

Assessment of Residential Real Estate Investment Performance in Lafia Metropolis, Nigeria

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Abstract

Investors are expected to be guided through investment performance measurement and analysis in order to safeguard against potential loss of investment returns or the capital invested. Whereas residential real estate (RRE) constitutes a significant part of the portfolios of individual and institutional investors across the globe, the assessment of risk-return performance of RRE investment in Nigeria generally has not been well researched. Investors in real estate (RE) in the Lafia city of Nasarawa State, like other cities in Nigeria, still rely on mere intuition, sales comparison and the rule of thumb in real estate investment decisions-making. Consequently, these ill-informed investors often venture into poorly conceived and subsequently financially disastrous real estate investment projects thereby failing to achieve their desired investment objectives. Hence, this research was conducted to evaluate the performances of RRE investment in Lafia metropolis of north-central Nigeria with a view to guiding existing and potential real estate investors and practitioners in the region in making informed property investment decision. A survey research design was adopted to collect transacted residential property value data from estate surveying and valuation firms as well as reputable estate agent offices in the study area. Mean scores, property value index and holding period return model were used to analyse the rental/capital value indices and total return performance respectively. The modified value-at-risk model was used to assess risk while the modified Sharpe ratio was used to evaluate the risk-return performance of RRE investment performance in the study area. The research findings revealed, among others, a progressive increase in rental and capital values of RRE within the study period. RRE investment showed an average rental growth of 6.8% per annum and capital value growth of 9.4% per annum. On the basis of investment returns, it was found that Angwan Doka outperformed other selected neighbourhoods in the study area with an average mean total return and risk-adjusted return of 13.76% and 0.80% per annum respectively while Shabu underperformed other locations with average mean total return and risk-adjusted return of 12.17% and 0.55% per annum. The study recommended, among others, that potential real estate investors should consider investing in residential real estate in Angwan Doka since this location gives higher total and risk-adjusted returns on residential property investment relative to other locations in the city.

Keywords: Real estate, property, investment performance, risk-return, Nigeria

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01.0 INTRODUCTION

The number of investment assets is increasing globally with a wide range of alternatives on which funds can be committed in anticipation of future benefits. Blackledge (2009) gave a list of investment options on which investors could choose to place their monies. They include but not limited to goods and chattels, insurance products, special savings, unit trusts and investment trusts, stocks and shares, currencies and commodities, and real estate or property. Investment is often used to refer to the present commitment of funds to any of the above aforementioned investment vehicles for a period of time with the aim of deriving future benefits or returns as a compensation for the investor's capital invested, the time within which the money would be tied down, fall in the purchasing power of money due to inflation and uncertainty (Reilly & Brown, 2011). It is obvious that real estate (RE) is just one out of the many investment opportunities open to potential investors globally. Shapiro et al. (2013) considered every purchase of real estate asset as an investment; whether it is meant to secure an income to the owner in the form of periodic rent or for owner occupation. The benefit in the case of owner occupation would be the annual value of the occupation.

It has been observed by Garay (2016) that RE formed a significant proportion of the world's wealth and still forms an essential asset in the portfolios of institutional investors. Over the years, real estate has gained wide recognition as an alternative investment asset that has distinguished itself among the numerous investment assets in the world. Real estate possesses unique characteristics; some classes of RE investors enjoy tax shelter, RE is generally regarded as a good hedge against inflation and a significant asset for portfolio diversification (Kalu, 2001). The correlation between RE investment return and the returns on other investment assets such as stocks and shares has been

described as an imperfect one thereby helping investors to minimise portfolio's unsystematic risks (Nittayagasetwat & Buranasiri, 2016). The two main classes of real estate investment assets are securitised (indirect) and unsecuritised (direct) real estate investments. While the former is used to investment in property stocks and shares, the latter refers to the direct acquisition or development of property for let, lease or outright sales. There are several spectra of direct real estate investment ranging from residential, commercial, to industrial real estate investment. This research focuses on the performance of direct real estate investment, specifically RRE investment.

The major goal of any investor is usually to optimise the return on investment whilst minimising investment risks and to achieve this goal, investment performance analysis becomes significant (Hargitay & Yu, 1992). Oyewole (2014) submitted that the significance of real estate investment measurement has become important due to the increasing quest for efficient investment decision-making and the need to protect investment returns against the ravage of risks. Investment performance analysis is defined by Feibel (2003) as the systematic quantification of the results achieved by investor for investing in investment asset. It is a powerful tool for investors in decision-making because the information emanates from performance analysis is fundamental to investment decision making process. As important as RE investment performance analysis is, majority of investors in Nigerian real estate sector still rely heavily on mere intuitions from sales comparison to make investment decisions.

Oyewole (2013) recommended that the decision to invest in real estate should be guided by objective, quantifiable evidence and sound analytical procedures rather than mere intuitions. The analysis of historic performance of investment is expected to play a vital role in the decision-making process and to provide an essential tool for taking more informed investment decisions. As noted by Devaney (2014), the subject of investment performance analysis has been widely discussed in the field of finance over the decades. Oyewole (2013), Salihu et al. (2020) and Agava et al. (2021) observed that the subject of investment performance analysis has been explored mostly in countries whose socio-political and economic climates are different from Nigeria. Thus there is need to embark on extensive research on the subject with a view to understanding the peculiarity of Nigeria's real estate investment market. The study of real estate investment performance (REIP) analysis in Nigeria began notably in the late 1990s (Agava et al., 2021). Among the early studies on REIP in Nigeria are Olaleye (2000) and Bello (2003) and thereafter, a number of related studies on the subject have been carried out.

Majority of the studies on REIP in Nigeria mostly focused on the south, east and western Nigerian real estate markets while leaving the northern Nigerian property market less explored. Even the few related studies conducted in the northern Nigeria were found to have focused majorly on Abuja property market. It has therefore become pertinent to expand the existing body of knowledge on this topic for wider inclusions and paying more attention to the northern Nigeria real estate market. Thus, this study focuses on the performance of residential real estate investment in Lafia (the capital city of Nasarawa State) in the north-central Nigeria. Nasarawa State shares a major geographical boundary with Abuja through Karu local government area of the state. A conurbation has developed from the expansion of Karu town and Abuja. In fact, New Nyanya and New Karu both in Nasarawa State are often loosely considered by many people as parts of Abuja metropolis. Many people whose workplaces are in Abuja reside in these Nasarawa suburbs including Lafia due to their proximity to Abuja and the fact that cost of residential accommodation in Abuja is higher compare to these proximate towns of Nasarawa State. This push-pull phenomenon or force has created and attracted investment opportunities in residential real estate in the cities of Karu, Keffi, and Lafia all in Nasarawa State. Aliero et al. (2022) noted that the poor access to real estate market data especially in developing economy, such as Nigeria, is due to the imperfect characteristic of the property market. Thus potential investors often rely on information based on speculations for decision-making. The potential danger of this approach to investment decision-making is the non-achievement of the desired result or even loss of investment. Thus, investors should be equipped with the requisite information that would guide them towards making efficient investment decisions. This information can be derived through investment performance analysis. Kalu (2001) has suggested that in order to ensure an efficient property investment strategy, the evaluation of the performance of the investment asset(s) on regular basis is essential in order to gain adequate insight into the actualisation or otherwise of the investor's investment goal(s).

1.1 Statement of Research Problem

The real estate market has been described as imperfect and dynamic one. Thus, real estate investment decision-making is made a complex human cognitive process with regard to risks and uncertainties in prices and returns (Kauškale & Geipele, 2017; Oba & Moses, 2016). Specifically, Domian et al. (2015) noted that whereas residential real estate forms a significant part of investors' portfolios, studies on the performance of RRE investment are limited. Investors in RE especially in developing economies, Nigeria inclusive, usually take decisions guided by mere intuition and the rule of thumb (Oyewole, 2013; Salihu et al., 2020). Consequently, these ill-informed investors often venture into poorly conceived and subsequently financially disastrous real estate investment projects thereby failing to achieve their desired investment objectives; which are to maximise returns, minimise risk and sustain the investment. Whereas real estate investment has continued to attract attention in the city of Lafia due to its proximity to Abuja, the Nigeria's capital territory, the usefulness of investment performance evaluation in real estate investment decision is yet to be appreciated by many investors. As the number of investors continues to grow substantially in this emerging real estate market niche, understanding the real estate investment return and risk characteristics in these markets has become very essential.

1.2 Aim and Objectives

This study analyses the historic performance of RRE investment in Lafia metropolis in order to furnish investors and other stakeholders in real estate business with information on the dynamics of RRE rental and capital values, return on investment and risk-return performances in the city of Lafia. The outcome of the study would be a guiding tool for real estate investors while taking investment decisions. The objectives of the study are to analyse the trend in rental and capital values performances of RRE and to evaluate the total and risk-adjusted returns performance of RRE investment in Lafia. This approach is guided by one of the Penny (1980)'s recommendations that, in order to adequately evaluate investment performance, the level of risk must be considered with the investment return and to achieve this, there is

need for an index of performance which incorporates both risk and return in a single number. The index of risk-return performance measurement of RRE investment used in this study is the modified Sharpe ratio (mSR). This is due to the non-normality nature of RE returns distribution as reported by Favre and Galeano (2002), and Gregoriou and Gueyie (2003) as well as Amédée-Manesme et al. (2017). According to Penny (1980), since real estate is a long-term investment, performance measurements should cover a period of at least five (5) years. The report of this study is divided into six sections. Following the introduction is the literature review, which explains the concept of RE investment performance analysis. Section three is the research methodology followed by the results of the research. Section five discusses the research findings while the conclusion and recommendations of the study are presented in the final section.

02.0 LITERATURE REVIEW

Investment performance analysis is not new because it has been carried out on investments such as gilts and equities for several decades now. However, its application in the field of real estate investment is still emerging in many developing economies of the world, including Nigeria (Agava et al., 2021). This section provides an understanding of investment performance generally and real estate in particular. It gives an overview of real estate investment performance measurement techniques and then reviews some related studies on the topic.

2.1 Concept of Real Estate Investment Performance Analysis

The operational definition of investment performance analysis used in this study is adapted from Feibel (2003) to mean ‘the quantification, interpretation and evaluation of the results achieved by investing in an asset as well as the level of the risk associated with the achievements to aid decision-making.’ It is concerned with the assessment of past performance in order to shape future investment strategies. The rationale for investment performance analysis generally stems from the need to examine the investor’s past achievements to aid future strategies. As stated by Kalu (2001), real estate investment performance analysis is needed for effective communication among portfolio managers or trustees and investors, ensuring accountability, measuring actual performance of investment compared to investor’s goal and a tool for future investment decision. Ogunba (2013) added that investment performance analysis is required for the purpose of comparing the performance of different categories of investment assets. The analysis of historic performance of investment is expected to play a vital role in investment decision process and guide investors in taking informed investment decisions. As stated by Morrell (1991),

“Performance analysis is analogous to the doctor who records information from a patient on heart rate, blood pressure and so on. The data collected provides some assessment of the patient’s health; it helps to diagnose what is wrong and thus provides an input to the choice of treatment; and it helps to measure the effectiveness of any medicine prescribed. Similarly, the analysis of past investment returns can provide an assessment of the well-being of a portfolio or asset; it can diagnose the reasons for good or poor performance, and it can help to measure the impact of any corrective action”.

The results of historic performance analysis often reveal invaluable information on the risk and/or return characteristics of an individual investment asset and/or portfolio. Such information is helpful to real estate investors because of its long-term nature. Finlay and Tyler (1991) reported that the analysis of investors’ portfolios in the United States (US) became a serious concern during the 1950s and 1960s leading to the first research on the topic by the Bank Administration Institute (BAI). The BAI’s study recommended the use of time-weighted return (TWR) as performance measurement index and the variability (variance) of TWR as measure of investment risk. Subsequently in 1970 a working group was set up by the Society of Investment Analysts (SIA), United Kingdom (UK) to study the report of BAI on investment performance measurement for adoption (Bain, 1996). Based on the report of the SIA working group submitted, SIA expressed concern on the complexity of the TWR computation thus recommended that Money-weighted return (MWR) be used to measure investment performance. These earliest studies on investment performance measurement focused solely on pension funds and other financial investment assets excluding real estate. It was not until three decades after when attention was given to the need for real estate investment performance measurement and analysis (Agava et al., 2021). This setback was attributed majorly to the absence of a reliable index of real estate market values at this early development in investment performance measurement techniques (Bain, 1996).

2.2 Real Estate Investment Performance Measurement Techniques

Many techniques of measuring investment performance have been identified in literature. Useful reviews of these techniques, in real estate context, are given by Finlay and Tyler (1991), Morrell (1991), Kalu (2001) and Ogunba (2013). For illustration, Finlay and Tyler (1991) grouped these techniques into three classes: (i) those techniques that measure investment returns only such as income return, capital return, MWR, TWR, and the internal rate of return (IRR) (ii) techniques that measure investment risk only such as historic risk factor, variance, standard deviation and Beta coefficient; and (iii) combined measure of return and risk techniques such as coefficient of variation, Sharpe index or ratio, Sortino index, Treynor index, and Jensen index. In this study, four investment performance measurement techniques are adopted to analyse the performance of RRE investment in Lafia. The first is rental/capital value index which shows the performance of investment on the basis of the observed trends in rental value growth and capital appreciation. Second technique is the time-weighted return, used to proxy the total return on investment. The level of investment risk is measured by the third technique which is the modified value-at-risk (mVaR) model. Finally, the risk-adjusted return performance of investment is measured using the modified Sharpe ratio.

Higgins (2017) noted that residential real estate investment has become an attractive investment asset among Australian private investors owing to its uniqueness; RE is a good source of debt financing, provides tax advantage and commanding attractive return on investment. However, the author questioned the traditional technique for measuring risk which may not fully reflect extreme downside

volatility of returns. He recommended that the downside risk should be treated separately from the traditional standard deviation risk evaluation.

2.3 Studies on Residential Real Estate Investment Performance Evaluation

This subsection reviews some selected studies on residential real estate investment performance conducted within and outside the shore of Nigeria. This is aimed at furnishing the readers with information on the works that have been done in this field, the authors, locations, methodologies, findings and some recommendations. Thus, this study attempts to answer the question arising from the review regarding what is left undone with a view to expanding the existing literature on real estate investment performance analysis. Agava et al. (2021) attempted a classification of previous studies on real estate investment performance into: studies that compared the performances of direct real estate investment on the basis of property types, studies that compared the performances of direct real estate with indirect (securitised) real estate investments and those that compared the performances of real estate investments (direct or indirect) with investment in stocks and shares. The focus of this study is on direct residential real estate investment performance. As such, the studies reviewed are those related to residential real estate investment.

2.3.1 Related Studies outside Nigeria

In the developed economies such as the UK, US, China, and Australia, from the available literature in this field, lesser attention has been given to the analysis of residential real estate investment performance as researchers focused majorly on commercial real estate investment or REITs. Few of such studies are reviewed in this subsection. The performance of the US securitised and unsecuritised RE investment was investigated by Kerrigan (2014). The study compared the performances of stocks, bonds, and Treasury Bill investments. Transaction data on these investment assets, covering a time period of 29 years (1983-2012), were collected and analysed. A number of performance metrics were used to analyse the data collected. The cumulative wealth index was used to compare the total return of each investment asset, Treynor and Sharpe ratios were used to evaluate the risk-adjusted returns of the assets and correlation analysis performed to examine the relationship between the assets' performances. The study found that although real estate investment trusts (REITs) recorded the best performance among these assets on the basis of total returns, residential and retail properties outperformed other assets on the basis of risk-return. The study further revealed an increasing trend in the correlation between ordinary stocks and REITs within the study period. The study recommended, among others, that investors with sufficient resources should diversify their portfolio with private direct real estate to ensure return maximisation while reducing risk.

Shao et al. (2015) assessed the house price returns and risks characteristics in Sydney, Australia using individual property sales data to develop a hybrid model for measuring the aggregate house price growth. The findings of the study showed that RE in the central business areas (CBDs) with three or more bedrooms outperformed other types of residential properties as well as the aggregate residential real estate market. Similarly, Hill and Melser (2017) analysed the return, risk as well as the diversification potential of RRE in Sydney, Australia. Flexible spline hedonic (FSH) models were estimated from the large data set of RRE rentals and prices in Sydney covering 2002 to 2014. The total returns and yields on RRE for the study period were further estimated with the FSH models. The findings revealed that there was variation in returns and their volatility and that residential real estate exhibited a significant diversification potential.

The return and risk-return performances of RRE in 10 selected cities in the United States were carried out by Domian et al. (2015). The study adopted the capital asset pricing model (CAPM), used the capital asset pricing models (CAPM), Jensen's model and market model to estimate excess return and beta. The study found significant variations in return and risk characteristics of residential real estate across the selected cities. Eichholtz et al. (2021) examined the performance of RRE investment in Paris and Amsterdam using price and rental values collected on 170,000 private homes in the study areas. It was found that the net annualized real total returns were 4% and 4.8% in Paris and Amsterdam respectively. The study submitted that risk associated with RRE investment yield has become an increasingly important aspect of RE investment performance evaluation.

2.3.2 Some Related Studies in Nigeria

As mentioned earlier, the works of Olaleye (2000) and Bello (2003) were the early documented research efforts on REIP evaluation in Nigeria (Agava et al., 2021). Olaleye (2000) investigated RE portfolio management practice in Nigeria. The author used Sharpe index to examine the risk-return characteristic of RE portfolios across selected neighbourhoods in Lagos state. The study found that RE investment in Ikeja neighbourhood performed best while Yaba's RE investment underperformed other locations. Bello (2003) carried out a comparative evaluation of RRE investment performance in Lagos and the performance of common equity investment in Nigeria. The study revealed that non-property stocks performed better than RRE investments in terms of absolute return while RRE investment outperformed non-property stocks on the basis of risk and risk-return.

Mfam and Kalu (2012) examined the return and risk characteristics of commercial and residential RE in the city of Calabar, Cross River State. Property transaction data were collected from real estate practitioners in the city. The data were analysed to estimate the average total returns and risk-adjusted returns for the selected RE assets. The study concluded that commercial RE investment outperformed RRE investment both on the bases of return and investment risk within the study period. Similarly, Oyewole (2013) examined the performance of residential and commercial RE investment in Ilorin metropolis using property transaction-based data to analyse the performances of these classes of RE. Real estate investment performances were measured on the bases of average property values, holding period returns, risk-adjusted returns, rental growth and capital value appreciations. From the findings, RRE underperformed commercial RE investment on the bases of annualized total return and risk-adjusted return. In terms of rental and capital value growths, retail properties also outperformed RRE within the study period.

Dabara (2015) investigated the performance of RRE investment in Gombe to determine the return, risk and risk-adjusted behaviours of this class of RE investment assets. A questionnaire survey was carried out to retrieve property transaction data from estate surveying and valuation firms in Gombe. Total returns were calculated using the holding period return model. Ordinary least square (OLS) regression model was adopted as analytical tool to determine the inflation-hedging characteristic of RRE in area. The study found that RRE investment return provided a partial hedge against inflation within the period under assessment. Investors were advised to always seek the opinions of RE professional when taking RE investment decision in order to safeguard against the havoc of inflation on investors' earnings. Dabara et al. (2015) expanded the study to examine the diversification and inflation-hedging potential of residential real estate and REITs in Nigeria. The study showed that only residential real estate indicated portfolio diversification potential compared to REITs.

The performance of RRE investment in selected neighbourhoods of Ado-Ekiti in Ondo state was conducted by Ade (2015) to guide investors on property investment decision-making. Structured questionnaire was used to collect rental and capital value transaction data from active estate surveying and valuation companies in Ado-Ekiti. The study used capital appreciation and total returns as the performance measurement indices. The findings of the study revealed highest capital growth and total returns on residential investment in the low density area of the city. The major shortcoming of the study is the non-inclusion of risk measurement in its analysis. Wahab et al. (2017) examined the performance of RRE investment in Abuja property submarket. A survey research approach was used to collect rental and capital value transaction data of 3 and 4 bedroom apartments in 12 different locations within the federal capital territory (FCT). The average total returns on these categories of investment were determined using the holding period return (HPR) model while their risk levels were analysed using coefficient of variation (CoV). The study found that investment in 3 and 4 bedroom properties performed best in Maitama in terms of total return and risk-adjusted return within the study period.

The risk-return performance of RRE investment in the 1004 estate's property submarket of Lagos State was analysed by Okonu et al. (2019). The study evaluated the total return and risk of investing in residential apartments within the estate and found that there was high risk associated with the returns in these apartments. They suggested that these apartments were not good portfolio diversifiers thus should not be included in portfolio diversification by investors. Mbah and Udobi (2019) carried out a comparative evaluation of the performance of commercial and residential RE investments in Awka, Anambra state. The study adopted the HPR model, standard deviation and CoV as the analytical tools. The study found that commercial RE performed better than RRE within the period of assessment on the bases of mean returns and capital appreciation. However, investing in residential real estate was found more secure in the study area as revealed by the low level of risk associated with this investment asset. Similarly, Diala et al. (2019) and Nissi et al. (2019) examined the comparative performances of residential and commercial real estate investments in Enugu metropolis of eastern Nigeria and found that commercial RE investment performed better than residential RE investment on the bases of total return and risk-adjusted return.

At regional level, the performance of residential and commercial RE investment in Lagos and Port Harcourt, Nigeria was investigated by Osa and Ekenta (2019). Questionnaire survey was used to retrieve property data from estate surveyors and valuers practicing in these cities. The data collected were specifically transaction data on rental and capital values of residential and commercial RE from 2011 to 2017. Geometric mean, standard deviation and CoV were used to determine the mean returns, risks and risk-returns respectively for these investment properties. The findings of the study revealed that commercial RE investment in New GRA of Port Harcourt and Victoria Island in Lagos performed better than RRE investment both in terms of total returns and risk-adjusted returns.

Awa et al. (2020) examined the performances of both RRE and commercial RE in southeastern Nigeria. Structured questionnaire was used to collect property transaction data comprising rental and sales/capital value of the targeted property types. The study used regression model to generate forecasting models for rental and capital values for the selected cities in southeastern Nigeria. The study found a progressive increase in rental and capital values of residential and commercial RE within the study period. Similarly, Effiong and Ogbuefi (2021) examined the risk-return performances of residential and commercial RE investment in selected cities of southern Nigeria's RE market. The selected cities were Port Harcourt, Calabar and Uyo. Property rental as well as capital value or sales data were collected from the firms of estate surveyors and valuers in the selected cities. The study found that RRE investment in Port Harcourt recorded the highest mean total return on investment compared to Calabar and Uyo while commercial RE investments performed best in Uyo. The result further showed that the risk of investing in office premises is higher than retail shops across the study areas.

2.4 Research Gaps Identified from the Literature Reviewed

The major knowledge gaps identified from the literature reviewed above were gaps in locational and analytical tools. Firstly, most of the previous studies on REIP in Nigeria focused more on southern Nigeria property market and lesser attention on northern Nigeria property markets. Only scanty studies on this topic were conducted in the north. Even the few studies carried out in the north were majorly on Abuja property submarket while none has been conducted in Lafia, the capital of Nasarawa State in north-central Nigeria. Secondly, there is no known previous study in Nigeria that have adopted the mSR and mVaR as analytical tools for assessing risk-adjusted return and risk of RE investment respectively. The mSR has been recommended for property investment performance analysis due to the non-normality nature of real estate transaction data. Besides, an important underlying statistical assumption for applying the popularly used risk measures (that is, variance, standard deviation, and coefficient of variation) is that the data are assumed to be normally distributed. This study is therefore, to the best of the authors' knowledge, the first to adopt the mSR and mVaR for REIP analysis in Nigeria.

03.0 METHODOLOGY

This subsection discusses the methodology adopted to achieve the objectives of the study. This research adopted a survey research design using primary data collected through questionnaire survey. The study population were residential real estate solely for investment purpose in the selected neighbourhoods of Lafia metropolis. The neighbourhoods in Lafia, residential real estate with the required characteristics

and offices of estate agents in the study area were the sampling units. The target residential properties were a-room-self-contain apartments, 1-bedroom apartments, 2-bedroom apartments and 3-bedroom apartments. The choice of these categories of residential property was guided by the fact that they are the dominant RRE types in Lafia metropolis.

For the purpose of this study, stratified and simple random sampling techniques were adopted in selecting the neighbourhoods included in this study. First, the metropolis was divided into strata of high density, medium density, low density and suburb neighbourhoods with the aid of the street map of Lafia (See figure 1). Thereafter, a neighbourhood was randomly picked from each stratum. Thus, four neighbourhoods were selected for the study, and they Angwan Tiv (low density), Tudun Gwandara (medium density), Angwan Doka (high density) and Shabu (suburb) neighbourhoods. Access was granted by the respective heads of the sampled real estate firms and offices to retrieve rental value and sales price/capital value data from the companies' property transaction records and files of the managed residential properties in their portfolios to complete the research questionnaire. The list of registered estate firms in Lafia was retrieved from the firm directory of the Nigeria Institution of Estate Surveyors and Valuers (NIESV) and the list of estate agent offices in Lafia was compiled through a reconnaissance survey carried out by the authors.

Questionnaire was administered on all the 3 estate surveying and valuation companies located in Lafia together with the 21 identified estate agent offices within Lafia metropolis. The questionnaire was designed and used to collect property rental and sales transaction data (that is, annual rental values and capital values/sales prices) on the residential real estate categories in Lafia metropolis for 15 year period (that is 2007 to 2021). This time period has been chosen to cover the boom and bust periods in Nigeria's economy; the economic prosperity of mid and late 2000s, the 2016-2018 economic recession, the 2020 global pandemic caused by COVID-19 and its impact on the national economy and the 2021 to 2022 economic recoveries). Also, since property infrequently changes hands in the market compare to stocks or shares, a long time frame is required to be able to observe the changes in property values over time. The specific data required to calculate the rental value index, capital value index and total returns on residential real estate investment were the average annual rental values and capital values or sales prices of the purposively sampled residential properties. The collected data were transformed into property value indices and total returns. Rental value index was calculated using equation 1 as follows:

$$RVI_t = \left[\left(\frac{RV_t - RV_{t-1}}{RV_{by}} \right) \times 100 \right] + 100 \quad (1)$$

Where RVI_t is the rental value index of the current year; RV_t is the average rental value for the current year; RV_{t-1} is the average rental value for the preceding year and CV_{by} is the average rental value for the base year (2007).

While capital value index was computed with equation 2 as follows:

$$CVI_t = \left[\left(\frac{CV_t - CV_{t-1}}{CV_{by}} \right) \times 100 \right] + 100 \quad (2)$$

Where CVI_t is the capital value index of the current year; CV_t is the average capital value for the current year; CV_{t-1} is the average capital value for the preceding year and CV_{by} is the average rental value for the base year (2007).

The HPR model was used to determine the annual total returns and the average total returns for the period across property types and neighbourhoods. The total return model is given in Equation 3 below:

$$\text{Total Return (TR)} = \left[\frac{(CV_t - CV_{t-1}) + NI_t}{CV_{t-1}} \right] \times 100 \quad (3)$$

The data required for determining the risk and risk-adjusted total return performance of residential real estate investment across the selected neighbourhoods were the average annual rental values and capital values/sales prices of the sampled residential properties as well as the average yield on Nigeria Treasury Bill (NTB). The mVaR formula and mSR were then computed as measures of risk and risk-adjusted returns respectively using Equations 4 and 5 as follows:

$$mVaR_\alpha = R_a + [z_c + \frac{1}{6}(z_c^2 - 1)S + \frac{1}{24}(z_c^3 - 3z_c)K - \frac{1}{36}(2z_c^3 - 5z_c)S^2]\sigma \quad (4)$$

Where:

$z_c = -1.65$ with 95% confidence level

R_a = expected total return on asset

S and K are skewness and kurtosis respectively

σ = standard deviation.

$$mSR = \frac{(R_a - R_f)}{mVaR_\alpha} \quad (5)$$

Where:

R_a is the average return of the asset;

R_f is the risk-free rate (N T-Bill rate), and

$mVaR_\alpha$ is a modified way of computing value at risk, taking into account skewness and kurtosis of the returns distribution.

3.1 Research Hypotheses

The following null (H_0) hypothesis with its alternative (H_1) hypothesis is formulated with respect to the research objective:

H_0 : There is no statistically significant difference in the mean annual total returns of residential real estate investments across the selected neighbourhoods.

H_1 : There is statistically significant difference in the mean annual total returns of residential real estate investments across the selected neighbourhoods.

In order to test the null hypothesis, that is, whether there is a significant variation in the calculated average mean total returns on residential real estate investment across the selected neighbourhoods of study area within the study period, the analysis of variance (ANOVA) was adopted. The statistical package for social scientists (SPSS) was used as the analytical tool for the ANOVA.

3.2 The Study Area

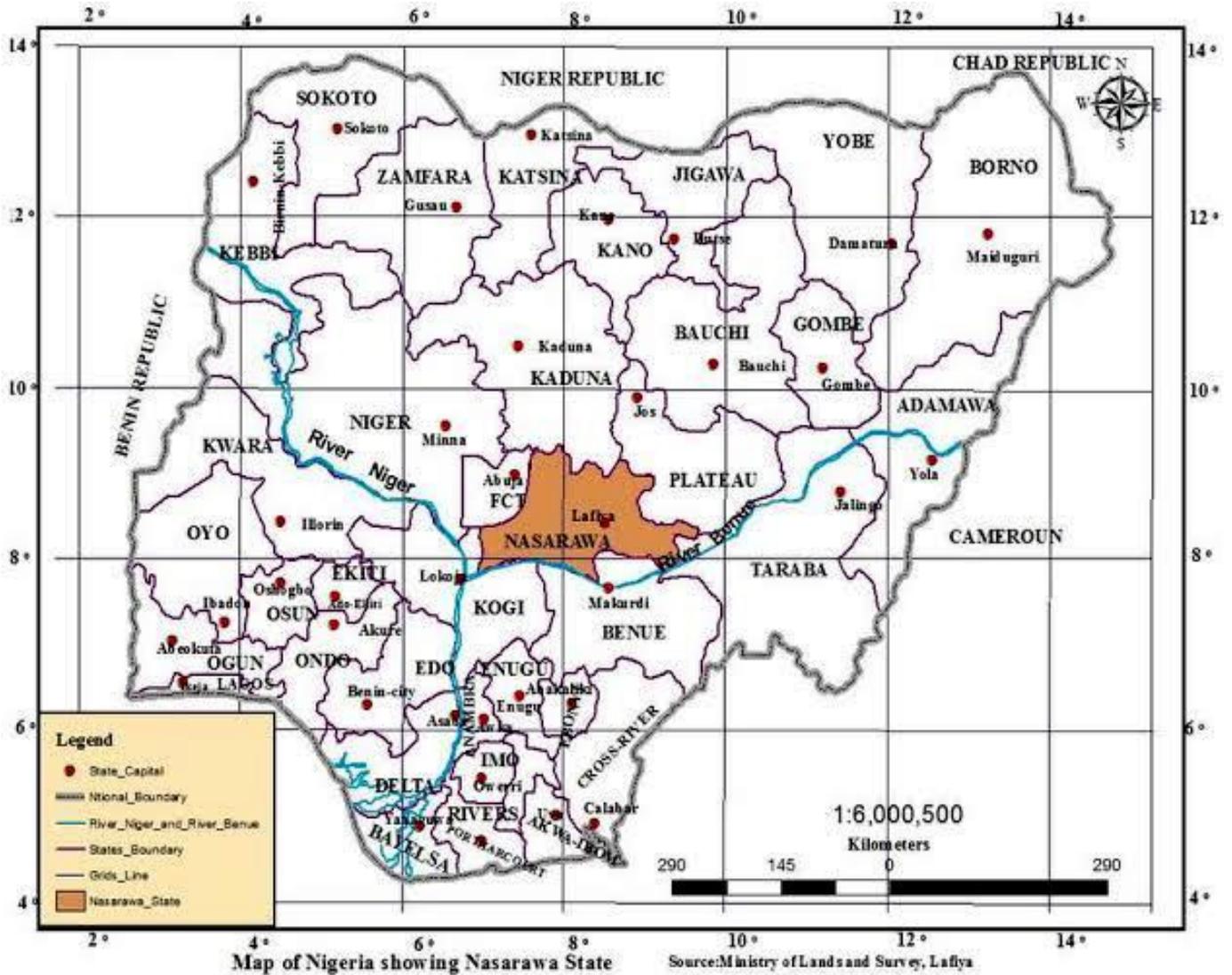


Figure 1 The study area
(Source: Nasarawa State Ministry of Lands Survey and Town Planning)

Lafia became the capital of Nasarawa State after its creation in 1996. Nasarawa is one of the states in the north-central region of Nigeria that shared border with Abuja, Plateau, Benue, Kaduna, Taraba and Kogi states (as shown in Figure 1). In 1930, Lafia was a small town with a population of less than 5,000 people. It grew to about 10,000 people two decades after and over 400,000 people in 1991. In 2015, the population of Lafia was estimated to be above 1.5 million people (Emankhu & Ubangari, 2015). Among the inhabitants are Kanuri, Alago, Hausa, Eggon, and other indigenous tribes from other local government areas of Nasarawa state and environs. The city is predominantly occupied by farmers, traders and civil servants. Lafia could be described a polynucleated metropolis as it emerged from the

amalgamation several settlements and has grown and changed over the years. According to Emankhu and Ubangari (2015), the RE market of Lafia is an active one there is an active and dynamic one. Most of the land in Lafia metropolis is under customary tenure and cultural norms and rules which forbid permanent alienation, still govern land transactions and management (Akomolafe & Rahmad, 2020). The situation of the Federal University Lafia, Nasarawa State Polytechnic, and Nasarawa State College of Agriculture in Lafia has become propellers of the city expansion attracting various industries to the city-centre area and the urban periphery. Thus, the RRE market is the most developed in the state attracting real estate investors into the city (Ogah et al., 2014). In this study, four locations were randomly selected for the study; Angwan Tiv (low density), Tudun Gwandara (medium density), Angwan Doka (high density) and Shabu (suburb).

04.0 RESULTS

The result of the data analysis is present in this section in line with the research objectives. It begins with the presentation of the numbers of sampled residential real estate and characteristics of the respondents in Tables 1 and 2 respectively. The results of the rental and capital value indices constructed are presented in Table 3. Thereafter, the results of total returns, risks and risk-adjusted return performances of residential real estate on the bases of property category and location are presented in Tables 4 and 5 respectively.

4.1 Response Rate and Sampled Residential Real Estate by Location and Category

Out of the 24 questionnaires administered to the sampled respondents, 21 were correctly completed and returned for analysis. This represents a response rate of 87.5%. At the end of the questionnaire administration exercise, an aggregate of 275 residential properties comprises of 58 room self-contained apartments, 68 1-bedroom apartments, 63 2-bedroom apartments and 86 3-bedroom apartments were purposively sampled through the questionnaire administration. The breakdown by property category is presented in Table 1.

Table 1 Sampled residential real estate by location and category
(Source: Authors' field survey)

Location	Room self-contained	1-Bedroom	2-Bedroom	3-Bedroom	Total
Angwan Tiv	12	14	20	23	69
Tudun Gwandara	12	22	18	20	72
Angwan Doka	21	17	13	24	75
Shabu	13	15	12	19	59
Total	58	68	63	86	275

4.2 Characteristics of Respondents

The respondents were the partners or senior valuers of the sampled firms or experienced estate agents in the study area. The educational backgrounds, years of experience or practice and the professional cadres of the respondents in the study area are presented in Table 2. The results show that about 57% of the respondents hold a minimum of bachelor degree in estate management course. The experience of the respondents is crucial to obtaining reliable data/information required for this study. The result of the analysis in this regard revealed that over 70% of the respondents in the study area have over 10 years experience in real estate practice.

Table 2 Educational qualifications, years of experience and professional cadres of respondents
(Source: Authors' field survey)

Characteristic	Frequency (Percent)
Education background	
O'Level	0 (0.0%)
OND	6 (28.5%)
HND	3 (14.3%)
BSc./BTech.	11 (52.4%)
PGD	0 (0.0%)
MSc./MTech	1 (4.8%)
PhD.	0 (0.0%)
Total	21 (100%)
Year of experience	
Below 5	2 (9.5%)
5-10	3 (14.3%)
10-15	6 (28.6%)
15-20	5 (23.8%)
Above 20	5 (23.8%)
Total	21 (100%)
Professional cadre	
Associate below 10 years	1 (4.8%)
Associate above 10 years	1 (4.8%)
Fellow below 10 years	0 (0.0%)
Fellow above 10 years	0 (0.0%)
Estate agent	19 (90.4%)
Total	21 (100%)

The last section of Table 2 shows the distribution of professional cadre of the respondents. Two professional grades of the NIESV were identified for this study, i.e. Associate and Fellow. These were further subdivided into the following: Associate below 10 years, Associate above 10 years, Fellow below 10 years and Fellow above 10 years. The remaining classification was estate agents. Generally, the results of the analysis revealed that the respondents understood the contents of the research questionnaire and the topic of the research. The respondents equally have good understanding of the operation of the real estate market in the study areas since majority of them have over 10 years experience in real estate practice in the study area.

4.3 Characteristics of the Real Estate Offices

The characteristics of the selected estate offices were assessed to find out their years of operation in the study area and whether the residential property categories under investigation were available in their records or management portfolios for data retrieval. The mode of property data/information storage and the availability of property data banking system by these organisations were examined. The responses obtained through the questionnaires administered to them were analysed and the results are presented in Table 3. From the analysis, most of the real estate offices have been in real estate practice for over 10 years. The analysis revealed that an aggregate of about 76% of the sampled real estate offices in Lafia have been in operation for over 10 years. This made it possible to be able to retrieve the required property rental and capital value data that spanned the study period. The residential property categories under consideration were equally available in the portfolios of the sampled real estate companies, as revealed by the analysis. With respect to methods of data storage, most of the estate offices used the manual filing system for property data storing or record keeping. As revealed by the analysis, 76.2 % of the sampled estate offices in the study area use only the manual data storage method for storing property data. None of the sampled real estate companies relied solely on digital or computerised data/information filing system across the three cities. However, few numbers of these companies adopted the hybrid mode of data and information storage. Consequently, due to the predominantly manual data storage system in these offices, a lot of time was spent retrieving property data from their records.

Table 3 Characteristics of real estate offices
(Source: Authors' survey)

S/No.	Characteristics	Frequency/Percentage
1	<i>Years of operation</i>	
	5 yrs and below	2 (9.5%)
	6 – 10	3 (14.3%)
	11 – 15	5 (23.8%)
	16 – 20	6 (28.6%)
	21 and above	5 (23.8%)
	Total	21 (100.0%)
2	<i>Types of property in firm/office's records</i>	
	A-room-self-contained	21(100.0%)
	1-bedroom apartments	20 (95.2%)
	2-bedroom apartments	19 (90.5%)
	3-bedroom apartments	20 (95.2%)
3	<i>System of data/information storage</i>	
	Purely manual storage	16 (76.2%)
	Digital/computerised storage only	0 (0.0%)
	Manual and computerised (hybrid) storage	5 (23.8%)
	Total	21 (100.0%)
4	<i>Awareness of computerised data banking system</i>	
	Yes	13 (61.9%)
	Undecided	3 (14.3%)
	No	5 (23.8%)
	Total	21 (100.0%)
5	<i>Do you have property data banking system?</i>	
	Yes	0(0.0%)
	Undecided	2 (9.5%)
	No	19 (90.5%)
	Total	21(100.0%)

Furthermore, whereas most of these real estate offices claimed to be aware of the computerised data banking system (CDBS), large percentage of them (90.5%) did not have a CDBS in operation. Again, this did not only limit the researchers' access to quality property transaction data, a lot of time and effort were involved in manually sorting and collating property data from the property files in these offices.

4.4 Rental and Capital Value Performances of Residential Real Estate in the Study Area

The first objective of this research is to assess the performance of RRE investment on the basis of the trends in rental values and capital values of the residential real estate categories under investigation. To achieve this, the rental and capital value data collected were used to construct rental value and capital value indices for residential real estate investment in the study area. The rental and capital value indices for the four classes of residential real estate in the study area were developed using Equations 1 and 2, taken 2007 as the base year (that is,

2007 = 100). These indices were used as proxies for growth or otherwise in rental values and capital values for the fifteen year period. The results of the combined rental value index and capital value index analyses for Lafia property market are presented in Table 4.

Table 4 Combined rental and capital value indices of residential real estate investment in Lafia
(Source: Authors' analysis)

Year	A room self-contained		1-Bedroom apartment		2-Bedroom apartment		3-Bedroom apartment	
	Rental Value Index	Capital Value Index	Rental Value Index	Capital Value Index	Rental Value Index	Capital Value Index	Rental Value Index	Capital Value Index
2007	100	100	100	100	100	100	100	100
2008	104	105	106	107	106	109	102	104
2009	116	116	112	115	110	115	105	108
2010	124	124	121	125	114	123	106	115
2011	131	133	129	135	117	131	110	122
2012	138	140	136	141	122	136	113	127
2013	148	153	140	155	126	143	117	133
2014	160	167	147	168	130	151	120	140
2015	172	182	151	176	133	157	126	146
2016	191	204	155	184	138	167	129	151
2017	207	222	161	189	141	172	133	158
2018	223	243	168	200	148	184	139	166
2019	237	275	183	209	152	193	143	171
2020	253	286	200	220	156	200	150	177
2021	277	319	209	240	165	214	157	190
Growth (%)	177	219	109	140	65	114	57	90
Growth p.a. (%)	11.8	14.6	7.3	9.3	4.3	7.6	3.8	6.0
Av. Rental Growth p.a. (%)	6.8							
Av. Capital Growth p.a. (%)	9.4							

4.5 Residential Real Estate Investment Performance on the Basis of Total Returns, Risk and Risk-Adjusted Returns

This subsection presents the results of the performance of RRE investment in Lafia metropolis on the basis of total returns, risk and risk-adjusted returns with a view to achieving the second objective of this study. The nominal total returns on residential real estate investment were evaluated using the holding period return model represented in Equation 3. The risk involved in investing residential property was analysed using the mVaR model in Equation 4 while the risk-adjusted returns were calculated using the mSR represented by Equation 5. Tables 5 and 6 show the average nominal total returns, value at risk and risk-adjusted returns on RRE investment in Lafia on property category and location bases respectively. The results of the analysis showed that on the basis of property category, a-room-self-contained apartment recorded the highest mean total return of 15.7% per annum. This was followed by 1-bedroom apartment with total returns of 13.2% while 2-bedroom apartment came third having a mean total return of 11.9% per annum. It was found that 3-bedroom apartments recorded the least mean annual total return of 11.1%. On the average, the combined total return on residential property investment in Lafia was found to be 12.97% per annum within the study period.

The findings further revealed that a room self-contained apartment recorded the highest modified value-at-risk of 9.21 while 1-bedroom apartment recorded the lowest modified values at risk of 7.68. In terms of risk-adjusted return performance, a room self-contained apartment recorded the highest risk-adjusted return of 0.81 compare to other categories while 3-bedroom apartments exhibited the lowest risk-adjusted return with modified Sharpe ratios of 0.36. The total returns, value-at-risk and risk-adjusted returns performances of residential property investment on the basis of neighbourhood are shown in Table 6. The mean total return and risk-adjusted returns of residential property investment in Angwan Doka were 13.76% per annum and 0.80% respectively. Tudun Gwandara, a medium density neighbourhood of Lafia, came second with an annual average mean total return of 13.11% and risk-adjusted return of 0.70. Residential real estate investment in Shabu (a suburb of Lafia) underperformed other neighbourhoods in Lafia with a mean total return of 12.17% per annum and risk-adjusted return of 0.55. Generally, the average combined mean total return on residential real estate in Lafia was 12.97% per annum within the period under assessment.

Table 5 Average total returns and risk-adjusted returns on residential real estate investment on property category basis
(Source: Computed from Appendices A, B, C and D)

Year	Return on NTB	A room self-contained	1-Bedroom apartment	2-Bedroom apartment	3-Bedroom apartment	Combined total return
2007	6.80	7.3	7.4	7.3	7.2	7.3
2008	8.20	12.5	14.5	16.6	11.8	13.9
2009	3.80	18.3	16.1	13.2	10.8	14.6
2010	3.80	15.3	16.4	13.7	13.9	14.8
2011	9.70	15.4	15.2	12.7	12.3	13.9
2012	13.60	12.5	12.2	10.9	10.7	11.6
2013	10.80	16.6	17.1	11.8	12.1	14.4
2014	10.50	16.6	15.6	12.1	11.1	13.8
2015	9.40	16.8	11.1	10.5	10.8	12.3
2016	10.10	20.3	11.3	13.0	9.8	13.6
2017	12.30	16.3	9.2	9.0	11.5	11.5
2018	10.10	17.3	12.2	13.7	11.0	13.6
2019	9.60	20.5	11.5	11.3	9.9	13.3
2020	1.60	10.6	12.8	10.0	9.5	10.7
2021	2.20	18.4	15.7	13.1	13.6	15.2
MEAN	8.17	15.7	13.2	11.9	11.1	12.97
Rank		1st	2nd	3rd	4th	
mVaR		9.21	7.68	7.82	8.14	8.21
Rank		4th	1st	2nd	3rd	
mSR		0.81	0.67	0.48	0.36	0.58
Rank		1st	2nd	3rd	4th	

Table 6 Average total returns and risk-adjusted returns on residential real estate investment on neighbourhood basis
(Source: Computed from Appendices A, B, C & D)

Year	Return on NTB	Angwan Tiv	Tudun Gwandara	Angwan Doka	Shabu	Combined total return
2007	6.80	7.34	7.47	7.30	7.15	7.31
2008	8.20	12.20	13.95	14.56	14.71	13.86
2009	3.80	14.68	14.64	16.63	12.45	14.60
2010	3.80	13.01	12.89	20.84	12.54	14.82
2011	9.70	11.08	16.61	16.84	11.10	13.91
2012	13.60	11.81	10.03	12.01	12.50	11.59
2013	10.80	12.75	17.94	16.29	10.55	14.38
2014	10.50	11.01	15.10	16.02	13.26	13.85
2015	9.40	12.12	13.61	9.82	13.69	12.31
2016	10.10	12.07	16.43	11.52	14.35	13.59
2017	12.30	13.50	9.55	11.57	11.44	11.51
2018	10.10	14.03	14.20	11.45	14.56	13.56
2019	9.60	18.63	12.72	11.27	10.75	13.34
2020	1.60	11.90	8.87	10.33	11.78	10.72
2021	2.20	16.46	12.59	20.01	11.71	15.19
MEAN	8.17	12.84	13.11	13.76	12.17	12.97
Rank		3rd	2nd	1st	4th	
mVaR		7.79	6.60	7.10	7.34	7.21
Rank		4th	1st	2nd	3rd	
mSR		0.57	0.70	0.80	0.55	0.66
Rank		3rd	2nd	1st	4th	

4.6 Verification of the Null Research Hypothesis (H_0)

The assumption that there is no statistically significant difference in the total returns of residential real estate investment in Lafia is verified in this subsection. To examine if the variations in total returns on the basis of property category and neighbourhood were statistically significant or not within the study period, both homogeneity tests and ANOVA were carried out on the data set and the results presented. Table 7 shows the result of the test of homogeneity of variances using the Levene's statistic on mean total returns (on property category basis).

Table 7 Test of homogeneity of residential real estate investment returns on property category basis
(Source: Computed from Table 5)

Levene Statistic	df1	df2	Sig.
2.794	3	56	0.049

The result of the analysis showed that the variation in total returns among the property categories was statistically significant with a p-value of 0.049. An ANOVA test was further carried out and the result is presented in Table 8.

Table 8 ANOVA on residential property investment returns on the basis of property category
(Source: Computed from Table 5)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	179.07	3	59.69	8.27	0.000
Within Groups	404.02	56	7.22		
Total	583.10	59			

The result of the analysis of variance in Table 8 confirmed that there is a statistically significant variation in residential real estate investment total returns on the basis of property category in Lafia. The calculated p-value of 0.000 is significant relative to alpha level of 0.05. To identify where this variation(s) existed, a post hoc test was carried out to determine Tukey honesty significant difference (HSD) of the variations that existed. This result is at variance with the finding of Wahab et al. (2017) which revealed that there was no statistically significant difference in the total returns of residential property investment across Abuja's neighbourhoods. The result of this analysis is presented in Table 9.

Table 9 Post hoc test on residential real estate investment returns in Lafia on property category basis
(Source: Computed from Table 5)

(I) PropcategoryLafia	(J) PropcategoryLafia	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A room self-contained	1-Bedroom	2.43	0.98	.075	-0.17	5.02
	2-Bedroom	3.72*	0.98	.002	1.12	6.32
	3-Bedroom	4.58*	0.98	.000	1.98	7.18
1-Bedroom	A room self-con	-2.43	0.98	.075	-5.02	.170
	2-Bedroom	1.29	0.98	.555	-1.30	3.89
	3-Bedroom	2.15	0.98	.137	-0.44	4.75
2-Bedroom	A room self-con	-3.72*	0.98	.002	-6.31	-1.12
	1-Bedroom	-1.29	0.98	.555	-3.89	1.30
	3-Bedroom	0.86	0.98	.817	-1.74	3.46
3-Bedroom	A room self-con	-4.58*	0.98	.000	-7.18	-1.98
	1-Bedroom	-2.15	0.98	.137	-4.75	.44
	2-Bedroom	-0.86	0.98	.817	-3.46	1.74

*The mean difference is significant at the 0.05 level

The result of the Tukey honesty significant difference (HSD) revealed that there were statistically significant differences between the mean total returns of a room self-contained apartment 2-bedroom and 3-bedroom apartments. As indicated in Table 9, the p-value of the variation that existed between a room self-contained and 2-bedroom is 0.002 while the p-value for the variation between a room self-contained apartment and 3-bedroom apartment is 0.000. These p-values are significant at a 0.05 level of significance. This null hypothesis was repeated on the basis of neighbourhood property submarkets in the study area and the results presented in Tables 10, 11 and 12.

Table 10 Test of homogeneity of variances of residential property investment returns
(Source: Computed from Table 6)

Levene Statistic	df1	df2	Sig.
3.58	3	56	0.02

From Table 10, the p-value of 0.02 is statistically significant and implies that there is a statistically significant difference in the average mean total returns on residential real estate investment across the four neighbourhoods in Lafia. Table 11 shows the result of the ANOVA while Table 12 presents the result of the Tukey HSD using post hoc test.

Table 11 ANOVA of mean total returns on residential property investment in Lafia neighbourhoods
(Source: Computed from Table 6)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.61	3	6.54	0.76	0.52
Within Groups	484.64	56	8.65		
Total	504.25	59			

In contrast to the homogeneity test result, the ANOVA revealed that there was a statistically significant variation in the mean total returns of residential real estate investment across the selected neighbourhoods within the study period because the p-value of 0.52 is greater than a 0.05 alpha level. A post hoc test was then carried out to determine the Tukey HSD on mean total returns across the selected neighbourhoods and the result presented in Table 12.

Table 12 Post hoc test on residential property investment total returns across neighbourhoods
(Source: Computed from Table 6)

(I) NeighbourhLafia	(J) NeighbourhLafia	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Angwan Tiv	Tudun Gwandara	-0.27	1.07	0.99	-3.11	2.58
	Angwan Doka	-0.92	1.07	0.83	-3.77	1.92
	Shabu	0.67	1.07	0.92	-2.17	3.5
Tudun Gwandara	Angwan Tiv	0.27	1.07	0.99	-2.58	3.11
	Angwan Doka	-0.66	1.07	0.93	-3.50	2.19
	Shabu	0.94	1.07	0.82	-1.91	3.78
Angwan Doka	Angwan Tiv	0.92	1.07	0.83	-1.92	3.77
	Tudun Gwandara	0.66	1.07	0.93	-2.19	3.50
	Shabu	1.59	1.07	0.45	-1.25	4.44
Shabu	Angwan Tiv	-0.67	1.07	0.92	-3.51	2.17
	Tudun Gwandara	-0.94	1.07	0.82	-3.78	1.91
	Angwan Doka	-1.59	1.07	0.45	-4.44	1.25

From the post hoc test result in Table 12, the significance values of the HSD of all paired comparisons revealed that the differences in mean total returns across the neighbourhoods were not statistically significant. Based on the results of the ANOVA and HSD, the null hypothesis is accepted because of the lack of sufficient evidence to reject the null hypothesis. It can therefore be inferred that even though there was an indication of variations in the mean total returns across the neighbourhoods, such variations were not statistically significant.

05.0 DISCUSSION

This section discusses the findings of this study in line with the stated research objectives. The first objective of this study is to analyse residential real estate performance on the basis of the trends in rental and capital value growth within the study period using index number. The second objective is to analyse performance in terms of total return and risk-adjusted return using the holding period return model and the modified Sharpe ratio respectively.

5.1 Performance on the Bases of Rental Value Growth and Capital Value Appreciation

The results of the constructed property value indices were presented in Table 4. The base year adopted was 2007 and the result shows a progressive growth in property values from 2007 to 2021. On these bases, a room self-contained apartment performed best both in rental value growth and capital value appreciation. Rental value of a room self-contained grew by 177% from 2007 to 2021 representing 11.8% annual growth rate and by 219% in capital value, representing 14.6% per annum for the study period. This was followed by 1-bedroom apartment whose rental value rose by 109% from 2007 to 2021, representing 7.3% per annum. The least performed residential property category in terms of rental growth was 3-bedroom apartment, which recorded about 57% growth for the period under assessment or 3.8% per annum. 1-bedroom apartment came second in terms of capital value performance with an annual capital growth of 9.3% followed by 2-bedroom apartment with an annual capital growth rate of 7.6% while 3-bedroom came last with 6.0% per annum.

Overall, the average annual growth rates in rental and capital values of RRE investment in Lafia for the study period are 6.8% and 9.4% per annum respectively. Even though there were variations in rental and capital value growths, all the classes of residential properties have shown a progressive growth in both rental and capital values from 2007 to 2021. Only fewer studies had measured real estate investment performance in terms of rental values growth and capital value appreciation in Nigeria's property market. The findings of this study on these bases corroborate the findings of Oyewole (2013), Udoekanam et al. (2014) and Ade (2015) which revealed that the rental value and capital value of real estate in Nigeria's property market show positively progressive growth over a given time frame. Impliedly, this study has demonstrated that the 2015 through 2018 economic recession in Nigeria and the 2020 COVID-19 global pandemic may not have affected residential real estate market values significantly within the study period. However, the effect of economic recession and COVID-19 pandemic on residential property investment performance in the study area is beyond the scope of this study. Thus, it can be concluded that residential property investment in the study areas is worthwhile in terms of rental and capital value growths or appreciations.

5.2 Performance on the Bases of Total Return and Risk-Adjusted Return

With respect to total return performance of residential real estate in the study area, the results of the analysis indicated, that on the basis of property category, a room self-contained apartment outperformed other residential property categories in Lafia within the period under assessment; with an average mean total return of 15.7% per annum. This was followed by 1-bedroom apartment, with a mean total return

of 13.2% while 2-bedroom apartment came third with mean total return of 11.9% per annum. It was found that 3-bedroom apartments underperformed other categories of residential real estate with an average total return of 11.1% per annum. The findings further revealed that a room self-contained apartment underperformed other property categories on the basis of risk with a modified value-at-risk of 9.21 while 1-bedroom apartment outperformed other categories on this basis with modified values at risk of 7.68. In terms of risk-adjusted return performance, a room self-contained apartment performed best with a modified Sharpe ratio of 0.81 compare to other categories while 3-bedroom apartments exhibited the least performance on the basis of risk-adjusted return with modified Sharpe ratios of 0.36.

Residential real estate performed best in Angwan Doka (a high density area of Lafia) both in terms of total return and risk-adjusted return. The average mean total return and risk-adjusted returns of residential property investment in Angwan Doka were 13.76% per annum and 0.80% respectively. Tudun Gwandara, a medium density neighbourhood of Lafia, came second with an annual average mean total return of 13.11% and risk-adjusted return of 0.70. Residential real estate investment in Shabu (a suburb of Lafia) underperformed other neighbourhoods in Lafia with a mean total return of 12.17% per annum and risk-adjusted return of 0.55. Generally, the average combined mean total return on residential real estate in Lafia was 12.97% per annum within the period under assessment.

On the basis of property category, the result of the ANOVA indicated that there was enough evidence to reject the null hypothesis. Thus, it was concludes that there was a statistically significant difference in the mean total return performance of these categories of residential real estate investment within the study period. The analysis further showed that such variations in total returns existed among room self-contained apartments, 2-bedroom and 3-bedroom apartments. However, there was no statistically significant difference in the mean total returns on residential real estate investment on neighbourhood basis in the study area within the period under assessment. Because this study is novel in terms of analytical tools in study area, further studies are required to confirm the findings of this study.

06.0 CONCLUSION

This study has assessed the performance of RRE investment in Lafia metropolis in Nasarawa State of north-central Nigeria with a view to guiding real estate investors on RE investment decision-making. This aim has been achieved through the achievement of two cardinal objectives. The first objective examined the trend in the rental and capital value performances of RRE investment in the study area from 2007 to 2021 using property price index analysis. The second objective analysed the total return and risk-adjusted return performances of RRE investment in the study areas using the holding period return and modified Sharpe ratio respectively.

The finding of this study revealed that a room self-contained apartment outperformed other residential real estate categories in the study area on the basis of rental and capital value performances. Rental and capital values of residential real estate grew progressively within the study period. On the basis of risk, total return and risk-adjusted return performances, a room self-contained residential real estate outperformed other categories of residential real estate investments in the study area within the study period and on the basis of location, residential property investment in Angwan Doka performed best among the four neighbourhoods in terms of risk, total return and risk-adjusted return while Shabu residential real estate market underperformed other neighbourhoods both in terms of risk, total return and risk-adjusted return within the study period.

Based on the research findings, it is recommended that potential real estate investors could consider investing in residential real estate in Angwan Doka since investment in this location gives higher total and risk-adjusted returns relative to other locations in the city. This study found (as revealed in Table 3) that there is still dearth of quality property transaction data within the reach of real estate researchers in the study area in particular due to lack of CDBS in most of the offices sampled. The study therefore recommends that the real estate practice regulating bodies especially the Nigerian Institution of Estate Surveyors and Valuers (NIESV) and Association of Estate Agents in Nigeria (AEAN) should enforce and promote neighbourhood, state, regional and national property transaction data banking among real estate practitioners.

Moreover, one of the objectives of AEAN, an affiliate of NIESV, is to maintain a property information system (PIS) to establish market trends and provide information for researchers and property investors. Unfortunately, this study found that there was absence of property transaction database in virtually all the sampled estate firms and agent offices. In addition, private individuals or organisations in Nigeria can tap the investment potential inherent in property data banking by engaging in collection, analyses and sales of property data, similar to what CoreLogic and DataTree in the US and Realyse in the UK do. This, if adopted, will address the problem of poor real estate data for real estate research in Nigeria generally. Finally, there are still limited numbers of the studies conducted on REIP in Nigeria focused on north-central Nigeria specifically. Thus, this study should be expanded to cover other major cities in north-central Nigeria like Lokoja, Jos, Suleja, Bida, Markurdi and other cities in northern Nigeria at large while using Abuja as a basis for comparison.

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APPENDIX A

Nigerian Treasury Bill (NTB), Initial Yield, Nominal Total Returns in Angwan Tiv

(Source: NTB retrieved from CBN, yields and total returns from authors' field survey)

Year	Return on NTB	A room self-contained		1-Bedroom apartment		2-Bedroom apartment		3-Bedroom apartment	
		Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return
2007	6.80	7.69	7.69	7.69	7.69	7.14	7.14	6.82	6.82
2008	8.20	7.78	13.05	7.69	9.17	6.98	13.23	6.58	13.36
2009	3.80	7.92	21.11	7.04	20.17	7.02	8.22	6.50	9.23
2010	3.80	8.24	14.46	6.67	18.52	7.14	8.82	6.31	10.25
2011	9.70	8.11	12.36	6.67	12.00	7.09	11.37	6.29	8.60
2012	13.60	8.05	13.69	6.61	11.43	6.67	14.29	6.28	7.83
2013	10.80	7.74	11.99	6.03	17.54	6.67	11.59	6.18	9.88
2014	10.50	7.50	18.12	6.22	7.67	6.61	10.69	6.17	7.57
2015	9.40	7.64	16.19	6.18	9.05	6.39	15.53	6.20	7.69
2016	10.10	7.70	12.64	5.96	13.49	6.15	11.04	6.02	11.12
2017	12.30	7.67	21.25	5.66	12.29	5.96	10.10	5.84	10.37
2018	10.10	7.24	22.29	5.62	9.77	5.66	12.84	5.71	11.24
2019	9.60	6.02	42.09	5.95	11.96	5.71	7.49	5.47	12.96
2020	1.60	6.30	10.73	6.04	15.53	5.47	12.19	6.04	9.14
2021	2.20	5.53	27.26	5.97	11.50	5.20	14.20	5.94	12.88
Mean	8.17	7.41	17.66	6.40	12.52	6.39	11.25	6.16	9.93

APPENDIX B

Nigerian Treasury Bill (NTB), Initial Yield, Nominal Total Returns in Tudun Gwandara

(Source: NTB retrieved from CBN, yields and total returns from authors' field survey)

Year	Return on NTB	A room self-contained		1-Bedroom apartment		2-Bedroom apartment		3-Bedroom apartment	
		Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return
2007	6.80	7.13	7.13	7.69	7.69	7.69	7.69	7.35	7.35
2008	8.20	7.13	10.69	7.69	15.12	7.69	18.46	7.12	11.53
2009	3.80	7.14	13.79	7.67	14.89	7.47	15.73	6.88	14.12
2010	3.80	7.10	17.53	7.69	13.95	7.38	11.56	6.82	8.52
2011	9.70	6.87	16.57	7.61	16.48	7.10	13.06	6.21	20.31
2012	13.60	7.02	10.31	7.66	14.11	7.35	8.05	6.41	7.63
2013	10.80	7.14	18.42	6.66	25.77	7.06	14.12	6.21	13.45
2014	10.50	7.11	14.76	6.01	23.15	7.05	9.71	6.00	12.77
2015	9.40	7.14	20.00	5.79	12.45	7.11	9.59	5.92	12.40
2016	10.10	7.14	34.92	5.66	10.59	6.93	12.00	5.94	8.22
2017	12.30	7.14	10.29	5.78	7.04	6.98	7.79	5.69	13.06
2018	10.10	7.14	16.33	5.48	13.48	6.42	19.95	5.87	7.04
2019	9.60	6.54	19.36	5.84	8.83	6.03	14.38	5.97	8.32
2020	1.60	6.61	8.22	6.69	8.31	6.11	6.81	5.83	12.15
2021	2.20	6.34	17.77	6.55	12.39	5.92	11.61	6.09	8.60
Mean	8.17	6.98	15.74	6.70	13.62	6.95	12.03	6.29	11.03

APPENDIX C

Nigerian Treasury Bill (NTB), Initial Yield, Nominal Total Returns in Angwan Doka

(Source: NTB retrieved from CBN, yields and total returns from authors' field survey)

Year	Return on NTB	A room self-contained		1-Bedroom apartment		2-Bedroom apartment		3-Bedroom apartment	
		Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return
2007	6.80	7.50	7.50	7.14	7.14	7.14	7.14	7.41	7.41
2008	8.20	7.17	12.08	7.02	12.28	6.73	21.43	7.40	12.46
2009	3.80	7.50	19.92	7.12	18.51	6.34	17.40	7.36	10.68
2010	3.80	7.14	17.86	7.13	18.46	5.66	24.45	6.56	22.58
2011	9.70	6.94	20.13	6.86	21.91	5.29	15.24	6.56	10.09
2012	13.60	6.94	11.27	7.07	10.82	5.42	10.21	6.11	15.75
2013	10.80	6.67	24.44	6.94	13.40	5.32	13.44	6.05	13.86
2014	10.50	6.67	21.90	6.96	13.06	4.92	16.84	5.83	12.28
2015	9.40	6.48	12.92	6.94	11.30	4.86	7.24	5.80	7.82
2016	10.10	6.36	14.93	7.05	9.22	4.68	12.04	5.79	9.91
2017	12.30	6.67	16.36	7.17	9.16	4.66	9.23	5.67	11.53
2018	10.10	6.67	14.67	7.34	10.21	4.83	9.81	5.61	11.12
2019	9.60	6.67	11.63	7.14	17.16	4.79	7.60	5.51	8.70
2020	1.60	7.07	12.15	7.14	13.64	4.73	8.59	5.51	6.94
2021	2.20	7.26	19.09	6.27	29.80	4.66	9.94	4.92	21.20
Mean	8.17	6.91	15.8	7.02	14.40	5.34	12.71	6.14	12.15

APPENDIX D

Nigerian Treasury Bill (NTB), Initial Yield, Nominal Total Returns in Shabu

(Source: NTB retrieved from CBN, yields and total returns from authors' field survey)

Year	Return on NTB	A room self-contained		1-Bedroom apartment		2-Bedroom apartment		3-Bedroom apartment	
		Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return	Initial Yield	Nominal Total Return
2007	6.80	7.00	7.0	7.14	7.1	7.19	7.2	7.25	7.3
2008	8.20	7.00	14.2	7.07	21.4	7.06	13.5	7.21	9.8
2009	3.80	6.99	18.2	7.01	10.9	7.10	11.6	7.18	9.0
2010	3.80	6.96	11.5	7.08	14.5	7.12	10.1	6.94	14.1
2011	9.70	6.99	12.4	7.12	10.4	7.11	11.3	6.98	10.3
2012	13.60	6.96	14.8	7.11	12.5	7.04	11.2	6.96	11.5
2013	10.80	6.99	11.7	7.13	11.6	7.14	7.9	6.97	11.0
2014	10.50	6.91	11.5	6.63	18.4	7.11	11.3	6.96	11.8
2015	9.40	6.60	18.1	6.53	11.5	7.08	9.6	7.20	15.5
2016	10.10	6.25	18.6	6.33	11.9	7.07	16.8	7.17	10.0
2017	12.30	5.94	17.3	6.61	8.2	7.11	9.0	7.23	11.2
2018	10.10	5.76	16.0	6.63	15.4	7.06	12.3	7.21	14.6
2019	9.60	6.00	9.1	7.13	8.2	6.99	15.9	7.19	9.7
2020	1.60	6.02	11.5	6.97	13.7	6.90	12.2	7.23	9.7
2021	2.20	6.48	9.4	7.11	9.2	7.12	16.7	7.24	11.6
Mean	8.17	6.59	13.42	6.91	12.35	7.08	11.77	7.13	11.14