Research Article

Performance of residential property investment returns in an emerging metropolitan area. The awareness, use and gender inequality

Muhammad Saidu Aliero[1]*, Salihu Nasiru[2], Henry Ojobo[3] and Yakubu Aminu Dodo[4]

[1]Department of Information Technology, Monash University, Malaysia

[2]Department of Estate Management, Bayero University, Kano, NIGERIA

[3]Department of Architecture, Kaduna State University, Nigeria

[4]Gelisim Universitesi, Istanbul, Turkey

Abstract

This study assessed the performance of residential property investment returns. To ascertain the awareness, use, and gender inequality in the usage of residential performance data by investors. The paper focuses on risk-return features of the tenement, two and three-bedroom property for investment purposes, in order to improve the understanding of the property market mechanism in Kano metropolis, Nigeria. Unraveling empirically risk-return features of residential property in the metropolitan area is unclear hence the speculative decision on residential investment is widespread. Quantitative research was employed using a questionnaire survey to obtain primary data on annual rental and capital values of residential properties from branch managers of estate firms. This data was afterward transformed into total returns and put to Phillip-Perron unit root test (stationarity). The study utilized both descriptive and inferential statistical techniques for analysis. Findings from the study show that total returns for residential property range from 6.99% to 14.44% with risk-return ranging from 20.92% to 51.54% within the property market, Badawa/GRA property has the lowest risk features hence the most secured location for residential investment, the paper also unveils that gender inequity in the usage of residential property investment performance data is high against women. It is on these findings that the study recommended Badawi/GRA property market for risk-averse investors, persistent sensitization program and incentives (reduction in service charge) targeting women in the property market is encouraged.

Introduction

Urbanization has been a typical issue in public discourse. Unabated by improvement in transportation, security, and communication infrastructure, consequently facilitating rural–urban drift [1,2]. Rural–urban drift increases the demand for houses and provides opportunities in the urban spaces for the residential estate market to strive. Returns producing the potential of residential real estate investment and its hedge against inflation have been attributed as a prime rationale for ascribing to it as an alternative investment portfolio [3–5]. Also, housing physical characteristics, location attributes, and the level of micro–economy usually play a vital role in the quantum of returns accruable to real estate in each property market [5–7]. But alas, disentangling returns and risks associated with a residential investment in the various property market have typically been a challenge to investors.

Therefore, the Estate Surveyor and Valuers (ESVs) as enshrined in Decree 24 of 1975 that established Estate Surveyors and Valuers Registration Board of Nigeria are usually abreast with data on performance trends of various residential property in the urban property market. Arguable, long and short–term investors tend not to seek recourse on performance measurement from Estate Surveyor and Valuers in Nigeria [8]. But rely on the speculative drive to make real estate decisions.

Decision-based on speculation is shrouded with uncertainty in terms of returns and risk profile of all classes of properties to be included in real estate investor's portfolio [9]. This uncertainty is an indicator of higher risk, specifically to female investors who are lagging in the Nigerian property market. Gender inequality to an informed decision on land use exacerbates the decline in the overall economy [10].

In fact, a positive returns profile of residential property compels investors to tie their lump sum of capital because it offers a shield through annuity cash inflow [5]. And equip a savvy investor by exploiting risk-returns strategy periodically for each residential property portfolio in the real estate cycle [11]. Disentangling the return-risk profile of residential property can be achieved by quantitatively gauging historical performance so as to forecast future trends. Yet, a chuck of residential investors in the developing world and particularly in Nigeria, invest in the property market without having quantitative knowledge of the returns-risk profile of a diverse range of property in a given property market.

Globally, research on residential property has tilted towards investment performance (risk and returns profile) whilst in Nigeria and other developing countries, it is in the contrast [8]. There are limited studies on the performance of a residential investment in cities across Nigeria. And these studies largely did not dwell on total returns of the tenement, two and three-bedroom property and highlighted the awareness, use, and gender inequality in the usage of residential performance data available at the coffer of Estate Surveying and Valuation firms. Gender equality in the usage of residential performance data suggests a fundamental factor in the economic emancipation of women. While inequality against women is unethically undesirable. It also prevents efficient exploits of the scarce land resource by women most especially in the study area where extreme poverty is endemic [10]. Hence women are left out in utilizing and developing their real estate productive potentials.

Nigeria is situated in Sub-Saharan Africa with a population of over 211.4 with an average annual growth of 2.6 percent, with represent 17 % of the global population and projected to be third-largest by 2050 [12]. Kano metropolis is the administrative site of Kano State, an inland city in North-East Nigeria, it lies between Latitudes 11° 52'N to 12° 80'N and Longitudes 8°22.5`E to 8° 40'E on an altitude of 1549ft above sea level. Globally, Kano metropolis is ranked number 68th with a population of over 4 million, it is the second-largest and industrial city in Nigeria after Lagos, with a landmass of 20,131 km² (7,773 sq mi). Prediction suggests by 2035 the population will double to over 6.5 million inhabitants (World population dashboard, 2022) [13]. Hence the need for an increase in housing investment, though data on annual land sales, housing demand, and supply for Kano metropolis are not officially available except isolated data in the confers of Estate surveying and valuations firm who are the custodian of this data (as enshrined in Decree 24 of 1975 currently cap III "Laws of the Federal Republic of Nigeria). As of 2020, Kano State GDP was ranked 5th after Oyo, Delta, Rivers, and Lagos (Nigeria Bureau of Statistics).

It is in this context that, this study attempt to assess the performance of tenement, two and three-bedroom residential property and highlights the level of awareness, use, and gender inequality in the usage of residential investment performance data by private investors. To achieve the aim, this paper seeks to answer the following research questions: What were the trends in total returns (TRs) on residential property in the Kano metropolis between 2010-2019? What were the risk-return features of residential properties in the Kano metropolis between 2010-2019? What is the level of awareness, use, and gender inequality in the use of residential property performance data by private investors in the Kano metropolis? The subsequent part of the study includes a literature review; section three methodological strategy employed for the study; section four is the result/discussion and section five is the conclusion.

Literature review

Globally, real estate investment performance is intuitively attributed to the economic activity and prosperity of a region [4,6,14-16]. Rental growth theory is built on the premise that market occupancy rate dictates the growth of asking price/rent [4]. Positively in up and negatively in the down cycle of property market position for different classes of property and at the varying time (Mueller, 2001), In most part, persistent rental income and capital gain usually lure investors to residential investment [5].

Volatility in rental income and capital gain in the property market circle if not managed leads to the deficit by property investors. Although a larger economy tends to absorb external economic turmoil, hence more stable than a smaller economy [17]. Consequently, awareness, use, and bridging the inequality gap between genders in accessing the information on residential property performance trends is the hallmark of the property market, devoid of negative risk-returns profile. Particularly the role of women investors in the property market has an enduring implication on the welfare and empowerment of women [18].

It is worthy to note that residential property investment in the realm of private investors is not merely an income-generating asset but an insurance policy-cum-pension plan [6]. Habitually, investors look for high capital gain and are allured with persistent positive returns-risk profile in the property market but are always confronted with the challenge of assessing the quantum of the risk-returns profile from a reliable central source [5].

The dearth of reliable and efficient source of property market information in a timely and structured manner have been attributed to the imperfect nature of the property market. Hence, potential investors rely on verbal values which are scattered in the coffer of speculators, instead of relying on an estate surveying and valuation firm, who are empowered by Decree 24 of 1975 that established ESVARBON to provide such details in Nigeria.

Residential property has significant diversification benefits that vary across regions and types of property [19]. Largely,

risk (cost reduction) and returns (capital maximization) are the indexes employed in determining residential real estate performance [20]. Residential returns are more predictable than comparable investment Garay [21]. Hence, most residential real estate investment decisions are based on past performance [22]. Therefore, the need to unbundle the risk returns behaviors of various residential properties to unearth their peculiarities and improve its understanding, particularly in North-west Nigeria where there is a dearth of emphasis on these studies.

Some limited literature had attempted to understand the performance of residential investment from a diverse perspective. For instance, some studies try to provide a comparative analysis of residential properties and commercial property, and findings unveil that commercial property investment out the performed residential property [23-26]. Though the details of the type of sampling technique employed and the number of property selected are ignored only the number of estate surveying and valuation firms that provide the information are provided. Equally, Dabara [3] concentrates on the inflation hedge performance and risk-returns attributes of residential flats, the study de-emphasized isolating the types of residential flats. While Ma, et al. [27]. Focused their study on retrofitting.

Other studies on residential property performance utilized varying sampling techniques and the results established that the location and type of property determine residential property investment returns [5,8,28-30]. Yet, these scholars ignored tenement buildings in their studies, which is a primary kind of residential property in Kano metropolis the study area.

This study adopted Phillip-Perron unit root test to test the time series data for its stationarity before predicting the total return of the residential property investment which has been largely ignored. In spite of this, the Phillip-Perron test certainly exists in a few studies, which have improved risk-return forecasting while trying to explain real estate performance [3,30]. Therefore, the stationarity procedure is a critical component in the time series data analysis. In addition, trend lines analysis was utilized to graphically reveal trends from 2010 to 2019, and this assists in easing future prediction of total returns trends.

Also, previous empirical literature only reflects the experience of the developed economy which has peculiar economic situations and investors behaviors different from those largely in the Kano metropolis. Therefore, limited studies assessing Kano metropolis. Residential property is a primary option for investors that seeks regular income and capital appreciation. Yet, none of the earlier empirical studies have focused on tenement, two and three-bedroom residential property emphasizing the awareness, use, and gender inequality in accessing data of residential property performance. From a data point of view, the previous research did not emphasize the dimension of total returns which is considered as the best measure of residential real estate performance [31]. However, this study focuses on three types of data set. First, its emphasis is on tenement, two and three-bedroom property. Second,

this study uses four metropolitan location data which includes Naibawa/Yar-Akwa, Hotoro/GRA, Rijiyar-Zaki, and Badawi in Kano metropolis Nigeria where these types of property are predominantly found, and third highlights gender inequality.

This study is among the earliest paper to assess the performance of these types of residential investment and highlight the awareness, use, and gender inequality in accessing residential property performance data in Kano metropolis North-west Nigeria. This study will give both local and foreign private investors, investment managers, and decision-makers of property market operation a better understanding of the returns and risk (uncertainty) surrounding investing in residential property in the Kano metropolis. It will also contribute to narrowing the gap in the literature on North-west Nigeria in the area of real estate performance trends. More so, it will expose practical answers for increasing returns and curtailing the risk surrounding residential investment decisions.

Methodology

In this study, a questionnaire survey design was employed to obtain quantitative data. The questionnaire (fill-in) was shaped in such a way that will elicit tangible information for aggregate average rental and capital values of residential properties. These properties are mainly tenement, two and three-bedroom properties that are primarily for investment purposes because they generate capital growth and rental incomes. The properties are situated across low, medium, and high-density residential Neighbourhoods of Badawi, Naibawa, Rijiyar-Zaki, and Hotoro/GRA in Kano metropolis from 2010 to 2019. Kano metropolis as an emerging economy was chosen for this study because of its political stability since its return to democracy in 1999 and its productive economy that drives the pace of its real estate market.

Map of Africa mark Nigeria and Kano State

Branch Manager/branch partners of registered estate surveying and valuation firms located in the study area provided annual data on rental and capital values of these classes of properties for the study periods because they are the custodian of this data (as enshrined in Decree 24 of 1975 currently cap III "Laws of the Federal Republic of Nigeria") that established the worth of property and their interest. In selecting the estate surveying and valuation firms in Kano metropolis that is fit to provide tangible data for this study from September to November 2019. Purposive sampling techniques were used to select 14 estate surveying and valuation firms that have been in practice for the past 11 years. Also, the questionnaire (Appendix A) employed for the study was administered through face-to-face distribution techniques, 12 estate firms responded representing 85.71% of the sample estate firms. Correspondingly, a sample size of 412 properties was collected for the study and was well thought out to be sufficient [32,33]. Hence, it is the summative average rental and capital value of the selected properties that were used for analysis and generalization. Also, a total enumeration survey was used to select 150 private investors through the Estate Surveying

and Valuation firms in the study area, 144 private residential properties investors responded representing a 96% response rate of investors.

To analyze the quantitative data both descriptive (percentages, weighted means and standard deviation, coefficient of variation) and inferential statistics (Analysis of variance "ANOVA" and Honesty Significant Difference post hoc test) were employed. This aided in showing if any, an overall statistically significant difference exists in total returns among the studied properties in the Neighbourhoods (Table 1-3).

The cumulative average rental and capital values (transaction price) were calculated for each year from the fill-in questionnaire by respondents (estate surveyors and valuation firms only), and Hoesli & MacGregor, (2000) formula was then used to convert the aggregate average rental and capital value into total returns as expressed below:

$$TR_t = \frac{(CV_t - CV_{t-1}) + NI}{CV_{t-1}}$$

(1)

Where:

CV_t = Capital value is at end of the year;

Table 1: Multiple comparison table for tenement properties investment (Tukey HSD) in Kano metropolis.

(I) Location	(J) Location	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Naibawa/Yar-akwa	Hotoro/GRA	3.85000*	1.86390	.046*	.0698	7.6302
	Rijiyar-zaki	3.20900	1.86390	.094	-.5712	6.9892
	Badawa	4.04900*	1.86390	.036*	.2688	7.8292
Hotoro/GRA	Naibawa/Yar-akwa	-3.85000*	1.86390	.046*	-7.6302	-.0698
	Rijiyar-zaki	.19900	1.86390	.916	-3.5812	3.9792
	Badawa	-.64100	1.86390	.733	-4.4212	3.1392
Rijiyar-zaki	Naibawa/Yar-akwa	-3.20900	1.86390	.094	-6.9892	.5712
	Hotoro/GRA	-.19900	1.86390	.916	-3.9792	3.5812
	Badawa	-.84000	1.86390	.655	-4.6202	2.9402
Badawa	Naibawa/Yar-akwa	-4.04900*	1.86390	.036*	-7.8292	-.2688
	Hotoro/GRA	.64100	1.86390	.733	-3.1392	4.4212
	Rijiyar-zaki	.84000	1.86390	.655	-2.9402	4.6202

Computed from Table 5. *The mean difference is significant at the 0.05 level.

Table 2: Multiple comparison table for two-bedroom investment (Tukey HSD) in Kano metropolis.

(I) Location	(J) Location	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Naibawa/Yar-akwa	Hotoro/GRA	-1.04300	1.59975	.519	-4.2874	2.2014
	Rijiyar-zaki	-1.88800	1.59975	.246	-5.1324	1.3564
	Badawa	-1.32500	1.59975	.413	-4.5694	1.9194
Hotoro/GRA	Naibawa/Yar-akwa	1.04300	1.59975	.519	-2.2014	4.2874
	Rijiyar-zaki	-.84500	1.59975	.601	-4.0894	2.3994
	Badawa	-.28200	1.59975	.861	-3.5264	2.9624
Rijiyar-zaki	Naibawa/Yar-akwa	1.88800	1.59975	.246	-1.3564	5.1324
	Hotoro/GRA	.84500	1.59975	.601	-2.3994	4.0894
	Badawa	.56300	1.59975	.727	-2.6814	3.8074
Badawa	Naibawa/Yar-akwa	1.32500	1.59975	.413	-1.9194	4.5694
	Hotoro/GRA	.28200	1.59975	.861	-2.9624	3.5264
	Rijiyar-zaki	-.56300	1.59975	.727	-3.8074	2.6814

Computed from Table 5. The mean difference is significant at the 0.05 level.

Table 3: Summary statistics showing the weighted return, the return-risk ratio of residential properties in Kano metropolis (2010-2019).

Return/property	Min	Max	Weighted Return	Rank (Weighted)	Std. Deviation	Coefficient of variation	Rank (COV)
TR Parlour and Bedroom	7.71	21.08	14.4460	1st	3.7627	0.2605	1st
TR 2Bedroom	5.19	11.81	8.3540	4th	2.0877	0.2499	1st
TR 3Bedroom	4.85	14.98	8.1130	3rd	3.2255	0.3976	3rd
ATR N/Yar-Akwa			30.9130	2nd	7.6320	0.2469	2nd
TR Parlour and Bedroom	5.53	19.12	10.5960	3rd	3.9162	0.3696	3rd
TR 2Bedroom	5.95	15.55	9.3970	3rd	3.1610	0.3364	2nd
TR 3Bedroom	4.90	27.93	12.1830	1st	6.1952	0.5085	4th
ATR Hotoro /GRA			32.1760	1st	11.9070	0.3701	4th
TR Parlour and Bedroom	5.42	20.97	10.3970	4th	5.3581	0.5154	4th
TR 2Bedroom	5.99	18.82	10.2420	1st	4.7542	0.4642	4th
TR 3Bedroom	6.56	14.51	9.9300	2nd	2.9998	0.3020	1st
ATR Rijiyar-Zaki			30.5690	3rd	10.0705	0.3294	3rd
TR Parlour and Bedroom	5.99	17.08	11.2370	2nd	3.3584	0.2989	2nd
TR 2Bedroom	4.29	15.60	9.6790	2nd	3.7724	0.3898	3rd
TR 3Bedroom	4.44	11.18	6.9880	4th	2.2403	0.3206	2nd
ATR Badawi			27.9040	4th	5.8372	0.2092	1st

Calculated from Table 5.
***ATR= Aggregate Total Return,

CV_{t-1}= Capital value beginning of the year (end of period t-1);

NI = Net income or rental value.

Firstly, the converted data (total return data) was put to the inferential test (analysis of variance and honesty significant difference post hoc test 'HSD Tukey) to see if there was variation (statistically significant difference) in total returns across the study properties.

Secondly, the converted data was also, put to Phillip-perron test of unit root to test for stationary and ability to make a prediction, the unit root test was employed to perceive the data integration and stationarity where the data was not stationary the difference of the data was taking to make it stationary to be able to make a precise prediction [3,30,34]. Thus, test regression for the Phillip-Perron tests is:

$$\Delta y_t = \beta ' D_t + \pi y_t - 1 + U_t \qquad (2)$$

Where U_t is I(0) which is a different level and maybe heteroskedastic. Phillip-Perron stationarity tests take the null hypothesis that y_t is trend stationery. As earlier stated if y_t is not stationary, the study takes the first difference to make the data become stationary at a point.

Decision rule: if there is a unit root problem (stationarity characteristic of the data set) to accept or reject the Null hypothesis at 10%, 5%, and 1% significant level for total returns.

Thirdly, the value of the standard deviation of the total return assists to quantify the level of volatility of the total returns which primarily establish the risk of investing in the tenement, two and three-bedroom residential properties in the study neighborhoods expressed as:

$$\text{Standard deviation/Asset risk} = \sqrt{\frac{\sum (x_i - \overline{x})^2}{n-1}} \qquad (3)$$

Where n-1 =df

x_i = asset period return

$\overline{x}$ = the mean return

n= number of observation

Decision rule: neighborhoods with low-risk value depict the hereditament as more secured whilst those with high-risk value indicate a less secured residential investment.

Fourthly, trend lines analysis was used to graphically establish trends from 2010 to 2019 and assist in easing the forecast of trends. Equally, the R^2 coefficient was used to establish the goodness of fit of the total returns trends and the precision of the forecast. The rule of thumb is that a trend line is most precise if the R^2 value is closer or at 1 or 0.5. Also, the trend line regression equation was generated for projecting future total returns coefficient. In order to demonstrate the

trend line equations, the steps involve identifying the line that generates the least coefficient for the sum of the squares of the vertical difference between the data point and line.

The equation is written as $y = mx + b$ .... (4)

Where:

y =dependent variable (total returns)

m =slope of the line, hence equals the Δ in the y coefficient divided by the Δ in the

x coefficient;

x= the independent variable (year);

b= the y-axis intercept of the line.

Fifthly, return-risk features of residential investment (tenement, two and three bedrooms) were comparatively analyzed to establish their distinctiveness. And conclusively, data on the level of awareness, use, and gender inequality from private investors were analyzed with the aid of percentages.

Results and discussions

The present study uses data from the confers of Estate surveyors and valuation firms because they are the custodian of this data in Nigeria (as enshrined in Decree 24 of 1975 currently cap III "Laws of the Federal Republic of Nigeria"), while the rationale for using residential investors as a source of data is because it is the largest reliable publically available, and State representative survey that can be accessed for this domain of research in developing economies like Nigeria. The questions and how the variables are defined and measured are available in **Appendix A&B** of the article. The result of the analysis conducted on the data is presented here. Firstly, the average total returns coefficient were calculated from 2010-2019 for tenement building, two and three-bedroom residential properties. Secondly, analysis of variance was done for this class of properties to unearth the level of dissimilarities. Thirdly, multiple comparison tables for the residential properties were presented and examined. Fourthly, the risk-return characteristic of the properties was presented and analyzed. Fifthly, aggregate trend line analysis was presented and the trend line equation was employed to make a prediction. Lastly, the respondent provided information on their level of awareness, use, and gender inequality in terms of utilizing the total returns data.

The average total returns of the tenement, two and three-bedroom residential property investment are presented from 2010 to 2019 in Table 1. These were arrived at by calculating for each year respectively, the cumulative averages of the respondent response on rental and capital value per property type and employing Hoesli and MacGregor, (2000) formula for total returns "(1)".

The result from Table 4 depicts the aggregate mean scores of total returns, which is envisioned to provide at a glance the disparities in the residential investment trend/

performance from years to years for the various location in the Kano metropolis. For tenement property, the most performed location is Naibawa (21.08%) whilst the least performed is at Rijiyar-Zaki (5.42%). Also, for two-bedroom property, Rijiyar-Zaki is the most performed location (18.82%) while Badawi is the least performed location with a coefficient of (4.29%). For three-bedroom property, the Hotoro property market performed better (27.93%) while the Naibawa property market is the least performed (4.68%).

Test results presented in Table 5 suggest that the study should accept the null hypothesis that is the data for total returns from Naibawa/Yar-Akwa contain unit root (not stationary). Equally test results for Hotoro, Rijiyar-Zaki, Badawa indicate that the study will reject the null hypothesis that is the data for total returns contain no unit root (is stationary). Therefore, the study takes a first difference of the data (in Naibawa) to establish stationarity, before predicting the total return of the property employing the trend line equation [3,30,34].

The result from Table 6 shows the analysis of variance on total return for the three selected classes of property in the Kano metropolis. The result suggests that the F-statistics for the tenement and two-bedroom properties (2.047, 0.490) are not significant at p-value (0.125, 0.692) greater than 0.05 level of significance, this shows that variation in the total returns for a tenement and two-bedroom property across the study locations in Kano metropolis are not statistically significantly different. Also, the result F-statistics (3.283) is significant at a P-value (0.032) less than 0.05 level of significance, depicting a statistically significant difference in total return across locations for a three-bedroom property. This insignificant and significant difference in means, between and across property types in the locations/market might be associated with location factors.

The insignificant differences in total returns across the property market can be evaluated through the results of the honesty significant difference posthoc test (HSD Tukey) in

Table 4: Average total returns (%) for tenement, two and three bedrooms' residential investment within Kano metropolis.

Location	Property type	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ninawa	Tenement	16.29	18.27	11.36	16.55	21.08	13.77	7.71	12.86	13.7	12.8
	Two	6.65	9.78	10.93	11.81	8.50	9.33	5.19	6.84	7.16	7.35
	Three	11.04	9.72	8.94	8.83	14.98	5.88	5.68	4.85	5.62	5.59
Mean		11.33	12.59	10.41	12.4	14.85	9.66	6.19	8.18	26.51	8.59
Hatboro	Tenement	19.12	7.75	8.87	14.06	12.35	7.17	9.32	10.95	10.84	5.53
	Two	15.55	12.93	6.35	8.94	7.13	11.44	10.7	7.26	7.75	5.95
	Three	27.93	9.01	11.33	12.87	14.95	10.65	8.60	12.59	9.00	4.90
Mean		20.87	9.87	8.85	11.96	11.48	9.75	9.53	10.27	9.20	6.52
Rijiyar zaki	Tenement	18.59	6.68	12.13	8.32	20.97	6.41	5.42	9.90	6.42	9.13
	Two	18.39	11.44	6.41	18.82	8.60	10.66	8.36	5.99	6.59	7.16
	Three	14.51	8.79	14.39	8.31	13.00	9.61	9.80	6.56	7.21	7.12
Mean		17.16	8.97	10.98	11.82	14.19	8.89	7.86	7.48	6.74	7.80
Badawa	Tenement	17.08	14.31	8.87	14.59	11.87	5.99	11.5	10.64	9.08	8.40
	Two	13.36	8.91	6.15	11.04	7.34	14.27	4.29	15.60	9.09	6.74
	Three	6.91	4.68	8.68	7.73	9.22	11.18	5.99	6.55	4.87	4.90
Mean		12.45	9.3	7.9	11.12	9.48	10.48	21.8	10.93	7.68	6.68

Source: Field survey 2019

Table 5: Phillip-Perron Stationarity test for all neighborhood.

		Test Statistic	1% Critical	5% Critical Value	10% Critical Value	MacKinnon approximate p-value for Z(t)
Naibawa	Z(rho)	-4.209	-17.2	-12.5	-10.2	0.5573
Yar-Akwa	Z(t)	-1.452	-3.75	-3	-2.63	
Hotoro/GRA	Z(rho)	-8.518	-17.2	-12.5	-10.2	0.0000
	Z(t)	-4.827	-3.75	-3	-2.63	
Rijiyar-zaki	Z(rho)	-7.708	-17.2	-12.5	-10.2	0.0430
	Z(t)	-2.92	-3.75	-3	-2.63	
Badawa	Z(rho)	-10.101	-17.2	-12.5	-10.2	0.0099
	Z(t)	-3.432	-3.75	-3	-2.63	

Source: Analysis of survey data Table 4

multiple comparisons Tables 1-3. These Tables demonstrate where the significant difference in total returns truly existed within the study property market.

The multiple comparison Table 1 shows that for tenement property there is a significant difference in total returns in Naibawa and Hotoro (Mean 3.85000 at P-value 0.046), Naibawa and Badawi (Mean 4.04900 at P-value 0.036) while Naibawa and Rijiyar-Zaki have no significant difference in total returns (Mean 3.20900 at P-value 0.094).

For the two-bedroom property Table 2 significant difference does not exist in total returns in the study areas. Similarly, for the three-bedroom property Table 3 significant difference exists in total returns for property in Naibawa/Yar-Akwa and Hotoro (Mean 4.07000 at P-value 0.028), Naibawa/Yar-Akwa, and Badawi (Mean 5.19500 at P-value 0.006). This significant difference in total returns in the property market might be attributed to location characteristics.

The result from Table 7 shows the descriptive statistics of the total returns and risk-return ratio profile of the three classes of residential rental properties in Naibawa/Yar-Akwa, Hotoro/ GRA, Rijiyar-Zaki, and Badawi in Kano metropolis.

Table 7 indicates that for tenement properties the highest level of total returns generated (Weighted returns) is (14.44%) in the Naibawa/Yar-Akwa property market and a corresponding risk-return profile of 26.05%, while the least total returns for the same type of property is in Rijiyar-Zaki (10.40%) with a corresponding highest risk-return profile of (51.54%).

For 2 Bedroom properties, Table 7 indicates that Hotoro/GRA neighborhood generated the highest total returns (Weighted returns) with a coefficient of (10.24%), having a corresponding highest level of risk-return profile at (46.42%), similarly Naibawa/Yar-Akwa property market generated the lowest rate of total returns coefficient of (8.35%) in the same class of property and a low risk-return profile of (24.99%).

Also, for 3 Bedroom properties, the result shows that Hotoro/GRA neighborhood generated the highest total returns (weighted returns) in the ranking with a coefficient of (12.18%) and a proportionate fourth place risk-return profile of (50.85%) whilst the Badawa property market generated the least total returns with a coefficient of (6.99%) and a proportionate (32.06%) risk-return profile.

In addition, the aggregate weighted total returns coefficient in Hotoro/GRA is ranked first with a coefficient of (32.17%) and a risk-return coefficient at (37.01%) for this classes of property in each property market location whilst Badawa come with the least aggregate total returns (Weighted returns) coefficient of (27.9%) and a proportionately lower level of risk-return coefficient of (20.92%). The risk-bearing trends of residential property investment provide. The total returns-

Table 6: Analysis of variance in total returns for the tenement, two bedrooms, and three-bedrooms residential properties investment in Kano metropolis.

Type of property	Source of variation	Sum of square	df	Mean square	F	p-value
Tenement	Within groups	625.342	36	17.371		
	Between groups	106.677	3	35.559	2.047	.125
	Total	732.019	39			
Two bedroom property	Within groups	460.656	36	12.796		
	Between groups	18.796	3	6.265	.490	.692
	Total	479.452	39			
Three bedroom property	Within groups	565.215	36	15.700		
	Between groups	154.629	3	51.543	3.283	.032
	Total	719.844	39			

Calculated from Table 5

Table 7: Multiple comparison table for three-bedroom investment (Tukey HSD) in Kano metropolis.

(I) Location	(J) Location	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Naibawa/Yar-akwa	Hotoro/GRA	-4.07000*	1.77203	.028*	-7.6638	-.4762
	Rijiyarzaki	-1.81700	1.77203	.312	-5.4108	1.7768
	Badawa	-5.19500*	1.77203	.006*	-8.7888	-1.6012
Hotoro/GRA	Naibawa/Yar-akwa	4.07000*	1.77203	.028*	.4762	7.6638
	Rijiyarzaki	2.25300	1.77203	.212	-1.3408	5.8468
	Badawa	1.12500	1.77203	.530	-2.4688	4.7188
Rijiyarzaki	Naibawa/Yar-akwa	1.81700	1.77203	.312	-1.7768	5.4108
	Hotoro/GRA	-2.25300	1.77203	.212	-5.8468	1.3408
	Badawa	2.94200	1.77203	.106	-.6518	6.5358
Badawa	Naibawa/Yar-akwa	5.19500*	1.77203	.006*	1.6012	8.7888
	Hotoro/GRA	-1.12500	1.77203	.530	-4.7188	2.4688
	Rijiyarzaki	-2.94200	1.77203	.106	-6.5358	.6518

Computed from Table 5. *The mean difference is significant at the 0.05 level.

risk performance profile of residential property in Naibawa, Hotoro, Rijiyar Zaki, and Badawi are discussed in Table 7. This was established with the aid of "(3)"; and afterward ranked and compared across the study locale. The trends in returns and risk-return ratio features of residential investment are persuasive for informed investors' decision making, it aids in diversifying profit spread and maximization, as well as minimizing investment risk in a mixed residential type investment portfolio.

The result from Table 7 shows the descriptive statistics of the total returns and risk-return ratio profile of the three classes of residential rental properties in Naibawa/Yar-Akwa, Hotoro/ GRA, Rijiyar-Zaki, and Badawi in Kano metropolis.

Table 7 indicates that for tenement properties the highest level of total returns generated (Weighted returns) is (14.44%) in the Naibawa/Yar-Akwa property market and a corresponding risk-return profile of (26.05%), while the least total returns for the same type of property is in Rijiyar-Zaki (10.40%) with a corresponding highest risk-return profile of (51.54%).

For 2 Bedroom properties, Table 7 indicates that Hotoro/ GRA neighborhood generated the highest total returns (Weighted returns) with a coefficient of (10.24%), having a corresponding highest level of risk-return profile at (46.42%), similarly Naibawa/Yar-Akwa property market generated the lowest rate of total returns coefficient of (8.35%) in the same class of property and a low risk-return profile of (24.99%).

Also, for 3 Bedroom properties, the result shows that Hotoro/GRA neighborhood generated the highest total returns (weighted returns) in the ranking with a coefficient of (12.18%) and a proportionate fourth place risk-return profile of (50.85%) whilst the Badawa property market generated the least total returns with a coefficient of (6.99%) and a proportionate (32.06%) risk-return profile.

In addition, the aggregate weighted total returns coefficient in Hotoro/GRA is ranked first with a coefficient of (32.17%) and a risk-return coefficient at (37.01%) for this classes of property in each property market location whilst Badawa come with the least aggregate total returns (Weighted returns) coefficient of (27.9%) and a proportionately lower level of risk-return coefficient of (20.92%). The risk-bearing trends of residential property investment provide.

An investor with an exclusive opportunity for safeguarding investment portfolio from risk complexities and inherent uncertainties associated with real estate investment. Also, the returns profile establishes the quantity of income that has been generated over time and aid in the subsequent prediction of total returns.

Similarly, Table 7 also shows the aggregate comparative analysis of risk factors of the various properties in the study areas from the least to the highest. Aggregate risk factor for the entire four locations was calculated "(3)" and results establish that Badawi has the least risk with a coefficient of (5.84%) demonstrating the best-secured location for risk-averse investors while Hotoro has the highest risk with a coefficient

of (11.91%) indicating a least secured investment location but best for risking taking investors respectively.

The graphical result from Figures 1,2 shows the Trends of total returns of residential properties in Naibawa/Yar-Akwa, Hotoro/GRA, Rijiyar-Zaki, and Badawi in Kano metropolis for tenement property, two-bedrooms, and three-bedrooms. Deduction from the graph indicated that Hotoro/GRA have the highest total returns in 2010 followed by Naibawa/Yar-Akwa in 2014, consequently, the total returns flow is volatile, though the point of fluctuation in total returns are positive. The trend equations for the different property market is shown in the graph with the R^2 values illustrating the goodness of fit of the model. The rule of thumb is that the closer the R^2 value to 1 or 0.5 the better the predictability. The peak of the predictability is at 54%.

Also, the trend line equations of the locations are utilized to make a prediction per annum (p. a) from 2020 to 2022, trend line is utilized because historical performance is the basis for future decision making though not unconditional. Utilizing the trend line equation in the graph (Figure 2) the following coefficient for total returns were predicted.

I. Total Returns trends line equation for Naibawa /Yar-Akwa= $-1.5602x+39.494$.

Employing the total returns trend line equation = $-1.5602(11)+39.494$ predicted value for 2020 is = 22.33%. Similarly, for 2021 the trend line equation coefficient = $-1.5602(12)+39.494$ predicted coefficient is = 20.77%. While for 2022 the trend line coefficient = $-1.5602(13)+39.494$ predicted value is 19.21%.

II. Total Returns trend line equation for Hotoro = $-2.6451x+46.724$

Also, using the total returns trend line equation = $-2.6451(11)+46.724$ predicted value for 2020 is = 17.63%. Again, for 2021 the trend line equation coefficient = $-2.6451(12)+46.724$ predicted value is = 14.98%. While, for 2022 the trend line equation coefficient = $-2.6451(13)+46.724$ predicted coefficient is = 12.34%.

III. Total Returns trend line equation for Rijiyar-zaki = $-2.4452x+44.017$

Using the total returns trend line equation = $-2.4452(11)+44.017$ predicted value 2020 is = 17.12%. In addition, 2021 trend line equation coefficient= $-2.4452(12)+44.017$ predicted value is = 14.67%. Lastly, for 2022 trend line equation coefficient = $-2.4452(13)+44.017$ predicted value is =12.23%.

IV. Total Returns trend line equation for Badawa = $-1.1065x+33.99$

Utilizing the total returns trend line equation= $-1.1065(11)+33.99$ the forecast coefficient for 2020 is 21.82%. Also, for 2021 the trend line equation coefficient = $-1.1065(12)+33.99$ forecasted value is =20.71%. While, for 2021 the trend line equation = $-1.1065(13)+33.99$ forecast coefficient is = 19.6055 (19.61%).
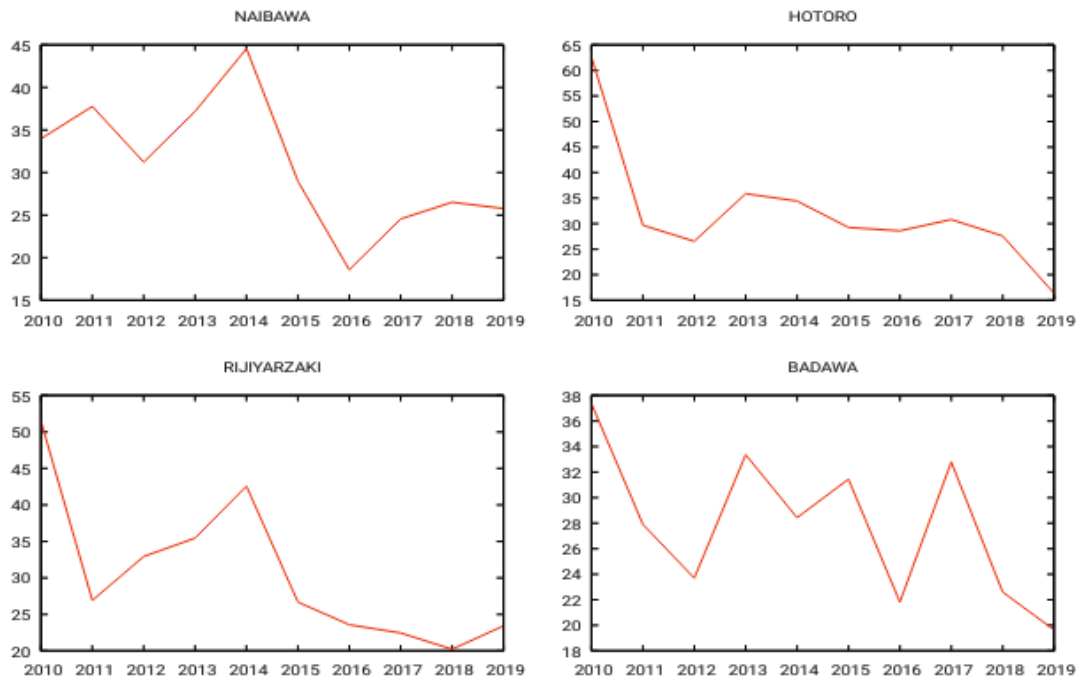
Figure 1: Trend analysis showing isolated aggregate total returns for residential properties in Kano metropolis.
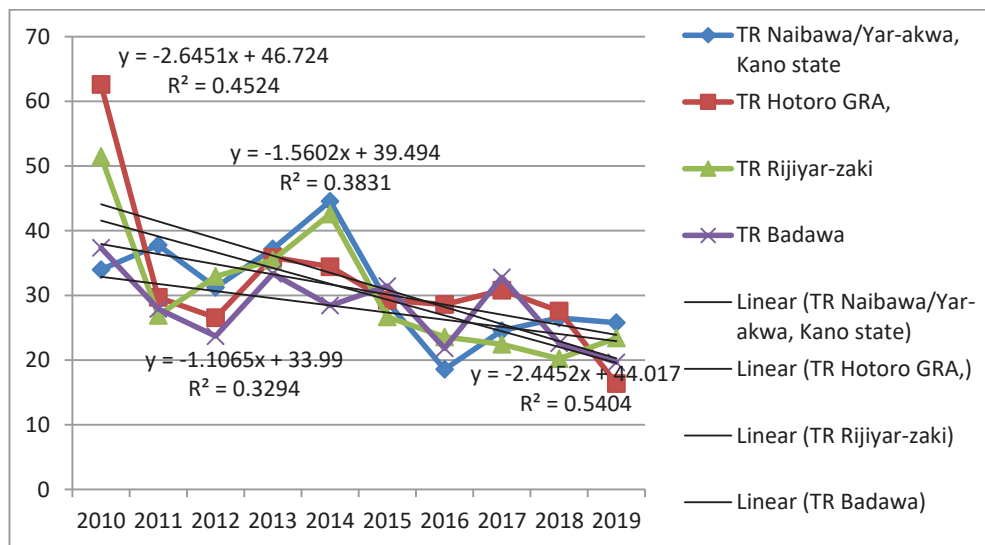

Figure 2: Trend analysis showing aggregate total returns for residential properties in Kano metropolis.

The prediction will provide an avenue for investors to make informed decisions. Though, this study recognizes the fact that this forecast falls short of capturing some socio–cultural variables that might affect total returns in the study area and are beyond the scope of this study.

Table 8 suggests that 96.92% of investors are aware (Weighted mean 3.3548) of the availability of investment performance data in the coffer of Estate surveyors and valuers. Consequently, should have ideally aid an investor in making an informed decision on investing in residential property. A high level of awareness of data will reduce or spread the risk associated with residential investment thereby increasing

investment returns, increasing accuracy in forecasting future residential needs which will mitigate against shortfall, and increasing access to critical factors will empower uniqueness of strategy in real estate approaches by the investor.

Table 9 indicates that only 37.01% of residential property investors from the study area use (weighted mean 2.3084) property investment performance information at the coffer of Estate surveyors and valuers. Suggesting that most residential property investment decisions are speculative without seeking expert advice hence creating a high level of uncertainty/ risk this corroborates the intuition of Nwakwo, et al. [8]. In Sub–Sahara Africa use of landed property improve household

Table 8: Summary statistics showing the weighted return, the return-risk ratio of residential properties in Kano metropolis (2010-2019).

Return/property	Min	Max	Weighted Return	Rank (Weighted)	Std. Deviation	Coefficient of variation	Rank (COV)
TR Parlour and Bedroom	7.71	21.08	14.4460	1st	3.7627	0.2605	1st
TR 2Bedroom	5.19	11.81	8.3540	4th	2.0877	0.2499	1st
TR 3Bedroom	4.85	14.98	8.1130	3rd	3.2255	0.3976	3rd
ATR N/Yar-Akwa			30.9130	2nd	7.6320	0.2469	2nd
TR Parlour and Bedroom	5.53	19.12	10.5960	3rd	3.9162	0.3696	3rd
TR 2Bedroom	5.95	15.55	9.3970	3rd	3.1610	0.3364	2nd
TR 3Bedroom	4.90	27.93	12.1830	1st	6.1952	0.5085	4th
ATR Hotoro /GRA			32.1760	1st	11.9070	0.3701	4th
TR Parlour and Bedroom	5.42	20.97	10.3970	4th	5.3581	0.5154	4th
TR 2Bedroom	5.99	18.82	10.2420	1st	4.7542	0.4642	4th
TR 3Bedroom	6.56	14.51	9.9300	2nd	2.9998	0.3020	1st
ATR Rijiyar-Zaki			30.5690	3rd	10.0705	0.3294	3rd
TR Parlour and Bedroom	5.99	17.08	11.2370	2nd	3.3584	0.2989	2nd
TR 2Bedroom	4.29	15.60	9.6790	2nd	3.7724	0.3898	3rd
TR 3Bedroom	4.44	11.18	6.9880	4th	2.2403	0.3206	2nd
ATR Badawi			27.9040	4th	5.8372	0.2092	1st

Calculated from Table 5.
***ATR= Aggregate Total Return,

income through rent, and access to loan facility to engage in another economic enterprise [35]. Thus reducing household poverty level and gender base inequality [18]. In order words, the Usage of performance data will influence human socio-economic development is twofold. First, improve his living standard through better income and economic growth. Second, might reduce social inequality by curtailing the level of gender-based violence through improving household bargaining power [36-38].

Also, Tables 10,11 indicates that out of the investors that use residential property performance data in decision making, only 12.5% are female while a whooping sum of 87.5% are male. Deduction suggests a great sign of gender inequality between men and women in accessing and usage of investment performance data. Demonstrating that a greater percentage of women's investment decisions in residential property are speculatively based. This suggests that women are excluded from far-sighted investment decisions, hence exacerbating their social status and livelihood in the study area, consequently reducing their exploitation in the property market. On one hand, excessive appropriation of the property market information by men will leave women destitute, because already North-West Nigeria has the highest level of gender-based inequality to agricultural land [10]. On the other hand, women exploiting the property market will add to their source of social identity and accord some privileges, and ensure equitable participation within the society.

This study acknowledges that residential property data in the confers of non-estate surveying and valuation firms were not accessed because the extent law did not bestow custodianship to them which might have led to more insightful revelations, also the forecast falls short of capturing some microeconomic

Table 9: Level of awareness of residential property performance data.

Variable	Response					
Awareness	Not aware	Slightly aware	Somewhat aware	Moderately aware	Extremely aware	Mean
Frequency	12 (3.08%)	70 (17.99%)	121 (31.11%)	140 (35.99%)	46 (11.83%)	3.355

Source: Field survey 2019

Table 10: Use of residential property performance data.

Variable	Response					
Use	Never use	Almost never	Sometimes	Almost every time	Frequently use	Mean
Frequency	124(31.88%)	121(31.11%)	74(19.02%)	40(10.28%)	30(7.71%)	2.308

Source: Field survey 2019

Table 11: Level of gender inequality in the use of residential property performance data.

Variable	Response	
Gender	Male	Female
Frequency	126(87.5%)	18(12.5%)

Source: Field survey 2019

data that are present in the study area but beyond the study scope. Future studies should explore the performance of the non-residential property and also variables like marital status that are not captured by the data utilized for the study.

Conclusion

This paper assessed the performance (total returns and risk features) of residential investment in Kano metropolis, North-west Nigeria. Findings from the study empirically established

the fact that investing in tenement, two and three-bedroom residential properties maintain a positive rate of total returns profile over the study timeframe corroborating the findings of Nwankwo, et al. [8]. In South-East Nigeria, Nissi, et al. [29]. In Enugu and Salihu, et al. [30]. In Kaduna studying other classes of residential property performance in the Nigeria context.

Naibawa/Ya-Akwa tenement property market performed better in terms of total returns (14.44%) and a corresponding third place risk (3.76%) as compared to other locations. Total returns are volatile with a weighted mean ranging from 6.99% to 14.44%. The highest aggregate of total returns for all the classes of residential property is Hotoro/GRA (32.17%) and lowest at Badawi (27.90%) respectively. Equally, the aggregate least secured property investment portfolio is located at Hotoro (risk factor 11.91%) fourth place though most favorable location for the risk taken investors while the most secured investment location is at Badawa (risk factor 5.84%). Consequently, Badawi is recommended as the most desirable location for risk-averse investors.

The aggregate trend line forecast for total returns in residential property (tenement property, two & three-bedroom) investment for all the neighborhoods from 2020 to 2022 ranges from 12.23% to 22.23%. By implication, the study, reveals that total returns will be maintaining a volatile positive trend with minimal risk capacity within the study period.

This study recommends that sensitization of women in the property market on benefits of using performance information should be encouraged and also, incentives in form of reduction in service charges to women investors should be pivotal, this might persuade women, investors, to utilize real estate performance data in decision making hence reducing gender-based inequality in this context.

Equally, the study broadens the scope of residential investment performance literature to embrace North-West Nigeria (Kano metropolis). The inference of the information provided in this literature embraces both foreign and local residential property developer desiring to invest in various residential property portfolio that needs to be included in their portfolio from the Nigeria property market. This study serves as the remedy for spreading real estate investment risk. Consequently, expanding residential investment portfolio performance by safeguarding marginal risk and accruing maximal returns.

Acknowledgment

References

1. Balta MO, Eke F (2011) Spatial Reflection of Urban Planning in Metropolitan Areas and Urban Rent: A case study of Cayyola, Ankara. European Planning Studies 19: 1817-1838. Link: https://bit.ly/359aJUd

2. Somanje AN, Mohan G, Lopes J, Mesah A, Gordon C, et al. (2020) Challenges and Potential Solutions for Sustainable Urban-Rural Linkages in a Ghanaian Context. Sustainability 12: 507. Link: https://bit.ly/3JFQwUZ

3. Dabara D (2015) The inflation hedge performance and risk return characteristics of residential property Investment in Gombe, Nigeria. Advance Research 3: 71-83. Link: https://bit.ly/3Bv43M1

4. Ho HK, Atkinson R (2018) Looking for the 'fry': The motives and methods of middle-class international property investors, Urban Studies 55: 2040- 2056. Link: Link: https://bit.ly/358U8j2

5. Okonu AA, Umeh OL, Akinwande O, Muraina O (2019) Comparative analysis of risks and returns on residential property sub-market in Lagos: Case study of 1004 Estate. J land management appraisal 6: 6-13. Link: https://bit.ly/3GXvb7K

6. Mahdzan SN, Wei CC (2016) Motives for residential property investment in Malaysia: Evidence from online property forum participant. J Wealth Planning Financial Planning 3: 15-34. Link: https://bit.ly/3LLsAkH

7. Osa KO, Ekenta C (2019) Appraising investment performance measurement of both residential and commercial properties in Lagos and Port-Harcourt. International J Innovative Science Engineering Technology 6: 68-84. Link: https://bit.ly/3LGxmjA

8. Nwankwo VC, Kalu IU, Igwe-Kalu A (2018) Comparative Analysis of the performance of residential investment real estate in South-Eastern Nigeria. IOSR J Economics Finance 9: 44-58. Link: https://bit.ly/3sPolvV

9. Hargitay SE, Yu SM (1993) Property investment decision: A Quantitative Approach. London: E & FN Spoon.

10. Abubakar IR (2021) Predictors of inequalities in land ownership among Nigerian households: Implications for sustainable development. Land Use Policy 10: 105-194. Link: https://bit.ly/3LFixO9

11. Mughees S (2012) The benefits and importance of commercial real estate.

12. United Nations (2019) World population prospects 2019. In: Comprehensive Tables. United Nations Department of Economic and Social Affairs, Volume I. United Nation, New York. Link: https://bit.ly/353hkiP

13. Population statistic (2022) Kano, Nigeria Population. Link: https://bit.ly/3Jy79So

14. Lieser K, Groh AP (2011) Determinant of commercial real estate investments. Working Paper. Link: https://bit.ly/3uYh5QV

15. Sesana MM, Salvalai G (2013) Overview on life cycle methodologies and economic feasibility for nZEBs, Building Environment 67: 211-216. Link: https://bit.ly/355IaqL

16. Binovska I, Kauskale L, Vanags J (2018) The comparative analysis of real estate market development tendencies in the Baltic states. Baltic J Real Estate Economics Construction Management 6: 6-23. Link: https://bit.ly/3l24ik6

17. Chen J, Hobbs P (2003) Global real estate risk index: To capture different level of market risk. J Portfolio Management Special Issue 66-76.

18. United Nations (2018) The sustainable development goals report 2018. United Nation, New York. Link: https://bit.ly/34QeNsz

19. Eichholtz PMA, Hoesli M, McGregor BDA, Nanthakumaran N (1995) real estate portfolio diversification by property type and region. J Property Finance 6: 39-59. Link: https://bit.ly/3JFUXiB

20. Komisarov V, Kauskale L, Lepkova N (2016) Positive influencing factors of commercial property development: Case of Lithuania. Baltic J Real Estate Economics Construction Management 4: 48-60. Link: https://bit.ly/3JvPE4Y

21. Garay U (2016) Real Estate as an Investment. In Kazemi H, Black K, Chambers D Alternative Investments: CAIA Level II, Chapter 14 (pp. 343-358). Wiley Finance, (3rd Ed.). Link: https://bit.ly/3H2DSxo

22. Mei J, Saunders A (1997) Have U.S. Financial institutions' real estate Investments exhibited Trend-chasing Behavior?, Review of Economics Statistics 79: 248-258. Link: https://bit.ly/3sNWT1I

23. Mfam CE, Kalu IU (2012) Analysis of return and risk in direct residential and commercial real estate investments in Calabar, South Eastern Nigeria. J Sci Engineering Technology 1: 128-133. **Link:** https://bit.ly/3IfOZop

24. Oyewole, MA (2013) Comparative analysis of residential and retail commercial property investments performance in Ilorin, Nigeria. J Economics Sustainable Development 4: 199-208. **Link:** https://bit.ly/35908Z6

25. Udobi AI, Onyejiaka JC, Nwozuzu GC (2018) Analysis of the performance of commercial and residential property Investments in Onitsha Metropolis Nigeria. British J Earth Sci Research 6: 21-32.

26. Kingsley OO, Chukwuemeka E (2019) Appraising investment performance measurement of both residential and commercial properties in Lagos and Port-Harcourt. International J Innovative Sci Engineering Technology 6: 68-84. **Link:** https://bit.ly/33vnkR9

27. Ma Z, Cooper P, Daly D, Ledo L (2012) Existing building retrofits: methodology and state of the art, Energy and Build 55: 889-902. **Link:** https://bit.ly/3I3qxXc

28. Wahab MB, Morenikeji GB, Adeogun AS, Durosinmi AW, Shittu WO (2017) Risk-return performance of residential property investment in Abuja, Nigeria. ATBU J Environmental Technology 10: 95-108.

29. Nissi CF, Diala O, Ezema C (2019) Comparative performance analysis of residential property investments in Enugu urban, Enugu State, Nigeria from 2010-2017. J Business Management 21: 1-7. **Link:** https://bit.ly/3LHez7A

30. Salihu N, Nuhu MB, Sanni ML, Sule A (2020) Structure and conduct of risk returns-characteristics of residential property investment in Kaduna metropolis, Nigeria, ATBU J Environmental Technology 13: 74-92. **Link:** https://bit.ly/3v3fhpU

31. Umeh OL, Oluwasore OA (2015) Inflation hedging abilities of residential properties in selected areas of Ibadan Metropolis, Nigeria. ATBU J Environmental Technology 8: 93-106. **Link:** https://bit.ly/3I7kNvC

32. Krejcie RV, Morgan DW (1970) Determining sample size for research activities. Educational Psychological Measurement 30: 607-610. **Link:** https://bit.ly/355KYE0

33. Salihu N, Nuhu MB, Sanni LM, Sule AI, Gwamna SE (2021) An Investigation into the Housing Condition and Affordability within high density neighbourhoods of Minna, Niger State. In Nuhu MB, Kuma SS (Eds) Theme Land and Property rights governance in Africa (A Book of Readings): Centre for Human Settlement and Urban Development Federal University of Technology Minna 103-121. **Link:** https://bit.ly/3p0komX

34. Ma L, Liu C (2010) Can investors hedge residential price dynamics of Australia's capital cities? International Real Estate Review 13: 30-45. **Link:** https://bit.ly/3sNHSg7

35. Deininger K, Xia F, Savastano S (2017) Smallholders' land ownership and access in sub-Saharan Africa: A new landscape? Food Policy 67: 78-92. **Link:** https://bit.ly/3oVMZtu

36. Mwasha Abraham, Rupert GW, Joseph Iwaro. (2011) Modeling the performance of residential building envelope: The role of sustainable energy performance indicators. Energy buildings 43: 2108-2117. **Link:** https://bit.ly/3I2aIQi

37. Nigeria Bureau of Statistics (2020). **Link:** https://bit.ly/3HYMzdx

38. World population dash board (2020). **Link:** https://bit.ly/3GZjxsM