

Predictors Of Urban Growth In A Peri-Urban Neighbourhood Of Minna, Niger State

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Abstract: *The rapid expansion of cities in the 21st century is a cause for concern. More worrisome is the uncontrolled expansion of urban areas in the cities of developing countries and the associated housing deficit. Third world urbanisation is associated with unplanned development at the periphery of cities, thus engendering unapproved land use and land cover changes. This study is aimed at assessing the predictors of urban growth in peri-urban area of Minna, Nigeria, and the objectives are to examine the spatio-temporal change of peri-urban area of Minna from 1990 to 2020; identify factors responsible for urban expansion in the study area; and examine the relationship between these factors in the study area. This study relies on both primary and secondary data. Primary data was collected through oral interviews and direct observation, while secondary data are through Landsat imageries and review of existing literature. Purposive sampling was used to select professionals for oral interview. The satellite imageries of 1990, 2000, 2010 and 2020 were used to determine the spatio-temporal change and were analyzed using remote sensing and geographical information system (GIS) techniques. The study reveals that the main predictors of urban growth are shift from rental tenure to home ownership, cheap price of land, increase in household formation, rising living standards, low rent of housing, weak land use planning, proximity to place of work and Safe environment. The study, therefore recommends active and judicious implementation of land use plans; simplification of plan approval process; public enlightenment campaign on the need to obey planning regulations with strict penalties attached to contravention; and monitoring of town planning agencies by appropriate authorities in order to checkmate corruption.*

Keywords: *Housing, Urban expansion, Peri-urban areas, Sprawl, Urban growth*

I. INTRODUCTION

Urban extension as a possible means of urban growth is an increase in the urbanized land cover. Urban growth in a spontaneous or unplanned urban development is called urban sprawl (Claudia M. *et al.*, 2019). Throughout the world, Urban sprawl has gradually become one of the dominant urban spatial expansion patterns (Mosamman *et al.*, 2017). In other word, it is a form of city spatial expansion toward peripheral areas with, low density, single-use, extensive road and highway networks, car-dependent, open up vast space of

territory, scattered and ribbon development in an mono-centric urban structure (Gomez-Antonio *et al.*, 2014).

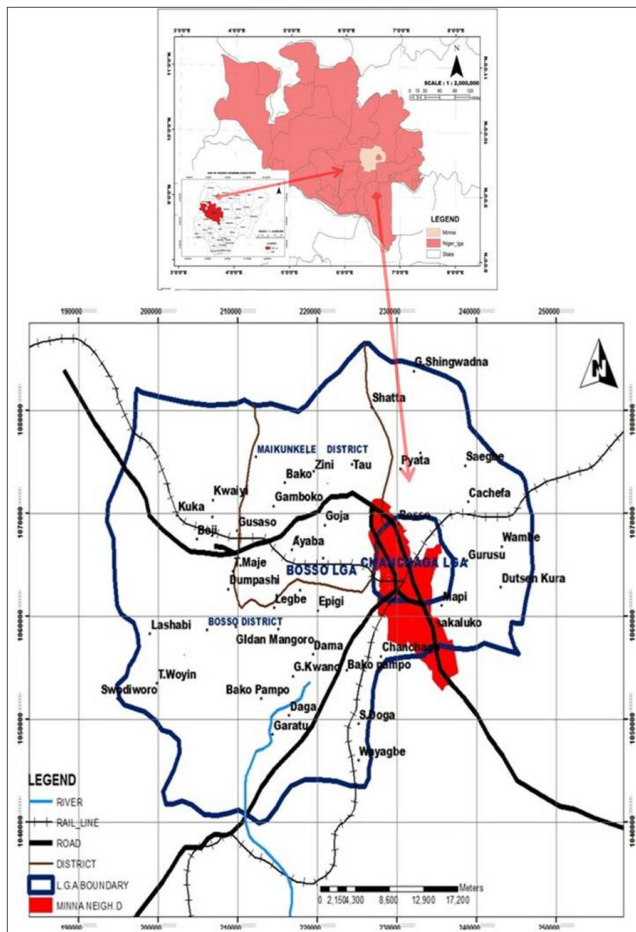
Urban growth is identified with Urban sprawl, as urban sprawl is referred to as an ‘uncoordinated growth’ (Fouberg, 2012; Nnaemeka-Okeke, 2016; Idowu *et al.*, 2017) and scattering of new development on isolated tracts, separated from other areas by vacant land. It often involves the construction of residential and commercial buildings in rural areas or otherwise undeveloped land at the outskirts of a city. Omole (2000) referred it as a formless dispersal of congested urban area with little or no regard for the inter-relationship of such factors as transportation, employment, health, and

recreational needs. This is evident in the poor environmental qualities of many Nigerian cities (Usman *et al.*, 2018).

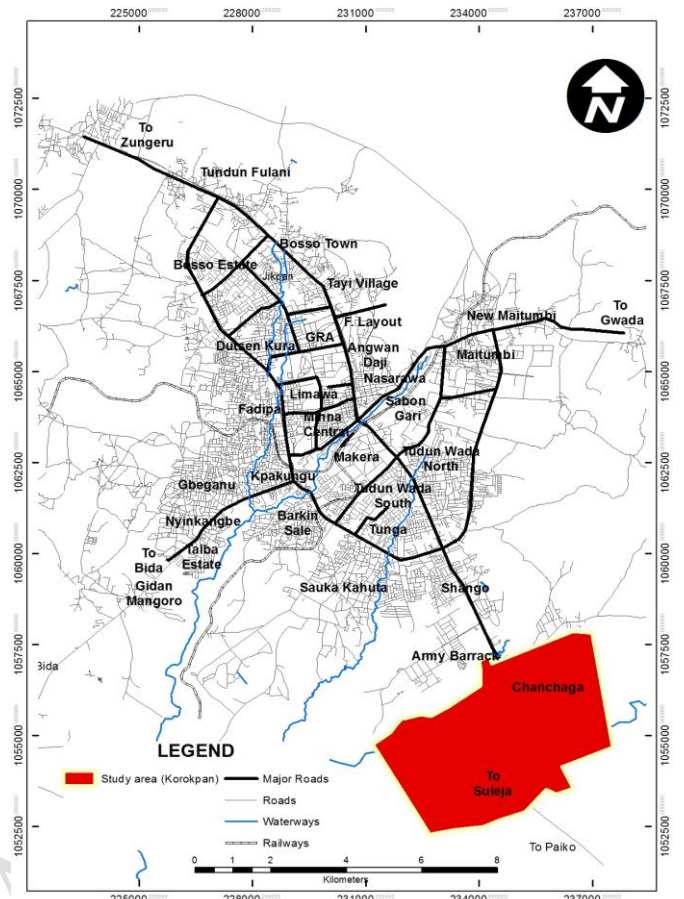
Based on the foregoing, the study aimed at assessing the predictors of urban growth in per-urban area of Minna, Nigeria and to examine the spatio-temporal change of per-urban area of Minna from 1990 to 2020, identify the factors responsible for urban expansion in the study area and examine the relationship between these factors in the study area.

II. THE STUDY AREA

Minna is located within the geographical area on latitudes 9°31'20"N to 9°41'27"N and longitudes 6°24'59"E to 6°37'42"E. The State is bordered to the North by Zamfara State, Northwest by Kebbi State, South by Kogi State, Southwest by both Kwara and Kaduna States, while the Federal Capital Territory, Abuja borders the State to both its Northeast and Southwest respectively. Minna comprises of Bosso and Chanchaga Local Government Area and it lies within the central region of Nigeria known as the Middle Belt region. According to the 2006 population and housing census figures, Minna has a population of 348,788 and the highest proportion of the population comprised of Nupe, Gwari and Hausa.



Source: Author, 2020
Figure 1: Minna, Niger State



Source: Authors 2020
Figure 2: Korokpan the study area

III. THE CONCEPT OF URBAN SPRAWL

Elkin *et al.*, (1991) believes that before the industrial revolution, people much preferred to live in rural areas. Although cities had been planned for decades, but after the industrial revolution only a small percentage of people lived in cities (Arbury, 2005). After the Industrial Revolution urban areas extended further than any other era in the history. This process was named urbanization. This phenomenon is taking place in developed or developing countries where human beings live. Most countries have the basic potential to this universal phenomenon that is mainly responsible for increasing the number of population and economy (Sudhira *et al.*, 2004). Excessive growth rate of population as a result of urbanization has led to upward growth of cities, which as consequence cities missed their realms and boundaries (Habibia & Asadib, 2011; Daramola & Ibem, 2010). Unplanned urbanization and dynamic urban development led to different types of urban forms that urban sprawl is a primary form of urban development (Bhatta, 2010; Sudhira, 2008; Arbury, 2005).

DEFINING URBAN SPRAWL

There are many definitions on urban sprawl (Habibi & Asadib, 2011). The exact definition of urban sprawl differs among researchers as the term lacks precision and sometime

have negative connotation (Guite, 2019). According to Oxford dictionary it has been defined as the disorganized and unattractive expansion of an urban or industrial area into the adjoining rural area. The European Environment Agency (EEA, 2006) has described sprawl as the physical pattern of low density expansion of large urban areas, under market conditions, mainly into the surrounding agricultural areas. Brueckner (2000) refers urban sprawl to excessive spatial growth of cities. Urban sprawl denotes expansion of human population away from the central urban areas into low-density areas that are mostly car dependent communities (Guite, 2019). Definition of sprawl is not only based on its characteristics, but also is based on its effects. Longley et al. (2002) interpreted that based on numerous crucial elements a definition of urban sprawl can be fed accordingly. Based on the last interpretation of sprawl, urban sprawl can also be defined based on form, land use, Impacts and density.

URBAN SPRAWL DEFINITION BASED ON FORM

With respect to this type of definition, sprawl is not a particular urban form, but ranging from strip to scattered development. Accordingly, Ewing (1994) and Pendall (1999) refer these types of urban sprawl over a linear pattern of compact development to scattered development (Maier *et al.*, 2006).

URBAN SPRAWL DEFINITION BASED ON LAND USE

Another criterion for defining urban sprawl is land use layouts. In (1998), "The Transportation Research Board" has listed the characteristics of urban sprawl such as low density housing expansion, single family houses with dispersed blocks, mixed of uses such as shopping malls and etc. As a whole, the essence of this approach is that sprawl is defined as low density urban development with a separation of functions (Maier *et al.*, 2006).

URBAN SPRAWL DEFINITION BASED ON IMPACTS

Ewing (1994) believes that different urban forms including sprawl are extremely debatable and important. Therefore, these terms are not distinguishable and it is suggested, that urban sprawl be defined by its costs and negative impacts. Al Gore (cit. in Wassmer 2002) believes that in such a circumstance, all negative impacts of urban form could be referred to urban sprawl.

URBAN SPRAWL DEFINITION BASED ON DENSITY

Scholars and researchers gave much more definitions of sprawl based on the density criteria. Generally, sprawl is directly related with low density urban growth. In many definitions, density in urban sprawl acts as an indicator of land use intensity which represents the ratio between the inhabitants of an area and a given land area (Maier *et al.*, 2006).

CAUSING FACTORS OF URBAN SPRAWL

Factors causing urban sprawl differ according to development level of countries or according to structure of society. For example, in America demand for having a large house detached with garden which is in touch with nature, introverted life styles (Bruegmann, 2005) and racism (Nechyba and Walsh, 2004) are the main reasons of urban sprawl. In a report prepared by European Commission, factors causing urban sprawl were drawn together (Table 1).

S/N	Factors	
1	Macro-Economic factors	Economic growth, Globalisation, European integration.
2	Micro-Economic factors	Rising living standards, Price of land. Availability of cheap agricultural land, Competition between municipalities.
3	Demographic factors	Population growth, Increase in household formation.
4	Housing preferences	More space per person, Housing preferences.
5	Inner city problems	Poor air quality, Noise, Small apartments, Unsafe environments, Social problems, Lack of green open space, Poor quality of school.
6	Transportation	Private car ownership, Availability of roads, Low cost of fuel, Poor public transport.
7	Regulatory frameworks	Weak land use planning Poor enforcement of existing plans Lack of horizontal and vertical coordination and collaboration

Source: European Environment Agency (EEA, 2006).

Table 1: Causing Factors of Urban Sprawl

FACTORS RESPONSIBLE FOR URBAN SPRAWL IN NIGERIAN CITIES

Different factors are responsible for urban sprawl in Nigerian cities. The unprecedented increase in the population in the Nigerian cities continues to put pressure on the existing housing facility. The inability of the housing delivery to cope effectively with the housing need has succeeded in pricing out majority of the low income-earners from the housing market. Most affected groups are the immigrants from the rural hinterland that prefer to settle at the suburbs of the cities. Often times, this is responsible for the development of squatter's settlement at the peri-urban zones (Olujimi 2009).

Cities present unlimited socio-economic opportunities, particularly in area of landed property development. The operations of the economic forces in the supply of land for commercial development within the city centre are

encouraging the acquisition of land at the suburb of the city for residential property development. This has sufficiently propelled the greed for land speculation and hoarding at the suburbs. Unfortunately, most of the isolated parcels of land hoarded at the suburb are not subjected to conventional design into layouts that could seek planning approval. Even when such parcels of land are designed into layouts, most of them are not properly charted to allow for coordination. Hence, most of the layouts are not linked to others for accessibility purposes (Olujimi, 2009).

Another factor that is responsible for the promotion of urban sprawl is the inability of government to effectively develop their compulsorily acquired parcels of land in some cities. This is predicated on the non-readiness of government to pay compensations on un-exhausted resources in the acquired land to the owners. Thus, the unwillingness of the owners to release fully the acquired land to government and their continuous disposal of the land to individuals, that continues to develop the land without reference to the planning authorities to seek planning permission (Olujimi, 2009). However, the planning authorities put in place are expected to control physical development in all parts of the city (including the sprawling areas) but the ineffectiveness of the development control tool at putting such sprawl at bay is hindered by a lot of factors. These among others include lack of political will to implement development control measures, insufficient planning staff to carryout effective monitoring, and lack of equipment such as development control monitoring vehicles. In spite of the shortcomings, efforts are being made at different quarters to check the sprawling growth of Nigerian cities. (Olujimi, 2009)

IV. METHODOLOGY

The research method or approach for this study is quantitative method. The analysis in this study is both from primary and secondary data. The survey was based on questionnaire and oral interviews. Data on factors influencing urban growth was collected using likert scale ranges from highly disagree to high agree. The satellite image processing and classification of 1990, 2000, 2010 and 2020 while the secondary data obtained from Landsat imageries to determine spatio-temporal change and analyzed using remote sensing techniques and Geographical Information System (GIS). The study covers Korokpan peri-urban area of Minna.

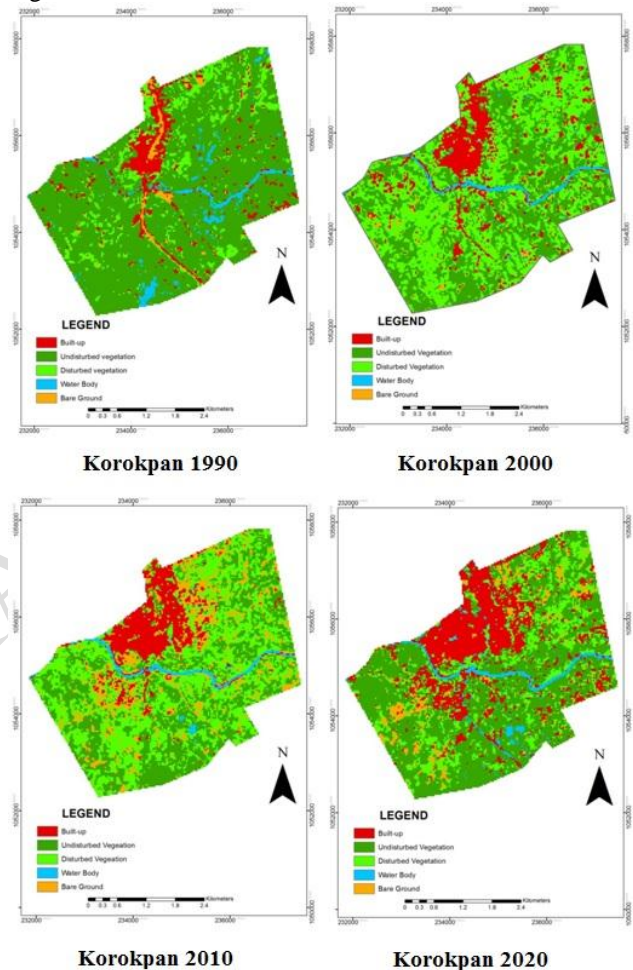
V. RESULTS DISCUSSIONS

LAND USE/LAND COVER CHANGES IN THE STUDY AREA

Figure 2 and Table 2 shows that built-up area in Korokpan axis of Minna has increased consistently from 1990 to 2020. For instance, the built-up area constituted 8.09% of the total land area in 1990; while it grew to 13.25% in 2000; 23.16% in 2010; and 40.15% in 2020. This indicates that the built-up area almost doubles every 10 years. On the contrary, the undisturbed vegetation in the study area has experienced

consistent diminishing from 76.29% in 1990 to 21.11% in 2020. This indicates that the rate of distortion of the vegetal cover in the study area more than tripled within the space of 30 years.

Furthermore, the disturbed vegetation cover increased from 10.94% of the total land area in 1990 to 33.57% in 2020. Interestingly, however, the water body in the study area has experienced only a relatively insignificant decrease from 3.03% in 1990 to 3.02% in 2020. However, the bare surface has grown from 1.65% in 1990 to 2.15% in 2020.



Source: Author, 2020.

Figure 3: Land use/Land cover of Korokpan for 1990, 2000, 2010, and 2020

Land use	1990 Area (Hectares)	1990 %	2000 Area (Hectares)	2000 %	2010 Area (Hectares)	2010 %	2020 Area (Hectares)	2020 %
Built-up	147.6	8.09	241.4	13.25	422.1	23.16	731.6	40.15
Undisturbed vegetation	1390.1	76.29	693.5	38.08	917.1	50.33	218.3	21.11
Disturbed Vegetation	199.4	10.94	836.6	45.91	348.4	19.12	611.8	33.57
Water body	55.3	3.03	37.4	2.05	57.1	3.13	221.3	3.02
Bare ground	30.1	1.65	13.3	0.73	77.5	4.25	39.1	2.15
Total	1822.2	100	1822.2	100	1822.2	100	1822.2	100

Source: Author, 2020

Table 2: Land use/Land cover of Korokpan for 1990, 2000, 2010, and 2020

FACTORS INFLUENCING URBAN GROWTH IN KOROKPAN AREA OF MINNA

The mean score of factors influencing urban growth in Korokpan peri-urban area of Minna is presented in table 3. The average mean score of respondents in the area is 4.08. Eight factors were identified as the core factors influencing urban growth in the area and are ranked according to their order of importance by the mean score value. These factors are: Shift from rental tenure to home ownership (4.75), Cheap price of land (4.58), Increase in household formation (4.29), Rising living standards (4.29), Low rent of housing (4.28), Weak land use planning (4.23), Proximity to place of work (4.21) and Safe environment (4.13).

The auxiliary factors in the case are the supporting or supplementary factors that influence urban growth in the area and these factors are Population growth (4.03), Ethnic/religion (3.47), Housing preferences (3.33) and Availability of infrastructures (3.31).

S/ N	Influencing Factors	Scale						Mean score	Ranking	*C/A
		Highly Disagree	Moderately Disagree	Disagree	Agree	Moderately Agree	Highly Agree			
1	Ethnic/religion	26	11	23	20	16	22	4.58	10	A
2	Cheap price of land	3	3	14	38	21	39	4.28		
3	Low rent of housing	5	6	15	46	18	28	4.28		
4	Availability of infrastructures	21	20	23	22	19	13	3.31		
5	Proximity to place of work	6	7	18	37	25	25	4.21		
6	Safe environment	7	13	12	34	30	22	4.13		
7	Rising living standards	6	6	17	34	29	26	4.29		
8	Population growth	12	7	21	27	28	23	4.03		
9	Increase in household formation	8	4	15	37	26	28	4.29		
10	Housing preferences	6	4	15	37	20	36	3.33		
11	Weak land use planning	7	5	21	36	19	30	4.23		
12	Shift from rental tenure to home ownership	6	1	12	26	26	47	4.75		
								4.08		

Source: Author, 2020

Table 3: Factors influencing urban growth in Korokpan area of Minna

DETERMINANTS OF URBAN GROWTH IN THE STUDY AREA

An oral interview conducted with the staff of Niger State Urban Development Board (NUDB) on the determinants of urban growth in the study area reveals that several factors are responsible for the growth of Korokpan axis of Minna. Some of these factors included the establishment of administrative functions in the study area, development of housing estates

and establishment of educational institutions of different levels in the area. Other factors reported to be responsible for rapid growth in the study area are in-migration and high birth rate. These last two factors can be categorized under the broad heading of demographic change or population growth.

The officials of NUDB expressed worries on the rapid rate of growth in the study area. One of the officials stated that:

With the way in which Korokpan axis of Minna is growing, the management and planning of the area has assumed a worrisome dimension. The area exhibit considerable level of planlessness and squalor. Concerted effort is required to curb the rate of uncontrolled growth in the area because it affects the infrastructure in the area negatively and some of the facilities are overstretched.

VI. CONCLUSION AND RECOMMENDATIONS

Spatial expansion of cities in developing countries is characterised by planlessness and lack of adequate control. This study has revealed that urban growth in the study area is rapid and uncontrolled. Furthermore, the study also reveals that the most noticeable determinants of urban growth in the study area are the establishment of educational institutions and administrative functions which serve as growth factors/growth poles, development of large-scale public housing estates, and uncontrolled population increase. The study therefore recommends that the establishment of public institutions and development of large-scale housing estates should be dispersed, rather than clustered. The need to develop and implement physical plans and other workable measures to checkmate the rapid rate of population increase in the study area is also suggested.

REFERENCES

- [1] Arbury, J. (2005). From Urban Sprawl to Compact City – An analysis of urban growth management in Auckland. published thesis. University of Auckland in Geography and Environmental Science.
- [2] Bhatta. B. (2010). Causes and Consequences of Urban Growth and Sprawl. Analysis of Urban Growth and Sprawl from Remote Sensing Data. Berlin. Germany.
- [3] Brueckner, J. K. (2000). Urban sprawl: Diagnosis and remedies. International Regional Science Review 23, 71-160.
- [4] Bruegmann, R (2005). Sprawl: A Compact History, USA: The University of Chicago Press
- [5] Claudia M.V& Sandra O& Sergio C.O& Jorge R. (2019). Land Use/Land Cover Change Detection and Urban Sprawl Analysis. Spatial Modeling in GIS and R for Earth and Environmental Sciences
- [6] Daramola, A., & Ibem, E. O. (2010). Urban Environmental Problems in Nigeria: Implications for Sustainable Development. Journal of Sustainable Development in Africa .12(1).

- [7] Elkin, T., McLaren, D., and Hillman, M. (1991). *Reviving the City: towards sustainable urban development*. Friends of the Earth. London.
- [8] European Environment Agency (EEA) (2006). *Urban Sprawl in Europe, the Ignored Challenge*. European Commission: Joint Research Center. 23, 5– 24.
- [9] Ewing, R. (1994). *Characteristics, Causes and Effects of Sprawl, A literature Review*. Environmental and Urban Issues. 1-15.
- [10] Foubert, E. H (2012). *Human geography: people, place, and culture*. Murphy, Alexander B.; De Blij, Harm J. (10th ed.). Hoboken: Wiley. p. 560. ISBN 978-1118018699. OCLC 752286985.
- [11] Gomez-Antonio, M., Hortas-Rico, M., Li, L., (2014). *The Causes of Urban Sprawl in Spanish Urban Areas: A Spatial Approach (No-1402)*. Universidade de Vigo, GEN-Governance and Economics Research Network.
- [12] Guite, L. T. S. (2019). *Assessment of urban sprawl in Bathinda city, India*. Journal of Urban Management, 8(2), 195–205. <https://doi.org/10.1016/j.jum.2018.12.002>
- [13] Habibia, S., and Asadib, N. (2011). *Causes, results and methods of controlling urban sprawl*. International Conference on Green Buildings and Sustainable Cities. Procedia Engineering. 21, 133 – 141.
- [14] Idowu O.O, Bako I. A, Ohadugha B. C, Abdulyekeen O. A and Raheem A. W (2017). *Growth and Challenges of Urban Sprawl in Suleja, Niger State*. International Journal of Architecture and Environment 7(1).
- [15] Longley, P., & Batty, M., & Chin, N. (2002). *Sprawling Cities and Transport: preliminary findings from Bristol, UK*. As part of the Fifth Framework Programme. 1-24.
- [16] Maier, G., & Franz, G., & Schrock, P. (2006). *Urban Sprawl: How Useful Is This Concept?*. Working paper. Vienna University of Economics and Business Administration. Vienna, Austria.
- [17] Mosammam, H. M., Nia, J. T., Khani, H., Teymouri, A., & Kazemi, M. (2017). *Monitoring land use change and measuring urban sprawl based on its spatial forms*. The Egyptian Journal of Remote Sensing and Space Science, 20(1), 103–116. <https://doi.org/10.1016/j.ejrs.2016.08.002>
- [18] Nechyba, T. J and Walsh, R. P. (2004) "Urban Sprawl", *Journal of Economic Perspectives*, S. 18, s. 177-200.
- [19] Nnaemeka-Okeke, R. (2016). *Urban Sprawl and Sustainable City Development in Nigeria*. Journal of Ecological Engineering, 17(2), 1–11. <https://doi.org/10.12911/22998993/62277>
- [20] Olujimi, J. (2009). *Evolving a Planning Strategy for Managing Urban Sprawl in Nigeria*. Journal of Human Ecology, 25(3): 201-208
- [21] Omole, F.K (2000); *Urban Renewal Process Issues and Strategies*; Concept Books and Publication Company Nig. Limited, Lagos, Nigeria.
- [22] Pendall, R. (1999). *Do Land Use Controls Cause Sprawl?*. Environment and Planning. 26 (4), 555-571.
- [23] Sudhira, H. (2008). *Studies on Urban Sprawl and Spatial Planning Support System for Bangalore, India*. Published doctorate thesis, Indian Institute of Science Department of Management Studies.
- [24] Sudhira, H., & Ramachandran, T., & Jagadish, K. (2004). *Urban sprawl: metrics, dynamics and modeling using GIS*. International Journal of Applied Earth Observation and Geoinformation. 5, 29–39.
- [25] Usman, V. A., Makinde, E. O., & Salami, A. T. (2018). *Geospatial Assessment of the Impact of Urban Sprawl in Akure, Southwestern Nigeria*. Journal of Geoscience and Environment Protection, 6(4), 720–726. <https://doi.org/10.4236/gep.2018.64008>
- [26] Wassmer, R. W. (2002). *An economic perspective on urban sprawl*. Working Paper for the California Senate Office of Research: 1-21.