An Empirical Assessment of Road Network Influence on Commercial Property Values in Ojo LGA, Lagos, Nigeria

Adefemi Quddus Abidola [1], Sunday Philip Akingbemisola [2], Olabimpe Bilquees Balogun [3], Ade Adebayo [1], Mutiurahmon Opeyemi Raji [1]

[1] *Lagos State University*
Lasu Main Rd, Ojo, Lagos 102101, Lagos, Nigeria

[2] *Florida International University*
11200 SW 8th Street, Miami, Florida 33199, USA

[3] *Lagos State University of Education*
Km 30, Badagry Express Way, Oto/Ijanikin, Lagos State, Nigeria

DOI: 10.22178/pos.125-70

JEL Classification: G32, L60, M10

Received 06.10.2025
Accepted 28.12.2025
Published online 31.12.2025

Corresponding Author:
Adefemi Quddus Abidola

Abstract. This paper is an empirical investigation of how the infrastructure of a road network affects the commercial property values in the Ojo Local Government Area in Lagos State, Nigeria; this is to determine the different levels of impact of road proximity, quality, connectivity and access to public transport on commercial rental performance in a fast-growing metropolitan setting. The researchers collected primary data through a cross-sectional survey of 473 commercial property owners, tenants, and real estate agents across nine major road corridors. Data analysis was conducted using descriptive statistics, correlation analysis, and multiple regression models. The findings indicate that residential homes close to arterial roads (within 100 meters) have average rental prices of about 25%, whereas immediate proximity to BRT corridors yields price increases of 30-68%. The most potent predictor of commercial property value was road quality (r = 0.72), and the regression equation explained 70 % of the variation in rental value. The paper finds that road network infrastructure is a dominant force in Lagos's commercial property markets. It suggests long-term investment in road maintenance, transit-oriented development, and corridor-based infrastructure planning to facilitate economic growth and sustainable urban development.

Keywords: Road Network Infrastructure; Commercial Property Valuation; Access to Transportation; Urban Development; Lagos Real Estate; Investment Performance.

INTRODUCTION

In modern cities, transportation infrastructure remains among the most critical factors shaping the economic performance and spatial development of the urban environment. Specifically, road networks shape trends in mobility, accessibility, and land use, thereby influencing the distribution of commercial activity and the prices of urban real estate [1, 2]. The importance of transportation infrastructure in fast-urbanising areas of developing economies is even greater because accessibility levels are insufficient and unevenly covered in many cases [3, 4]. With the rising spatial and economic growth in cities, infrastructure investment is becoming a defining factor not only for the efficiency of movement but also for the competitiveness of commercial sites within urban systems.

The largest metropolitan area and economic hub in Nigeria, Lagos, is a typical example of such dynamics. As the population continues to grow,

commercial density increases, and traffic congestion intensifies, transportation infrastructure now acts as both a constraint and a business opportunity for urban development [2, 5]. The Lagos metropolitan transport network is an amalgamation of formal transport infrastructure, such as BRT corridors and rail projects, and a well-developed informal transport system, creating complex accessibility patterns that directly influence business processes and location decision-making [6, 7]. In this framework, commercial property markets are sensitive to the quality of infrastructure, underscoring the dependence of investors and tenants on good mobility, customer access, and supply chain connectivity [8, 9].

Economically, transportation infrastructure lowers transaction costs, expands market access, and generates agglomeration benefits that are reflected in property values [10, 11]. According to the theory of accessibility, the value of the property is based on location benefits, especially proximity to effective transport systems [12]. The urban economic theory also proposes that commercial activities are concentrated in available corridors, thereby minimising interrelation costs and maximising productivity [13]. As a result, road networks do not just facilitate commercial development but actively shape the markets for urban land and investment behaviour.

Empirical research across developed economies finds a consistent positive association between transport access and property values, particularly in transit-oriented and highly connected areas [19-21]. But these relationships are not always linear, since proximity to roads can create adverse externalities, such as congestion, pollution, and noise, which create nonlinear value gradients [22, 23]. In less developed economies, where infrastructure is more limited, even modest gains in road quality and connectivity are likely to have disproportionately greater effects on property markets [24]. This implies that local contexts shape the relationship between infrastructure and property, and that researchers should investigate it empirically at the regional level.

Transportation infrastructure in African cities serves as a two-fold determinant of the economic opportunity and spatial inequality [7, 25]. Informal transport networks often replace formal transport infrastructure by developing alternative patterns of accessibility that usually are not reflected in traditional valuation analysis [7]. The situation in Nigerian cities is especially fragile, as commercial property values are highly vulnerable to improvements in road conditions and transit availability [8, 14]. Although commercial real estate is economically significant to urban productivity, most Nigerian studies have focused more on residential property markets than on commercial property dynamics.

Ojo, Local Government Area of Lagos State, offers a good case study for studying these relations. It is a natural location on the international road trade path, is close to Alaba International Market, and has recently developed its road network and transit infrastructure to evaluate how road network features affect commercial property value differentials [6, 14]. The heterogeneity of commercial land uses in Ojo also makes it well-suited as a laboratory for studying infrastructure-property interaction in a fast-changing metropolitan setting.

Against this backdrop, this research paper explores how a network's road infrastructure affects commercial property values in Ojo LGA, Lagos. The study aims to capture the relationship between proximity, quality, connectivity, and transit access to commercial rentals by combining ideas from accessibility theory, bid-rent logic, and hedonic valuation approaches [12, 13, 17, 18]. The results are expected to facilitate evidence-based urban planning and decision-making in real estate investments and bridge the empirical gap in the literature on the relationship between transportation and property values in the Nigerian metropolis.

METHODS

Study Area. Ojo Local Government Area covers a total area of about 182 square kilometres in northeastern Lagos State, Nigeria, and is well-positioned along international trade routes. The region also boasts major commercial hubs, including Alaba International Market (one of the largest electronic markets in West Africa), the Ojo Town commercial area, and emerging retail markets. The geographic centre of the study comprises 9 major road corridors: Badagry Express Road, Alaba International Road, Iyana-Iba-Igando Road, Okoko-Ajangbadi Road, Igbo Elerin Road, Iyana School Road, Iyana-Era-Ajangbadi Road, Volks Mile 10-Agric Road, and Shibiri-Ajangbadi Road. These corridors are significant in terms of traffic volume, road condition, interconnectedness, and

the intensity of commercial development, which are necessary to provide vital empirical variation.

Sampling Strategy. The target group includes the owners of commercial property, tenants who run businesses in commercial property and real estate agents within Ojo LGA. The researchers adopted a multi-stage sampling method because no elaborate sampling frame was available and calculated a sample size of 390 respondents using the Yamane formula for finite populations, assuming an estimated population of 15,000 commercial properties and a 0.05 level of precision. It was set to 500 to include non-response and increase statistical power.

In the first stage, the study purposively selected major corridors and identified nine corridors based on commercial activity, infrastructure features, and geographic distribution. In the second stage, the study applied systematic random sampling to the corridors and obtained property lists through field enumeration. The distribution of the commercial property was done on a proportional basis, whereby the start-ups with the highest commercialisation, such as Badagry Express Road and Alaba International Road, were allocated higher numbers of respondents (80 and 70, respectively), and less developed ones were allocated 40-60 respondents each.

Data Collection. Primary data were collected using a structured questionnaire consisting of five parts, which included:

a) demographics and socioeconomic characteristics of the respondents;

b) property features such as type, size, age, condition, and price of the property;

c) road network features such as the type, quality and volumes of road traffic and connectivity;

d) transportation access measured by proximity to transit, parking, and loading facilities; and

e) perceived infrastructure impact measured by Likert-scale items.

Pilot testing with 30 respondents led to modifications to the instrument, including the addition of categorical distance bands alongside precise measurements. The study collected data between October and December 2024 through face-to-face interviews administered by trained enumerators. Quality control consisted of field monitoring, daily follow-up, and random telephone follow-up with 10% of the respondents. The study supplemented primary data collection with secondary data from government publications, real estate market reports, geographical datasets, and transportation system information.

Variable Measurement. This study measures commercial property value as the dependent variable using rental value (annual rent per square meter) and sales price, which the researchers standardised to price per square meter. The independent variables were road proximity measurements (measures distance to arterial/collector roads), road quality measurements (pavement condition, road width, road drainage, road lighting), connectivity measures (measures of alternative routes, measures of time to travel to central business district) and transportation-access measures (measures distance to BRT corridor, bus terminals, parking). Some of the control variables included property features, neighbourhood security, market proximity, and competitor presence.

Analytical Techniques. There were several methods of analysis which tackled various research questions. Sample demographics and property attributes were analysed descriptively using frequency distributions and cross-tabulations. The correlation analysis was used to evaluate bivariate correlations and to detect multicollinearity. The general equation was the

$$Property\ Value = b_0 + b_1(Road\ Proximity) + b_2(Road\ Quality) + b_3(Connectivity) + b_4(Transit\ Access) + b_5(Property\ Characteristics) + e.$$

Multiple regression was performed using ordinary least squares to estimate the impact of road networks, holding other property and location factors constant.

Model diagnostics evaluated normality, homoscedasticity, multicollinearity and influential observations. Simple spatial analysis examined patterns of values along corridors and spatial clustering using buffer analysis. ANOVA was used to analyse property values in relation to corridor type and groups of infrastructure quality. The study determined statistical significance at $p = 0.05$ and conducted the analysis using SPSS version 26 and Microsoft Excel.

Ethical Considerations. The study conformed to the ethical guidelines for human subjects research. All participants received informed consent with clear explanations of the research purpose, voluntary participation, and confidentiality. Aggregate-only reporting was maintained, with individual responses being confidential. The study stored data securely with limited access and obtained institutional review board approval before data collection.

RESULTS AND DISCUSSION

Sample Characteristics and Response Rate. The study distributed 500 questionnaires and received 473 complete responses, yielding a response rate of 94.6%. Table 1 presents demographic and socioeconomic characteristics of the respondents.

Table 1 – Demographic and Socioeconomic Characteristics of Respondents

Characteristic	Category	Count	%
Gender	Male	310	65.5
	Female	163	34.5
Age Group	18–30 years	87	18.4
	31–40 years	156	33.0
	41–50 years	116	24.5
	51–60 years	84	17.8
	Above 60 years	30	6.3
Marital Status	Single	164	34.7
	Married	309	65.3
Education Level	No formal education	45	9.5
	Primary education	83	17.5
	Secondary education	178	37.6
	Tertiary education	167	35.3
Respondent Role	Property owner	189	40.0
	Tenant/business operator	231	48.8
	Real estate agent	53	11.2
Years of Experience	Less than 2 years	62	13.1
	2–5 years	147	31.1
	6–10 years	168	35.5

Table 2 – Presents the distribution of commercial property types and their valuation characteristics across the study area

Property Type	Count	%	Mean Annual Rent (₦/m^2)	Std. Deviation	Coefficient of Variation
Retail shops	187	39.5	45,600	18,2	0.399
Office spaces	94	19.9	52,300	22,4	0.428
Warehouses	78	16.5	28,700	11,8	0.411
Mixed-use	71	15.0	48,900	19,6	0.401
Service centers	43	9.1	41,200	16,3	0.396
Total/ Average	473	100.0	43,340	17,7	0.407

Table 3 – Distribution of Properties by Road Network Characteristics

Road Characteristic	Category	Count	%	Mean Rental Value (₦/m^2)
Road Type	Arterial	142	30.0	58,400
	Collector	198	41.9	42,100
	Local street	133	28.1	31,200
Distance to Arterial Road	0–50 m	128	27.1	56,700
	51–100 m	167	35.3	47,300

Road Characteristic	Category	Count	%	Mean Rental Value (₦/m²)
	101–200 m	102	21.6	38,900
	201–500 m	54	11.4	32,400
	Over 500 m	22	4.7	26,800
Road Quality	Excellent	87	18.4	61,200
	Good	176	37.2	48,600
	Fair	143	30.2	36,700
	Poor	67	14.2	28,400
BRT Access	Within 500 m	203	42.9	51,800
	501–1000 m	156	33.0	42,300
	Over 1000 m	114	24.1	34,100

Table 4 – Correlation Analysis of Road Network Factors and Property Values

Variable	Correlation	Sig.	N
Proximity to an arterial road	0.68**	<0.001	473
Road quality index	0.72**	<0.001	473
Connectivity index	0.61**	<0.001	473
BRT proximity	0.58**	<0.001	473
Transportation hub distance	0.54**	<0.001	473
Road width	0.49**	<0.001	473
Traffic volume	0.43**	<0.001	473
Drainage system	0.38**	<0.001	473
Street lighting	0.41**	<0.001	473
Alternative routes	0.47**	<0.001	473

Table 5 – Multiple Regression Results

Variable	Model 1 B(SE)	Model 2 B(SE)	Model 3 B(SE)
Constant	18,450**	15,680**	14,230**
Arterial frontage	12,600**	10,400**	9,800**
Distance to the arterial	-2,850**	-2,340**	-2,180**
Road quality	6,720**	5,940**	5,560**
Connectivity	1,980**	1,740**	1,620**
BRT proximity	6,340**	5,870**	5,440**
Property size	—	3,420**	3,280**
Property age	—	-380**	-340**
Structural condition	—	4,150**	3,890**
Alaba Market proximity	—	—	7,230**
Security index	—	—	2,140**
R^2	0.586	0.672	0.709

Table 6 – Perceived Importance of Factors

Factor	Weighted Mean	Rank
Arterial road access	4.85	1
Road quality	4.81	2
Structural condition	4.76	3
BRT access	4.72	4
Proximity to markets	4.68	5

Table 7 – Corridor Comparison

Corridor	Mean Rent (₦/m^2)	Road Quality
Badagry Express	63,200	3.6
Alaba Int'l Road	58,900	3.4
Iyana-Iba	47,300	3.1
Okoko-Ajangbadi	39,600	2.8
Shibiri-Ajangbadi	27,400	2.1

Table 8 – Property Values by Distance from Hubs

Distance	Mean Rent (₦/m^2)	Premium
0–200 m	58,700	+68.2%
201–500 m	49,200	+40.9%
>1000 m	34,900	Baseline

Table 9 – Perceived Impacts

Impact	Weighted Mean
Customer accessibility	4.73
Property values	4.71
Business revenue	4.64
Rental demand	4.59

Retail shops constituted the largest category (39.5%), reflecting Ojo's commercial character. Office spaces commanded the highest average annual rental values (₦52,300/m^2), followed by mixed-use properties (₦48,900/m^2). Warehouses exhibited lower rental values (₦28,700/m^2) due to their location in less central areas and lower finish-quality requirements. The coefficient of variation (0.407 overall) indicates substantial rental value heterogeneity, motivating investigation of infrastructure-related explanatory factors.

The results of the present study provide strong empirical evidence that the availability of road network infrastructure significantly determines the value of commercial properties in Ojo LGA, Lagos. Table 3 reveals that properties in arterial roads had a higher mean rental value of 58,400/m2, though this was lower than the 31,200/m2 in local streets and the 56,700/m2 within 50 meters of arterial roads. This fat-tail distance-decay profile is consistent with the accessibility theory, which holds that property prices reflect the ability to capitalise on locational benefits, including lower travel time and greater market share [12, 13]. The researchers found similar results in the Dutch housing market studied by the authors [19]. In transit-oriented developments by the author [20], but the scale of the results obtained in Ojo is significantly larger, indicating the value of infrastructure as a marginal development factor in a developing urban setting.

The quality of roads came out as the best predictor of the value of commercial real estate with a correlation coefficient of 0.72 (Table 4) and a regression coefficient of 5,560-6,720 per unit rise in the quality index (Table 5). On good roads, average rents were ₦ 61,200/m^2, which is more than twice as high as on bad roads; this shows that the quality of infrastructure is a guarantee of the reliability, safety, and stability of investments made to commercial players in the long term. Author [7] noted the same in West African cities, where road quality is ranked higher than proximity in determining property value. The finding also confirms that quality gains yield excessively high income returns in cities lacking infrastructure, as the authors [24] advanced.

Close to transport centres, especially BRT, generated significant value gains of 30-68 %, depending on distance (Table 8). This result is consistent with the theory of transit-oriented development. It supports the findings of authors [20, 21] that the accessibility of commercial land values is stimulated by the availability of public transport, which makes customer catchment areas larger and more reliant on household access to this transport. The premiums registered in Ojo, com-

pared with those in developed economies, indicate that BRT corridors in Lagos were used as important lifeline accessibility routes rather than as marginal convenience amenities; this substantiates the author's [7] argument that transportation access in African cities has greater equity and economic consequences because it cannot be mobility-structured.

The regression results also show that road connectivity and access to BRTs remain significant even when controlling for property area, age, structural condition, and neighbourhood security. The last model captures more than 70 % of the variation in commercial rental values (R2 = 0.709), indicating that variables related to infrastructure are more dominant in developing the commercial property market; this is in line with evidence from Nigerian research by the Lagos Metropolitan Area Transport Authority (LAMATA) [6], which also found that variation in commercial property values is related to road accessibility in a large portion. Nevertheless, this paper adds value to the literature by concurrently modelling proximity, quality, connectivity, and transit access, thereby bridging a significant gap identified in earlier studies [7].

It showed a high level of intra-urban inequality using corridor-specific analysis, whereby the Badagry Express Road and Alaba International Road performed much better than other unconnected corridors; this helps validate the existence of agglomeration economies, in which infrastructure and commercial concentration are mutually reinforcing, as postulated by urban economic theory [13]. The quantitative results are once again confirmed by the stakeholder perception results (Table 6) since the following two value determinants were the most important: arterial road access and road quality. Such convergence between the empirical models and stakeholders' judgments strengthens the research's conclusions and policy implications, which argue that investing in infrastructure, especially corridors, should be central to efforts to improve infrastructure [10, 11].

CONCLUSIONS

This paper presents strong empirical results indicating that road network infrastructure is one of the factors that contribute to commercial property value in the Ojo Local Government Area of Lagos State. The premises close to arterial roads and the BRT route have rental premiums of 25-60%, and the capitalisation of the hindrance to street quality has produced massive capitalisation effects on property values. The regression analysis supports the idea that infrastructure variables account for more than 70 % of the variation in commercial rental values, after adjusting for property and neighbourhood characteristics. These results confirm the accessibility and bid-rent theories in a Nigerian metropolitan setting and show that infrastructure investment yields high economic payoffs in commercial property markets. This study, therefore, concludes that policymakers and urban planners can achieve sustainable urban development, stable real estate markets, and fair economic growth in Lagos and other African cities by strategically investing in road conditions, connectivity, and public transport corridors.

REFERENCES

1. Behr, D. M., Chen, L., Goel, A., Haider, K. T., Singh, S., & Zaman, A. (2021). Introducing the Adequate Housing Index (AHI): A New Approach to Estimate the Adequate Housing Deficit within and across Emerging Economies. *World Bank Group.*

2. World Bank Group. (2023). Lagos Diagnostic Study and Pathway for Transformation. Retrieved from https://documents1.worldbank.org/curated/en/099062123034023646/pdf/P1750310c8d0390000afa70e5c583aa3b87.pdf

3. Kim, D., & Jin, J. (2019). The Effect of land use on housing price and rent: Empirical evidence of job accessibility and Mixed land use. *Sustainability, 11*(3), 938. doi: 10.3390/su11030938

4. Chen, J. (2025). Real Estate: Definition, Types, How to Invest in It. Retrieved from https://www.investopedia.com/terms/r/realestate.asp

5. ITDP Africa. (2020). Solutions to Nairobi's transport challenges. Retrieved from https://africa.itdp.org/finding-real-solutions-to-nairobis-transport-challenges/

6. LAMATA. (n. d.). Lagos Rail Mass Transit. Retrieved from https://www.lamata-ng.com/train-services/

7. Lucas, K. (2022). Transport Poverty and Social Divisions in African Cities: An Introduction. In R. A. Acheampong, K. Lucas, M. Poku-Boansi, & C. Uzondu, *Transport and Mobility Futures in Urban Africa* (Chapter 6). Springer International Publishing.

8. Ibrahim, I., Daud, D., Wan Ismail, W. I., Maimun, N. H., Yusoff, N. S. (2022). Real Property Investment in Nigerian Cities: Review of Factors Affecting Residential Property Value. *International Journal of Accounting and Finance, 39*(7), 87-97.

9. Colley, N. (2022). Core Real Estate: Opportunities to Enhance Returns and Lower Risk. *CBRE Investment Management.*

10. Litman, T. (2025). Evaluating Transportation Equity Guidance for Incorporating Distributional Impacts in Transport Planning. *Victoria Transport Policy Institute.*

11. Wang, L., Xue, X., Zhao, Z., & Wang, Z. (2018). The Impacts of transportation infrastructure on sustainable Development: Emerging trends and challenges. *International Journal of Environmental Research and Public Health, 15*(6), 1172. doi: 10.3390/ijerph15061172

12. Martens, K. (2021). Equity considerations in transport planning. In *Elsevier eBooks* (pp. 154–160). doi: 10.1016/b978-0-08-102671-7.10634-7

13. Otegbulu, A. (2023). *Property Development and Investment Analysis*. Kindle eBooks.

14. Ebelechukwu, A. O., Victor, O. I., Sunday, O. C., John, O. N., & Wisdom, O. (2024). Transportation Infrastructure Development and Nigeria's Economy: An Empirical Investigation. *International Journal of Social Science Technology and Economics Management, 1*(2). doi: 10.59781/ripi3024

15. Pereira, R. H., & Karner, A. (2021). Transportation equity. In *Elsevier eBooks* (pp. 271–277). doi: 10.1016/b978-0-08-102671-7.10053-3

16. Kaplan, R. S., & Norton, D. P. (2004). *Strategy Maps.* Harvard Business School Press.

17. Newell, G., Chau, K. W., & Wong, S. K. (2009). The significance of Chinese commercial property in an Asian property portfolio. *Journal of Property Investment and Finance, 27*(2), 102–119. doi: 10.1108/14635780910937827

18. Newell, G., & Hsu, W. P. (2007). The significance and performance of retail property in Australia. *Journal of Property Investment & Finance, 25*(2), 147-165.

19. Debrezion, G., Pels, E., & Rietveld, P. (2006). The impact of rail transport on real estate prices: An Empirical analysis of the Dutch housing market. *SSRN Electronic Journal*. doi: 10.2139/ssrn.895270

20. Cervero, R. (2012). *Transit-Oriented Development and Land Use*. New York: Springer.

21. Polzin, S. E. (2004). The Relationship Between Land Use, Urban Form, and Vehicle Miles of Travel: The State of Knowledge and Implications for Transportation Planning. *Centre for Urban Transportation Research.*

22. Droj, G., Droj, L., & Badea, A. (2021). GIS-Based Survey over the Public Transport Strategy: An Instrument for Economic and Sustainable Urban Traffic Planning. *ISPRS International Journal of Geo-Information, 11*(1), 16. doi: 10.3390/ijgi11010016

23. Kaiser, N., & Barstow, C. K. (2022). Rural Transportation Infrastructure in Low- and Middle-Income Countries: A Review of Impacts, Implications, and Interventions. *Sustainability, 14*(4), 2149. doi: 10.3390/su14042149

24. Martínez, L. M., & Viegas, J. M. (2009). Effects of transportation accessibility on residential property values. *Transportation Research Record Journal of the Transportation Research Board, 2115*(1), 127–137. doi: 10.3141/2115-16

25. Lucas, K., Stokes, G., Bastiaanssen, J., & Burkinshaw, J. (2019). Inequalities in Mobility and Access in the UK Transport System. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784685/future_of_mobility_access.pdf