

COMPARATIVE ANALYSIS OF FACTORS INFLUENCE IN OCCUPANCY RATIO AND RENTAL VALUE OF HIGH- AND LOW- RISE BUILDINGS IN KADUNA

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Abstract

The study examines the factors influencing the occupancy ratio and rental value of high-rise and low-rise buildings in the Kaduna metropolis of Nigeria. A quantitative approach was adopted with questionnaires administered to thirty-five registered estate surveyor firms in the study area with purposive sampling techniques used to identify firms managing both low- and high-rise buildings. Thirty of the administered questionnaires were returned valid for analysis showing an 85.7% success rate. With the aid of a five-point Likert scale analysed with average mean and relative importance index (RII), findings revealed that the non-provision of elevators was ranked highest among the factors influencing rental values of high-rise buildings with 0.77 RII value while that of low-rise building was found to be population/demand with 0.71 RII. Also revealed by the study is an upward trajectory of rental values for both high and low-rise buildings; although, low-rise buildings commanded a higher rental value when compared to high-rise buildings. With a similar RII value of 0.80, location influences the occupancy ratio of high-rise buildings while individual preferences do for low-rise buildings. The study, therefore, concludes by recommending that investors and stakeholders in the housing sector should intensify regulation and supervision of high-rise building constructions to ensure adherence to sound structural design and execution on-site alongside the provision of basic facilities like emergency exits, fire extinguishing systems and elevators to further enhance the rental values and eventual return on investment.

Keywords: High-Rise Building, Occupancy ratio, Rental value

INTRODUCTION

After food and clothes, shelter is one of man's three fundamental requirements. Shelter is a topic that continually resurfaces in public debate among those involved in the design and construction of structures. When man was largely traditional, the question of shelter was not as pressing as it is today (Desai & Dharmapala, 2009). The original community was completely unplanned and centred on horizontal building development rather than predefined arrangements or preferences for height (Berger, 2006; Shirowzhan, 2020). Individuals, corporations, and governments have developed different inventions as a result of urbanization to address the problem of human shelter, particularly in the housing sector, resulting in vertical building development (Wang & Wang, 2010; Nwankwo & Okonkwo, 2012).

A construction with walls, floors, a roof, and typically windows is referred to as a building (Sadineni, 2011). As a result, tall buildings are multi-story structures where the majority of residents rely on elevators (lifts) or staircases to get to their destinations. Most countries refer to such buildings as "high-rise buildings," although Britain and several European countries refer to them as "tower blocks" (Urban, 2013; Urban, 2018). The emergence of large cities is aided by the rapid rise of the economies of the major countries. The population density is expanding as a result of extensive internal and external migration to major cities. As a result, the number of contemporary multi-story and high-rise structures is growing, and engineering and transportation infrastructure is evolving at a breakneck speed (Penner et al., 2013; McDuié-Ra & Chettri, 2020). Overall, housing, as a component of man's environment, has a significant impact on the community's health, social behaviour, satisfaction, and overall well-being. It is the best physical and historical proof of civilisation in a country, and it represents a society's sociocultural and economic ideals (Aluko, 2009).

A building is designated a high-rise when an "occupied floor" is more than 75 feet above the lowest level of fire department truck access, according to the criteria for a high-rise building in Section 202 of the 2015 International Building Code (IBC). A mid-rise apartment building has five to twelve floors, which is shorter than a high-rise. This indicates that they are likely to feature an elevator and amenities like swimming pools and community spaces (Yuen et al., 2006). In the United States, a high-rise is defined as a structure that is more than 75 feet (23 meters), or about seven storeys tall, according to the National Fire Protection Association (NFPA) (Li et al., 2018). A high-rise is defined by most building engineers, inspectors, architects, and other professionals as a structure that is at least 75 feet tall (Kavilkar & Patil, 2014). High-rise buildings are frequently associated with high resource consumption, requiring considerable quantities of building materials during construction, significant amounts of energy for building operations, and generating big amounts of garbage when they are demolished at the end of their life cycle (Ahmad et al., 2017). With the growing urbanization of many emerging countries, more people are flocking to cities, resulting in a considerably higher demand for construction space than before (Suzuki et al., 2013). As a result, high-rise structures are being constructed in these developing economies to accommodate the great demand (Ma et al., 2012).

High-rise structures differ from mid-rise and low-rise ones in various ways (Korolchenko & Kholshchevnikov, 2017). How high-rise impacts people, profit, and the environment, as well as how society, the economy, and the environment interact with high-rise, are the primary factors that lead to this differentiation (Ahmad et al., 2017; Høibø et al., 2015; da Rocha & Kemmer, 2013). When it comes to sustainability and growth, high-rise building challenges play both a beneficial and negative role (Ahmad et al., 2017; Avini et al., 2019). While some of the difficulties are genuine and readily apparent, others have potential that is now limited to experimental use or that must be incorporated into standard building construction and management practices (Pekuri et al., 2011).

The development of high-rise structures is an emerging trend in 21st-century cities around the world, mostly to address the issues of urban overcrowding, ensuring judicious use of limited land resources, as a status symbol, as tourist attractions, and to create magnificent skylines

(Janssen-Jansen & Hutton, 2011; Swapan et al., 2017; Konaev, 2019). Despite these benefits, the construction of high-rise buildings in Nigeria has been plagued by problems (Nimlyat et al., 2017). The retarded growth translates to a scarcity of high-rise buildings in Nigerian cities, as well as the fact that most of those that do exist are underutilized due to several chronic issues that result in lower occupancy rates than planned (Bernt, 2009). As a result, several high-rise residential buildings have been converted into commercial and office complexes, or mixed-use developments including residential on the first few levels (Nimlyat et al., 2017; Han et al., 2021).

The ratio of occupied rooms to available rooms is known as the building occupancy rate. The percentage of occupied rooms in a property at any particular time is known as the occupancy rate (deRoss, 1999; Gurran & Phibbs, 2017). It influences the return on investment and is one of the most high-level markers of real estate performance. The ratio of rented or used space to total available space is known as the occupancy ratio. Analysts utilize occupancy rates to analyse a variety of topics, including residential, hospitals, businesses, hotels, and rental units (Thrall, 2001). The study of building occupancy ratio efficiency is a scientific study that benefits not only the residents of buildings (high or low-rise) but also the property owners and managers (Craig, 2015). One of the most essential inputs for building simulations, design specifications design, optimization, and environmentally friendly policy decisions is the occupancy of residential structures (Hu et al., 2019).

Results from empirical studies revealed the following different outcomes; Olajide (2018) explores the position of building or neighbourhood characteristics of investment properties among the key determinants of the residential property value in a residential neighbourhood and suggests that accessibility is the most significant determinant of property value, followed by neighbourhood security and lastly building or neighbourhood characteristics. There is however no statistically significant relationship between building or neighbourhood characteristics and investment property values. Oladapo et al. (2019) reveal that dwelling attributes of several rooms, baths and toilets and accessibility attributes of nearness to primary and secondary schools are the main attributes that determine the preferred location of tenants' residences and influence the rental value of residential property. Abidoye and Chan (2016) from the framework of 20 attributes of residential investment property in Lagos, Nigeria observed in the order of importance the most highly significant variables that influence the property value as: property location; neighbourhood characteristics; property state of repairs; size of property; availability of neighbourhood security and age of the property. Popoola, Jinadu, Liman, and Abd'Rasack (2015) examined the environmental quality effect on the rent of residential properties in the exterior zones of Minna, Nigeria and observed that rent variation in the selected suburban areas can be credited to ecological quality factors. Danlami et al (2019) in their study reveal various property attributes such as the number of rooms and conveniences as well as accessibility features such as nearness to schools as main features influencing the location choice of tenants' residence and the rental value the property can command. of residential property. McElveen et al. (2020) specified the neighbourhood features such as renters' percentage, household income, economic boundaries, and school districts as the factors that influence the value of residential real estate. However, none of these recent studies has been

able to examine the factors influencing the rental values of high-rise and low-rise properties, this is the gap that this study intends to address.

The aim is to identify and analyse the various factors that influence the occupancy ratio and rental value of high-rise and low-rise buildings to gauge the performance of investment in such properties in Kaduna, Nigeria. To achieve this central aim, the following variables are considered: general and specific factors influencing rental values of apartments; specific factors influencing rental values of High-rise and low-rise; factors influencing occupancy ratios; trends in rental values of the apartments; the pros and cons of both high-rise and low-rise buildings are related to the study area.

METHODOLOGY

This study was conducted in Kaduna, a state in the North Eastern part of Nigeria within latitude 10° 36' 33.5484" N and longitude 7° 25' 46.2144" E (see figure 1). A quantitative research approach was adopted for this study, with a structured close-ended questionnaire administered to respondents. Data for this study were gathered from purposive random techniques which enabled the selection of estate surveyors and valuers' firms with the considered properties in the Kawo and Television areas of the location. A total of thirty-five (35) registered estate Valuers were sampled while thirty (30) questionnaires were returned valid and analysed for this study. The contents of questionnaires comprise the demographic information of respondents, expected attributes of high- and low-rise buildings, and factors influencing the occupancy ratio of high-rise buildings. This shows an 85.7% return which is considered relevant and enough. The study adopted a descriptive method of data analysis which comprises percentages and mean score (A five-point Likert scale was adopted to analyse the factors in the questionnaire ranging from the least 1 to 5 being the highest scale). Combinations of average mean alongside the relative importance index (RII) were further applied to enable the ranking of the factors in line with their level of importance.

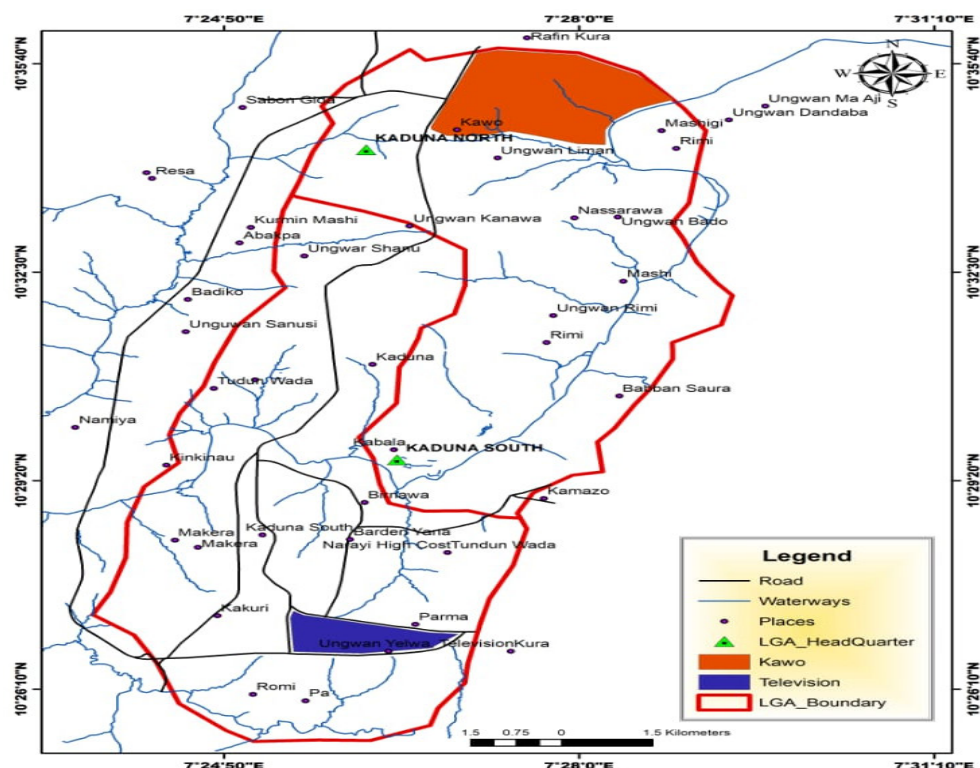


Figure 1: Kaduna showing the Study Area

Source: (Fieldwork, 2022)

The general factors influencing the rental value of properties in the study area were revealed to be numerous. As observed from Figure 2, Inadequate structural qualities were ranked highest with 0.78 relative importance index (RII) followed by Amenities and facilities which ranked second with 0.76 RII while Size and Layout were ranked third having 0.75 RII. Void in property is ranked fourth with 0.74 RII. Household income could be seen in the fifth spot with 0.73 RII values. The neighbourhood attributes the sixth-ranked factor with 0.71 RII. location was ranked seventh among the least ranked factors at 0.70 relative importance index (RII). Meanwhile, provision of emergency 0.69, economic condition / Cost of construction and fire incidence 0.68, and market condition were ranked at 0.69, 0.68 and 0.60 respectively. All the factors had a relatively important index of 0.60 and above. This indicates that these factors have a high influence on rental values.

Table 1: General Factors Influencing Rental Value Properties

Factors Influencing Rental Value	N	SUM	Mean	RII	Rank
Structural Qualities	30	117	3.89	0.78	1
Neighbourhood attributes	30	107	3.56	0.71	6
Provision of emergency exits	30	104	3.45	0.69	8
Cost of construction and fire incidence	30	102	3.40	0.68	9
Household income	30	110	3.67	0.73	5
Location factors	30	105	3.50	0.70	7
Void in property	30	111	3.70	0.74	4
Economic condition	30	102	3.40	0.68	9
Market condition	30	90	3.00	0.60	10
Amenities and facilities	30	114	3.80	0.76	2
Size and Layout	30	113	3.75	0.75	3

Source: (Fieldwork, 2022)

The specific factors influencing the rental value of high-rise buildings in the study area were revealed to be numerous. As observed from Table 2, non-provision of the elevator was ranked highest with a 0.77 relative importance index (RII) followed by cost of construction and fire incidence having 0.76 RII at second spot while poor structural designs and incessant cases of building collapse occupies the third spot with 0.75 RII as number of floors could be seen on the fifth spot with 0.71 RII values. The sixth-ranked factor with 0.69 RII was inadequate provision of emergency exits while the least-ranked factor recorded 0.59 relative importance index (RII). Meanwhile, population and demand were ranked highest for low-rise buildings with 0.71 RII followed by building collapse with 0.65 RII while stringent regulations were ranked third with 0.49 RII. Equally, 0.55 RII was observed for fire outbreaks ranked fourth while the high cost of maintenance ranks fifth with 0.53 RII alongside 0.46 RII recorded for the duo of poor structural designs and cost of construction respectively. An RII value of 0.44 was observed for inadequacies in the provision of an elevator ranked seventh and finally ranked lowest with 0.34 RII for was absence of an elevator.

Table 2 Specific Factors Influencing Rental Values High-rise and Low-rise Properties

	Variables	SD	D	N	A	SA	F	fx	Mean	RII	Rank
High rise	Inadequate emergency exits		7	8	9	6	30	104	2.13	0.69	6 th
	Poor structural design		3	10	9	8	30	112	3.73	0.75	3 rd
	Incessant accident of building collapse		5	8	6	11	30	113	3.77	0.75	3 rd
	Non-Provision of elevator	2	5	1	10	12	30	115	3.83	0.77	1 st
	Fire outbreaks/incidence		4	8	8	10	30	114	3.8	0.76	2 nd
	Stringent regulatory measures		6	9	5	10	30	109	3.63	0.73	4 th
	Maintenance cost		7	8	9	6	30	104	3.47	0.69	6 th
	Number of floors		6	10	6	8	30	106	3.53	0.71	5 th
	Construction cost		4	8	8	10	30	114	3.80	0.76	2 nd
Low rise	Inadequate emergency exits	10	7	10	3		30	66	2.20	0.44	7 th
	Poor structural design	11	5	8	6		30	69	2.30	0.46	6 th
	Incessant accident of building collapse		9	9	7	5	30	98	3.27	0.65	2 nd
	Non-Provision of elevator	19	4	4	3		30	51	1.70	0.34	8 th
	Fire outbreaks/incidence	11		8	7	4	30	83	2.77	0.55	3 rd
	Stringent regulatory measures	7	8	12		3	74	74	2.47	0.49	5 th
	Maintenance cost	13		6	7	4	30	79	2.63	0.53	4 th
	Population/Demand	3	7	7	4	9	30	99	3.53	0.71	1 st
	Cost of construction	10	6	9	5		30	69	2.30	0.46	6 th

Source: (Fieldwork, 2022)

It can be concluded that the rental value of high-rise buildings was influenced by a series of factors which all relate to the provision of basic and essential facilities like elevators, construction cost, and emergency exits in times of accidents and fire outbreaks alongside regulations (Sunder, 2004; Ali, 2008) framework for structural design (Ali & Al-Kodmany, 2012), fear of building collapse (Okeke et al., 2020; Dwijendra et al., 2021), maintenance cost, similar to (Hu et al., 2019; Mohammed, 2021) all approaching 1.00 RII and contributes immensely to the price tag by investors to recoup their return on investment (RoI). Consequently, the same factors considered above are peculiar to low-rise buildings, though lower than the RII recorded for high-rise buildings.

Studies have shown that many factors contribute to the building occupancy ratio. As observed in Table 3 shows the various factors and their levels of importance in the occupancy ratio of low- and high-rise buildings in the study area. Findings revealed that the factor in high-rise buildings with the highest relative importance index (RII) and ranked highest was the family size and nature of design with 0.79 followed by several room and locational attributes with 0.78 RII value and the availability of facilities had 0.75 RII making it ranked third. With 0.75 RII, the level of demand was ranked fourth at 0.72 RII followed by availability of property space

and individual preferences at 0.70 RII and 0.69 RII were ranked 5th and 6th respectively. Finally, the least ranked factor with the lowest RII was found to be the population at 0.58 RII. Contrastingly, the highest-ranked factor influencing occupancy ratio in low-rise buildings with a 0.79 RII value was family size followed by the number of rooms and availability of facilities. From the foregoing, it could be inferred that all variables analysed greatly influence the occupancy ratio of buildings.

Table 3: Factors Influencing Building Occupancy Ratio

Factors Influencing Occupancy Ratio	N	SUM	Mean	RII	Rank
Family size	30	119	3.97	0.79	1
Individual preference	30	104	3.45	0.69	6
Population	30	87	2.90	0.58	7
Available facilities	30	113	3.76	0.75	3
Number of rooms	30	116	3.87	0.78	2
Level of demand	30	108	3.60	0.72	4
Nature design	30	119	3.97	0.79	1
Locational attributes	30	116	3.87	0.78	2
Available property space	30	105	3.50	0.70	5

Source: (Fieldwork, 2022)

Results from the analysed data on rental trends over the past five years presented in Figure 2 indicated that the rental value for single-room apartments in the study area was ₦400000 in 2017 and 2018 while it increased to ₦500000 in 2019 and dropped to ₦350000 in 2020 only to rise again in 2021 to ₦550000. Monetary value placed on two-bedroom apartments in 2017 and 2018 was ₦750000 with an increase to ₦900000 observed in 2019 which later dropped to ₦700000 in 2020 and eventually rose to ₦1000000 in 2021. Occupants of three-bedroom apartments in the high-rise building available in the study area paid ₦1000000 in 2017 and 2018 while ₦1200000 was paid in 2019 as the price dropped to ₦850000 in 2020 and later rose to 1200000 in 2021. Similarly, single room apartment in the low-rise apartments has a rental value of ₦550000 in 2017 and 2018 which later rose to ₦700000 in 2019 and dropped to ₦600000 in 2020 before rising to ₦850000 in 2021. Two-bedroom apartments for the low-rise buildings in 2017 and 2018 possess ₦900000 values while the rental value for 2019 was ₦1050000 which dropped to ₦900000 in 2020 and increased to ₦1200000 in 2021. A similar pattern was observed in the rental trend for three-bedroom apartments of low-rise buildings with ₦1200000 paid as rent by occupants in 2017 and 2018 while ₦1450000 was paid in 2019 while a drop to ₦900000 was observed in the rent for 2020 and an increase to ₦1600000 was attainable in 2021.

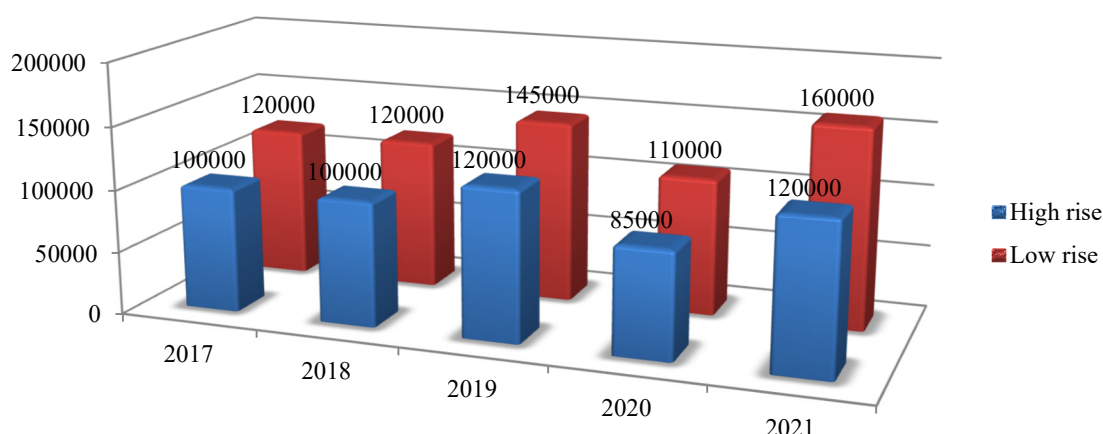


Figure 2: Rental Trend for Single Rooms in the Study Area

Source: (Fieldwork, 2022)

From the foregoing, it can be inferred that the rental trend in the study area is on an upward trajectory irrespective of the height. However, a slight variation is observed as the rental value of low-rise buildings was higher than that of high-rise buildings. More so, a drop and reduction in the rental value was observed for 2020, which is traceable to the global lockdown as a result of the COVID-19 pandemic that brought the world to a standstill and agrees with the findings of (Oyedeji, 2020). In addition, the high rental value in high-rise buildings is a result of the convenience attached and reduced occurrence of various incidents alongside the high demand for such types of properties.

As obtained in Table 4, the pros and cons of occupying a high-rise building as peculiar to the study area revealed that residing in a high-rise building ensures absolute control over noise with a 4.27 mean value recorded for less noise ranking as its highest, followed by the provision of vantage view of the city with 4.20 mean and the least ranked merits of residing in a high rise building was found to be the availability of cleaner air as a result of distance from the ground floor where noise and all other forms of pollution thrives. Consequently, the highest ranked shortcoming of occupying a high-rise building as observed from the analysed field data was the problem of vertical transportation and movement with a 4.10 mean value followed by resident's anxiety for height having a 4.06 mean value and 4.00 mean value was recorded for possibility of accidents and emergencies while the lowest ranked demerit was wind induced motion with 3.73 mean value.

Meanwhile, slight variation in both pros and cons was observed for the analysed data on low-rise buildings. As contained in the same table, control of noise level in low-rise buildings has a mean value of 3.73 and this was followed by 3.47 mean values observed for both cleaner air

and vantage view of the city as analysed from the collected data. In contrast, the shortcomings of residing in low-rise buildings revealed height anxiety being ranked highest with a 3.10 mean followed by a propensity for accidents and emergencies to occur ranked second with a 2.47 mean value while a 2.30 mean was recorded for vertical transportation within the building ranks third and the least ranked shortcoming having 2.23 mean was motion/vibration induced by wind.

Table 4: Pros and cons of High- and Low-Rise Buildings

Building Heights	Variables	SD 1	D 2	N 3	A 4	SA 5	fx	Mean	Rank
High rise	Pros	Vantage View		3	9	13	125	4.20	2 nd
		Cleaner air		11	7	13	121	4.03	3 rd
		Less noise		7	14	9	128	4.27	1 st
	Cons	Height Anxiety		8	12	10	122	4.06	2 nd
		Wind Induced Motion	4	8	10	8	112	3.73	4 th
		Vertical Transportation		7	13	10	123	4.10	1 st
		Accidents and emergency		9	12	9	120	4.00	3 rd
Low rise	Pros	Vantage View	7	8	9	6	104	3.47	2 nd
		Cleaner air	6	11	6	7	104	3.47	2 nd
		Less noise	5	8	7	10	112	3.73	1 st
	Cons	Height Anxiety	12	3	7	5	94	3.10	1 st
		Wind Induced Motion	9	8	10	3	67	2.23	4 th
		Vertical Transportation	10	9	7	-	69	2.30	3 rd
		Accidents and emergency	6	8	12	4	74	2.47	2 nd

Source: (Fieldwork, 2022)

It can be implied from the above that residing in a high-rise building provides a vantage view of the entire neighbourhood coupled with cleaner ventilation and air alongside less pollution from noise. However, occupants often time feel anxious from a height which is not advisable for children while vertical movement and transportation in the buildings is equally a challenge to the elderly, especially in buildings with no elevator leaving behind accidents and emergencies similar to the findings of (Ibem et al., 2015; Ahmad et al., 2017). However, though similar to the low-rise buildings, the observed advantages and demerits are less pronounced therein. Hence, the residents prefer to reside in low-rise buildings than in high-rise buildings.

CONCLUSION

The study set out to comparatively analyse the role of occupancy ratio on the rental value of high and low-rise buildings in Kaduna with a focus on rental value alongside factors influencing the occupancy ratio and pros and cons of building heights as peculiar to the study area. Findings from the relative importance index analysis revealed that low-rise buildings had higher rental values than high-rise buildings while a drop in rental value was experienced in 2020 resulting from the global lockdown from COVID-19. Provision of elevator was ranked the highest for

high-rise buildings with 0.77 RII while inadequate emergency exits and maintenance cost were ranked lowest with 0.69 RII. However, for low-rise buildings, the provision of elevators was the least ranked factor with 0.34 RII while the highest factor influencing property values was demand/population with 0.71 RII values. The highest factor influencing the occupancy ratio for high-rise buildings was location with 0.80 RII while individual preference was the highest with the same RII for low-rise buildings in the study area. The study, therefore, recommends that investors and stakeholders in the housing sector should intensify regulation and supervision of high-rise building constructions to ensure adherence to sound structural design and execution on-site alongside the provision of basic facilities like emergency exits, fire extinguishing systems and elevators to further enhance the rental values and eventual return on investment.

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