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Research Article

EXISTING CONDITIONS OF PHYSICAL DEVELOPMENT IN AWKA CAPITAL TERRITORY, ANAMBRA STATE NIGERIA; A CALL FOR REDIRECTION TO ACHIEVE SUSTAINABLE DEVELOPMENT

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Abstract

Persistent attempts to circumvent Physical Planning Administration and policy in Awka Capital Territory have resulted in widespread manipulation by developers and some development control stakeholders, raising serious concerns about the state of physical development in the area. This has manifested in incompatible land uses, poor compliance with basic planning standards such as setbacks, and the proliferation of illegal and informal developments. The existence of dual planning authorities performing overlapping functions has further intensified conflicts of interest and inconsistent enforcement actions. The ***goal*** *of this study is to assess the existing conditions of physical development in Awka Capital Territory and propose redirection strategies toward sustainable urban development. The* ***objectives*** *are to examine the effectiveness of current Physical Planning Administration and policy implementation, identify the causes and impacts of planning deviations, and evaluate stakeholder roles in development control across the six Local Planning Authorities. A survey research design was adopted. Quota sampling was used to administer questionnaires to developers, while interviews were conducted with heads of planning authorities, environmental and waste management agencies, political representatives, and town union leaders. Data collected was analyzed to test the study's hypotheses. Findings reveal significant deviation from established planning norms due to improper policy application, resulting in uncoordinated infrastructure development and chaotic land-use patterns. The study provides insights to guide government decision-making and recommends effective redirection of physical planning to achieve a functional, orderly, and sustainable urban environment.*

Keywords: Physical Planning, Physical Development, Administration, Policy, Environment.

1. Introduction

We observe, as noted by Wapwera et al. (2023) in their study on Physical Planning Administrative Structures: Impacts and Implications for Urban Development and Management in Jos, that urbanisation in the context of physical planning is shaped by transformation processes within urban development and management systems, mediated through planning institutions and their guiding policies. These institutions comprise established norms, values, and beliefs designed to achieve planning targets, while the administrative framework provides the connective mechanism that integrates subsystems and facilitates the flow of information across them. Together, these elements constitute the functional structure of the urban centre.

Despite the central role of planning institutions and administrative frameworks in guiding urban growth, many contemporary urban centres are increasingly confronted with complex challenges that undermine their livability (Adejugbagbe and Ojo, 2022). These challenges largely stem from intensified

human activities aimed at modifying natural systems to enhance living standards, often without adequate regulatory oversight. Among the critical factors influencing sustainable urban development, access to land remains paramount. The persistent shortage of affordable land has been identified as a major driver of city decay and the deterioration of urban infrastructure, as available land is frequently scarce, expensive, and largely inaccessible to low-income populations (UN-Habitat, 2014). Given that land is fixed and limited in supply, ineffective land management poses significant risks to orderly urban development, as virtually all human activities are spatially grounded.

We contend that in the absence of effective administrative control, urban growth being largely irreversible in scale becomes susceptible to distortion, sprawl, and infrastructural strain. This underscores the necessity of a strong and coherent administrative framework capable of directing urban expansion and enforcing development control. As argued by Alom et al. (2025), the human propensity to exceed defined planning boundaries in the absence of regulatory checks often results in undesirable urban conditions. However, while existing studies have extensively discussed the general impacts of weak planning institutions on urban development, there remains a notable gap in empirical, location-specific analyses that examine how administrative and policy failures translate into unregulated urban growth at the metropolitan scale.

This gap is particularly evident in Anambra State, Nigeria, where rapid urban development is occurring with limited institutional capacity for effective control. In the Awka Capital Territory especially, development activities have intensified daily without a corresponding strengthening of regulatory mechanisms. This situation has been attributed to weak policy frameworks, administrative lacunae, and political interference in planning processes, making the Awka Capital Territory the most adversely affected Local Planning Authority in the state (Alom et al., 2024). However, systematic assessments that link these administrative weaknesses to their observable implications for urban development and land-use management in the area remain scarce.

Against this background, this study seeks to examine the role of physical planning administrative frameworks in shaping urban development patterns within the Awka Capital Territory. Specifically, the **goal** of this study is to assess the existing conditions of physical development in Awka Capital Territory and propose redirection strategies toward sustainable urban development. By doing so, the study contributes to the growing body of urban planning literature and provides evidence-based insights to inform policy reforms and strengthen urban governance in rapidly growing Nigerian cities.

2. Literature Review

Physical development refers to the spatial manifestation of human activities through the interaction of different land uses within a given environment or ecosystem. It reflects how residential, commercial, institutional, industrial, and recreational uses are organised and managed to achieve functional efficiency and environmental sustainability. In rapidly urbanising regions, the balance among these land uses is often disrupted due to population pressure, weak planning control, and inadequate infrastructure provision. Such imbalances frequently result in land-use conflicts, environmental degradation, and declining urban quality. Anambra State, identified as one of the major commercial hubs in South-Eastern Nigeria and Africa at large, has experienced sustained population influx driven by economic opportunities and administrative importance (Alom et al., 2023). This demographic pressure has translated into increased demand for land, housing, and services across the state, particularly within the Awka Capital Territory. Although Awka was

designated primarily as an administrative city, its physical development trajectory increasingly reflects characteristics of a commercial and educational hub rather than a well-structured capital city.

The presence of multiple institutions of higher learning and the seat of government in Awka Capital Territory was expected to foster planned development aligned with its administrative function. However, the rapid influx of students and related service providers has significantly altered land-use decisions and urban form. The need to accommodate student housing, commercial activities, and informal services has intensified competition for space and exerted pressure on existing infrastructure. This situation has resulted in a persistent shortage of residential and commercial buildings, thereby triggering continuous construction activities within and around the capital territory. The speed at which buildings are emerging is alarming, as development is rapidly exhausting available land without corresponding attention to planning standards. Consequently, informal settlements, shanties, and environmentally degrading developments have proliferated, despite the existence of a statutory planning authority, the Awka Capital Territory Development Authority, mandated to regulate physical development in the area.

The challenges observed in Awka Capital Territory are consistent with findings from other Nigerian cities where weak development control mechanisms prevail. Oduwaye (2009), in a study of metropolitan Lagos, identified key physical and environmental challenges including conflicting land uses, poor urban aesthetics, high building density, informal settlement encroachment, infrastructure inadequacies, traffic congestion, flooding, pollution, and building collapse. These problems were found to be more pronounced in areas inhabited by low-income populations and ecologically vulnerable zones. Although Awka Capital Territory has recorded relatively fewer cases of building collapse compared to Lagos, it exhibits significant deficiencies in land-use coordination and infrastructure provision. Drainage problems are widespread, as stormwater and wastewater are frequently discharged onto roadways instead of properly designed drainage channels. These conditions reflect ineffective development control and weak enforcement of planning regulations, which undermine the functionality and safety of the urban environment.

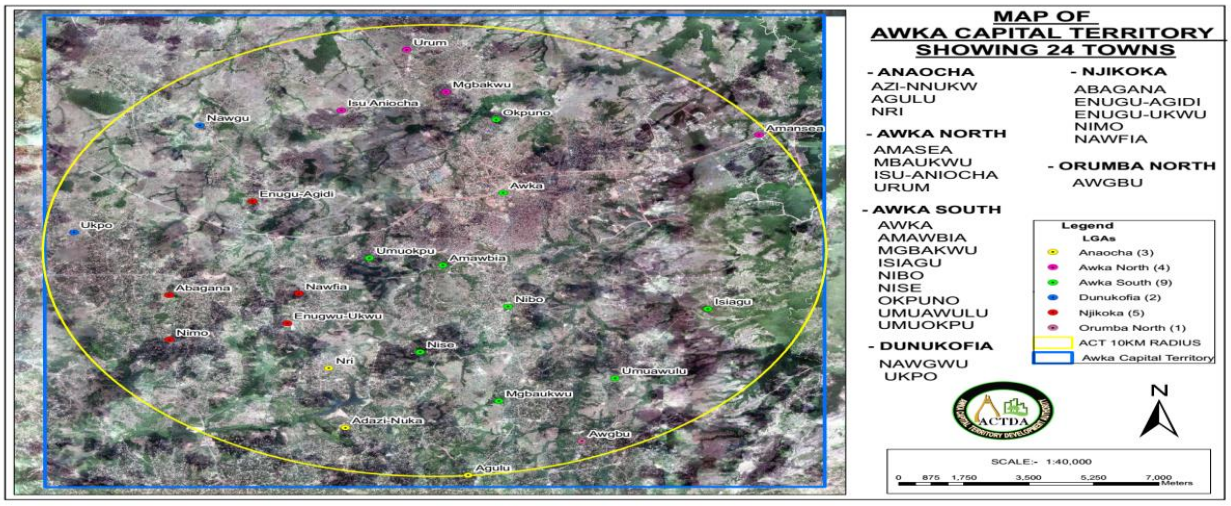
Rural–urban migration remains a major driver of congestion and uncoordinated urban expansion in Nigerian cities. Vivian et al. (2013) observed that rapid population growth has caused towns and cities to sprawl into surrounding rural areas, overstretching infrastructure and public services. This pattern of growth often leads to unplanned land-use arrangements, inefficient road networks, traffic congestion, poor waste management, and uneven distribution of socio-physical infrastructure. Such outcomes are evident in Awka Capital Territory, where uncontrolled development has gradually transformed the city from its intended administrative role into a mixed-use urban space dominated by commercial activities. Student-driven demand has further accelerated this transformation, eroding planning intentions and creating a cityscape that no longer reflects the status and expectations of a state capital.

Uncontrolled physical development has been shown to generate undesirable environmental conditions that negatively affect urban livability and socio-economic wellbeing. Yenusa (2015) highlighted the prevalence of dysfunctional land-use patterns in Kaduna metropolis, characterised by traffic congestion, informal commercial activities, poor circulation systems, and spatial chaos. These conditions reduce urban efficiency, discourage tourism, and diminish overall city attractiveness. Similar conditions are increasingly evident in Awka Capital Territory, where residents and visitors express dissatisfaction with the city's physical outlook. Expectations of a well-organised administrative capital comparable to other major cities in Anambra State, such as Onitsha and Nnewi, are often unmet due to haphazard development patterns and poor urban aesthetics.

Effective physical planning relies on coherent regulatory frameworks, professional enforcement, and alignment with national planning laws. Olajuyigbe and Rotowa (2011), in their study of Ondo State, noted that many urban centres suffer from disjointed and uncoordinated development due to the absence of comprehensive physical plans, weak standards, and ineffective regulation. This has resulted in infrastructure decay, unreliable services, and general urban disorder. In Awka Capital Territory, planning regulations are often inconsistent with national laws, and enforcement is frequently carried out by personnel lacking professional training. These challenges are compounded by unethical practices and personal interests ("stomach infrastructure"), which undermine compliance and distort development outcomes. As a result, planning authorities struggle to effectively guide development, contributing to the uncoordinated growth and environmental challenges observed in the area.

The reviewed literature demonstrates that uncontrolled urban development, weak planning institutions, population pressure, and ineffective development control are persistent challenges across Nigerian cities. However, while several studies have examined these issues in major metropolitan areas, there is limited empirical evidence focusing on emerging state capitals such as Awka, where administrative significance, educational institutions, and rapid urbanisation intersect. In particular, the specific role of physical planning administrative frameworks in shaping land-use outcomes and development control effectiveness in Awka Capital Territory remains underexplored. This study therefore seeks to address this gap by critically assessing the existing conditions of physical development in Awka Capital Territory and propose redirection strategies toward sustainable urban development.

3. Materials And Methods



Map of Awka Capital Territory Showing 10 kilometer radius
Source: Awka Capital Development Authority GIS section 2023

The study area, Awka Capital Territory, was stratified into six (6) Local Government Areas to ensure adequate representation and coverage of the entire area. These Local Government Areas include Anaocha, Awka North, Awka South, Dunukofia, Njikoka, and Orumba North. Stratification was employed to enhance the reliability of the findings by capturing variations in development activities across the different Local Government Areas. Respondents were selected from each stratum to ensure that all sections of the study area were fairly represented.

The study adopted a survey research design, which was considered appropriate for obtaining quantitative data from a large population. Data was collected using a structured questionnaire designed to elicit relevant information from respondents. The questionnaire was structured into sections A and B for Biodata of Respondents and Existing conditions of physical development of Awka Capital Territory respectively. The questionnaire was administered to property developers operating within the Awka Capital Territory. A total of four hundred (400) questionnaires were distributed across the six Local Government Areas that constitute the Awka Capital Territory, and all were utilized for the study. The allocation of questionnaires to each Local Government Area was based on their respective percentage coverage within the 10-kilometre radius designated as the Awka Capital Territory. Awka South Local Government Area received the highest number of questionnaires (221), followed by Anaocha (96), Njikoka (62), Awka North (12), Dunukofia (7), and Orumba North (2). The completed questionnaires were collated and analyzed using Principal Component Analysis (PCA). PCA was employed to reduce the large number of observed variables into a smaller set of underlying components and to identify the dominant factors influencing physical development in the study area. This technique was considered appropriate due to its ability to explain variance in multivariate data and enhance interpretability of complex relationships among variables. In addition to the questionnaire survey, key informant interviews were conducted with major stakeholders in physical planning and environmental management. These included three former Directors and the present Director of the Ministry of Lands, Survey and Town Planning, Awka; the Managing Director/Chief Executive Officer and Executive Secretary of the Awka Capital Territory Development Authority (ACTDA); and the Managing Director/Chief Executive Officer, General Manager, Development Control Officers, and Field Assistant Development Control Officers of the Anambra State Physical Planning Board (ANSPPB). These stakeholders were selected due to their statutory responsibilities and central roles in physical planning and development control in Anambra State.

4. Results

Initial Eigenvalues: The focus here is on the *Initial Eigenvalues* and the *Extracted Sums of Squared Loadings*. The criterion used for determining the number of components or factors to retain is the Kaiser criterion, which specifies that only components with eigenvalues greater than 1 should be considered significant. In this analysis, the first component recorded an eigenvalue of 3.628 (>1), the second 2.763 (>1), the third 2.389 (>1), the fourth 1.981 (>1), the fifth 1.845 (>1), the sixth 1.571 (>1), the seventh 1.542 (>1), the eighth 1.474 (>1), the ninth 1.438 (>1), the tenth 1.387 (>1), the eleventh 1.315 (>1), the twelfth 1.307 (>1), the thirteenth 1.235 (>1), the fourteenth 1.179 (>1), the fifteenth 1.164 (>1), the sixteenth 1.118 (>1), the seventeenth 1.102 (>1), the eighteenth 1.067 (>1), the nineteenth 1.025 (>1), and the twentieth 1.001 (>1). However, the twenty-first component had an eigenvalue of 0.968 (<1). Based on this criterion, twenty components met the requirement of having eigenvalues greater than 1 and were therefore retained. Thus, the specified set of 50 variables with 400 observations accounted for twenty significant components

Extracted Sums of Squared Loadings: The *Extracted Sums of Squared Loadings* (percentage of variance explained) indicate the proportion of total variance accounted for by each retained component. The first factor explained 7.256% of the total variance in the dataset. The second factor accounted for 5.527%, the third 4.778%, the fourth 3.961%, the fifth 3.690%, the sixth 3.142%, the seventh 3.083%, the eighth 2.948%, the ninth 2.876%, the tenth 2.774%, the eleventh 2.631%, the twelfth 2.614%, the thirteenth

2.470%, the fourteenth 2.359%, the fifteenth 2.328%, the sixteenth 2.236%, the seventeenth 2.205%, the eighteenth 2.135%, the nineteenth 2.050%, and the twentieth 2.003%. Based on these results, twenty (20) components were considered sufficiently significant in representing the characteristics measured by the fifty variables across the 400 observations.

The interpretation further focused on identifying the variables most strongly associated with each component, those with loadings farthest from zero, whether positive or negative. The determination of what constituted a "large" or "small" loading involved a degree of subjectivity; however, in this study, loadings greater than 0.40 were considered significant. Only these substantial loadings were retained for interpretation, while smaller loadings were suppressed. Through this process, the fifty variables measured across 400 observations were effectively reduced and summarized into twenty principal components.

Principal Component Analysis (PCA) was conducted to reduce the dimensionality of fifty variables measured across four hundred observations, while identifying the key underlying dimensions influencing physical development in Awka Capital Territory. Twenty components were extracted based on eigenvalues greater than one, collectively accounting for the significant variance in the dataset. The components were interpreted based on variable loadings above 0.4, reflecting meaningful contributions to each dimension. The interpretations for each principal component are presented below.

Urban Development Constraint Index (PCA1): PCA1 exhibited strong loadings on five variables: existing condition of recreational facilities, uncoordinated land uses, traffic condition, building collapse, and road condition. The component increases with rising levels of these factors, indicating that they vary together. Among these, traffic conditions had the highest loading (r = 0.785), making PCA1 primarily a measure of traffic condition. This component reflects the influence of transportation and infrastructure on physical development in the territory, where traffic conditions significantly affect urban functionality and accessibility.

Urban Degradation Index (PCA2): PCA2 loaded strongly on four variables: informal industry, arbitrary change of land use, road verge encroachment, and urban shabby scores. The component reflects the simultaneous variation of these factors, with urban shabby recording the highest loading (r = 0.732). PCA2 represents the level of informal land and industrial activity and its impact on urban aesthetics and physical development. Poorly maintained areas with arbitrary land-use changes directly affect the organization and quality of urban development.

Urban Service Inadequacy (PCA3): PCA3 loaded on scarcity of buildings and public transport, increasing as both factors rise. Public transport had the highest correlation (r = 0.734), making PCA3 primarily a measure of public transport adequacy. This component highlights the interplay between housing availability and transportation infrastructure, emphasizing the critical role of public transport in shaping urban development patterns.

Social Infrastructure Quality (PCA4): PCA4 loaded on roof condition, proper circulation, and health facilities, with health facilities showing the highest loading (r = 0.719). This component represents an infrastructure and service adequacy dimension, demonstrating that proper circulation, building quality, and health facility provision collectively influence sustainable physical development.

Environmental and Spatial Disorder (PCA5): PCA5 was associated with disjointed settlements, scarcity of buildings, and waste disposal, with waste disposal being dominant (r = 0.747). This component represents a settlement and environmental management dimension, highlighting the impact of settlement patterns, housing scarcity, and waste management practices on urban development.

Environmental Quality (PCA6): PCA6 loaded on water pollution and waste dumpsites, with water pollution as the dominant variable (r = 0.759). This component reflects environmental pollution, indicating that poor water quality and unmanaged waste disposal have significant consequences for sustainable physical development.

Civic and Drainage Infrastructure (PCA7): PCA7 loaded on proper circulation, proper drainage system, and civic centres, with proper drainage system as the dominant contributor (r = 0.773). This component highlights the importance of functional infrastructure and civic amenities in facilitating urban development, with drainage systems playing a critical role in sustainability.

Informal Urban Pressures (PCA8): PCA8 loaded on informal commercial activities and overcrowding, with informal commercial activities being dominant (r = 0.694). This component represents urban commercial pressure, demonstrating how unregulated commercial activities combined with high population density affect physical development and urban livability.

Mobility Constraints (PCA9): PCA9 loaded on winding roads and congestion, with congestion having the highest loading (r = 0.761). This component reflects traffic infrastructure and mobility pressures, where road geometry and traffic congestion influence accessibility, travel efficiency, and urban functionality.

Environmental and Safety Stressors (PCA10): PCA10 loaded on security and air pollution, with air pollution being dominant (r = 0.761). This component represents an environmental and safety dimension, emphasizing how poor air quality and security challenges jointly affect urban development and livability.

Urban Density and Cityscape (PCA11): PCA11 loaded on high building density and cityscape quality, with building density showing the highest loading (r = 0.812). This component reflects urban density and the built environment, indicating that concentrated development shapes both the vertical growth and the aesthetic quality of the cityscape.

Hydrological Risk (PCA12): PCA12 loaded solely on flooding areas (r = 0.726). This component represents flood risk, highlighting the influence of topography, impervious surfaces, and hydrological factors on physical development and the need for effective drainage and flood management.

Urban Accessibility and Aesthetic Quality (PCA13): PCA13 loaded on secondary roads, environmental aesthetic quality, and access roads, with environmental aesthetics dominant (r = 0.653). This component represents urban infrastructure and visual quality, demonstrating that well-maintained road networks and aesthetic considerations shape sustainable physical development.

Land Use Compatibility (PCA14): PCA14 loaded solely on compactible land uses (r = 0.807). This component represents land-use integration, emphasizing the importance of compatible and well-coordinated land uses for organized and efficient urban development.

Urban Mobility Corridors (PCA15): PCA15 loaded on primary roads and building setbacks, with primary roads dominant (r = 0.787). This component represents transportation infrastructure and regulatory compliance, highlighting the role of major road networks in shaping urban accessibility and settlement patterns.

Environmental Health Risk (PCA16): PCA16 loaded on soil erosion and insanitary conditions, with insanitary conditions dominant (r = 0.733). This component reflects environmental degradation, indicating that poor sanitation and soil instability impact sustainable urban development.

Road setbacks (PCA17): PCA17 loaded solely on road setbacks (r = 0.826). This component represents urban planning regulation, emphasizing the importance of building orientation and spatial separation between structures and roads for orderly urban growth.

Bus-stops (PCA18): PCA18 loaded solely on bus-stops (r = 0.748). This component represents public transport infrastructure, highlighting the critical role of bus-stop provision in facilitating urban mobility and connectivity.

Health-Driven Infrastructure (PCA19): PCA19 loaded on building walls and medical services, with medical services dominant (r = 0.632). This component reflects building quality and healthcare infrastructure, demonstrating the impact of structural quality and access to health facilities on physical development.

Slums (PCA20): PCA20 loaded solely on slums (r = 0.753). This component represents socio-environmental deprivation, emphasizing how informal settlements characterized by poor living conditions, overcrowding, and lack of services impact sustainable urban development.

The twenty extracted principal components collectively capture the multidimensional factors influencing physical development in Awka Capital Territory, including transportation, environmental quality, urban density, infrastructure adequacy, land-use integration, and socio-economic conditions. Each component identifies a distinct dimension that contributes to shaping the urban environment, providing a robust framework for targeted planning, policy formulation, and sustainable urban development interventions.

Table 1: Summary of Principal Components and Their Dominant Variables

Thematic Dimension	Key Variables	Dominant Loading (r)	Interpretation
Urban Development Constraint Index	Recreational facilities, Uncoordinated land uses, Traffic condition, Building collapse, Road condition	0.785 (Traffic condition)	Traffic and infrastructure dimension; traffic condition strongly influences physical development.

Thematic Dimension	Key Variables	Dominant Loading (r)	Interpretation
Urban Degradation Index	Informal industry, Arbitrary change of use, Road verge encroachment, Urban shabby	0.732 (Urban shabby)	Reflects informal land use and urban aesthetics; poor maintenance and unregulated activities affect urban quality.
Urban Service Inadequacy	Scarcity of buildings, Public transport	0.734 (Public transport)	Housing and transport adequacy; public transport availability strongly influences urban accessibility.
Social Infrastructure Quality	Roof condition, Proper circulation, Health facilities	0.719 (Health facilities)	Infrastructure and service adequacy; health facilities significantly impact sustainable development.
Environmental and Spatial Disorder	Disjointed settlements, Scarcity of buildings, Waste disposal	0.747 (Waste disposal)	Settlement patterns and environmental management; waste disposal is critical for urban sustainability.
Environmental Quality	Water pollution, Waste dumpsites	0.759 (Water pollution)	Environmental pollution dimension; water pollution dominates the impact on physical development.
Civic and Drainage Infrastructure	Proper circulation, Proper drainage system, Civic centres	0.773 (Proper drainage system)	Infrastructure and civic amenities; drainage system is vital for sustainable development.
Informal Urban Pressures	Informal commercial activities, Overcrowding	0.694 (Informal commercial activities)	Urban commercial pressure; informal commercial activities and overcrowding impact livability.
Mobility Constraints	Winding roads, Congestion	0.761 (Congestion)	Traffic infrastructure and mobility; congestion is the main constraint on accessibility.
Environmental and Safety Stressors	Security, Air pollution	0.761 (Air pollution)	Environmental and safety dimension; poor air quality affects livability.
Urban Density and Cityscape	High building density, Cityscape quality	0.812 (High building density)	`Urban density and built environment; density shapes vertical growth and cityscape aesthetics.
Hydrological Risk	Flooding areas	0.726	Flood risk; flood-prone zones influence urban planning and drainage requirements.
Urban Accessibility and Aesthetic Quality	Secondary roads, Environmental aesthetic quality, Access roads	0.653 (Environmental aesthetic quality)	Infrastructure and visual quality; roads and aesthetics affect urban development.

Thematic Dimension	Key Variables	Dominant Loading (r)	Interpretation
Land Use Compatibility	Compactible land uses	0.807	Land-use integration; compatible land uses promote organized urban growth.
Urban Mobility Corridors	Primary roads, Building setbacks	0.787 (Primary roads)	Transportation infrastructure and regulation; primary roads drive accessibility.
Environmental Health Risk	Soil erosion, Insanitary conditions	0.733 (Insanitary conditions)	Environmental degradation; poor sanitation impacts development.
Road setbacks	Road setbacks	0.826	Urban planning regulation; proper setbacks ensure functional circulation and organized growth.
Bus-stops	Bus-stops	0.748	Public transport infrastructure; bus-stops enhance urban mobility and connectivity.
Health-Driven Infrastructure	Building walls, Medical services	0.632 (Medical services)	Building quality and healthcare; medical service availability influences development.
Slums	Slums	0.753	Socio-environmental deprivation; slum prevalence affects livability and sustainable development.

5. Discussion

The Principal Component Analysis (PCA) conducted in this study distilled fifty variables across four hundred observations into twenty interpretable components, collectively capturing the multidimensional factors influencing physical development in Awka Capital Territory. The results highlight the interrelated roles of transportation, environmental quality, urban infrastructure, housing patterns, and socio-economic conditions in shaping urban growth and sustainability.

Transportation and Infrastructure: Several principal components (PCA1, PCA9, PCA13, PCA15, PCA18) were dominated by transportation-related variables, underscoring the critical role of mobility and road networks in urban development. PCA1 and PCA9, representing traffic condition, winding roads, and congestion, demonstrate that inefficient transport systems can constrain accessibility, increase travel time, and adversely impact urban functionality. PCA15 and PCA18 further highlight the importance of primary roads and bus-stop infrastructure in facilitating connectivity, emphasizing that well-planned transport networks are essential for promoting efficient movement and integrating urban spaces.

Environmental Quality: Environmental quality emerged as a key theme, represented by PCA6, PCA10, PCA12, and PCA16. Water pollution, waste management, air quality, flooding, soil erosion, and insanitary

conditions were identified as major determinants of urban sustainability. PCA6 and PCA16 indicate that poor sanitation and water pollution not only compromise human health but also affect the functionality of physical infrastructure. PCA12 highlights flood-prone areas as critical constraints on physical development, while PCA10 demonstrates that air pollution impacts livability. Collectively, these findings suggest that environmental management is a prerequisite for sustainable urban growth, reinforcing the need for integrated environmental planning and monitoring frameworks. This coincides with the assertions received from key informant interviews.

Housing and Settlement Patterns: Housing conditions and settlement structures were captured by PCA3, PCA5, PCA11, and PCA20. Scarcity of buildings, high-density development, slums, and disjointed settlements underscore the complexity of residential patterns in Awka Capital Territory. PCA20, representing slums, reflects the socio-environmental challenges of informal settlements, including overcrowding, poor sanitation, and lack of secure tenure. PCA11 and PCA5 further show that building density and settlement patterns directly influence urban form, property values, and service provision. These results suggest that housing policies and spatial planning interventions are critical to improving livability, reducing informal settlements, and enhancing the resilience of urban communities.

Land Use, Urban Aesthetics, and Planning Regulations: PCA2, PCA4, PCA8, PCA13, PCA14, and PCA17 highlight the influence of land use, urban aesthetics, and regulatory compliance on physical development. Uncoordinated land uses, informal industries, urban shabby conditions, and compactible land-use patterns were significant contributors. PCA17, emphasizing road setbacks, and PCA14, reflecting land-use integration, demonstrate that adherence to planning regulations is essential for orderly growth. PCA13 and PCA8 further illustrate that informal commercial activities and poor environmental aesthetics compromise urban functionality. These findings reinforce the importance of enforcing zoning regulations, promoting integrated land-use planning, and maintaining urban visual quality as part of sustainable urban development strategies. This echoes the responses from the interview results of the stakeholders.

Infrastructure and Services: Several components (PCA4, PCA7, PCA19) were dominated by infrastructure and service-related variables, including health facilities, proper circulation, drainage systems, and building quality. PCA4 and PCA7 indicate that infrastructure adequacy, including health facilities and civic amenities, is crucial for sustainable urban development. PCA19 highlights that access to medical services, and the quality of building walls contribute to both the safety and livability of the urban environment. These results emphasize that the provision and maintenance of essential services and infrastructure significantly shape urban resilience and development outcomes.

Integrated Insights: Overall, the PCA results suggest that physical development in Awka Capital Territory is a multifaceted phenomenon, driven by interdependent factors across transportation, environmental quality, housing, land use, and service provision. Traffic conditions, environmental degradation, informal settlements, and infrastructure inadequacies emerge as key limiting factors, while proper road networks, land-use planning, environmental management, and service provision act as enablers of sustainable development. The extraction of twenty principal components provides a robust framework for prioritizing urban interventions, guiding policy formulation, and targeting investment in areas that will maximize positive development outcomes.

The thematic grouping of the components further illustrates that sustainable urban development requires an integrated approach, where transportation planning, environmental protection, housing policy, and regulatory enforcement operate synergistically. Addressing the identified challenges can enhance accessibility, livability, and resilience in Awka Capital Territory

6. Conclusion

This study reveals significant variations in the existing conditions of physical development across Awka Capital Territory. The overall assessment indicates that the state of physical development is largely inadequate and characterized by disorderly land-use patterns, infrastructural deficiencies, environmental degradation, and weak regulatory enforcement. The cumulative effect of these conditions presents serious challenges to sustainable urban growth and livability within the Capital Territory.

The findings from the Principal Component Analysis demonstrate that critical dimensions of urban development, including transportation systems, environmental quality, housing conditions, infrastructure provision, land-use compatibility, and socio-economic pressures, are interrelated and collectively shape the current urban form of Awka. Key problem areas identified include adverse traffic conditions, urban shabbiness, ineffective public transport systems, inadequate health facilities, poor waste disposal practices, water pollution, deficient drainage systems, widespread informal commercial activities, congestion, air pollution, high building density, flooding, poor environmental aesthetics, incompatible land uses, weak enforcement of setbacks, insufficient bus-stop infrastructure, and the proliferation of slums.

Traffic conditions in Awka Capital Territory are particularly concerning. The road network in many areas does not adequately support safe steering, stopping, and maneuvering, thereby compromising mobility and increasing the risk of accidents. Congestion, poor road design, and encroachment on roadways further reduce efficiency and accessibility. Given that transportation infrastructure is a fundamental driver of urban development, these deficiencies significantly constrain economic productivity and spatial integration.

Urban aesthetics and environmental management also present major concerns. The Capital Territory exhibits widespread physical deterioration, untidy surroundings, and poorly maintained public spaces. Waste management systems appear ineffective, with unclear institutional coordination and inadequate infrastructure for collection, recycling, and disposal. The persistence of open dumping and indiscriminate waste disposal reflects systemic weaknesses in environmental governance and planning implementation.

Water supply and sanitation conditions further compound these challenges. Scarcity of potable water has compelled many residents to depend on unsafe sources, including shallow wells and untreated alternatives. In some areas, geological conditions limit borehole development, intensifying reliance on potentially contaminated water. This situation poses serious public health risks and undermines urban resilience. Similarly, inadequate drainage infrastructure across much of the Capital Territory contributes to frequent surface runoff during rainfall, leading to flooding, erosion, and, in some cases, loss of lives and property. Past incidents in areas such as Ring Road Awka and Amawbia underscore the urgent need for comprehensive drainage planning and flood mitigation strategies.

The proliferation of informal commercial activities represents another major structural challenge. Street trading, unauthorized land-use conversion, encroachment on setbacks, on-street parking, and roadside advertising are widespread. While the informal sector plays an important role in livelihood generation, its largely unregulated operation has contributed to congestion, environmental degradation, and compromised

urban order. Weak enforcement of planning regulations, particularly concerning road setbacks and land-use compatibility, has further exacerbated spatial disorder within the Capital Territory.

The presence of slums and high-density, poorly serviced settlements highlights persistent housing deficits and socio-economic inequalities. Overcrowding, inadequate infrastructure, insecure tenure, and poor sanitation within informal settlements undermine the quality of life and limit sustainable urban transformation. Addressing these conditions requires integrated housing policies, urban renewal strategies, and inclusive planning frameworks.

Overall, the study concludes that physical development in Awka Capital Territory is constrained by systemic weaknesses in infrastructure provision, environmental management, land-use control, and regulatory enforcement. Sustainable transformation of the Capital Territory will require:

- Strengthening institutional capacity for urban planning and development control.
- Upgrading transportation infrastructure and improving traffic management systems.
- Implementing integrated waste management and sanitation reforms.
- Expanding potable water supply and modern drainage infrastructure.
- Enforcing land-use regulations and road setback compliance.
- Formalizing and properly integrating informal commercial activities; and
- Promoting inclusive housing and slum upgrading programs.

An integrated, multi-sectoral planning approach, anchored in strong governance, environmental sustainability, and participatory urban management, is essential to reposition Awka Capital Territory toward a more functional, resilient, and livable urban future

7. Recommendations

In view of the findings of this study, the following recommendations are proposed to address the deficiencies in physical development and promote sustainable urban growth in Awka Capital Territory.

Strengthening Development Control and Layout Approval: All physical developments within Awka Capital Territory should strictly adhere to approved layout plans. No development should commence without prior approval from the appropriate physical planning authority. Strengthening development control mechanisms will enhance monitoring, reduce arbitrary land-use changes, prevent encroachments, and minimize violations of building regulations. Effective enforcement of approved layouts will significantly improve spatial order and urban functionality.

Full Implementation of Planning Laws and Institutional Reform; The complete implementation of the Anambra State Physical Planning Law (2013) and its amendments is imperative. Political interference in planning decisions should be eliminated to ensure professional, transparent, and legally compliant urban management. Where discrepancies exist between customary land practices and statutory regulations, statutory provisions should prevail in order to maintain planning consistency and urban order.

Furthermore, Local Planning Authorities should be fully inaugurated and empowered to complement the Anambra State Physical Planning Board (ANSPPB). Decentralizing planning administration will

improve monitoring efficiency, strengthen grassroots enforcement, and enhance compliance with development standards.

Integrated Waste Management and Circular Economy Approach: Government should establish strategically located central waste collection points and modern sanitary disposal facilities to address the unsanitary conditions observed across the Capital Territory. However, beyond centralized dumping systems, a more comprehensive waste management framework should be adopted.

The study recommends transitioning from the current linear economic model (collect–use–dispose) to a circular economy approach guided by the waste hierarchy principle. This includes:

- **Reduce**: Minimizing waste generation at source.
- **Reuse**: Encouraging material reuse and extended product life cycles.
- **Recycle**: Promoting source separation and recovery of recyclable materials.

This restorative and regenerative system seeks to maintain products, components, and materials at their highest utility and value, while reducing landfill dependence. Enforcement mechanisms should also ensure that individuals and organizations obstructing drainage channels or utility lines are sanctioned in accordance with the law.

Drainage Improvement and Flood Mitigation: Blocked drainage channels should be immediately cleared, and routine maintenance schedules institutionalized. Comprehensive stormwater management systems should be designed and implemented, especially in flood-prone areas such as Ring Road Awka and Amawbia. Investments in sustainable drainage infrastructure will reduce surface runoff, prevent property damage, and protect lives.

Transportation and Traffic Management Reform: To improve mobility and accessibility, government should rehabilitate deteriorating road networks, enforce road setback regulations, and eliminate encroachments on rights-of-way. Properly designated bus stops should be constructed and maintained to regulate passenger loading and alighting. Traffic management systems, including signage, road markings, and parking controls, should be strengthened to reduce congestion and improve safety.

Comprehensive Land Use Planning: There is an urgent need for comprehensive and enforceable land-use planning across Awka Capital Territory. All organizations occupying land areas of one hectare (10,000 m^2) or more should be required to prepare and submit Operative Development Plans or Layout Plans to the Ministry responsible for Physical Planning for approval. Additionally, markets, schools, hospitals, and other major institutions should be mandated to prepare master plans to guide their spatial development and building projects. This policy will help to:

- Control overcrowding.
- Ensure adequate setbacks and circulation.
- Improve landscape and environmental quality.
- Enhance overall townscape and urban aesthetics.

Regulation and Integration of Informal Activities: While informal commercial activities contribute significantly to livelihoods, their unregulated operation undermines urban order. Government should adopt a formalization and integration strategy by designating properly planned commercial spaces and enforcing setback regulations. This approach will balance economic inclusion with spatial organization and environmental sustainability.

Housing and Slum Upgrading: Targeted housing policies should be implemented to address slum proliferation and high-density settlements. Slum upgrading programs, provision of basic services, and enforcement of minimum building standards will improve living conditions and reduce socio-environmental vulnerabilities.

References

Adejugbagbe, J.A and Ojo, O.O *(2022)* Assessment of Compliance with Physical Planning Standards in the Urban Fringe of Lagos. *Ilaro Journal of Environmental Research and Development vol 6 (1) 38 – 52.*

Alom A.C , Ogbuene B. E, Orji C, and Egbuna O. K (2025) Physical Planning Administration and Policy in Awka Capital Territory, Anambra State, Nigeria: Liveability of the Environment and Avert Potential Future Disasters. *Journal of Engineering Resources Report. vol. 27 (4) 110-122, 2025; Article no.JERR.125538*

Alom A. C, Ogbuene B. E, Orji C, and Egbuna O. K (2024) Evaluation of the Existing Level of Ap plication of Physical Planning Administration and Policy in Awka Capital Territory Anambra State, Nigeria. *Journals of innovations Vol 79 (12) 189-214)*. https://journal-innovations.com/publica tion/2025/79/682811894

Alom, A. C; and Ogbuene, B. E. (2023) Seasonal Incessant Fire Outbreaks in Anambra State; a Case for Concern: Town Planners View. *Environmental Review,* Vol. 9 (2),https://erjournal.net/in dex.php/erjournal/article/view

Gasu, M.B, Ibrahim, R.B, and Yakubu, D.A (2020) An Appraisal of informal commercial activities in Osogbo. Osun State Nigeria Uniosun journal of Engineering and Environmental sciences vol2 (1) 54-64

Oduwaye L. (2009). Challenges of Sustainable Physical Planning and Development in Metropolitan Lagos, *Journal of Sustainable Development, Vol. 2, No. 1*

Olajuyigbe A. E, Rotowa O. O (2011). Optimizing physical planning in the developing countries. A Case Study of Ondo State, Nigeria, *Journal of Sustainable Development 4(4):* (http://www.ccse-net.org/journal/index.php/jsd/article/view/8161)

Vivian, E. L., Kyom, B. C. and Balasom, M. K. (2013). The Nature, Scope and Dimensions of Development Control, Tools and Machineries in Urban Planning In Nigeria. *International Journal of Innovative Environmental Studies Research* 1 (1):48-54.

Wapwera S.D, Wazhi T.T and Azi M.B (2023) Physical Planning Administrative Structures; Impacts and Implication for Urban Development and Its Management. *Journal Urban Studies and Public Administration Vol. 6(1) pp 1-20.* https://www.researchgate.net/publication/366851555