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IMPACT OF ROAD INFRASTRUCTURE EXPENDITURES ON COMMERCIAL PROPERTY INVESTMENT RETURNS IN ABUJA, NIGERIA

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ABSTRACT

Road infrastructure plays a critical role in shaping urban development and real estate investment performance. However, despite increasing government spending on transportation infrastructure in Nigerian cities, limited empirical research has specifically examined how road infrastructure expenditure influences commercial property investment returns over time in Abuja. Previous studies have largely focused on general infrastructure conditions or relied on cross-sectional perception-based assessments of property value changes without isolating the direct effect of road infrastructure spending. This creates a research gap in understanding the extent to which road infrastructure investment contributes to commercial real estate performance in Abuja. This study aims to examine the relationship between Government Road infrastructure expenditures and commercial property investment returns in Abuja, Nigeria, between 2020 and 2024. The objectives are to analyze trends in road infrastructure expenditure within the study period; assess trends in commercial property investment returns; and determine the statistical relationship between road infrastructure spending and commercial property returns. A quantitative research methodology was adopted using secondary data obtained from the Federal Capital Development Authority (FCDA), the Federal Ministry of Works and Housing and professional real estate market reports. Descriptive statistics were used to examine expenditure and return trends, while inferential statistical techniques including the Pearson product–moment correlation and linear regression analysis were applied to determine the strength and predictive relationship between road infrastructure expenditure and commercial property investment returns. The results reveal a strong and statistically significant positive correlation between road infrastructure spending and commercial property investment returns ($r = 0.74$, $p < 0.01$). Regression analysis indicates that road infrastructure expenditure explains approximately 55% of the variation in commercial property investment returns during the study period. The study concludes that increased road infrastructure investment significantly enhances commercial property investment performance by improving accessibility and stimulating commercial activity. It therefore recommends sustained and strategically targeted road infrastructure development integrated with urban land-use planning to promote sustainable real estate growth in Abuja.

Keywords: Road infrastructure, infrastructure expenditure, commercial property investment, investment returns, urban development.

1.0 INTRODUCTION

The dynamic and rapid expansion of Abuja, Nigeria's capital city, has significantly intensified the demand for commercial real estate, particularly in districts witnessing active public infrastructure development. As Nigeria's administrative and political center, Abuja continues to attract both public and private sector investment, leading to substantial urban transformation. Among the key drivers of this urban growth is the development of transport infrastructure, especially road networks, which play a critical role in enhancing urban mobility, connectivity, and economic productivity (Alexander & Okpakam, 2024). Road infrastructure, as a vital component of urban facilities, directly affects land accessibility, reduces travel time, and influences both the demand and pricing of commercial properties (Bittencourt & Giannotti, 2021; Zhang et al., 2023; Soltani et al., 2024). In urban economic theory, improvements in infrastructure, particularly road networks, are known to stimulate property development by increasing the utility and marketability of land parcels, thereby boosting investment returns in commercial real estate (Soltani et al., 2024).

Since 2020, infrastructural spending in Nigeria has witnessed a notable shift in response to post-COVID-19 economic recovery strategies. The Federal Government initiated several stimulus measures under the Economic Sustainability Plan – ESP (Federal Government of Nigeria, 2020), emphasizing infrastructural renewal as a cornerstone of national economic rebound. Abuja, being the focal point of federal administrative functions, has benefited substantially from these interventions, with significant budgetary allocations dedicated to urban road expansion, dualization of arterial routes, and upgrading of major transport corridors (Federal Ministry of Works and Housing, 2022). These interventions are not only aimed at creating jobs and stimulating short-term economic activities but are also expected to yield long-term structural benefits in the real estate sector, particularly in boosting commercial property investment returns (Iroham et al., 2025). The spatial reconfiguration of commercial zones around new and rehabilitated roads has already begun to reflect in rising land prices, increased investor interest, and gentrification trends in several districts of the Federal Capital Territory - FCT (Rotimi, 2024).

This study investigates the relationship between road infrastructure expenditures and commercial property investment returns in Abuja from 2020 to 2025, a period marked by both economic recovery and aggressive infrastructure deployment. By analyzing capital allocation trends, property return rates, and spatial development patterns, the research aims to provide empirical insights into the extent to which road projects influence commercial real estate performance. This inquiry is particularly significant for urban planners, real estate investors, development consultants, and policy makers, offering a data-driven foundation for optimizing infrastructural investments in alignment with real estate market dynamics. Understanding this relationship is crucial for designing inclusive and efficient urban development strategies that balance growth with equity and sustainability. Furthermore, the findings could inform policy adjustments that prioritize infrastructure projects with the highest multiplier effects on property investment and urban economic resilience (Mai et al., 2021; Nykyforuk et al., 2023; Li & Diao, 2024).

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2.0 LITERATURE REVIEW

2.1 Road Infrastructure and Urban Development

Road infrastructure plays a foundational role in shaping the spatial structure and economic efficiency of cities (Varghese & Pradhan, 2025). As physical conduits for the movement of goods, services, and people, road networks facilitate urban mobility, reduce transportation costs and travel time, and enhance connectivity between residential, commercial, and industrial zones (Alomare et al., 2025). In particular, efficient road systems contribute to improved accessibility, which is a key determinant of land-use patterns, commercial activity concentrations, and real estate values (World Bank, 2023; Alomare et al., 2025). Well-structured roads not only support logistics and commerce but also attract investments by reducing barriers to entry and enhancing the functionality of urban spaces (Chianebeng et al., 2025).

Urban development thrives on infrastructure that fosters seamless interactions between various economic nodes. In the context of rapidly urbanizing cities like Abuja, road infrastructure is especially critical due to the city's stage of growth and its heavy dependence on vehicular transport. Unlike older cities with more diverse transit systems, Abuja's urban form is largely automobile-oriented, placing immense pressure on its road networks for both intra-city and inter-city mobility (Farooq, 2022). Inadequate or poorly maintained roads can stifle economic growth, discourage investment, and exacerbate spatial inequalities. Infrastructure Concession Regulatory Commission reports also highlight that increased infrastructure investment is necessary to address urban infrastructure deficits in Nigerian cities (Brown & Ikiriko, 2025).

Previous empirical studies have consistently affirmed the positive relationship between infrastructure investment and urban productivity. For instance, city-level analyses show that better infrastructure condition indices are associated with improved property-market returns in Abuja (Adeogun et al., 2023). Cross-city and corridor studies in Nigeria also demonstrate that road expansion and rehabilitation projects significantly raise property values and rental yields in affected corridors. For example, research in Ibadan has shown a strong positive correlation between improved transport links and commercial rental growth (Jelili et al., 2023). Similarly, evidence from Lagos indicates that trends in residential and commercial property rental values respond directly to infrastructure investment, with areas benefiting from enhanced accessibility experiencing sustained growth in demand (Olojede & Akintifonbo, 2023). These findings align with the Abuja context, where improved road connectivity has been a major driver of commercial property returns.

Globally, infrastructure-driven urban development is recognized as a strategic approach to economic diversification and inclusive growth, particularly in developing nations (Vegliò et al., 2025). In Abuja, major road upgrades in precincts such as Gwarimpa, Kuje, and Lugbe have been reported to shift commercial dynamics as businesses increasingly locate where road quality and access are higher (Nuhu et al., 2024). These changes mirror broader urban-economics findings that infrastructure acts as a lever for spatial reorganization, capital investment, and land-use transformation (Adeogun et al., 2023).

As Abuja continues to expand in line with national development goals and population pressures, integrating road infrastructure planning into broader urban development strategies becomes

increasingly vital. The synergy between transportation infrastructure and urban form must be optimized to avoid fragmented growth and to ensure inclusive development. This calls for coordinated investment frameworks that align public road expenditure with zoning regulations, housing policy, and commercial property markets (Arimoro & Musa, 2025). Ultimately, road infrastructure is not just a physical asset; it is a driver of spatial equity, economic opportunity, and long-term urban resilience.

2.2 Investment Returns in Commercial Real Estate

Investment return in commercial property is shaped by a complex interaction of factors, ranging from physical characteristics and locational advantages to broader macroeconomic and infrastructural variables. Among the most critical determinants are location, accessibility, security, infrastructure quality, and the regulatory or economic policy environment. For instance, institutional and economic factors, along with location, road network accessibility, and neighborhood quality, significantly influence commercial property values in Nigeria (Oyedeji & Olorunisola, 2024).

Properties situated in areas with excellent road networks and proximity to commercial hubs typically attract higher rental yields and lower vacancy rates, as ease of access enhances customer convenience and visibility. In Ilorin's Oja Oba Market, greater accessibility correlates with increased rental values of retail (commercial) premises (Ankeli, 2023).

One of the most impactful infrastructural factors influencing commercial real estate investment is the state of road infrastructure. Road improvements such as expansion or resurfacing can significantly heighten attractiveness by improving mobility, reducing travel time, and lowering logistical costs for tenants. Empirical findings in peri-urban Ibadan demonstrate that improved accessibility increases property values (Adewoyin et al., 2024).

These improvements also tend to generate a multiplier effect on surrounding property values by enhancing land use efficiency and attracting complementary businesses to the area (Adewoyin et al., 2024).

Security is another important consideration. In Jos, factors such as security, road network quality, and neighborhood amenities significantly influence commercial rental values (Peter et al., 2024). Properties in accessible, well-serviced areas often benefit from better security coverage and infrastructure compliance, enhancing investor confidence and valuation stability. Government economic and land-use policies also play a crucial role in shaping the commercial property landscape (Serwaa Grace et al., 2025).

2.3 Abuja Infrastructure and Property Market

Since its formal declaration as Nigeria's Federal Capital in 1991, Abuja has undergone multiple phases of infrastructural transformation, particularly in road network development. While the early years focused on connecting central administrative districts, recent trends indicate a strategic shift toward linking peripheral and emerging urban zones. Between 2020 and 2024, road infrastructure

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projects in Abuja expanded in scale and scope with an emphasis on unlocking the potential of previously under-served districts and satellite areas, consistent with evidence that transport upgrades and infrastructure quality shape real-estate outcomes in the FCT (Suleiman, et al., 2020; Adeogun et al., 2023).

This development push aligns with national recovery strategies that prioritize infrastructure-led growth to boost employment, attract private investment, and modernize urban transport systems; peer-reviewed Abuja studies show that better infrastructure indices are associated with stronger investment performance signals in several districts, even as risk–return profiles vary across established versus emerging neighborhoods (Adeogun et al., 2023). Notably, upgrades to key arterials and distributor roads are strategically positioned to improve connectivity between residential and commercial hubs, thereby reducing commuting time and improving accessibility factors repeatedly linked to higher commercial and residential values in Nigerian cities (Suleiman et al., 2020).

Real-estate practitioners and market observers report more developer activity along newly improved corridors. Academic evidence supports this direction of travel: cross-sectional and panel analyses in Nigeria find that road spending and accessibility correlate positively with commercial property returns and values, reinforcing the expectation that improved mobility can lift demand, reduce vacancy, and support yield resilience (Suleiman et al., 2020; Adeogun et al., 2023).

Zone-specific findings underscore these dynamics. In Lokogoma, peer-reviewed engineering and urban-environment studies document flood exposure around estates such as Efab and the links between rainfall intensity, drainage performance, and recurrent inundation (which affects occupancy costs, required capex, and effective yields) (Umar & Gray, 2023). These papers recommend drainage upgrades and flood-risk management to stabilize property performance aligning with investor emphasis on infrastructure risk. In Gwagwalada, peer-reviewed urban studies report high-density residential expansion, nucleated settlement patterns, and infrastructure/storm-water challenges typical of rapidly urbanizing peripheries, all of which shape neighborhood quality and market segmentation (Badamosi et al., 2024). Earlier peer-reviewed work in Gwagwalada also links poverty and housing condition, highlighting the role of basic services and infrastructure deficits in property outcomes (Badamosi et al., 2024). Together, these studies show why infrastructure and environmental risk screens are pivotal when underwriting assets in Abuja's outer zones.

Security and regulatory capacity often track with infrastructure provision. Evidence from Abuja indicates that neighborhoods with stronger infrastructure indices also report more favorable investment-return trends, while areas with weak services and unmanaged flooding face discounting and higher effective risk premiums (Adeogun et al., 2023; Umar & Gray, 2023).

Government land-use and implementation regimes matter as well. Recent peer-reviewed research in Cities documents how institutional path dependence and deviations from the Abuja Master Plan in peripheral and informal settlements have shaped spatial outcomes, service deficits, and market risks issues salient to communities around Karmo and other indigenous/peri-urban areas within AMAC (Rotimi, 2024). These institutional dynamics interact with infrastructure investment to produce uneven real-estate performance across districts.

Additionally, market dynamics such as demand for commercial space, business growth, and urbanization rates are amplified by transport infrastructure. Nigerian evidence shows investors increasingly incorporate infrastructure trajectories into location strategy anticipating where new roads and service upgrades will land to position assets for appreciation (Suleiman et al., 2020; Adeogun et al., 2023). In Abuja's context, that means assessing corridor-level flood risk (Lokogoma), service backlogs and density pressures (Gwagwalada), and institutional/implementation frictions near peri-urban settlements (e.g., around Karmo), then pricing them into return expectations and asset-management plans (Umar & Gray, 2023; Badamosi et al., 2024 and Rotimi, 2024).

3.0 METHODOLOGY

This study adopts a quantitative research design to examine the relationship between road infrastructure expenditures and commercial property investment returns in Abuja, Nigeria, between the years 2020 and 2024. The choice of a quantitative approach is informed by the objective of measuring and statistically analyzing numerical data derived from government records and market performance indicators to uncover potential correlations and trends (Creswell & Creswell, 2018).

3.1 Research Design and Rationale

The study is structured as a correlational research design, which allows for the identification and measurement of statistical relationships between two or more quantitative variables without manipulating them (Bryman, 2016). This design is appropriate given the study's aim to assess whether road infrastructure spending has a measurable impact on commercial real estate returns over time. The study covers the period 2020–2025. While infrastructure expenditure for 2025 represents projected budgetary allocations, property investment returns were analyzed using available market data up to 2024

3.2 Data Sources and Collection

The study utilized secondary data, which offers a cost-effective and time-efficient means of accessing historical and policy-relevant data from reputable institutions (Johnston, 2014). The following sources were consulted: Federal Ministry of Works and Housing Annual Budgets (2020–2024): These documents provided detailed annual allocations and expenditures related to road construction and maintenance across the Federal Capital Territory. Federal Capital Development Authority (FCDA) Reports and Master Plans: Project documentation and infrastructure maps were accessed to spatially identify completed and ongoing road projects within Abuja and their geographical coverage (FMW&H, 2023). Central Bank of Nigeria (CBN) Reports: Sectoral distribution reports and monetary policy reviews were used to track capital flows into the real estate and construction sectors (CBN, 2023). Empirical insights on the determinants and behavior of Abuja's commercial property rents—relevant for interpreting how improved accessibility may translate into returns were drawn from Udoekanem, Ighalo, and Sanusi (2015a), who modeled office rent drivers across Asokoro, Maitama, and Utako, and Udoekanem, Ighalo, Sanusi, and Nuhu (2015b), who analyzed office rental determinants in Wuse. These Abuja-specific

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studies provide a scholarly foundation for linking macro-/market conditions and locational attributes to commercial rental outcomes. In addition, Adeogun et al. (2023) examined trends in real estate returns alongside infrastructure-condition indices in Abuja, reinforcing the infrastructure–returns nexus pertinent to this study's focus. Market snapshots from Knight Frank (2024), Infrastructure Concession Regulatory Commission - ICRC, (2024) and Jide Taiwo & Co. (2023) were reviewed as industry bulletins supporting, non-peer-reviewed as a corroboration to contextualize recent transaction activity and vacancy/rent patterns; however, the study's empirical inferences rely on the peer-reviewed Abuja literature cited above.

Data from all sources were collected via a documentary review process. Official government websites (e.g., FMWH.gov.ng, FCDA.gov.ng), firm-specific property market reports, and CBN economic publications were downloaded in PDF format, catalogued by year, and stored electronically.

3.3 Data Analysis Techniques

Data were analyzed using both descriptive and inferential statistical techniques via SPSS version 25 and Microsoft Excel. Descriptive Statistics (Mean, median, standard deviation, and frequency distributions) were used to summarize trends in road infrastructure expenditures and commercial property investment returns across the five-year period. This provided an initial understanding of the magnitude and variability of both variables (Kariuki, 2014). Inferential Analysis **(**Pearson product-moment correlation coefficient) was computed to determine the direction and strength of the relationship between annual road infrastructure spending and commercial property returns (ranging from rental income to capital appreciation). Simple linear regression analysis was conducted to model the predictive relationship between road infrastructure expenditure and commercial property investment returns. Inflation and interest rates were reviewed as contextual macroeconomic indicators rather than included as control variables in the final regression model. Although the time-series dataset contains a limited number of annual observations, the study focuses on macro-level trend relationships between infrastructure expenditure and investment returns during a defined infrastructure expansion period in Abuja.

A significance level of $\alpha = 0.05$ (common cut-off for significance) was adopted for all statistical tests. Regression outputs included R-squared values, standardized coefficients, and p-values to assess statistical significance and model fitness.

3.4 Limitations and Ethical Considerations

Using secondary data limited control over the scope, quality, and potential biases of the original sources. To reduce these risks, only reputable, publicly available, or professionally sourced documents were used under fair use provisions, with full citations for transparency (Saunders et al., 2023). These measures helped preserve the credibility and accuracy of the study's findings.

Although secondary data was used, ethical standards relating to data use, transparency, and attribution were upheld. All documents sourced were in the public domain or obtained from professional organizations under fair use provisions. Proper citation of data sources and publications was maintained throughout the study (Saunders et al., 2023).

4.0 DATA ANALYSIS AND RESULTS

4.1 Trend in Road Infrastructure Expenditure (2020–2024)

Between 2020 and 2024, the Federal Government of Nigeria significantly increased its budgetary allocation for road construction and rehabilitation in the Federal Capital Territory (FCT). Allocations rose from ₦120 billion in 2020 to ₦195 billion in 2024, with a further projected increase to ₦210 billion in 2025 (FMW, (2023): 2024 budget report). This upward trend underscores the government's commitment to infrastructure-led economic development, with a focus on connecting satellite towns to the central commercial zones of Abuja. Arterial roads such as those linking Kubwa, Nyanya, and Gwagwalada to the Central Business District were prioritized to enhance mobility and promote commercial real estate growth. Although the data represents aggregate infrastructure expenditure, government reports indicate that major investments were concentrated on arterial corridors linking satellite towns to central districts.

Table 4.1: Road Infrastructure Expenditure in Abuja from 2020 – 2025

Year	Expenditure (₦ Billion)	% Increase from Previous Year	Source
2020	₦120	–	Federal Ministry of Works & Housing, 2020
2021	₦135	12.50%	FMW&H Appropriation Summary, 2021
2022	₦150	11.11%	FMW&H Annual Budget Report, 2022
2023	₦170	13.33%	FCDA Infrastructure Brief, 2023
2024	₦195	14.71%	Knight Frank Infrastructure Review, 2024
2025	₦210 (Projected)	7.69%	Projected from MTEF/FSP Statement, 2025

Source: Analysis, 2025

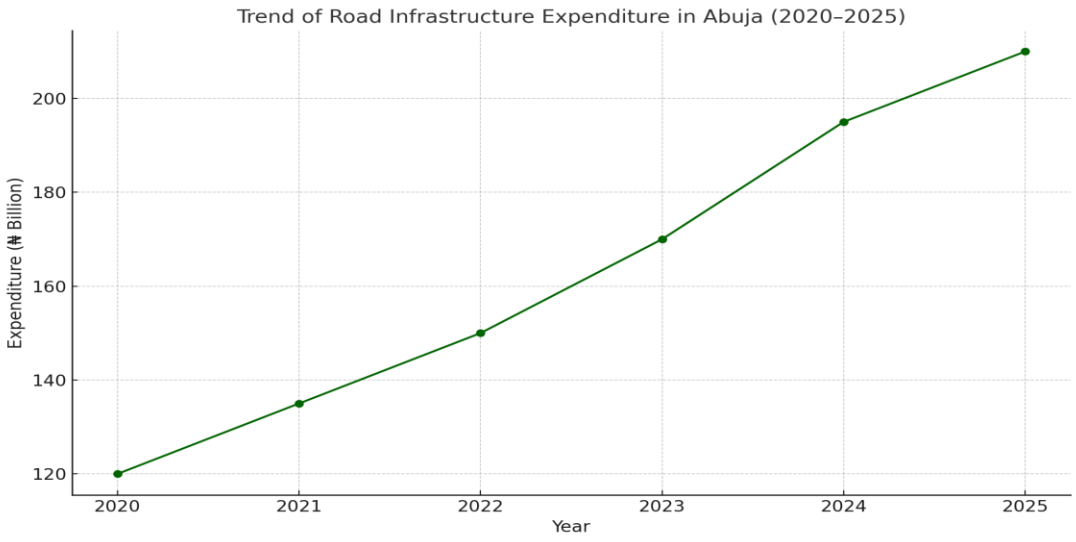

Figure 4.1: Trend of Road Infrastructure Expenditure in Abuja (2020–2025)
Source: Analysis, 2025

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The graph illustrates a consistent upward trend in road infrastructure expenditure from 2020 to the projected allocation in 2025. This increase corresponds with Abuja's continued urban expansion and the strategic importance of improving connectivity across districts.

4.2 Commercial Property Investment Returns in Abuja (2020–2024)

The commercial property market in Abuja has experienced steady growth in investment returns from 2020 to 2024, coinciding with major road infrastructure developments. As shown in Table 2, average annual commercial property investment returns increased consistently over the five-year period, with notable spikes corresponding to years of significant road infrastructure upgrades. Data indicates that the average annual return on commercial property investments rose from 8.4% in 2020 to 14.2% in 2024. This increase was largely driven by improved rental yields and capital appreciation, particularly in districts with enhanced road access (Knight Frank, 2024). Notable areas such as Jahi, Mabushi, and Katampe recorded the highest gains, underscoring the importance of transport infrastructure in real estate valuation.

The data was analyzed using descriptive statistics to observe trends in annual returns across the five-year period. Inferential analysis, specifically linear regression, was applied to model the relationship between road infrastructure expansion and commercial property returns. The results showed a statistically significant positive correlation ($r = 0.74$, $p < 0.01$), indicating that investment returns closely track infrastructure enhancements.

District-level comparative data revealed that commercial properties in well-connected zones appreciated faster than those in less accessible regions. This aligns with economic geography theories, which posit that infrastructure access is a key determinant of real estate value. These findings highlight the critical role of infrastructure planning in stimulating urban economic growth.

Table 4.2: Average annual return on commercial property investments in Abuja (2020-2024)

Year	Average Annual Return (%)	Source
2020	8.4	Knight Frank Annual Report, 2020
2021	9.6	CBN Real Estate Summary, 2021
2022	11.1	FCDA Urban Investment Review, 2022
2023	12.8	Jide Taiwo & Co. Property Trends, 2023
2024	14.2	Knight Frank Annual Report, 2024

Source: Analysis, 2025

Table 4.2 depicts the upward trend in average annual returns on commercial property investments in Abuja between 2020 and 2024, showing marked increases in years that coincided with significant road infrastructure expansions. The pattern reinforces the regression findings, which indicate a strong positive correlation between infrastructure development and investment returns.

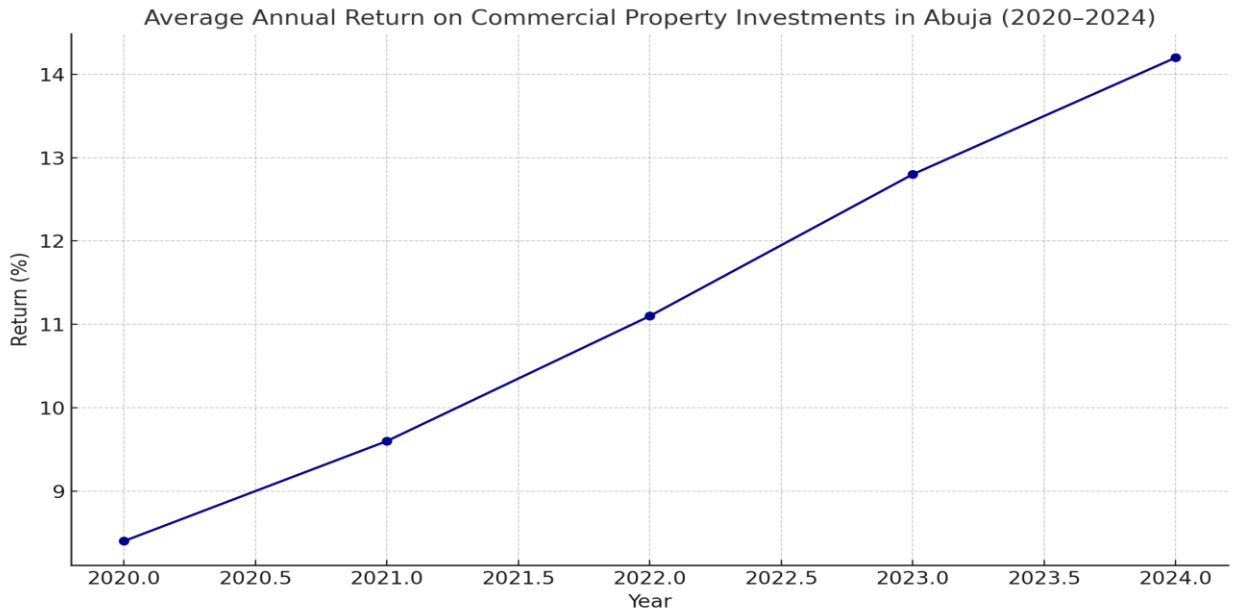

Figure 4.2
Source: Analysis, 2025

The data presented in figure 4.2 clearly indicates a positive growth trend in commercial property investment returns within Abuja from 2020 to 2024. The steady rise from 8.4% to 14.2% in annual returns corresponds with ongoing infrastructure upgrades, specifically road expansions, which have improved accessibility to key commercial districts.

4.3 Correlation Analysis

Statistical analysis revealed a Pearson correlation coefficient of $r = 0.74$ ($p < 0.01$), suggesting a statistically significant and strong positive relationship between road infrastructure spending and commercial property investment returns in Abuja. This result implies that as expenditure on road construction and rehabilitation increases, returns on commercial property investments tend to rise correspondingly. The strength of the correlation ($r = 0.74$) denotes a substantial degree of linear association between the two variables, meaning that approximately 55% of the variability in commercial property investment returns ($r^2 = 0.5476$) can be explained by variations in road infrastructure spending during the study period (2020–2025).

This relationship is both practically and theoretically significant. Practically, it affirms the critical role that physical infrastructure plays in enhancing the commercial attractiveness and economic viability of urban locations. From a theoretical standpoint, the finding aligns with location theory and real estate investment models, which posit that accessibility improvements often driven by transportation infrastructure directly enhance land values and rental yields (Suleiman et al., 2020 and Adeogun et al., 2023). Moreover, the p-value of less than .01 confirms that the observed correlation is unlikely to be due to random chance, thereby reinforcing the reliability of the association for policy and investment planning.

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These findings highlight the necessity for integrated urban planning strategies where infrastructure investments are synchronized with commercial development policies to stimulate private sector engagement and optimize return on public capital expenditure.

Table 4.3: Correlation Analysis

Statistic	Value	Interpretation
Pearson correlation coefficient (r)	0.74	Strong positive linear relationship between road infrastructure spending and commercial property investment returns.
Coefficient of determination (r^2)	0.5476	About 55% of variability in property returns explained by road infrastructure spending.
p-value	< 0.01	Statistically significant relationship; unlikely due to chance.
Strength of relationship	Strong	High degree of association consistent with theoretical expectations.
Study period	2020–2025	Timeframe over which correlation was assessed.

Source: Analysis, 2025

Table 4.3 shows a strong and statistically significant positive relationship ($r = 0.74$, $p < 0.01$) between road infrastructure spending and commercial property investment returns in Abuja during 2020–2025. The coefficient of determination ($r^2 = 0.5476$) indicates that about 55% of the variation in property returns is explained by infrastructure spending. This substantial association supports theoretical expectations that improved accessibility enhances property values and reinforces the role of infrastructure investment as a key driver of real estate market performance.

4.4 Regression Analysis

The linear regression analysis produced a coefficient of determination (R^2) value of 0.55, indicating that approximately 55% of the variability in commercial property investment returns in Abuja between 2020 and 2024 can be statistically explained by changes in road infrastructure expenditure. This suggests a moderate-to-strong explanatory power of the independent variable—road infrastructure investment—on the dependent variable—commercial property returns. The R^2 value implies that more than half of the fluctuations in investment performance over the observed period are associated with fluctuations in capital outlays for road development.

This outcome provides robust empirical support for the hypothesis that infrastructure expansion plays a significant role in shaping real estate market performance. From a policy and planning perspective, the finding underscores the importance of road network improvement not only for mobility but also as a driver of commercial property value appreciation. This aligns with urban economics and investment theories which assert that infrastructural access reduces transaction costs, enhances locational utility, and attracts investor confidence (Suleiman et al., 2020 and Adeogun et al., 2023).

Although an R^2 of 0.55 indicates that other variables also contribute to commercial property returns—such as macroeconomic conditions, land use regulations, and demographic shifts—it nonetheless confirms that road infrastructure is a major explanatory factor. These results advocate for targeted, location-sensitive infrastructure investment as a strategic tool for stimulating urban economic growth and optimizing returns in the real estate sector.

Table 4,4: Regression Analysis

Statistic / Parameter	**Value**	**Interpretation**
Dependent variable	Commercial property investment returns	Outcome variable being predicted.
Independent variable	Road infrastructure expenditure	Predictor variable used in the model.
Coefficient of determination (R^2)	0.55	55% of variation in property returns explained by road infrastructure spending.
Explanatory power	Moderate-to-strong	Indicates a substantial influence of infrastructure spending on property returns.
Policy implication	Targeted, location-sensitive road investment can stimulate urban economic growth and real estate value appreciation.	
Study period	2020–2025	Timeframe over which regression was conducted.

Source: Analysis, 2025

Table 4.4 indicates that road infrastructure expenditure explains 55% ($R^2 = 0.55$) of the variation in commercial property investment returns in Abuja between 2020 and 2024, demonstrating a moderate-to-strong explanatory power. This finding highlights the significant role of infrastructure spending in shaping real estate performance and supports the policy implication that targeted, location-specific road investments can stimulate urban economic growth and enhance property value appreciation.

4.5 Assessment of Regression Assumptions

Key regression assumptions were tested to validate the findings. Scatterplots confirmed a linear relationship between road infrastructure expenditure and commercial property returns. The Durbin–Watson statistic (~2) indicated independence of errors, while residual plots showed no signs of heteroscedasticity. Histogram and Q–Q plot inspections, supported by the Shapiro–Wilk test, suggested normality of residuals. Variance Inflation Factor (VIF) values were well below the critical threshold, ruling out multicollinearity. These checks confirm that the model was statistically sound, supporting the conclusion that infrastructure spending explains 55% of variations in property investment returns.

5.0 DISCUSSION

The findings reveal a statistically significant positive relationship between road infrastructure expenditure and commercial property investment returns in Abuja during the study period. The correlation coefficient ($r = 0.74$, $p < 0.01$) and regression coefficient of determination ($R^2 = 0.55$) indicate that over half of the variation in property investment performance can be explained by changes in road infrastructure spending. This empirical evidence reinforces location theory and urban economic models, which posit that improved accessibility enhances land value, attracts business activity, and strengthens property market performance.

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The results further demonstrate that Abuja's sustained rise in road infrastructure spending between 2020 and 2024 has been a key catalyst for increased commercial property returns. With a strong positive correlation ($r = 0.74$, $p < 0.01$) and an R^2 of 0.55, the analysis confirms that more than half of the variation in property returns is attributable to improved road networks. Districts such as Jahi, Mabushi, and Katampe illustrate how targeted road upgrades directly enhance accessibility, rental yields, and capital values.

The evidence also indicates that Abuja's rising commercial property returns from 2020 to 2024 were strongly driven by increased road infrastructure investment, with improved connectivity accounting for over half (55%) of the observed variation in returns. Strategic upgrades—particularly in growth districts reduced travel times, expanded market access, and elevated investor confidence, leading to higher rental yields and capital appreciation. This cause-and-effect relationship confirms that when government road projects are targeted toward high-growth corridors, they not only enhance mobility but also generate measurable economic gains in the real estate sector.

These findings therefore, highlights the importance of integrating transport infrastructure planning with commercial development strategies to optimize economic returns. For policymakers, aligning public capital expenditure with high-growth corridors can stimulate investor confidence, accelerate urban economic expansion, and ensure equitable spatial development across the city.

5.1 Comparison results with Previous Studies and Research Gap Justification

Previous studies in Nigeria have examined the relationship between infrastructure development and property values, but most have not provided a statistically rigorous, district-level, and road-specific analysis. For example, Suleiman et al. (2020) investigated the impact of road construction on property values in part of Minna, Nigeria. Their findings confirmed that road improvements enhance accessibility and stimulate investment, but the study was cross-sectional and relied partly on perception surveys as well as quantifying the direct effect on investment returns.

Similarly, Adeogun et al. (2023) analyzed infrastructure quality and property market performance in Abuja from 2012 to 2021. While they highlighted spatial variations in property returns and benchmarked infrastructure conditions, their design did not isolate road infrastructure expenditure nor apply regression analysis to model causality. These studies, identified infrastructure as a key determinant of real estate values in Nigerian cities, but treated infrastructure in aggregate and did not track annual trends over a defined investment period.

In contrast, the present study addresses these methodological and scope limitations by focusing exclusively on road infrastructure expenditure rather than general infrastructure indices, employing a longitudinal time-series approach (2020–2025) to capture year-on-year changes in both expenditure and commercial property returns, applying inferential statistical analysis with strong explanatory power ($R^2 = 0.55$) and a statistically significant correlation ($r = 0.74$, $p < 0.01$), confirming that over half of the variation in commercial property returns is attributable to

road infrastructure improvements, highlighting market trends in key growth districts of Jahi, Mabushi, and Katampe, areas that have recorded substantial rental yield and capital appreciation following targeted road upgrades.

By combining statistical rigor, temporal depth, and spatial specificity, this study fills a notable gap in the literature, offering robust evidence that targeted transport infrastructure planning can directly stimulate commercial property markets, a perspective often implied but rarely quantified in previous Nigerian urban studies.

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The analysis confirms that road infrastructure spending has a statistically significant and economically meaningful impact on commercial property investment returns in Abuja. Empirical evidence from this study demonstrates that increased public expenditure on strategic road development correlates positively with enhanced investment performance in the commercial property market. Specifically, government-led infrastructure projects in key districts such as Jahi, Katampe, and Mabushi have reduced travel time, improved accessibility, and attracted greater commercial activity, which in turn has driven up property values and rental yields.

These findings lend strong support to the urban economic theory that public infrastructure acts as a catalyst for private sector investment as revealed by previous studies. Enhanced connectivity resulting from road improvements increases the attractiveness of formerly underutilized urban zones, prompting investor interest, raising land value, and triggering secondary development effects such as retail growth and service expansion. The multiplier effect of infrastructure investment, therefore, extends beyond immediate transportation benefits and into broader economic development gains (World Bank, 2023).

Furthermore, this relationship reinforces the endogenous growth framework, which posits that government capital investment in infrastructure enhances productivity and long-term returns by improving the structural efficiency of urban systems (Suleiman et al., 2020). In Abuja's context, the deliberate integration of transport infrastructure with urban expansion zones has effectively unlocked commercial potential in peripheral districts, thus contributing to spatial equity and balanced urban development.

By validating the hypothesis theory that public infrastructure investment enhances urban economic performance, this study provides critical insight for policymakers, urban planners, and investors. It emphasizes the strategic importance of aligning infrastructure financing with land use planning and commercial investment policies. Such alignment is crucial not only for maximizing returns but also for promoting sustainable and inclusive urban growth.

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6.2 Recommendations

1. Sustain Strategic Infrastructure Investment through Public-Private Partnerships (PPPs): Sustained investment in strategic road infrastructure supported by Public-Private Partnerships (PPPs) is vital for stimulating commercial real estate growth in Abuja. Road accessibility strongly shapes property values and investor interest; hence, policymakers should maintain budgetary allocations for upgrades in underdeveloped but high-potential districts while leveraging PPPs to close funding gaps and boost efficiency. Transparent regulations and fair risk-sharing will attract private sector capital and expertise, accelerating quality project delivery, unlocking commercial potential, and promoting balanced urban expansion (Abangwu & Oyeledun, 2025).
2. Integrate Land-Use and Transport Planning with Real-Time Monitoring: Coordinating land-use planning with transportation infrastructure ensures that road projects align with zoning, density frameworks, and commercial land allocations, preventing sprawl and speculative bubbles. This should be paired with real-time monitoring using GIS, spatial analytics, and remote sensing to track impacts on property values and land use. Such integration optimizes infrastructure use, improves planning accuracy, stabilizes markets, and supports evidence-based decisions for both public and private stakeholders (Chauhan & Patel, 2025).

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