered that diverse peri-urban patterns are caused by variances in the country's physical location, culture, heritage, and economic growth.However, peripheral lands in developing countries tends to have a little attention in urban development and planning. This leads to dispersed developments and unguided expansion coming from the existing urban centers.

(11) examined the efficacy of the analytical hierarchy approach by juxtapose the drivers of urban growth in city centre, peripheral areas and rural areas of the Kathmandu valley in Nepal. The hierarchical analysis revealed that in the peripheral areas of Kathmandu, the most significant drivers were population growth, land market, political situation, economic opportunities and public service accessibility.

(12) conducted a study on rural-urban connections. According to the study, around 76.6% of the residents of the peri-urban villages came from Lagos and the motivations for moving into the Lagos-Ibadan Peri-urban communities include cheaper land, lower rent, social and cultural contacts, political affiliations, proximity to Lagos, and proximity to a workplace. According to the report, 96.3% of the people polled go to Lagos on a daily basis, and 64% of them only do so for work-related reasons. In the same Lagos, (13) investigated peri-urban growth in the Lagos neighborhood of Ikorodu. Low living costs, accessibility, and jobs were identified as the main drivers of spatial urban expansion. This was further affirmed in another location in Lagos by (14) on a comparative study on the disparity in peri-urban pattern in Ikorodu and Ibeju-lekki, Lagos, Nigeria. Descriptive statistics were used to show that a variety of factors, including the degree of connections, occupational accessibility, and residential development, could be responsible for the variance in the peri-urbanization process in the research locations.

(15) explored the physical, socioeconomic, and political dynamics of peri-urbanization transformation within both the global and European context. A framework stressing five elements that determine how peri urbanization occurs was built using secondary data gleaned from literature. Urban expansion occurs in the first component as an immediate consequence of population expansion, economic expansion, and rising demand for real estate. Cities are still expanding and becoming regional agglomerations, wherein economies of scale drastically change and a new type of peri-urban zone appears. Thirdly, the peri-urban region is shaped by a number of deep cultural and political forces that are at play beneath these trends. The fourth component is the potential for fast transitions, drastic change, and reorganization throughout the entire metropolitan system. The final consideration is to the policy reactions to these transitions and changes, which end up becoming their own "dynamics." In reality, the situation is rarely cut and dry, and each component will interact and overlap with the others.

(16) examined at the elements influencing Beijing, China's urban growth between 1972 and 2010. It has been found that there are strong correlations between urban growth and proximity to place of employment-rich, other socioeconomic hubs and urban infrastructure, indicating that the closer a region is to these resources and to major transportation routes, the more likely it is to experience urban development. This is in sync with the study conducted by (17) on the causes and characteristics of peri-urbanization in Benin City, Nigeria. The construction of the College of Education, together with related educational, job, and economic prospects, was found to be the primary factor in the development of Ekiadolor, a neighborhood on the outskirts of Benin City, according to the study. Along with the academic institution, the community's affordable land prices and affordable housing rents played a vital role in the urban boom.

(18) conducted a comparison analysis on the factors influencing urban land expansion during a thirty-year period, from 1980 to 2010 in 3 cities in China (Shijiazhuang, Tianjin, and Beijing). The elements taken into account are the natural ones, such as slope, elevation, and distance to water, as well as the socioeconomic ones, such as distance to highways, distance to railroads, and distance to the city and district center. Urban expansion was negatively impacted by elevation, slope, and the distance to highways. In most epochs, Beijing's proximity to water had good advantages, but Tianjin's had negative effects. Prior to 1995, Shijiazhuang's urban expansion was positively impacted by its proximity to water; however, this effect changed after 1995. Tianjin benefited from the distance to the

railroads. Tianjin benefited from its distance from the railroads, whereas Beijing and Shijiazhuang suffered in most epochs. Beijing consistently demonstrated adverse effects for proximity to district cores, while Tianjin and Shijiazhuang showed erratic tendencies. However, (19) proposed a somewhat different conclusion in its study on the factors influencing urban growth in China. According to the study, urban growth was positively correlated with population, GDP, and proximity to lakes and rivers, but adversely correlated with elevation, slope, proximity to city or county centers, and proximity to highways.

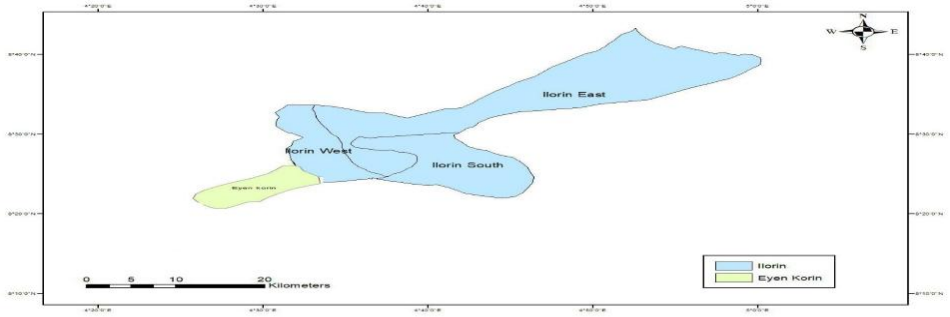
(20) analyzed the expansion of rapidly urbanizing town of Ore in Nigeria. It was discovered that immigrants constituted about 63% of the respondent. The study emphasized that expansion drastically increased after the construction of the Ore express road, the construction of the NNPC depot and when Ore became a local government. This brings employment opportunities and increased economic activities.

(6) evaluated the factors influencing settlement in the peripheral region of Woldia, Ethiopia. It was investigated through focus groups and in-person interviews how demographic and socioeconomic variables influence the creation of settlements. The primary drivers of informal settlements have been identified to be family size, a shortage of affordable housing, and an increase in city rental prices. Economic inequality, rising land lease prices, an expanding urban population, and ineffective land use were additional contributing factors.

Most of the literatures that have been reviewed did not cover the drivers of urban expansion comprehensively as many of the studies focused holistically on an aspect; of which Socio-economic drivers was studied in most of the study. A few others studied the socio-economic factors along other factors. Socio-economic factors (11; 12; 13; 14;15; 16; 18; 19). Demographic factors (11; 13; 15; 6). Cultural factors (12; 13). Physical and neighbourhood factors (16;17; 18; 19; 20). Political factors (11; 13).

The study sought to merge the drivers of urban expansion (as obtained from the reviewed literatures) into the study area; encompassing socio-economic factors, demographic factors, cultural factors, political factors, physical factors and neighbourhood factors.

The peri-urban area considered in Ilorin is Eyenkorin because it is an indigenous community that have extensively been experiencing urban expansion initiated from the core city center of Ilorin. It is geographically located at the extreme end of Ilorin (as shown in Fig 1) of which any development on them may be termed an urban expansion, but not captured within Ilorin metropolis. Eyenkorin is located along Ilorin – Ogbomosho Express Road. It lies beyond the borders of the Ilorin International Airport. Eyenkorin also serves as location for some industries and sites for various religious camps.



Map1 : Ilorin Highlighting Eyenkorin
Source: Adapted from (21)

2. METHODOLOGY

After a thorough literature review on the drivers of urban expansion at peri-urban area, fifteen (15) drivers were highlighted. Afterwards a pilot survey among experts in academia whose relevant experiences in the built environment was done to ensure the adequacy of the drivers of urban expansion highlighted for the study and the highlighted factors were adequate for the study.The simple random sampling technique was adopted to obtain an adequate Sample Size from the Sample

Frame of 1936 Households in the study area. The households were grouped in 6s', of which one was randomly chosen in each group cumulating to a total number of 332 Households.Structured questionnaire was administered to the household heads of the selected 322 Households.

i. **Weighted Mean Score**

This allows factors to be scored against a pre-defined scale, which aids in determining the importance of each component as well as their rankings. Factors are sorted from the first to the last in descending order of their weighted mean. The Weighted mean on a 4-point scale, with 4, 3, 2 and 1 denoting Strong Agree, Agree, Disagree and Strongly Disagree respectively was computed using this method.

Weighted Mean = $\frac{4n_4 + 3n_3 + 2n_2 + 1n_1}{n_4 + n_3 + n_2 + n_1}$ .....(*i*)

ii. **Factor Analysis**

Factor analysis is a method used to explain the differences between different variables that are less likely to be unobserved. It is used to define a small number of dimensions or values that can be used to represent relationships between variables. Factor analysis to identify potential factors that could explain dimensions associated with different data. Situational analysis provides a geometric representation that can visualize the relationship between attributes.

The two main uses of factor analysis are to reduce the number of variables and to identify patterns of relationships between variables. According to Niranjan (22), there are four main methods to evaluate performance. The first is to collect data and create a correlation matrix survey. Second, the values are analyzed to get the first solution and find out how many factors to subtract. The third is to turn around and interpret to see that all inferences point to a single output. If the change is variable, it means that the final value is not the same for all cases. Finally, create scales or quality scores for further analysis. The scores of these scores are especially useful for making decisions or how to further analyze the identified situations. Factor rotation is used to determine whether the charges have a simple structure and is used to simplify the interpretation process. Mathematically, factor analysis is represented thus:

$Fk = W_1kX_1 + W_2kX_2 + W_3kX_3$ ---------- $+ W_nkX_n$ ---------- ***eq.*** *(ii)* Where W_1k is the weight of the original variable X_1 in the linear composite of the factor k. Fk is factor K.

This helped to identify the principal individual factors driving urban expansion at the study area and how they are related with to one another.

i. **Fuzzy Synthetic**

Fuzzy comprehensive assessment is a comprehensive assessment method based on fuzzy mathematics. In mathematics, it transforms qualitative assessment based on degree membership theory into quantitative assessment. It is the focus of attention in many areas such as comprehensive assessment, resource management and optimization. The meaning of evaluation is often not clearly defined and overall evaluation is a method used and its steps are as follows:

Step 1: Build the factors set $X = \{u_1, u_2, \cdots, u_s\}$.

Step 2: Build the evaluation set $Y = \{v_1, v_2, \cdots, v_m\}$.

Step 3**:** Determine the single factor evaluation matrix R by fuzzy statistics method, expert scoring method, etc. Here $r_{ij} \in [0,1]$ means the degree of the evaluation objects to each $v_j$on each u_i, $i = 1,2,\cdots,s$, $j = 1,2,\cdots,m$.

$$R = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ r_{s1} & r_{s2} & \cdots & r_{sm} \end{bmatrix} \triangleq (R_1, R_2, \cdots, R_m) \quad .$$

Step 4:Choose a suitable fuzzy synthetic function $S(x_1, x_2, \cdots, x_s)$ satisfying the following conditions: (a) $S(x_1, x_2, \cdots, x_s) : [0,1]^s \rightarrow [0,1]$; (b) $S(x, x, \cdots, x) = x$. It is monotone non-decreasing on each variable x_i.

Step 5:Synthesize each column of R for a value $b_j = S(R_j) = S(r_{j1}, r_{j2}, \cdots, r_{js})$ by synthetic function, then we get the fuzzy synthetic evaluation results $B = (b_1, b_2, \cdots, b_m)$, where $b_j$means the degree of the evaluation objects to each evaluation set $v_j$in synthetic sense, $j = 1,2, \cdots, m$. That is

$$B = S \circ R = (S(R_1), S(R_2), \cdots, S(R_m)).$$

3. RESULTS AND DISCUSSION

(a) Spatial structure 2000 (b) Spatial structure 2011 (c) Spatial structure 2022

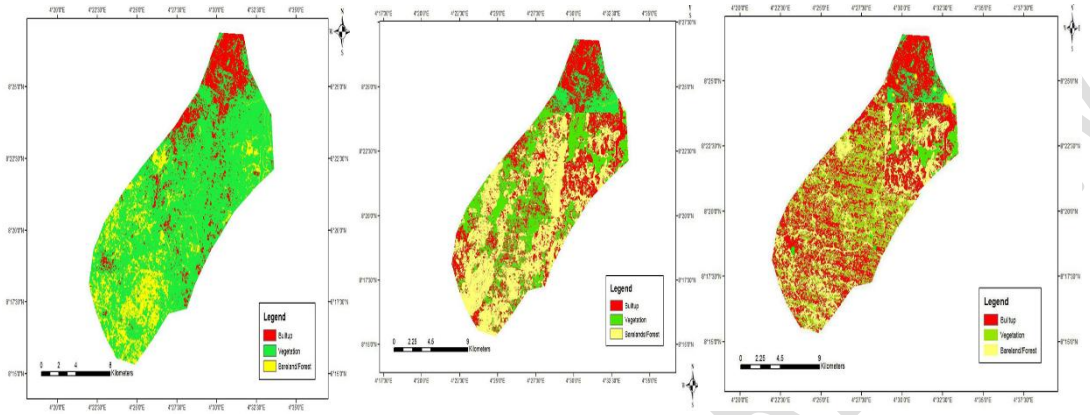


Fig. 1. Spatial structure of Eyenkorin between 2000 – 2022

Source: Adapted from (21)

Table 1: Area statistics of Spatial Structure in 2000, 2011 and 2022 at Eyenkorin

Land Classification	2000		2011		2022	
	Area (km^2)	Area (%)	Area (km^2)	Area (%)	Area (km^2)	Area (%)
Built-up	27.52	12.80	55.25	25.70	71.81	33.40
Vegetation	154.86	72.03	68.37	31.80	79.77	37.10
Bare land/Natural	32.62	15.17	91.38	42.50	63.42	29.50
Total	**215**	**100**	**215**	**100**	**215**	**100**

Source: Adapted from (21)

Fig. 1 and Table 1 revealed that as at 2000, the built-up land in Eyenkorin constituted 27.52km^2 (12.80% of it land area), vegetation/agricultural land constituted 154.86km^2 (72.03% of it land area) and bare land/natural land constituted 32.62km^2 (15.17%% of it land area). However, as at 2022, the built-up land had increased to an area cover of 71.81km^2 (33.40% of the total area), vegetation/agricultural land decreased to an area cover of 79.77 km^2 (37.10% of the total area) and bare land/natural land had also decreased to an area cover of 63.42km^2 (29.50% of the total area). This implies the swift growth in the built-up land at the detriment of agricultural land and bare land. This swift growth is linked to urban expansion from the core city centre of Ilorin to the peripheral area in study (Eyenkorin).

Table 2: Reliability Test of Respondent in the Study Area

Variable	Cronbach's	Number

	Alpha	of items
Factors driving urban expansion of peripheral lands in the study area	0.761	15

Source: Field Survey, 2023

Table 2 shows the result of the reliability test conducted on the questionnaires administered to Household heads in the study area. The table shows the result of the reliability test conducted on the factors driving urban expansion of peripheral lands in the study area with a Cronbach's alpha value of 0.761. The internal consistency of these values justifies the reliability of the instrument to adequately measure the information obtained. Hence, the questionnaire is good for the analysis.

Table 3: Descriptive Statistics of Factors driving urban expansion at the Study Area

Factors	Mean	Std.	Rank
Increased housing demand	3.57	.497	**1**
Lower cost of living	3.52	.500	**2**
Proximity to transport terminals	3.49	.540	**3**
Job and business opportunities	3.41	.492	**4**
Proximity to religious centre	3.39	.718	**5**
Land Speculation opportunities	3.22	.641	**6**
Proximity to emerging centre business district	3.17	.558	**7**
Proximity to Schools	2.83	.938	**8**
Family size	2.72	1.039	**9**
Political stability and security	2.38	.977	**10**
Natural scenery	2.17	.742	**11**
Proximity to health facilities	1.52	.500	**12**
Closeness to family	1.29	.454	**13**
Proximity to historical sites	1.26	.437	**14**
Desire for second home	1.12	.323	**15**

Source: Field Survey,2022

Table 3 depicts that at Eyenkorin, the most significant drivers of it urban expansion ranked 1st, 2nd and 3rd are increased housing demand, Lower cost of living and Proximity to transport terminals with a mean score of 3.57, 3.52 and 3.49 respectively. Other significant drivers of urban expansion were ranked 4th, 5th, 6th, 7th, 8th and 9th. The drivers are job and business opportunities, proximity to religious centres, land speculation opportunities, proximity to emerging centres business district, proximity to schools and family size with a mean score of 3.41, 3.39, 3.22, 3.17, 2.83 and 2.72 respectively. However, factors like Political stability and security, natural scenery, proximity to health facilities, closeness to family, proximity to historical sitesand desire for second home are not consider significant drivers of urban expansion at Eyenkorin with a mean score of 2.38, 2.17, 1.52, 1.29, 1.26 and 1.12 respectively.

Table 4: Factor Analysis Drivers of Urban Expansion at Eyenkorin based on opinion of the Respondents

DUES code	Groups	Label	Factor loading	Eigen value	Variance explained	
					%	Cummulative %
4	**1. Occupation and living factors**	Job and business opportunities	.665	**5.891**	**36.816**	**36.816**
1		Increase in housing demand	.799			
2		Lower living cost	.786			
9		Increase in family size	.631			
10		Political stability and safety	.685			
7	**2.Religious and Institutional factors**	Proximity to emeging centre business districts	.745	**3.341**	**20. 882**	**57.698**
5		Proximity to religious centre	.835			
8		Proximity to schools	.683			
12		Proximity to health facilities	.636			
14	**3. Socio-Cultural factors**	Proximity to historical sites	.665	**2.214**	**13.838**	**71.536**
15		Desire for second home	.550			
13		Closeness to family and tribesmen	.625			
6	**4. Accessibility comfort and Land speculation factors**	Land Speculation opportunities	.698	**1.415**	**8.846**	**80.382**
4		Proximity to transport terminals	.730			
11		Natural scenery	.786			

Extraction Method: Principal Component Analysis.
Source: Field Survey, 2022

The factor loadings for all DUEs are above 0.50, highlighting the appropriateness of the data and sample size for the factor analysis. In Table 4, all DUEs and their factor loadings are presented. The four-factor clustering is labeled based on the common themes of the individual DUEs as follows:

1. Occupation and living factors
2. Religious and Institutional factors
3. Socio-Cultural factors
4. Accessibility comfort and Land speculation factors

The 4 factors form the underlying grouping of the 15DUEs for drivers of urban expansion at Eyenkorin. With attention to the 4 underlying groups, there remains the need to ascertain the factor grouping, which is more critical in achieving drivers of urban expansion. To this effect, Fuzzy Synthetic Evaluation is employed.

Fuzzy Synthetic Evaluation on the factors driving urban Expansion

Fuzzy Synthetic Evaluation approach was adopted to determine the relative contribution of the 15 factors understudy identified as the Drivers of Urban Expansion (DUEs). There exist two categories of membership functions in the Fuzzy Synthetic Evaluation. The first level is the Drivers of Urban Expansion Groups (DUEGs) as obtained from the factor analysis while the second level is the Drivers of Urban Expansion (DUEs). A Fuzzy Evaluation was demonstrated to ascertain the weighting of each level of membership function.

To ascertain the weightings for DUEs and DUEGs, the 15 Drivers of Urban Expansion (DUEs), the 4-factor analysis cluster grouping weighting for Eyenkorin respectively were defined based on the mean scores gotten from the survey conducted.

Where Wi is the weightings of a DUE/DUEG; Mi is the mean score value of a DUE/DUEG, ΣM_{ii} is the summation of mean score values of all the DUEs/DUEGs. For example, from Table 5, the weighting for DUE10 (Political stability and safety) of 0.15 is obtained by divide the mean score of the factor (2.38) by the total mean score of all the factors in the group (15.60). Likewise, similar procedure is done for all the factors in each group.

Ascertain the membership function of each DUEG (first level) and DUEs (second level), the membership function of the respective DUEG, each DUE membership function is first determined. Having done this, the foundation for estimating DUEG membership function becomes clearer. The membership function of a DUE is derived from the evaluation by the experts given the grades for selection (i.e. *1 – strongly disagree, 2 – disagree, 3 – agree, 4 – strongly agree.* For instance, the survey carried out revealed that 22%, 32.1%, 32.1%,13.8% of the respondent in eyenkorin rated DUE10 (*Political stability and safety)* as strongly disagree, disagree, agree and strongly agree respectively. With regards to this, the membership function and other DUE is presented.

Table 5: DUE Membership function for Urban Expansion at Eyenkorin

DUES Codes	Factor Grouping	Factor Label	Mean Scores		WEIGHTING	
			DUE MS	DUEG	DUE	DUEG
4	**1. Occupation and living factors**	Job and business opportunities	3.41	15.60	0.22	0.40
1		Increase in housing demand	3.57		0.23	
2		Lower living cost	3.52		0.23	
9		Increase in family size	2.72		0.17	
10		Political stability and safety	2.38		0.15	
7	**2.Religious and Institutional factors**	Proximity to emeging centre business districts	3.17	10.91	0.29	0.28
5		Proximity to religious centre	3.39		0.31	
8		Proximity to schools	2.83		0.26	
12		Proximity to health facilities	1.52		0.14	
14	**3. Socio-Cultural factors**	Proximity to historical sites	1.26	3.67	0.34	0.09
15		Desire for second home	1.12		0.31	
13		Closeness to family and tribesmen	1.29		0.35	
6	**4. Accessibility comfort and Land speculation factors**	Land Speculation opportunities	3.22	8.88	0.36	0.23
4		Proximity to transport terminals	3.49		0.39	
11		Natural scenery	2.17		0.24	
	Total Mean Score for the DUEG			39.06		

Source: Field Survey, 2022

Table 6:DUE Membership function for Urban Expansion at Eyenkorin

Codes	DUEG	DUE Label	Weighting	DUE	
				Membership functions	
				Level 2	Level 1
4	**1. Occupation and living factors**	Job and business opportunities	0.22	(0.00, 0.00, 0.59, 0.41)	(0.05, 0.12, 0.42, 0.41)
1		Increase in housing demand	0.23	(0.00, 0.00, 0.44, 0.56)	
2		Lower living cost	0.23	(0.00, 0.00, 0.48, 0.52)	
9		Increase in family size	0.17	(0.09, 0.40, 0.20, 0.31)	
10		Political stability and safety	0.15	(0.22, 0.32, 0.32, 0.14)	
7	**2.Religious and Institutional factors**	Proximity to emeging centre business districts	0.29	(0.00, 0.09, 0.66, 0.25)	(0.09, 0.22, 0.39, 0.31)
5		Proximity to religious centre	0.31	(0.00, 0.14, 0.34, 0.52)	
8		Proximity to schools	0.26	(0.08, 0.29, 0.35, 0.28)	
12		Proximity to health facilities	0.14	(0.48, 0.52, 0.00, 0.00)	
14	**3. Socio-Cultural factors**	Proximity to historical sites	0.34	(0.74, 0.26, 0.00, 0.00)	0.77, 0.23, 0.00, 0.00
15		Desire for second home	0.31	(0.88, 0.12, 0.00, 0.00)	
13		Closeness to family and tribesmen	0.35	(0.71, 0.29, 0.00, 0.00)	
6	**4. Accessibility comfort and Land speculation factors**	Land Speculation opportunities	0.36	(0.00, 0.12, 0.54, 0.34)	0.05, 0.15, 0.47, 0.32
4		Proximity to transport terminals	0.39	(0.00, 0.02, 0.47, 0.51)	
11		Natural scenery	0.24	(0.20, 0.42, 0.37, 0.00)	

Source: Field Survey, 2022

Table 7: DUE grouping decision rule for Urban Expansion at Eyenkorin

DUE Grouping	Factor Grouping	Index	Coefficient	Decision Rule	Rank
1	**Occupation and living factors**	3.12	0.31	Very Significant	**1**
4	**Accessibility comfort and Land speculation factors**	2.96	0.30	Significant	**2**
2	**Religious and Institutional factors**	2.72	0.27	Significant	**3**
3	**Socio-Cultural factors**	1.22	0.12	Not Significant	**4**

Source: Field Survey, 2022

From Table 7, DUEG1 "Occupational and living factors" is regarded as very significantin driving urban expansion at Eyenkorin. This group has the highest index of 3.12 and a coefficient of 0.31. This group has 5 DUEs(sub-factors) which includes; job and business opportunities, increase in housing demand, lower living cost, increase in family size and Political stability. Increasing housing demand, one of the sub-factors under this DUEG1 has a mean score of 3.57 (Table 3) and a factor loading of 0.779 (Table 4) which is the highest in the group. Other sub-factors under the DUEG1 which are also very significant are: lower cost of living with a mean score of 3.52 (Table 3) and a factor loading of 0.786 (Table 4); job and business opportunities with a mean score of 3.41 (Table 3) and a factor loading of 0.665 (Table 4). In the same DUEG1 increase in family size with a mean score of 2.72 (Table 3) and a factor loading of 0.631 (Table 4) and political stability with a mean score of 2.38 (Table 3) and a factor loading of 0.685 (Table 4) are also significant divers of urban expansion to Eyenkorin, though it is not as significant as job and business opportunities, increase in housing demand, lower living cost.

Table 7 also reveals that after DUEG1 which is ranked significant, anothersignificant group driving urban expansion at Eyenkorin is DUEG4 "Accessibility comfort and Land speculation factors",having a critical index of 2.96 and a coefficient of 0.30. This group has 3 DUEs (sub-factors) which are; proximity to transport terminals, land Speculation opportunities and natural scenery. Proximity to transport terminals, one of the sub-factors under this DUEG4 has a mean score of 3.49 (Table 3) and a factor loading of 0.730 (Table 4) which is the highest in the group. This is attributed to Eyenkorin's proximity to the Ilorin International Airport and also because the area has one of the major road transitioning into the South West Geo-Political zone of Nigeria. Another sub-factor under the DUEG4 which are also very significant island speculation opportunities with a mean score of 3.22 (Table 3) and a factor loading of 0.698 (Table 4). The wide expansion of land of the location is also a bait for land speculation activities where a vast expanse of land can be secured with little development for current utilization. Finally, the last sub-factor under the DUEG4 is natural scenery with a mean score of 2.17 (Table 3) and a factor loading of 0.786 (Table 4). This implies though natural scenery and landscape is significant, it does not really account as a critical driver of urban expansion in Eyenkorin.

Also from Table 7, DUEG2, "Religious and Institutional factors" was ranked third with a critical index of 2.72 and a coefficient of 0.27. implying that religious and institutional factors are significant drivers of urban expansion in Eyenkorin. This group has 4 DUEs (sub-factors) which are; proximity to emerging centre business districts, proximity to health facilities,proximity to religious centres and proximity to schools. In DUEG3, proximity to religious centres with a factor loading of 0.835 (Table 4) is the most critical driver of urban expansion in this group with a mean score of 3.39 (Table 3). This may be linked to that fact that Eyenkorin is where several religious camping groundsare situated, which is attracting developments aroundsuch landmarks. Proximity to emerging centre business districts and proximity to schools are also driver of urban expansion at Eyenkorin having a mean score of 3.17 and 2.83 respectively (Table 3) and also a factor loading of 0.645 and 0.583 respectively (Table 4). The emerging centre business district mostly is as a result of the agglomeration from previous urban expansion at Eyenkorin causing more exponential expansion. Proximity to school is also considered as a driver of urban expansion at Eyenkorin as it hosts several primary schools, secondary schools and a new private university which may trigger more expansion in the coming years. However, in the DUEG2, proximity tohealth facilities is not a significant driver of urban exxpansion at Eyenkorin, having a mean score of 1.22 (Table 3) and and factor loading of .636 (Table 4). This don't not implies that there are not health care facilities at Eyenkorin. However, there

are no notable health care facilities germane to significantly influence the pull of urban expansion at Eyenkorin.

Finally, DUEG3 “Socio-cultural factors” was the least ranked as the driver of urban expansion at Eyenkorin with a critical index of 1.22 and coefficient of 0.12. This group has 3 DUEs (sub-factors), which are proximity to historical sites, desire for second home and closeness to family and tribesmen. None of the factors has significant contribution to the drive of urban expansion at Eyenkorin. In this group,closeness to family, proximity to historical sites and desire for second home had a mean score of 1.29, 1.26 and 1.12 respectively (Table 3) and also a factor loading of .665, .650 and .525 respectively (Table 4).This implies that the socio-cultural factors do not contributes significantly in driving urban expansion at Eyenkorin

From previous studies Ravetz et.al (2012); Zhang & Su (2016); Baye et.al, (2020) attests that socio-economic factors are major drivers of urban expansion. In the same vein, Li et.al (2013); Olajuyigbe (2016); Adedire (2018); Rijal et.al 2020 affirms that neighbourhood factors are also major drivers of urban expansion. Likewise, Adedire (2017); Hilal et.al (2017) avers that housing and living factors are also critical in driving urban expansion at peripheral areas.

4. CONCLUSION

The study revealed that there has been exponential spatial urban land use expansion in the peripheral area considered for the study. The study revealed that the factors driving urban expansion to the peripheral area centred around job/occupation related factors, housing and living factors, accessibility factors, religious and institutional factors. In summary, the most dominant driver of urban expansion will still centre factors around socio-economic factors and neighborhood characteristics. Hence, socio-economic factors and neighborhood factors are critical to determining the directional flow and pace for urban expansion towards the urban peripherals.

From the study, most of the factors driving urban expansion at the periphery are needful and should not be neglected. However, For the purpose of environmental preservation and a structured land use, attention should be given to the pace and pattern of urban expansion to achieve a sustainable land use. Hence, urban expansion should not be restricted to the interaction of forces of population growth, market demand and supply alone but subject to a benchmark on the area of land expansion that should cover periodically. There is also need to have governmental and institutional structures that embraces and encourages vertical (upward) development rather than horizontal (parallel) development that keeps consuming lands that should be preserved. In the same vein, because of the novelty of urban land use encroachmenton some parts of peri-urban area, more attention should be given towards sustainable urban land use and management practice concepts like smart city, city efficiency etc to help integrate the four pillars of sustainability which are human, social, economic and environment.

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