

# DETERMINANTS OF RESIDENTIAL RENTAL VALUES IN GHANA: EVIDENCE FROM EXPERTS AND STAKEHOLDER PERSPECTIVES.

**ABSTRACT:** Rental value or rent that is observed in the market has individual utility bearing attributes (explanatory variables) that could be modelled to ascertain the significance or contribution of same on overall rental value. A residential property is multidimensional and spatially fixed. A variety of theoretical and econometric studies have explored the determinants of house prices. However, the phenomenon that location determines RRVs has not been much understood as various researchers measure these explanatory variables differently. Not only does location and neighbourhood attributes determine to a large extent RRVs, but also the physical characteristics of the subject property. We present a first step in recognising and identifying which explanatory variables are relevant in determining RRVs prior to an empirical analysis. This in our opinion puts the discussion in its proper perspective in a market that is highly complex and diverse. The main objective is to analyse the main drivers of residential rental values (RRVs) from experts and stakeholders' perspectives in the residential rental market in a developing country context. To situate the research in its proper local context, 114 respondents (who comprise experts and stakeholders in the rental market) were asked about what they perceive, based on their individual experiences, on what explanatory variables drive the fixing of RRVs in the rental housing market in Ghana. We provide 38 different variables based on 3 broad groupings; structural, locational and neighbourhood characteristics. Most of these variables are statistically significant and have a positive effect on RRVs. Respondents agree that the variables electricity connection, piped water connection, type of house, property condition and number of bedrooms ranked among the top 5 variables per the relative importance index measured. Also the variables storeroom availability, rental units near to recreational facilities and a place of worship, quality of landscaping and number of storeys ranked among the bottom 5 variables.

**KEY WORDS:** Rental Market, Real Estate, Residential Rental Value, Ghana

## INTRODUCTION

Residential Rental Values (RRVs) or rent that is observed in the market has individual utility bearing attributes (explanatory variables) that could be modelled to ascertain the significance or contribution of same on overall rental value and describes its relationship to other residential units. Several theoretical and econometric research (Tse 2002) have explored what determines real estate prices. However, the phenomenon that location determines RRVs has not been much understood as various researchers measure these explanatory variables differently. Not only does location and neighbourhood attributes determine to a large extent RRVs, but also the physical characteristics of the subject property. Fixity in space defines distance of housing from other features such as commercial and other activities or uses (Gelfand et al. 1998). In homogenous neighbourhoods, common amenities are best represented by location.

The relationship between RRVs and location are as a result of unobservable variation in location across properties coupled with a heterogeneous market. One classical theory that helps in understanding this phenomenon better is the location theory; which is attributed to Heinrich von Thünen's theory of location of agricultural land uses in his book "Der Isolierte Staat" and Alfred Weber's theory of location of manufacturing industries. von Thünen's depiction of concentric circles of agricultural activities or uses around the consuming centre is a useful and a good starting point for research in this field (Predöhl 1928). In his model those paying higher prices at the consuming centre (or the Central Business District - CBD) are compensated by lower costs of commuting to the CBD.

Attributes that influences residential prices are numerous and heterogeneous. Kim and Park (2005) posit that macro variables, spatial differences, characteristics of community structure, environment and neighbourhood amenities affect market price of a house. Using a hedonic equation, house price is regressed on a number of these inherent attributes; some of these attributes include the size of the house, age, floor area, neighbourhood characteristics, job access among others. The hedonic equation helps to explain these implicit prices based on empirical evidence.

Valuers (especially in Ghana) have been challenged for not providing valuations that can easily be relied upon (Baffour Awuah et al. 2016). This is because of the disparities between what is reality in the market and the value placed on properties. When these disparities are properly examined it will guide valuers in assigning premium values to housing based on empirical market considerations. Roulac (2007, 2001) is however quick to add that researchers have predominantly used physical metrics of age, size among others as the explanatory variables that determine a residential property's value relative to other property data samples. This emphasis has been on correlation other than the fundamental issue of causation. Roulac's concern has been the need to also focus on what causes these correlations to occur.

Currently, little is known of the determinants of residential rental values in a developing country context. This study analyses the main drivers of residential rental values (RRVs) from experts and stakeholders in the residential rental market in a developing country context to contribute to the discourse in literature as well as serve as guide to property valuation.

## 2. DETERMINANTS OF RENTAL VALUE – EVIDENCE FROM LITERATURE

It has been established that housing characteristics and locational attributes of the house determines to a large extent the rental value of same. How each individual item affects value and the magnitude are usual disagreements. Factors that determine value can be grouped into 4 factors (Owusu-Ansah 2012);

1. Structural attributes of the house – this comprises size, structural improvements and materials, age and condition
2. Location and neighbourhood amenities
3. Environmental attributes (eg. air quality, noise levels)
4. Macro attributes such as inflation and interest rates

This research work will focus on the first 2 factors as the last 2 factors are already inherent in the transaction prices. So unless a time series analysis is embarked upon the effect of environmental and other macro attributes can be said to be negligible.

In determining neighbourhood variables to include there is the need to review existing empirical literature to establish which factors are best suited for such studies? One important factor to consider according to Ellen and Turner (1997) is the quality of local services. This makes a particular location superior or less superior than another in determining rental values. Local neighbourhood services that can be analysed include availability of educational facilities, medical facilities among others.

Actually quantifying the independent variables of neighbourhood factors that have an effect on rental value may be a daunting task. Per literature analysed (Gilbert 2016; Helbich et al. 2013; Anim-Odame et al. 2010) there are some perceived challenges in quantifying neighbourhood effects. Some of these are mentioned below.

1. It may be difficult to identify and measure those neighbourhood factors that actually are important key variables in determining value. The question here is what is important to be measured and how do we identify same?
2. Some of the effects may not be easily noticeable or may be non-linear. The question here would be how do we account for factors that we may not be aware of?
3. It may be difficult to separate or draw a fine line between individual property characteristics (that affect value) and neighbourhood factors, and how these individual factors contribute to price in the real estate market. How do these interrelationships interact to determine rental value in the market?

The failure to successfully address these issues in the methodology yields results that perhaps understate or overstate the effect of neighbourhood factors (as well as other factors) on rental value. The next important issue at this point to consider is a question that needs an answer. How do we measure variables that drive residential rental values that are relevant?

In determining the effects of neighbourhood characteristics there is also the need to ascertain the influence of individual houses on the overall neighbourhood. The influence of "outliers" must be critically examined. The researcher is of the view that failure to adequately control for unobserved characteristics yields results that overstate the effects of neighbourhood in any research setting and vice versa. There may be better quality individual houses that are found in say third (3rd) class residential neighbourhoods commanding low rents. There is the need to take these into account in the analysis. The data however should be reliable. These concerns are however cured when data is based on randomly selected houses within a particular neighbourhood so that unobserved characteristics are randomised in the whole neighbourhood and not localised at one particular area. A variety of hedonic techniques are used to model determinants of price variation of properties in the real estate market (Kain & Quigley 1970; Case & Quigley 1991). This modelling results in a kind of regression relationship between rental value of a property, and physical and locational characteristics of same. Proper interpretation requires that a "correct set" of property attributes are included in the analysis.

## METHODOLOGY

### SURVEY DESIGN

So now we are back to answering the 3 questions posed earlier in section 2, to give a direction as to what explanatory variables to consider that drive residential rental values. We developed a questionnaire that was administered to experts, stakeholders and key market players. The main objective of this survey was to elucidate from same what drives residential rental value in the rental housing market to the best of their knowledge. A number of explanatory variables were identified through literature review and the role of experts/ stakeholders was

to rank these variables based on their perceptions about how the explanatory variables could be incorporated in defining what is relevant from a purely theoretical perspective. The reason is that this was seen as a first step to put the research in its relevant local context to make this phenomenon more understandable.

The snowball sampling technique was employed to identify specific respondents. The snowball technique has the advantage of being able to utilise populations that may not have been included and is cost effective. The disadvantage is the possibility of bias through over sampling and ensuring a representative sample. However every effort has been made to ensure that the downsides are mitigated. The sample frame was drawn from landlords; tenants; real estate agents; real estate developers; academic staff and graduates from Universities (in the real estate and related sectors); and valuation and estate surveyors of the Ghana Institution of Surveyors (GhIS). The data analysed in this research was obtained from a total of 114 respondents. The survey was carried out between January and February 2017.

The web-link to the questionnaire is provided here: [https://docs.google.com/forms/d/e/1FAIpQLScIJXgdUf9KU0nwsWhbFFFRml2F3NGz6-OVqHgVmgc3YG8v5A/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLScIJXgdUf9KU0nwsWhbFFFRml2F3NGz6-OVqHgVmgc3YG8v5A/viewform?usp=sf_link)

#### TYPE OF DATA COLLECTED DURING THE SURVEY

The following outlines the data collected as part of this research. Most of the questions were compulsory with (pre-coded) multiple choices of answers to choose from.

1. Category of respondents – this section collected data relating to how the respondent identifies him or herself. These are landlord, tenant, real estate developer, real estate agent, academic (real estate and related fields), valuation and estate surveyor (member of the Ghana Institution of Surveyors – GhIS) and others (these are respondents who did not identify with any of the above categories).
2. Residential location – here we sought to find out where respondents were residing. This was to give a fair idea where they lived currently. They had 2 options to choose from: whether one lives in Accra or outside Accra.
3. Years of contact with the residential real estate rental market – there were basically 5 options to choose from. These were below 5 years, 6 to 10 years, 11 to 15 years, 16 to 20 years and over 21 years.
4. Variables that drive the creation of a residential rental housing submarket – the options considered included location (or spatial segregation), property type, price (rental value of property), location and property type, and all of the above. All options here were deemed to be mutually exclusive and respondents had only one choice.
5. The key variables that drive prices in the rental market are examined using 2 types of scales. The first was assessed using a 5-point likert scale. This considered the effect (whether significant or otherwise) on rental values. The scales were:
  - 1 – Highly Insignificant
  - 2 – Insignificant
  - 3 – Neither Insignificant nor Significant
  - 4 – Significant
  - 5 – Highly Significant

Using an odd numbered scale offers a median choice while an even numbered scale is used to force an opinion. We adopted an odd numbered scale as the objective in this instance was to find out what experts and stakeholders perceived to have an effect on the residential rental values. They were therefore free to say they were not sure the kind of effect to be expected.

The second assessment used the same variables but we wanted to find out whether the choice made earlier (in terms of choosing from the 5 point likert scale) had a positive effect, negative effect, no effect

or respondents were not sure of the variable's effect on rental value. So in the first assessment we wanted to find out the degree of significance of these variables on rental values. And in the second assessment to estimate whether these variables usually made a positive, negative or no impact on rental values.

6. We also sought to find out whether variables assessed in (6) above could be priced and disaggregated from rental values. The options opened to answer this were 'Yes', 'No' or 'Not Sure'. Respondents were required to make a choice as to their opinion and give reasons for same. This information will be used as a proxy to find out whether respondents are aware of modeling techniques that attempt to disaggregate rental values into implicit parts to explain determinants of same.
7. Respondents were also asked whether any variables were omitted. They were first to respond by choosing 'Yes', 'No' or 'Not Sure' and give reasons to their choice of answer.
8. We also asked respondents to describe the residential rental market in Accra. This was an open ended question.
9. Lastly respondents were also asked to briefly describe in their opinion a residential neighbourhood. This was also an open ended question.

#### 4. DETERMINANTS OF RESIDENTIAL RENTAL VALUES: EVIDENCE FROM KEY STAKEHOLDER SURVEY

It is clear from the literature that there is some agreement as to what categories of variables determine rental values to a large extent especially in a developed country context. However in a developing country perspective there is little consensus as to which specific variables are relevant and which ones are not. Various approaches have been adopted to surmount this problem. We therefore took the approach by first developing a questionnaire for key stakeholders in the rental market in Ghana. We asked these experts/ stakeholders about their perception as to what these key variables are. They finally ranked the variables and we present our findings in this section.

Data analysed consists of 114 responses from experts and stakeholders collected during pre-fieldwork. We start with a summary of the respondents and the total numbers that responded. Respondents were asked to select one category from the list provided that best describes them (see table 4.1). We realise from the table that majority of respondents are tenants, Valuation and Estate Surveyors and Academics (from real estate and related fields) who together make up 35%, 30% and 20% of the sample respectively. The questionnaire made available an option known as 'others' for respondents who did not identify themselves with any of the categorised groupings. This group from the survey could be made up of owner occupiers, sharers and rent-free occupiers of rental property (which include children and relatives of both landlords and tenants).

Table 4.1: Summary of respondents

Respondent	Number	Percentage (%)
Landlord	6	5.26
Tenant	40	35.08
Real Estate Developer	1	0.88
Real Estate Agent	5	4.39
Academic (real estate and related fields)	23	20.18
Valuation and Estate Surveyor (Ghana Institution of Surveyors - GhIS)	34	29.82
Others	5	4.39
Total	114	100.00

Source: Expert/ Stakeholder Survey, 2017

We asked about the residential location of respondents to find out whether they lived in the capital, Accra or outside the capital. It was found out that majority of respondents resided in Accra (this represents 67.5%) while the remaining resided outside the capital. The reasoning behind this question was to ascertain the understanding of respondents to the local residential rental market in Accra. It is however possible for an expert/ stakeholder who does not reside in Accra to have a fairly good perspective and understanding of the rental market there.

There was also the need to ascertain the number of years that respondents had had experience with the market. It was found out that majority (about 72%) had below 5 years of experience in terms of market experience. Table 4.2 shows this breakdown of respondents' years of experience with the residential rental market.

Table 4.2: Respondents' years of contact (experience) with the residential real estate market in Accra

Respondent	Experience in number of years					Total
	Below 5	6 to 10	11 to 15	16 to 20	Above 21	
Landlord	4	1	0	0	1	6
Tenant	29	6	1	0	4	40
Real Estate Developer	0	1	0	0	0	1
Real Estate Agent	4	0	1	0	0	5
Academic	20	2	0	0	1	23
Valuation and Estate Surveyor	20	11	2	1	0	34
Others	5	0	0	0	0	5
<b>Total</b>	<b>82</b>	<b>21</b>	<b>4</b>	<b>1</b>	<b>6</b>	<b>114</b>
<b>%</b>	<b>71,93</b>	<b>18,42</b>	<b>3,51</b>	<b>0,88</b>	<b>5,26</b>	<b>--</b>

Source: Expert/ Stakeholder Survey, 2017

From table 4.2 we realised that respondents years of experience with the market is varied and provides a detailed breakdown for each category of respondent. The 'total' represents the statistics for all respondents in each category. We realise that about 72%; 18%; 4%; 1% and 5% have 5; 6 to 10; 11 to 15; 16 to 20; and above 21 years of experience with the residential real estate market respectively. More than half of the respondents whose experience with the market is below 5 years are considered experts in the field. These are real estate agents, valuation and estate surveyors and academics. Although majority of respondents have experiences below 5 years they still have valuable information to offer on the topic.

#### 4.1 DESCRIPTIVE STATISTICS - MEASURES OF CENTRAL TENDENCY

Table 4.3 highlights the measures of central tendency for each of the variables in each category by providing the median and mode of the ordinal scale we employed in this case. We measured this using a 5 point likert scale and respondents ranked their choice from an ordered scale of 1 - highly insignificant to 5 - highly significant. The midpoint 3 represented neither insignificant nor significant (neutral). We measured 2 different measures of central tendency; ie the median and the mode.

## MEDIAN

As can be generally asserted from table 4.3, majority of respondents (about 58%) are of the opinion that these variables are significant or highly significant in determining residential rental values. In terms of significance of these variables being the determinants of residential rental values, there is a general consensus. However about 42% of respondents were not certain about especially locational characteristics.

Almost all locational characteristics had a median score of 3 (10 out of 14 locational variables) with 4 variables having a median score of 4. This result is quite surprising as it was expected that since the mantra that location determines to a large extent rental values, these variables will have significant scores. But that does not seem to be the case. Respondents' by the median score suggest that only 4 variables are significant. These are *presence of rental units to suitable surface drainage, near to market or shopping centre, near to educational facility and near to healthcare facilities*.

In terms of structural characteristics, we can conclude from table 4.3 that out of 18 variables measured 11 appear to be significant and 1 highly significant. However there seems to be a neutral position taken with 6 of these variables as there appears to be no consensus as to their significance. These variables are *age, plot size, number of bathrooms, number of storeys, storeroom availability and the quality of landscaping*. For 'age' the explanation could be that it also depends on its physical condition and how that reflects in terms of deterioration. In rental housing Ghana there appears to be no regard for the plot size. Many tenants are concerned about the physical accommodation space they have at their disposal and not necessarily how large the plot is. That may reflect the reason why that score was realised. In Ghana unlike in other jurisdictions, no matter the number of storeys the rental value for each unit remains the same. This in my opinion may explain why the median reflects that. More so respondents suggest that the number of baths, availability of a storeroom and the quality of landscaping are neither significant nor significant in determining rental values. In effect respondents suggest that it has no effect in determining rental value.

In terms of neighbourhood characteristics there appears to be a general consensus that they are significant. In fact a rental unit having electricity and piped-water connection are perceived by respondents to be highly significant in determining residential rental values. This perhaps is to be expected in the Ghanaian context where the availability of some of these variables are considered as a 'luxury' and not basic facilities that ought to be present in all accommodation.

## MODE

Using the mode presents a slightly different picture as regarding which variables are ranked significant or otherwise (see table 4.3). 3 variables (age of building, storeroom availability and near place of worship) are perceived and ranked by respondents to be insignificant in determining the value of a rental unit. Respondents also suggest that the quality of landscaping, rental unit near to traffic congestion, rental unit near to recreational facilities and population density have neither a significant nor insignificant effect in determining rental values. This is in agreement with scores obtained when the median was used. All other variables apart from the 7 discussed above are perceived to have a significant or highly significant effect in determining rental values according to respondents.

Table 4.3: Measures of central tendency of variable significance

Category of factor	Name of Variable	Median	Mode
Structural Characteristics	Type of house (eg. apartment, hall & chamber, single room)	5	5
	Quality of construction (& materials)	4	4
	Age of building	3	2
	Plot size	3	4
	Size of building (floor area)	4	4
	Number of bedrooms	4	5
	Number of wc	4	4
	Number of baths	3	4
	Floor finish (screed, concrete, tiled, terrazzo)	4	4
	Number of storeys (floors)	3	4
	Kitchen available (separate or shared)	4	4
	Toilet available (separate or shared)	4	5
	Bathroom available (separate or shared)	4	4
	Property condition (physical deterioration)	4	5
	Fence or wall availability	4	4
	Parking space or garage availability	4	4
	Storeroom availability	3	2
	Quality of landscaping	3	3
Neighbourhood characteristics	Near to suitable vehicular access	4	4
	Has electricity connection	5	5
	Has piped-water connection or well	5	5
	Waste disposal or garbage collection available	4	4
	Area considered safe (security)	4	5
	Streetlighting present	4	4
Locational characteristics	Presence of suitable surface drainage	4	4
	Near to traffic congestion	3	3
	Near to market or shopping center	4	4
	Near to CBD	3	4
	Near to job opportunities	3	4
	Near to educational facility	4	4
	Near to healthcare (medical) facilities	4	4
	Near to recreational facilities (parks & green spaces)	3	3
	Near to squatter settlements	3	5
	Near to Police station (security post)	3	4
	Near to place of worship	3	2
	Population density	3	3
	Near to bus stop (public transport)	3	4
Quality of property view	3	4	

Source: Expert/ Stakeholder Survey, 2017

The second aspect of the rankings required respondents to rank the perceived effect of each of the variables. These nominal rankings allowed respondents to make a choice on 4 perceived effects of each variable as given in terms of whether they had (i) a 'positive effect' (+ve), (ii) 'negative effect' (-ve), (iii) 'no effect' or (iv) respondents were 'not sure' of the effect of these variables on residential rental value. So in the first assessment we wanted to find out whether these variables are significant or otherwise and in the second to find out the extent of significance by measuring the variable's perceived effect on rental value as ranked by respondents. We present the results of these in table 4.4.

Table 4.4 shows the percentage of respondents who ranked each variable based on the effects as shown. Each of the variables was ranked by the 114 respondents and as such each percentage adds to 100 *per cent*. From the table we can see that majority of the variables are perceived to have a positive effect in determining residential rental value. Also worth noting are variables that are perceived to have a negative effect on determining rental values; these are population density of an area, rental units near to squatter settlements and traffic congestion. This is to be expected as squatter settlements are seen as a blight to any neighbourhood and may account for reduction or lower rental values where these are near to neighbourhoods. Also when a neighbourhood has traffic congestion problems people would prefer to stay in alternative neighbourhoods (if the opportunity exists) where the problem may not be severe.

In general we could see a convergence with some of the variables presented by Sirmans *et al* (2005) who are also of the opinion that number of bathrooms, bedrooms, public rooms, garage and size of rental unit predominantly have a positive effect on rental values (see table 4.1). We must mention here that Sirmans *et al* (2005) assertions are based on empirical evidence. We do realise that although respondents' choice are only perceived to be the effects without any empirical basis, it does present a starting point to examine which variables may be relevant in modelling the rental market in a developing country context. We did mention earlier that researchers in this field need to be able to identify the 'correct set of variables' that must be incorporated in the model.

Category of factor	Name of Variable	% Effects				Total N=114
		+ve	-ve	no effect	not sure	
Structural Characteristics	Type of house (eg. apartment, hall & chamber, single room)	92,1	0,9	4,4	2,6	100
	Quality of construction (& materials)	82,5	3,5	12,3	1,8	100
	Age of building	46,5	19,3	27,2	7,0	100
	Plot size	57,0	2,6	31,6	8,8	100
	Size of building (floor area)	84,2	1,8	7,9	6,1	100
	Number of bedrooms	93,0	2,6	2,6	1,8	100
	Number of wc	74,6	2,6	18,4	4,4	100
	Number of baths	69,3	1,8	22,8	6,1	100
	Floor finish (screed, concrete, tiled, terrazzo)	78,9	1,8	15,8	3,5	100
	Number of storeys (floors)	47,4	4,4	43,9	4,4	100
	Kitchen available (separate or shared)	82,5	3,5	11,4	2,6	100
	Toilet available (separate or shared)	87,7	3,5	7,0	1,8	100
	Bathroom available (separate or shared)	86,8	5,3	5,3	2,6	100
	Property condition (physical deterioration)	59,6	36,0	3,5	0,9	100
	Fence or wall availability	75,4	3,5	15,8	5,3	100
	Parking space or garage availability	70,2	0,9	26,3	2,6	100
	Storeroom availability	37,7	3,5	53,5	5,3	100
Quality of landscaping	55,3	1,8	36,8	6,1	100	
Neighbourhood characteristics	Near to suitable vehicular access	76,3	2,6	19,3	1,8	100
	Has electricity connection	94,7	0,0	4,4	0,9	100
	Has piped-water connection or well	94,7	0,9	3,5	0,9	100
	Waste disposal or garbage collection available	75,4	1,8	21,1	1,8	100
	Area considered safe (security)	89,5	1,8	7,9	0,9	100
	Streetlighting present	66,7	5,3	25,4	2,6	100
Locational characteristics	Presence of suitable surface drainage	72,8	5,3	18,4	3,5	100
	Near to traffic congestion	23,7	47,4	22,8	6,1	100
	Near to market or shopping center	63,2	4,4	28,1	4,4	100
	Near to CBD	53,5	12,3	26,3	7,9	100
	Near to job opportunities	58,8	1,8	29,8	9,6	100
	Near to educational facility	68,4	3,5	24,6	3,5	100
	Near to healthcare (medical) facilities	71,9	2,6	22,8	2,6	100
	Near to recreational facilities (parks & green spaces)	47,4	6,1	43,0	3,5	100
	Near to squatter settlements	13,2	59,6	20,2	7,0	100
	Near to Police station (security post)	65,8	2,6	25,4	6,1	100
	Near to place of worship	39,5	9,6	38,6	12,3	100
	Population density	33,3	35,1	20,2	11,4	100
	Near to bus stop (public transport)	63,2	8,8	23,7	4,4	100
Quality of property view	68,4	2,6	25,4	3,5	100	

Source: Expert/ Stakeholder Survey, 2017

By combining tables 4.3 and 4.4, we generate table 4.5 which provides a summary of the perceived significant effect of each of the variables. Table 4.5 describes for each variable whether it is significant or otherwise and its impact in determining residential rental value. By significance we refer to the 5 point likert scale referred to in table 4.3 and by effect on rental value we refer to the nominal scale as presented in table 4.4. The summary in table 4.5 is an attempt to further summarise and explain (from the 2 tables) what the data suggests in terms of what each variable represents.

From table 4.5 we can clearly realise that variables which are ranked '*significant*' or '*highly significant*' are perceived to also have a positive effect on rental value. This means that when these variables are modelled using a regression equation or hedonic model the signs of their coefficients are expected to be positive and most probably statistically significant.

Another group of variables are ranked as neutral in terms of significance and effect on rental value. These are '*number of storeys (floors)*', '*storeroom availability*' and rental units '*near to recreational facilities*'. This result also suggest that these variables may not be statistically significant and may not have any effect on rental value when modelled. This suggests that the effect may be 0.

The next group of variables are perceived to have a neutral significance but a positive effect on rental value. These variables include '*age of building*', '*plot size*', '*number of baths*', '*quality of landscaping*', '*next to CBD*', '*next to job opportunities*', '*near to police station*', '*near to bus stop*' and '*quality of property view*'. So it presupposes that when these variables are modelled in a hedonic equation the expected sign of the coefficients may be positive but not have statistical significance. This seems at variance with literature on the effects of some of these variables especially '*plot size*' and '*number of baths*'. The literature suggests that the coefficients of these variables normally have a positive sign when modelled in a hedonic equation or regression analysis.

These next set of variables are perceived to also have neutral significance but negative effect on rental value. These variables are '*next to traffic congestion*', '*near to squatter settlements*'. Since many residents will generally want to avoid these areas, the perception is that it has a negative effect on rental values and as such a negative sign is expected in terms of coefficient sign when modelled. It may also imply that these variables may not be statistically significant.

The final set of variables in terms of significance are neutral but could have both positive and negative impacts on rental value. These variables are '*near to place of worship*' and '*population density*'. The perceived effect here is inconclusive and suggests that when modelled in a hedonic equation the variable coefficient could be positive or negative depending on the empirical data analysed and probably statistically insignificant.

To conclude on table 4.5 we do realise that most of the variables identified throughout the literature and presented here are perceived to be statistically significant and may have a positive coefficient sign when modelled in a hedonic equation. It should however be noted that these are effects perceived by various respondents and empirical evidence may suggest otherwise. We only present here what the data from respondents suggest. We will later in a subsequent research present empirical results and compare whether any trends, similarities or divergence could be identified. As we mentioned earlier in this research these analyses are only a first step in trying to identify variables that may be selected and utilised in empirical data collection. The empirical data will give a strong direction as to the conclusions that may be drawn from these variables especially in a developing country context.

Table 4.5: Perceived significant effect of each variable as extracted from tables 4.4 and 4.5 (Summary)

Category of factor	Name of Variable	Significance	Effect on rental value (expected sign)	Comment
Structural Characteristics	Type of house (eg. apartment, hall & chamber, single room)	Highly Significant	Positive	
	Quality of construction (& materials)	Significant	Positive	
	Age of building	Neutral	Positive	Inconclusive
	Plot size	Neutral	Positive	
	Size of building (floor area)	Significant	Positive	
	Number of bedrooms	Significant	Positive	
	Number of wc	Significant	Positive	
	Number of baths	Neutral	Positive	
	Floor finish (screed, concrete, tiled, terrazzo)	Significant	Positive	
	Number of storeys (floors)	Neutral	Neutral	Inconclusive
	Kitchen available (separate or shared)	Significant	Positive	
	Toilet available (separate or shared)	Significant	Positive	
	Bathroom available (separate or shared)	Significant	Positive	
	Property condition (physical deterioration)	Significant	Positive	Effect could be negative
	Fence or wall availability	Significant	Positive	
	Parking space or garage availability	Significant	Positive	
	Storeroom availability	Neutral	Neutral	Neutral
Quality of landscaping	Neutral	Positive	Effect could be neutral	
Neighbourhood characteristics	Near to suitable vehicular access	Significant	Positive	
	Has electricity connection	Highly Significant	Positive	
	Has piped-water connection or well	Highly Significant	Positive	
	Waste disposal or garbage collection available	Significant	Positive	
	Area considered safe (security)	Significant	Positive	
	Streetlighting present	Significant	Positive	
Locational characteristics	Presence of suitable surface drainage	Significant	Positive	
	Near to traffic congestion	Neutral	Negative	Inconclusive
	Near to market or shopping center	Significant	Positive	
	Near to CBD	Neutral	Positive	Effect could be neutral
	Near to job opportunities	Neutral	Positive	Effect could be neutral
	Near to educational facility	Significant	Positive	
	Near to healthcare (medical) facilities	Significant	Positive	
	Near to recreational facilities (parks & green spaces)	Neutral	Neutral	Effect could be positive
	Near to squatter settlements	Neutral	Negative	
	Near to Police station (security post)	Neutral	Positive	
	Near to place of worship	Neutral	Positive/ Negative	Inconclusive
	Population density	Neutral	Positive/ Negative	Inconclusive
	Near to bus stop (public transport)	Neutral	Positive	
Quality of property view	Neutral	Positive		

Source: Expert/ Stakeholder Survey, 2017

Next we rank the variables based on the Relative Importance Index. The objective here is to identify and rank which variable scores are highest and which are lowest. The next section explains this concept further.

#### 4.2 RELATIVE IMPORTANCE INDEX

The Relative Importance Index (RII) is used to evaluate each variable in order to determine their relative contribution to rental value and ranking same. This index is computed by utilising all individual variable scores and ranking variables against each other. We utilise the frequently cited RII formula as presented by Holt (2014):

$$RII = \frac{\sum W}{A * N} \quad \text{Where } 0 \leq RII \leq 1 \quad (4.1)$$

$W$  is the sum of scores awarded a variable,  $V_i$  from  $N$  number of respondents. The sum of  $N$  respondents selecting a response point multiplied by the point's integer value, for an option on the scale term.  $A$  is the largest integer response scale ( $A_{max}$  in this case will be 5). The index has a value between 0 and 1. When the value of the index is close to 1, it suggests that respondents rank that particular variable high and vice versa suggests that the variable has a low ranking.

The relative importance index computes the 'relative importance' of (independent) variables by comparing the rank attributed to the variable by respondents and also by comparing with other variables that are computed.

The main reason for using the RII is to rank variables in terms of importance as perceived and ranked by respondents. These rankings are computed from the raw data used in table 4.3. Respondents were asked to rank each variable based on a 5 point likert scale from **1** (*highly insignificant*) to **5** (*highly significant*). Table 4.6 provides the computed RII for each variable and category of respondent using the formula as provided in (4.2). The scores as computed range from 0,48 to 0,97.

Table 4.6: Relative Importance Index of variables by category

Category of factor	Name of Variable	Academics	VES	VES	Tenant	Landlord	Others	Total
		N = 23	N = 34	N = 5	N = 40	N = 6	N = 5	N = 113
Structural Characteristics	Type of house (eg. apartment, hall & chamber, single room)	0,92	0,89	0,96	0,85	0,90	0,80	0,88
	Quality of construction (& materials)	0,80	0,79	0,84	0,72	0,63	0,64	0,76
	Age of building	0,67	0,61	0,60	0,67	0,77	0,56	0,65
	Plot size	0,70	0,66	0,72	0,58	0,67	0,52	0,64
	Size of building (floor area)	0,82	0,76	0,84	0,69	0,83	0,68	0,75
	Number of bedrooms	0,89	0,83	0,88	0,81	0,97	0,76	0,84
	Number of wc	0,70	0,62	0,76	0,66	0,83	0,68	0,67
	Number of baths	0,67	0,60	0,72	0,66	0,83	0,64	0,66
	Floor finish (screed, concrete, tiled, terrazzo)	0,79	0,74	0,80	0,74	0,77	0,52	0,75
	Number of storeys (floors)	0,73	0,61	0,64	0,62	0,67	0,44	0,63
	Kitchen available (separate or shared)	0,79	0,76	0,80	0,77	0,87	0,72	0,78
	Toilet available (separate or shared)	0,82	0,84	0,84	0,81	0,90	0,76	0,82
	Bathroom available (separate or shared)	0,82	0,84	0,80	0,81	0,90	0,76	0,82
	Property condition (physical deterioration)	0,90	0,85	0,96	0,83	0,83	0,68	0,85
	Fence or wall availability	0,73	0,67	0,68	0,73	0,83	0,72	0,71
	Neighbourhood characteristics	Parking space or garage availability	0,71	0,62	0,72	0,67	0,73	0,68
Storeroom availability		0,59	0,49	0,48	0,59	0,57	0,56	0,55
Quality of landscaping		0,64	0,61	0,48	0,60	0,63	0,44	0,60
Near to suitable vehicular access		0,83	0,71	0,88	0,74	0,80	0,68	0,75
Has electricity connection		0,92	0,92	0,92	0,87	0,97	0,84	0,90
Has piped-water connection or well		0,91	0,88	0,92	0,83	0,97	0,80	0,87
Locational characteristics	Waste disposal or garbage collection available	0,78	0,72	0,84	0,70	0,93	0,64	0,74
	Area considered safe (security)	0,86	0,85	0,92	0,79	0,93	0,76	0,83
	Streetlighting present	0,75	0,64	0,56	0,66	0,80	0,56	0,67
	Presence of suitable surface drainage	0,77	0,69	0,64	0,65	0,83	0,72	0,69
	Near to traffic congestion	0,73	0,65	0,68	0,65	0,80	0,44	0,66
	Near to market or shopping center	0,74	0,64	0,56	0,66	0,77	0,56	0,66
	Near to CBD	0,75	0,62	0,80	0,65	0,60	0,60	0,66
	Near to job opportunities	0,69	0,62	0,68	0,62	0,77	0,56	0,64
	Near to educational facility	0,70	0,65	0,80	0,63	0,83	0,60	0,66
	Near to healthcare (medical) facilities	0,70	0,68	0,84	0,66	0,83	0,56	0,69
	Near to recreational facilities (parks & green spaces)	0,60	0,55	0,64	0,53	0,70	0,52	0,56
	Near to squatter settlements	0,70	0,65	0,72	0,68	0,77	0,44	0,67
Near to Police station (security post)	0,59	0,68	0,52	0,64	0,83	0,52	0,64	
Near to place of worship	0,58	0,54	0,56	0,57	0,83	0,52	0,57	
Population density	0,64	0,59	0,72	0,65	0,77	0,48	0,63	
Near to bus stop (public transport)	0,70	0,55	0,72	0,66	0,73	0,64	0,64	
Quality of property view	0,66	0,65	0,68	0,68	0,83	0,44	0,66	

Source: Expert/ Stakeholder Survey, 2017

**N.B.** From tables 4.6 and 4.7;

'Academic' represents – academic (real estate and related fields)

'VES' represents – Valuation and Estate Surveyor (GhIS)

'REA' represents – Real Estate Agent

It would be realised from tables 4.6 and 4.7 that no computations were made in respect of the respondent category Real Estate Developer. The reason is that only 1 response was received and as such it would not be possible for the index to be computed. Hence the total sample used in these analyses are 113 instead of 114.

Based on the results from table 4.6, table 4.7 is computed which ranks each variable from the highest to the lowest. There are 38 individual variables and the RII is computed for each category of respondents. The RII for each category is ranked from the highest value (1) to the lowest (38). The results of this ranking is presented in table 4.7.

Table 4.7: Ranking of the variables based on the Relative Importance Index (RII) by category

Name of Variable	Academics N = 23	VES N = 34	VES N = 5	Tenant N = 40	Landlord N = 6	Others N = 5	Total N = 113
Has electricity connection	1	1	3	1	1	1	1
Type of house (eg. apartment, hall & chamber, single room)	1	2	1	2	6	2	2
Has piped-water connection or well	3	3	3	3	1	2	3
Property condition (physical deterioration)	4	4	1	3	10	11	4
Number of bedrooms	5	8	6	5	1	4	5
Area considered safe (security)	6	4	3	8	4	4	6
Toilet available (separate or shared)	8	6	8	5	6	4	7
Bathroom available (separate or shared)	8	6	13	5	6	4	7
Kitchen available (separate or shared)	12	10	13	9	9	8	9
Quality of construction (& materials)	11	9	8	13	35	16	10
Size of building (floor area)	8	10	8	15	10	11	11
Near to suitable vehicular access	7	14	6	10	21	11	11
Floor finish (screed, concrete, tiled, terrazzo)	12	12	13	10	24	28	11
Waste disposal or garbage collection available	14	13	8	14	4	16	14
Fence or wall availability	19	18	25	12	10	8	15
Presence of suitable surface drainage	15	15	29	26	10	8	16
Near to healthcare (medical) facilities	23	16	8	20	10	22	16
Number of wc	23	26	18	20	10	11	18
Parking space or garage availability	22	26	19	18	30	11	18
Streetlighting present	16	24	33	20	21	22	18
Near to squatter settlements	23	20	19	16	24	34	18
Number of baths	30	33	19	20	10	16	22
Near to educational facility	23	20	13	31	10	20	22
Near to CBD	16	26	13	26	37	20	22
Near to market or shopping center	18	24	33	20	24	22	22
Quality of property view	32	20	25	16	10	34	22
Near to traffic congestion	19	20	25	26	21	34	22
Age of building	30	30	32	18	24	22	28
Near to bus stop (public transport)	23	35	19	20	30	16	29
Near to job opportunities	29	26	25	32	24	22	29
Near to Police station (security post)	36	16	36	30	10	28	29
Plot size	23	19	19	36	33	28	29
Population density	33	34	19	26	24	33	33
Number of storeys (floors)	19	30	29	32	33	34	33
Quality of landscaping	33	30	37	34	35	34	35
Near to place of worship	38	37	33	37	10	28	36
Near to recreational facilities (parks & green spaces)	35	35	29	38	32	28	37
Storeroom availability	36	38	37	35	38	22	38

Source: Expert/ Stakeholder Survey, 2017

Structural characteristics  
 Neighbourhood characteristics  
 Locational characteristics

It can be realised from table 4.7 that the following variables are generally ranked very high (ie from 1 to 5). These are 'electricity connection', 'piped-water connection', 'type of house', 'property condition' and 'number of bedrooms'. We use colour coding as provided in table 4.7 to differentiate the categories of variables measured.

For example it is striking to notice that among the category landlords, a variable like 'property condition', which we expect to be ranked probably among the top 5 rather has a rank of 10. The same can be realised from the 'quality of construction material' which has a score of 35. Could it probably mean that landlords generally do not really consider the 'quality of construction material' and 'property condition' when they decide on rental value? If this assertion is right then it could also suggest that the motive of landlords would be to rent out their properties irrespective of the condition or quality of construction materials.

From table 4.7 we realise a general trend, that shows that neighbourhood and structural characteristics rank higher followed by locational characteristics.

**4.3 CAN THESE VARIABLES BE INDIVIDUALLY PRICED AND DISAGGREGATED FROM RENTAL VALUE?**

We asked the above question as a proxy in our quest to find out whether respondents are aware of modelling techniques that allow individual variables to be priced in a regression equation. The results are presented in table 4.8.

Table 4.8: Can these variables be disaggregated from rental value?

	Frequency (N = 114)	Percentage (%)
Yes	51	44,7
No	30	26,3
Not Sure	33	28,9

Source: Expert/ Stakeholder Survey, 2017

We realised from the table that although majority of respondents (44,7%) are in agreement that these individual variables can be priced and disaggregated from rental value the result is not conclusive. More than half of the respondents are either not sure or do not agree that these variables can be priced individually. Generally the reason for this assertion is that housing is a composite good and it is let or sold wholly as one unit although individual characteristic variables as discussed above play a role in determining how high the rental value should be.

Respondents gave reasons why they perceive that variables could be disaggregated from rental value. We present some of these reasons below;

*"These variables inherently add value to the property once they are provided in the neighborhood within which the subject property is situate";*

*"Can be broken-down into components because, each variable has its unique way of influencing rent";*

*"These variables have considerable effect of determining the rental value of a property. They can be priced to determine their degree of influencing the rental value";*

*"Hedonistic pricing models in mainstream economics are capable of allowing a disaggregation of the variables making up rental values and even assigning their respective values. These techniques however require extensive and relatively detailed property sales or rental data to accomplish";*

*"Through some hedonic valuation techniques, various elements can be priced differently to ascertain their contribution to rental value";*

*"Theoretically through regression analysis".*

As we can see from the above responses the agreement to the assertion that these variables can be priced stem from hedonic or regression analysis that can be performed on these variables to examine the level of contribution to rental values. We however realised that there are a few respondents who although agree that the variables can be disaggregated, perceive that these can be done by subjective analysis by an appraiser/ valuer. For example one respondent opines that these analysis could be done;

*"mainly by subjectivity of appraiser on the current market conditions on such property directly compared to comparables and/or cost rates".*

*For respondents who disagree that variables as provided in the survey could not be disaggregated offered the following reasons including;*

*"... rental values seem to be pegged at certain value ranges based on aggregated locational and neighbourhood characteristics which may be difficult to segregate accurately";*

*"It is practically difficult to estimate these variables on their own since they are intrinsic";*

#### 4.4 OMITTED VARIABLES

In order to ensure that no variables have been possibly omitted we asked respondents to indicate whether any variables may have been omitted. The results to the question, 'Are there other variables that may have been omitted?' are presented in table 4.9.

Table 4.9: Are there other variables that may have been omitted?

	Frequency (N = 114)	Percentage (%)
Yes	26	22,8
No	35	30,7
Not Sure	53	46,5

Source: Expert/ Stakeholder Survey, 2017

We did realise that majority of the respondents (47%) were not sure whether some variables were omitted or otherwise. We did mention that it may be difficult to identify all individual variables (or the correct set of variables) that together make up the rental value. Although this may be the case we are of the view that most of the relevant variables have been identified in this research. For the persons who responded in the affirmative (22,8%) a number of variables to be included were suggested. These included, *availability of telecommunication infrastructure, whether location or neighbourhood is flood prone, presence of landlord in the same facility, environmental pollution levels in neighbourhood, type of tenant (eg. government, private company or individual), type of land tenure arrangement and quality of property management.*

#### 4.5 WHICH VARIABLES DRIVE RESIDENTIAL RENTAL VALUES?

We have attempted to discuss what drives residential rental values from experts and stakeholders' perspective. We conclude this research by providing a summary of the relevance of structural, neighbourhood and locational characteristics in giving guidance as to which of these drives residential rental values. Figure 5.1 provides the median values of Relative Importance Index (RII) per each category of respondents as computed earlier and discussed. Respondents are in general agreement and suggest that in terms of ranking from the highest to the lowest, neighbourhood characteristics are ranked highest, then followed closely with structural characteristics and then locational characteristics rank third.

Table 5.1: Relative Importance Index of structural, neighbourhood and locational characteristics

Respondent	Structural characteristics	Neighbourhood characteristics	Locational characteristics
Academics	0,76	0,85	0,70
Valuation and Estate Surveyors	0,71	0,79	0,65
Real Estate Agent	0,78	0,90	0,68
Tenant	0,71	0,77	0,65
Landlord	0,83	0,93	0,79
Others	0,68	0,72	0,54
Total	0,73	0,79	0,66

Source: Expert/ Stakeholder Survey, 2017

Figure 5.1: Relative Importance Index of structural, neighbourhood and locational characteristics



Source: Expert/ Stakeholder Survey, 2017

## 6 CONCLUSION

In this paper we have established explanatory variables which drive the creation of residential rental values (RRVs) from an expert and stakeholder perspective. We began by identifying variables that are generally used in modelling residential rental values. We concluded that structural, neighbourhood and locational characteristics are the main factors that determine RRVs in the residential rental housing market.

114 respondents (who comprise experts and stakeholders in the rental market) were asked their views about what they perceive, based on their individual experiences on what variables drive the fixing of RRVs in the housing market. This was done to situate the research in a local context and tap from the experience of these market players on their perception about how the rental market functions and how rental values are determined. We summarise briefly some of the major findings.

- › Respondents generally agree that out of the 38 variables identified, most are statistically significant and may have a positive effect on rental value when modelled in a regression equation.
- › Respondents agree that the variables *electricity connection, piped water connection, type of house, property condition* and *number of bedrooms* ranked among the top 5 variables per the relative importance index as provided in tables 4.6 and 4.7.
- › Respondents are also of the opinion that the variables *storeroom availability, rental units near to recreational facilities and a place of worship, quality of landscaping and number of storeys* ranked among the bottom 5 variables based on the relative importance index.
- › Respondents suggest that in terms of ranking from the highest to the lowest, neighbourhood characteristics are ranked highest, then followed closely with structural characteristics and then locational characteristics rank third.

Although these findings represent expert and stakeholder perception about the residential rental market and the implicit composition of rental values, we are quick to add that these results in themselves are not conclusive unless we undertake empirical studies to ascertain the veracity of findings. We do acknowledge this limitation, but provide evidence in subsequent research to discuss results of empirical evidence and how these results perform.

Knowledge that is already available is critical in the understanding of a housing market that lacks the required data for empirical analysis. This research provided a basis as to which variables to measure during the empirical study. The philosophy is to start from the known to the unknown; from experts and stakeholder knowledge about the market to empirical leanings.

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