Exploring the Key Factors Influencing Commercial Land Use Decisions in Port Harcourt

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ABSTRACT

Commercial land use expansion has become a defining feature of rapidly urbanizing cities in Nigeria, often reshaping residential neighbourhoods and altering urban spatial structure. Despite this transformation, limited empirical research has examined the key determinants influencing commercial land use decisions at corridor level in Port Harcourt. This study investigates the factors influencing commercial land use decisions along Woji Road (GRA Phase 2) and Peter Odili Road in Port Harcourt, Rivers State. A mixed-methods approach was adopted, combining field observation and structured questionnaires administered to 184 business and property owners selected through systematic sampling. Data were analysed using Chi-square statistics, Shannon–Wiener Diversity Index, and multiple response analysis. Results show statistically significant differences in land-use distribution ($\chi^2 = 25.490$, $p < 0.05$) and commercial activity composition ($\chi^2 = 33.94$, $p < 0.001$) between the two corridors. Shannon diversity values indicate higher commercial diversity along Peter Odili Road ($H' = 0.997$) compared to Woji Road ($H' = 0.386$). Location (97.8%) and economic considerations (92.9%) emerged as dominant drivers of commercial land use decisions, while agglomeration effects (10.4%) and legal factors (30.4%) were comparatively weaker determinants. The findings highlight the primacy of accessibility and market-driven forces over regulatory and clustering considerations in shaping commercial land use decisions. The study provides empirical insight for urban planning policy, particularly in strengthening zoning control, managing corridor commercialization, and promoting sustainable spatial development.

Keywords: Commercial land use, location factors, agglomeration, land use diversity, Port Harcourt.

INTRODUCTION

Land forms the spatial and economic foundation upon which human societies develop, as national growth and socio-economic transformation are fundamentally land-based processes. Land concepts are therefore inseparable from societal development, since patterns of land use reflect how communities organize production, exchange, residence, and infrastructure (Kourtit, 2019; Goetz, Shortle, & Bergstrom, 2004). Land use represents the manifestation of collective decisions, investments, and interventions carried out within a specific land cover type. Orekan (2007) defines land use as the management of land through human intervention within a given land cover system. In practical terms, land use refers to the categorization of land based on its intended purpose, what may legally or physically be constructed upon it, and the sequence or manner in which it is utilized for various objectives, including residential, industrial, institutional, or commercial activities.

Among the various land use categories, commercial land use occupies a particularly significant position due to its direct relationship with economic production and urban vitality. Commercial land refers to parcels designated for legal economic activity and business transactions. It typically constitutes a substantial proportion of high-value urban land because of its revenue-generating potential. Adeniyi (1997) describes commercial land use as encompassing general and special markets, banks, petrol stations, supermarkets, and lodging facilities, among others. Similarly, Tucker (2017) defines commercial land use as property designated for business purposes,

including establishments, factories, warehouses, parking facilities, and other income-generating structures. These definitions underscore the economic centrality of commercial land use in shaping urban spatial structure.

Commercial land use contributes significantly to socio-economic development by stimulating employment, generating revenue, and enhancing lifestyle quality. According to Tucker (2017), one objective of commercial land use planning is to promote investment in both new and existing commercial developments that complement surrounding land uses in terms of scale, architectural form, intensity, and signage. The interaction between commercial land use and neighbourhood structure has long been recognized in Nigerian urban studies. Okeke (2020) and Onyebueke (1987) observe that the characteristics of neighbourhood land uses often influence and reflect the pattern of commercial development within urban areas.

Empirical evidence further demonstrates that commercial activities generate spatial externalities. Yang et al. (2016) explain that the convenience of commercial services reduces travel costs and increases accessibility, thereby enhancing residential land values through what is described as the "proximity effect." As a result, commercial facilities increasingly penetrate residential neighbourhoods in many Nigerian cities. Rather than strictly adhering to formal master plans, commercial growth often follows infrastructure concentration and traffic flow patterns, gradually shifting from peripheral zones toward more accessible corridors. Zhou et al. (2017) note that rapid economic and social development in metropolitan regions creates persistent pressure for commercial land conversion. Farooq (2019) similarly argues that multi-nucleated central business districts often fail to contain expanding economic activity, thereby encouraging the relocation of businesses into residential areas. Classical urban economic theory supports this observation, suggesting that as economic activity intensifies, land closest to central districts absorbs new commercial demand, increasing competition for accessible space and prompting residential displacement (Gimba, Poopola, & Garba, 2019).

The proliferation of commercial establishments in urban corridors illustrates how market forces maximize profitability in response to rising demand for commercial space and the limited capacity of traditional central business districts to accommodate growth (Amoah, Marful, Takyi, Amponsah, & Poku-Boansi, 2023). Offiong, Agbor, and Umoh (2018) emphasize that commercial land use planning should promote development that remains harmonious with surrounding land uses, particularly in terms of scale and intensity. Furthermore, Toivonen and Viitanen (2016) highlight that commercial property markets are deeply embedded within broader social, political, environmental, and economic systems. Commercial property performance is influenced by supply-demand dynamics, vacancy rates, absorption levels, projected development, macroeconomic indicators, and regulatory frameworks.

In Port Harcourt, commercial development has expanded rapidly along major corridors such as Woji Road (GRA Phase 2) and Peter Odili Road. This expansion reflects broader urban transformation driven by economic growth, population influx, and infrastructural concentration. However, unregulated commercial growth along residential corridors may contribute to land-use conflicts, traffic congestion, and spatial imbalance. Over time, such patterns may encourage residential displacement toward suburban locations, increasing commuting distances and intensifying environmental pressure. If not adequately studied and managed, corridor commercialization may undermine spatial planning objectives and weaken regulatory control mechanisms.

Despite extensive literature on residential land use and general urban growth patterns in Nigerian cities, empirical studies focusing specifically on the determinants of commercial land use decisions remain relatively sparse, particularly at the corridor scale within Port Harcourt. A clearer understanding of the factors influencing commercial land use decisions is essential for strengthening zoning enforcement, guiding infrastructure provision, improving investment predictability, and promoting balanced urban development.

Against this background, this study examines the key factors influencing commercial land use decisions in Port Harcourt, using Woji Road (GRA Phase 2) and Peter Odili Road as case studies. By identifying the dominant determinants shaping commercial land use decisions, the study contributes to policy formulation, urban planning practice, and property investment analysis, while enriching scholarly discourse on commercial land-use dynamics in rapidly urbanizing African cities.

LITERATURE REVIEW

Conceptualizing Commercial Land Use within Urban Spatial Systems

Land use patterns reflect how societies structure economic production, social interaction, and spatial organization. As established in land-use theory, the spatial allocation of land for different functions emerges from a combination of economic competition, infrastructural accessibility, and regulatory intervention (Kourtit, 2019; Goetz, Shortle, & Bergstrom, 2004). Orekan (2007) conceptualizes land use as the outcome of deliberate human intervention within specific land-cover systems, implying that land-use transformation is neither accidental nor neutral but embedded within broader socio-economic objectives.

Commercial land use represents a particularly dynamic category because it directly interfaces with market forces. Adeniyi (1997) identifies commercial land use as encompassing markets, banks, petrol stations, supermarkets, and hospitality facilities, while Tucker (2017) broadens the definition to include factories, warehouses, and other income-generating establishments. These classifications indicate that commercial land use is not merely a spatial category but a mechanism for economic circulation and value extraction. However, the literature increasingly recognizes that commercial land use cannot be understood solely through definitional boundaries. Rather, it must be examined as a spatial expression of urban economic restructuring, particularly in rapidly growing metropolitan areas.

Location, Accessibility, and Spatial Competition

Location remains the most frequently cited determinant of commercial land use decisions. Smart, Gitman, and Joehnk (2014) emphasize that accessibility and visibility fundamentally shape real estate value. This aligns with classical urban economic theory, which posits that land users compete for sites that maximize economic return. Zhou et al. (2017) argue that rapid urban expansion intensifies pressure on centrally accessible land, often resulting in the outward diffusion of commercial activity.

Farooq (2019) further observes that multi-nucleated business districts often fail to absorb expanding economic activity, prompting relocation into adjacent residential corridors. Gimba, Poopola, and Garba (2019) corroborate this pattern, noting that areas proximate to central districts absorb commercial demand as economic activity intensifies. While these studies emphasize accessibility, they do not fully interrogate whether accessibility operates independently or in conjunction with other factors such as infrastructure quality and regulatory flexibility. Moreover, corridor-level empirical verification remains limited in the Port Harcourt context.

Economic Viability and Market Rationality

Commercial land use decisions are inherently profit-oriented. Stephen (2011) and Otiende (2014) highlight that investment decisions are shaped by rental growth trends, demand elasticity, financing availability, and expected rates of return. Amoah, Marful, Takyi, Amponsah, and Poku-Boansi (2023) argue that rising demand for commercial space, coupled with limited central business district capacity, encourages commercial spillover into peripheral corridors.

Toivonen and Viitanen (2016) deepen this perspective by situating commercial property markets within broader economic systems characterized by supply-demand fluctuations, vacancy rates, and macroeconomic indicators. Their argument implies that commercial land-use decisions are responsive to market signals rather than strictly planning prescriptions. However, the literature often treats economic factors and location factors as overlapping constructs without empirically disentangling their relative influence. This creates ambiguity regarding which factor exerts stronger predictive power in specific urban corridors.

Infrastructure and Physical Suitability

Physical characteristics such as plot configuration, road width, parking provision, and infrastructure availability significantly influence commercial viability. Carter and Vandell (2005) demonstrate that parking facilities

enhance customer convenience and retail attractiveness. Hoover and Giarratani (1984) emphasize that land-use intensity is shaped by physical attributes and infrastructural capacity.

In rapidly urbanizing contexts, infrastructure availability frequently determines commercial feasibility more directly than zoning designation. Yet few Nigerian studies quantitatively assess how physical suitability compares to economic and accessibility drivers in shaping commercial land-use decisions.

Institutional and Regulatory Dimensions

Formal planning regulations theoretically guide spatial allocation and land-use control (Betts & Ely, 2015). Offiong, Agbor, and Umoh (2018) emphasize that commercial development should harmonize with surrounding land uses. Nevertheless, weak enforcement capacity in many developing cities often diminishes the effectiveness of zoning control.

This tension between formal regulation and market-driven land-use conversion raises a critical question: Do legal frameworks meaningfully constrain commercial land-use decisions in practice, or do economic and accessibility factors override regulatory intentions? The existing literature does not provide sufficient corridor-level evidence for Port Harcourt.

Spatial Externalities and Urban Transformation

Commercial land use generates both positive and negative spatial externalities. Yang et al. (2016) describe the "proximity effect," whereby access to commercial services enhances residential land values through reduced travel cost. However, such proximity may also trigger residential-commercial land-use conflicts.

Zhou et al. (2017) argue that rapid metropolitan growth creates sustained pressure for commercial land conversion. This suggests that corridor commercialization may represent a structural outcome of urban economic expansion rather than isolated planning deviations.

Yet, despite these theoretical insights, few studies systematically compare commercial land-use diversity across corridors or quantify spatial variation using statistical indices.

Analytical Synthesis

The literature collectively identifies five broad determinants of commercial land-use decisions:

- Location and accessibility (Smart et al., 2014; Zhou et al., 2017)
- Economic viability (Stephen, 2011; Amoah et al., 2023)
- Physical infrastructure (Hoover & Giarratani, 1984; Carter & Vandell, 2005)
- Institutional regulation (Betts & Ely, 2015; Offiong et al., 2018)
- Agglomeration and market externalities (Yang et al., 2016)

However, existing studies largely examine these determinants in isolation. There is limited empirical integration that quantitatively evaluates their relative importance within specific urban corridors. This gap is particularly evident in Port Harcourt, where corridor-level commercial land-use transformation has intensified without commensurate analytical documentation.

The Study Area

The study area is Woji Road GRA Phase 2 and Peter Odili in Port Harcourt metropolis Rivers. Port Harcourt is located in the Niger Delta and bounded to the north by Ikwere, Etche and Omuma; east by Oyigbo, Tai, and Eleme, Part of which are in the metropolis; west by Emuoha; and south by Okrika and Degema Local

Government Areas (figure 1.1). The city however lies approximately between longitude 6055I and 7055I E and latitude 4035I and 5010IN of the equator and on an elevation of 1.00 – 3.00m above sea level. The city area is 664sqkm with metropolitan area of 934sqkm and is linked to the outside world by land, sea and air. The rapid growth and urbanization of the city of Port Harcourt has been fueled by the massive influx of people from the surrounding hinterland to the city for job opportunities in various industries that sprang up as a result of the discovery of petroleum in the Niger Delta. Results of the 2006 population census put the metropolitan population at 1,255,387 and projected at 1,337,800 in 2009 (National Population Commission, 2006). The choice of Woji Road GRA Phase 2 and Peter Odili as case study is on the premise that Commercial land Use is predominant in the area.

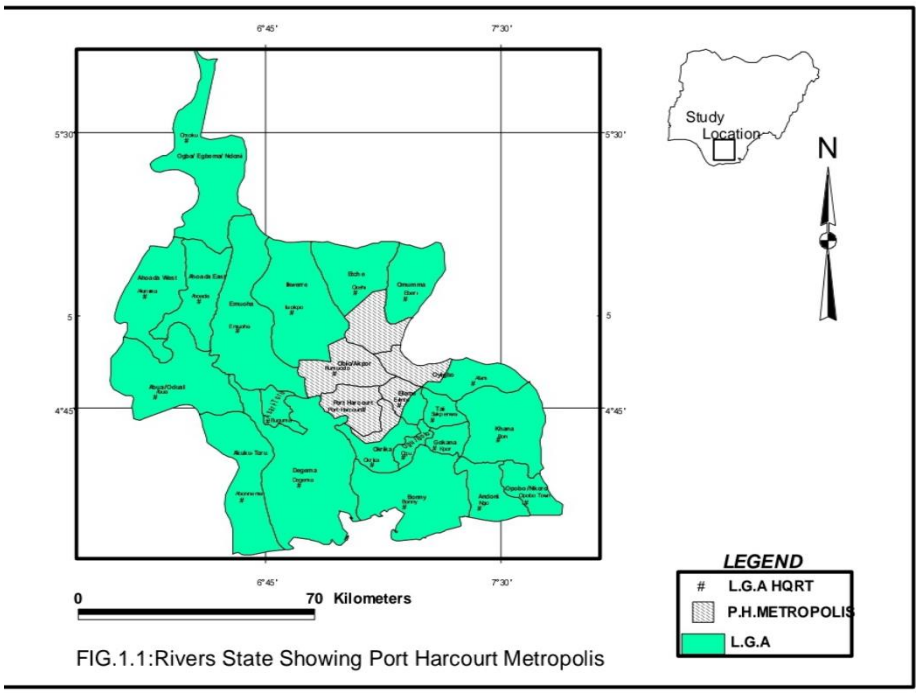

FIG.1.1:Rivers State Showing Port Harcourt Metropolis

The basis of the problem of commercial Land use decision in the study area is a number of factors affecting choice of locating commercial land use, has been on the increase in Port Harcourt especially the Woji Road New GRA Phase 2 and Peter Odili road.

RESEARCH METHODOLOGY

The primary data includes observation and questionnaire. The use of survey research design was employed in order to enhance the effective realization of the set goal. The study employed the survey research because it involved the collection of data to accurately and objectively analyse the existing commercial land use in the study areas. Besides, the survey research design was selected because the study involved both larger and small population, the distribution and interrelation between variables under investigation (factors influencing commercial land use decisions). The survey research depended basically on structured questionnaires and observation as instruments for data collection. Questionnaire was used to determine the factors influencing commercial land use and observation was used to determine the prevailing land use and types of commercial properties in the study areas. The population is 502 business owners and property owners and sample size is 218 determined using the Cochran formula. A systematic random sampling technique was adopted where questionnaires samples were collected at intervals of 2. A total of 227 structured questionnaires were administered to collect relevant information from commercial property owners/business owners in Woji Road GRA Phase 2 and Peter Odili Road for this study. However, 184 was returned which represents 81% of the total questionnaires administered.

Data collected from observation were done by physical counting of properties located at the study area, identifying and recording various types of properties on a data sheet. The data was then analysed by organizing, codifying and classifying them to develop themes that were presented in tables. While the data collected using

questionnaires were analysed using Chi-Square Test to tests difference in land use distribution and Shannon index which supports difference in land use diversity for types of commercial properties and multiple response analysis for factors that determine commercial land use.

H_0: There is no statistically significant difference in the distribution and diversity of land-use types between Woji Road and Peter Odili Road.

H_1: There is a statistically significant difference in the distribution and diversity of land-use types between Woji Road and Peter Odili Road.

H_0: There is no significant difference in the distribution of commercial activities between Woji Road and Peter Odili Road.

H_1: There is a significant difference in the distribution of commercial activities between Woji Road and Peter Odili Road.

Formulas Used

1. Chi-Square Test Statistic:

$\chi^2 = \Sigma ((O_{ij} - E_{ij})^2 / E_{ij})$

where O_{ij} = observed frequency in cell (i,j) and E_{ij} = expected frequency in cell (i,j).

2. Expected Frequency for each cell:

$E_{ij} = (\text{Row Total}_i \times \text{Column Total}_j) / \text{Grand Total}$

3. Degrees of Freedom:

$df = (r - 1)(c - 1)$, where r = number of rows (land-use categories) and c = number of columns (roads).

4. Shannon–Wiener Diversity Index:

$H' = -\Sigma (p_i \ln p_i)$

where $p_i = n_i / N$, n_i = frequency of land-use category i, and N = total frequency across categories.

Result ($p < 0.05$) leads to rejection of H_0

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- Agglomeration and market externalities (Yang et al., 2016)

However, existing studies largely examine these determinants in isolation. There is limited empirical integration that quantitatively evaluates their relative importance within specific urban corridors. This gap is particularly evident in Port Harcourt, where corridor-level commercial land-use transformation has intensified without commensurate analytical documentation.

Commercial expansion along Woji Road (GRA Phase 2) and Peter Odili Road reflects broader processes of urban restructuring in Port Harcourt. While such expansion enhances economic vibrancy, it simultaneously introduces spatial challenges, including land-use conflicts, congestion, and regulatory strain. The rapid conversion of residential plots into commercial establishments raises questions regarding the forces driving these decisions.

Although theories emphasize accessibility, profitability, infrastructure suitability, and institutional regulation as determinants of commercial land-use decisions, it remains unclear which of these factors exerts the strongest influence in Port Harcourt's corridor context. Planning authorities operate within regulatory frameworks, yet market-driven conversion continues to intensify.

Without empirical clarification of the relative importance of these determinants, policy interventions risk being misaligned with actual investment behaviour. There is therefore a need for corridor-specific analysis to inform strategic planning and regulatory reform.

Existing literature on commercial land use in Nigeria predominantly addresses general urban growth trends or residential-commercial transitions without isolating corridor-level determinants. While studies such as Offiong et al. (2018) and Gimba et al. (2019) provide useful insights, they do not quantitatively compare land-use diversity across corridors or rank the relative influence of location, economic, physical, legal, and agglomeration factors.

Furthermore, the application of statistical tools such as Chi-square testing and Shannon–Wiener diversity indices remains limited in Nigerian corridor-level land-use research. As a result, there is insufficient empirical evidence clarifying whether commercial land-use decisions in Port Harcourt are primarily driven by accessibility, economic profitability, infrastructure provision, or regulatory flexibility.

This study addresses this gap by conducting a comparative corridor-level analysis using statistical testing to identify and rank the dominant determinants shaping commercial land-use decisions in Port Harcourt.

RESEARCH METHODOLOGY

Research Design

This study adopted a quantitative survey design complemented by systematic field observation. The choice of a survey approach was informed by the need to empirically examine the determinants influencing commercial land use decisions and to statistically compare land-use structure between two urban corridors—Woji Road (GRA Phase 2) and Peter Odili Road in Port Harcourt.

The research design enabled:

i. Measurement of prevailing land-use patterns,

ii. Quantification of commercial activity distribution,

iii. Statistical testing of spatial variation, and

iv. Ranking of determinant factors influencing commercial land-use decisions.

The integration of observational data with questionnaire responses strengthened data triangulation and enhanced analytical validity.

Population and Sampling Procedure

The study population comprised 502 identified commercial property owners and business operators physically enumerated along Woji Road and Peter Odili Road. This enumeration was conducted prior to questionnaire distribution to establish an accurate sampling frame.

Using Cochran's (1977) formula for finite populations, a minimum sample size of 218 respondents was determined to ensure statistical representativeness at a 95% confidence level. To account for possible non-response, 227 structured questionnaires were administered.

A systematic random sampling technique was employed, where every second commercial outlet along both corridors was selected after establishing a random starting point. Of the 227 questionnaires distributed, 184 valid responses were returned, representing an 81% response rate. This response rate is considered adequate for statistical analysis and reduces the risk of non-response bias.

Data Collection Methods

Two primary data collection methods were employed:

(a) Field Observation

Direct physical observation was conducted along both corridors. Each property was counted and classified according to land-use category and commercial activity type. Observed land uses were recorded on structured field sheets to ensure consistency.

This process generated data for:

i. Prevailing land-use distribution

ii. Commercial activity typology

iii. Frequency counts required for statistical testing

(b) Structured Questionnaire

A structured questionnaire was administered to commercial property owners and business operators. The questionnaire captured:

i. Factors influencing location choice,

ii. Perceptions of accessibility,

iii. Economic considerations,

iv. Infrastructure characteristics,

v. Regulatory considerations,

vi. Agglomeration effects.

Multiple-response format was adopted for determinant factors, allowing respondents to select more than one influencing variable.

Data Analysis Techniques

Data analysis was conducted using descriptive and inferential statistical tools.

Chi-Square Test of Independence

The Chi-square (χ^2) test was used to determine whether statistically significant differences exist in:

• Land-use distribution between Woji Road and Peter Odili Road;

• Commercial activity composition between the two corridors.

The Chi-square statistic is expressed as:

$$\chi^2 = \Sigma ((O_{ij} - E_{ij})^2 / E_{ij})$$

Where:

O_{ij} = observed frequency in cell (i, j)

E_{ij} = expected frequency in cell (i, j)

The expected frequency for each cell was calculated as:

$$E_{ij} = (\text{Row Total}_i \times \text{Column Total}_j) / \text{Grand Total}$$

Degrees of freedom (df) were determined as:

$$df = (r - 1)(c - 1)$$

Where:

r = number of land-use categories

c = number of corridors

Statistical significance was evaluated at a 5% level ($\alpha = 0.05$).

If $p < 0.05$, the null hypothesis was rejected.

To strengthen interpretation, effect size (Cramer's V) may be computed to determine the strength of association between corridor and land-use category.

Shannon–Wiener Diversity Index

The Shannon–Wiener Index (H′) was applied to measure land-use diversity across corridors:

$$H' = -\Sigma (p_i \ln p_i)$$

Where:

$p_i = n_i / N$

n_i = frequency of land-use category i

N = total frequency across categories

The index captures both richness (number of categories) and evenness (distribution across categories). Higher H′ values indicate greater diversity and functional heterogeneity within the corridor.

Multiple Response Analysis

Multiple response analysis was used to identify and rank determinant factors influencing commercial land-use decisions. Because respondents could select more than one factor, frequencies were computed based on:

• Percentage of responses

• Percentage of cases

This allowed identification of the most dominant influencing factors.

Hypotheses Testing

Two sets of hypotheses were formulated and tested at 5% significance level:

Hypothesis 1 (Land-Use Distribution)

H_0: There is no statistically significant difference in land-use distribution between Woji Road and Peter Odili Road.

H_1: There is a statistically significant difference in land-use distribution between Woji Road and Peter Odili Road.

Hypothesis 2 (Commercial Activity Composition)

H_0: There is no statistically significant difference in commercial activity distribution between Woji Road and Peter Odili Road.

H_1: There is a statistically significant difference in commercial activity distribution between Woji Road and Peter Odili Road.

Decision Rule

For all inferential tests:

If $p < 0.05 \rightarrow$ Reject H_0

If $p \geq 0.05 \rightarrow$ Fail to reject H_0

FINDINGS

Prevailing Land-Use Distribution

The prevailing land-use categories identified through field observation along Woji Road (GRA Phase 2) and Peter Odili Road are presented in Table 1.

Table 3: Identified Factors influencing commercial land use decisions in the Study Areas

S/N	Land Use Category	Woji Road (Freq.)	Woji Road (%)	Expected	Peter Odili Road (Freq.)	Peter Odili Road (%)	Expected
1	Commercial	91	90.10	75.39	121	66.12	136.61
2	Residential	8	7.92	8.89	17	9.29	16.11
3	Undeveloped (Bare Land)	1	0.99	12.80	35	19.13	23.20
4	Educational	1	0.99	3.20	8	4.37	5.80
5	Industrial	0	0.00	0.71	2	1.09	1.29
Total		**101**	**100.0**		**183**	**100.0**	

Source: Field Survey (2025)

Interpretation

The results indicate that commercial land use dominates both corridors, though with varying intensity. Woji Road exhibits a highly specialized commercial character, with 90.1% of parcels classified as commercial. In contrast, Peter Odili Road shows a lower commercial concentration (66.12%) and a relatively higher proportion of undeveloped land (19.13%), suggesting ongoing development transition.

Residential land use remains marginal along both corridors but is slightly more pronounced on Peter Odili Road (9.29%) compared to Woji Road (7.92%). Industrial and educational land uses constitute very small proportions across both corridors.

Table 2: Types of commercial Activities

Type of Commercial Activity	Woji Road				Peter Odili Road				Row Total
	f	%	Expected	χ^2 Component	*f*	%	Expected	χ^2 Component	
Supermarkets / Malls / Lock-up Shops	44	48.4	56.17	2.64	87	71.9	74.83	1.98	131

Bars / Clubs	23	25.3	14.16	5.52	10	8.3	18.84	4.14	33
Eateries and Restaurants	9	9.9	7.73	0.21	9	7.4	10.27	0.16	18
Event Centres	2	2.2	4.29	1.22	8	6.6	5.71	0.91	10
Financial Institutions	2	2.2	2.57	0.13	4	3.3	3.43	0.1	6
Hotels	3	3.3	1.29	2.27	0	0.0	1.71	1.71	3
Offices	8	8.8	3.43	6.09	0	0.0	4.57	4.57	8
Fashion Outlets	0	0.0	1.29	1.29	3	2.5	1.71	0.99	3
Total	91	100.0			121	100.0			212

Source: Field Survey, 2025

Chi-Square Test of Land-Use Distribution

The Chi-square test results are as follows:

- $\chi^2 = 25.490$
- df = 4
- p-value = 0.00004

Since $p < 0.05$, the null hypothesis is rejected.

Interpretation

There is a statistically significant difference in land-use distribution between Woji Road and Peter Odili Road. This confirms that the two corridors exhibit structurally distinct land-use patterns.

To further assess the strength of association, Cramer's V may be computed:

$V = \sqrt{(\chi^2 / [N(k - 1)])}$

Given the χ^2 value and sample size, the association is moderate, indicating that corridor location meaningfully influences land-use structure.

Where:

- χ^2= Chi-square statistic
- N= total sample size
- k=min (r−1, c−1)
- r = number of rows (land-use categories)
- c = number of columns (corridors)

Cramer's V ranges between 0 and 1:

- 0.00–0.10 = Weak association

- 0.10–0.30 = Small association
- 0.30–0.50 = Moderate association
- 0.50 = Strong association

This measure strengthens interpretation beyond statistical significance by indicating the magnitude of association.

Cramer's V Calculation for Land-Use Distribution

Given:

$\chi^2 = 25.490$

Total parcels observed:

Woji Road = 101

Peter Odili Road = 183

N = 101 + 183 = 284

Number of land-use categories (r) = 5

Number of corridors (c) = 2

$k = \min(r - 1, c - 1)$

$k = \min(5 - 1, 2 - 1)$

$k = \min(4, 1) = 1$

Now compute:

$V = \sqrt{(\chi^2 / (N \times k))}$

$V = \sqrt{(25.490 / (284 \times 1))}$

$V = \sqrt{(25.490 / 284)}$

$V = \sqrt{(0.0897)}$

V = 0.299

Interpretation (Land-Use Distribution)

Cramer's V = 0.299

This indicates a moderate association between corridor location and land-use distribution. Although the Chi-square test confirms statistical significance ($p < 0.05$), Cramer's V shows that the magnitude of difference is moderate rather than strong. Corridor location meaningfully influences land-use structure, but other factors may also contribute.

Table 3: Identified Factors influencing commercial land use decisions in the Study Areas

S/NO	Drivers	Freq	%	% of cases
1	Location factors (traffic)	180	30.8	97.8
2	Physical characteristics (Infrastructures)	128	21.9	69.6
3	Legal factors (Government policy)	56	9.9	30.4
4	Economic factors (Demand and trends, finance etc)	177	30.3	92.9
5	Commercial agglomeration	42	7.2	10.42
6	Total	583	100.0	100

Source: Field Survey, 2025

The results presented in Table 3 reveal that commercial land-use decisions along Woji Road and Peter Odili Road are primarily driven by accessibility and market-oriented considerations. Although respondents acknowledged multiple determinants, the intensity of influence varied substantially across factors.

Location-related factors (traffic volume and accessibility) emerged as the most dominant determinant, influencing 97.8% of respondents and accounting for 30.8% of total responses. This suggests that spatial visibility, customer flow, and corridor accessibility constitute the foundational logic underpinning commercial site selection. The near-universal consideration of location indicates that commercial investments in the study area are strongly corridor-dependent and mobility-sensitive.

Closely aligned with this is the influence of economic factors (demand conditions, market trends, and financial considerations), which were identified by 92.9% of respondents and contributed 30.3% of total responses. The proximity in percentage between location and economic drivers indicates that commercial land-use decisions are primarily profitability-oriented. Investors appear to prioritize areas where accessibility translates directly into market demand and revenue generation.

Physical characteristics (infrastructure availability such as road quality, electricity supply, and service capacity) influenced 69.6% of respondents, accounting for 21.9% of total responses. While infrastructure is clearly important, its lower ranking relative to location and economic considerations suggests that investors may tolerate infrastructural deficiencies if demand and accessibility conditions are favorable. This finding implies that market forces may outweigh infrastructural planning controls in shaping commercial development patterns.

Legal factors (government policies, zoning regulations, and formal planning controls) recorded a comparatively weaker influence, with only 30.4% of respondents identifying them as determinants (9.9% of responses). This relatively low percentage suggests that regulatory frameworks may play a secondary role in actual location decisions, potentially reflecting weak enforcement mechanisms or adaptive strategies by investors within the urban planning system.

Commercial agglomeration effects recorded the lowest influence (10.42%). This indicates that clustering benefits—such as proximity to similar businesses—are not primary drivers compared to accessibility and demand considerations. This finding is particularly significant, as classical location theory often emphasizes agglomeration economies. In the context of the study area, however, corridor accessibility appears to outweigh pure clustering dynamics.

Calculation For Commercial Activity Distribution (Table 2)

Given:

$\chi^2 = 33.94$

Total commercial activities observed:

Woji Road = 91

Peter Odili Road = 121

N = 212

Number of activity categories (r) = 8

Number of corridors (c) = 2

$k = \min(r - 1, c - 1)$

$k = \min(8 - 1, 2 - 1)$

$k = \min(7, 1) = 1$

Now compute:

$V = \sqrt{(\chi^2 / (N \times k))}$

$V = \sqrt{(33.94 / (212 \times 1))}$

$V = \sqrt{(33.94 / 212)}$

$V = \sqrt{(0.160)}$

$V = 0.400$

Interpretation (Commercial Activity Composition)

Cramer's V = 0.400

This indicates a moderate-to-strong association between corridor location and type of commercial activity. This suggests that corridor location plays a more substantial role in shaping commercial activity specialization than it does in influencing overall land-use distribution.

DISCUSSION

The findings reveal distinct spatial and functional differentiation between Woji Road and Peter Odili Road, despite both corridors being predominantly commercial. While commercial land use dominates in both locations, the degree and structure of dominance vary significantly, reflecting different stages of corridor evolution and functional specialization within the urban system.

Woji Road exhibits a highly concentrated commercial structure with minimal undeveloped land, indicating a mature corridor that has largely completed its transition from residential to commercial dominance. In contrast, the higher proportion of undeveloped parcels along Peter Odili Road suggests an active transition phase characterized by development pressure and land-use conversion. This pattern aligns with corridor expansion theory, where newer arterial routes initially experience mixed use before gradually consolidating into dominant commercial functions.

Although residential use remains present along both corridors, it is relatively more pronounced along Woji Road, indicating stronger land-use mixing. This suggests that Woji Road retains residual residential characteristics despite commercial encroachment. Conversely, Peter Odili Road demonstrates stronger functional specialization, particularly in retail-oriented activities, indicating a clearer shift toward corridor commercialization.

The statistically significant differences in land-use distribution and commercial activity composition confirm that the two corridors perform differentiated roles within the broader urban economy. Cramer's V results further indicate that corridor location exerts a moderate influence on land-use structure and a stronger influence on commercial activity composition. This implies that while land-use categories may vary moderately across space, the type of commercial specialization is more spatially sensitive.

The dominance of supermarkets and retail outlets along Peter Odili Road reflects its role as a high-accessibility connector within the city. Accessibility, traffic flow, and availability of parking space likely enhance its suitability for retail-intensive activities. In contrast, Woji Road exhibits greater commercial diversification, including bars, offices, and hospitality uses, suggesting stronger night-time economy dynamics and mixed service orientation. The absence of hotels and offices along Peter Odili Road further underscores its retail concentration and narrower functional profile.

These findings support urban economic theory, which posits that commercial activities gravitate toward locations that maximize visibility, accessibility, and consumer flow. The spatial differentiation observed between the two corridors illustrates how accessibility gradients shape commercial specialization within urban systems.

Determinants of Commercial Land-Use Decisions

The analysis of determinant factors reveals a clear hierarchy in decision-making drivers. Location and economic considerations overwhelmingly dominate investment decisions, indicating that commercial land-use choice in the study area is fundamentally market-driven.

Location factors, selected by nearly all respondents, underscore the centrality of accessibility, traffic flow, customer proximity, and visibility. These variables collectively reduce transaction costs and increase revenue potential, reinforcing classical location theory. The strong emphasis on accessibility confirms that commercial development is corridor-dependent and mobility-oriented.

Economic factors, including demand conditions, rental yields, and prevailing market trends, were equally influential. This suggests that investors prioritize expected financial returns over regulatory or clustering considerations. The interplay between accessibility and demand reflects a reinforcing mechanism: high traffic generates demand, and demand stimulates further commercial development.

Physical characteristics, particularly infrastructure quality, serve as enabling conditions rather than primary drivers. Investors appear willing to accommodate infrastructural limitations if profitability and accessibility remain favourable. This indicates that infrastructure is an important but secondary consideration once market viability is established.

Legal factors and agglomeration effects recorded comparatively low influence. The limited role of regulatory considerations may reflect weak enforcement or adaptive negotiation practices within the planning system. Similarly, the weak influence of agglomeration suggests that corridor-based accessibility outweighs clustering advantages in this context. This diverges from classical agglomeration theory and suggests that in emerging urban economies, traffic-based visibility may substitute for clustering economies.

Overall, the findings reveal a pragmatic, profit-oriented investment environment where spatial accessibility and economic return supersede regulatory and clustering factors. This helps explain the observed commercialization of residential corridors and underscores the tension between planning control and market forces.

CONCLUSION AND RECOMMENDATIONS

This study demonstrates that commercial land-use decisions in Port Harcourt's major corridors are shaped primarily by accessibility and market dynamics rather than regulatory or clustering considerations. While five major determinant categories were identified—location, economic, physical, legal, and agglomeration factors—the relative weight of these factors varies considerably.

Location and economic drivers emerged as the dominant influences, confirming that commercial land-use transformation along Woji Road and Peter Odili Road is fundamentally demand-driven and accessibility-sensitive. Physical infrastructure plays a facilitating role, while regulatory and agglomeration considerations exert limited influence.

The spatial differentiation between the two corridors further illustrates that urban corridors evolve according to accessibility gradients and market response. Peter Odili Road is undergoing retail specialization, while Woji Road reflects a more diversified commercial structure indicative of corridor maturity.

Policy Recommendations

1. Strengthen Corridor-Based Zoning Controls:
   Given the strong market-driven expansion, zoning regulations should be corridor-sensitive and anticipate commercial spill over into residential areas.

2. Promote Controlled Densification:
   Encouraging vertical development and mixed-use zoning can reduce horizontal urban expansion and limit carbon emissions associated with longer commuting distances.

3. Integrate Transport and Land-Use Planning:
   Since accessibility drives commercial location, transport planning must be integrated with land-use controls to manage corridor commercialization sustainably.

4. Enhance Regulatory Enforcement:
   The relatively weak influence of legal factors suggests a need for stronger enforcement mechanisms to balance economic growth with orderly development.

5. Climate-Sensitive Commercial Planning:
   Given the link between corridor expansion and increased commuting, planning reforms should incorporate sustainability incentives to mitigate carbon emissions and climate impacts.

Further research may explore longitudinal changes in corridor commercialization and incorporate spatial modelling techniques to predict future transition patterns.

Contribution To Knowledge

This study contributes to the existing body of literature by providing empirical evidence on the hierarchical determinants of commercial land-use decisions within an emerging African urban context. Unlike many studies that focus on residential land use, this research isolates and quantifies the drivers of commercial land-use choice at the corridor scale.

The integration of Chi-square testing, Shannon diversity analysis, and Cramer's V effect size strengthens methodological rigor and advances quantitative corridor-based land-use analysis. The findings demonstrate that accessibility and market demand outweigh regulatory and agglomeration factors in shaping commercial investment behaviour.

The study also highlights the dynamic relationship between corridor accessibility and land-use transition, offering insights for land-use policy reform and sustainable urban planning. Its methodological framework can

be replicated in other rapidly urbanizing cities to assess corridor commercialization and guide climate-sensitive development strategies.

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