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Analyzing Area-Based Rating Assessment Implementation in Bauchi Metropolis, Nigeria, Testing SWOT Variables

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Abstract: *The Area-based Rating Assessment (AbRA) entails assessing the real property for rating purposes on the basis of the land area only. This study analyzed the implementation of AbRA in Bauchi metropolis, experimentally by testing the helpful factors under both internal and external variables; and subsequently, by testing the harmful factors under the internal and external variables all derived from SWOT analysis, and measuring their effects on the endogenous variable (AbRA). The study derived major themes from SWOT analyses, whose variables under each theme were used as measurement items or sub-themes for the primary data collection. Structural Equation Modelling was used to analyze the impact of the variables on the implementation of AbRA in the study area. It was found that the area assessment required the limited data to conduct the rating assessment, and did not necessarily require periodic revaluation to update the valuation list with the volatilities in value, thus, making AbRA to demand less cost of administration. It was also found that, information on land area can be collected remotely without entry into the individual properties, the process did not defy the residents' privacy, also, the remote data collection could be done using tools like Google Earth/Map which allowed the ease of reconnaissance and faster inspections and measurements, hence, this study recommended the area-based rating assessment (AbRA) for Bauchi metropolis of Nigeria.*

Keywords: *Area-Based, Value-Based Rating Assessment, Bauchi*

INTRODUCTION

Property rating is a term used in the realm of the real estate management and valuation to mean the property taxation for the purpose of developing and maintaining community infrastructure (Johnson *et al.,* 2005; Bahl, 2009; Nwachukwu & Emoh, 2010; Mangioni, 2010; Cozmei & Onofrei, 2012). The assessment procedure may vary according to peculiar local settings of any given country. Plimmer & McCluskey (2010) identified value-based assessment, area-based assessment and self-assessment; and further advocated that value-based approach is suitable in countries that have an active and functional property market where real

property transaction data are readily available; the area-based approach is applicable where property market is not active and market information is not easily accessible, while the self-assessment entailed the personal assessment made by the property owner for rating purposes, this approach has been suitable in impoverished countries. Each of these approaches has had its merits and demerits.

This study was poised to analyze the suitability of Area-based Rating Assessment (AbRA) in Bauchi metropolis of Nigeria, based on the SWOT variables extracted from published books and articles, and then sorted into micro (internal) variables viz. strengths and weaknesses; and macro (external) variables viz. opportunities and threats. The strengths and opportunities have been the helpful factors, while the weaknesses and threats have been the harmful factors (Sarsby, 2012; Team FME, 2013). This approach was chosen because cultural and religious barriers may affect the smooth running of a value based approach, other reasons that may call for AbRA includes the facts that the property market is not as active and functional as that of the advanced nations, thus market data and information are not readily available which are necessary for a value-based assessment. AbRA can operate as it focuses on the land area only. It's fast and involves remote data collection, managed by few experts, no periodic reassessment, and can control the unnecessary urban sprawl, and most importantly it is not affected by the cultural and religious barriers in a way that the required data are collected without entry into the subject properties (using Google Earth/ Map), and so the exercise does not defy the privacy of people. In Plimmer & McCluskey's (2010) area-based rating assessment, less cost of administration was demanded compared to the Value-based rating.

The need for the appropriate pattern of assessment for the study area was informed by the fact that the property rating was not implemented in Bauchi metropolis despite the Tenement Laws of Bauchi State Volume 4 of 2004; and Baba, Kasim, Alhaji, Sule, Maje & Aliyu (2016), and also in Baba, Kasim, Aliyu & Mammadi (2017) have identified 'Over Reliance on Crude Oil Revenue' and 'Poor Taxation System' as the most significant factors that impeded the implementation of property rating in Bauchi metropolis; the need to solve the rating implementation problem should be accompanied with a suitable assessment pattern, as property rating contributes reasonably to GDP in OECD countries, and more than 50% of the municipal revenue in Belgium, Czech, France, Mexico, Slovak has been from property rates, while up to 90% - 100% of the municipal revenue in Australia, UK, Ireland, Canada, New Zealand etc has been from ratesBaba, Kasim, Alhaji, and Maje (2016), thus reiterated the importance of the property rating especially in developing countries with the decrepitude infrastructure.

Literature Review

In the value-based assessment, where the capital value is usually known to be 5%, is calculated as the assessed or rateable value on which the rate is applied; and where the rental value is known, it has to be converted into the capital value, then the same process should be performed (Kuye, 2002; Bahl, 2009; Babawale, 2013); in the commercial investment, the annual value serves as the basis on which the rate is applied (Kuye, 2002), and it has been practiced in Australia, China, Tunisia (Bird & Slack, 2002). The area based assessment, has been widely practiced in Central and Eastern Europe, while the self-assessment has been seldom practiced, but was found to be good in Colombia and Bolivia (Bird & Slack, 2002).

The value-based approach in some countries has been modified to adapt two rates instead of a single rate (called split rate taxation, graded land-improvement tax or dual rate tax) where the higher tax rate is applied on land, and the lower rate is applied on the improvements (Anderson, 1999; Schaaf, 2001; Kwak & Mak, 2009), this approach has the advantage of encouraging the optimum use of lands; however, it is an expensive exercise (Bahl, 2009), in that it requires adequate information on the improvement of the market situation in addition to the skilled team of Valuers (Slack, 2011). Table 1 classifies the characteristics of the area assessment according to the four key variables adopted from SWOT for the purpose of the analysis and hypothesis testing.

Table 1. Area-based Rating Assessment characteristics identified from SWOT Analysis

	Internal		External	
	Strengths (S) Helpful Factors	**Weaknesses (W) Harmful Factors**	**Opportunities (O) Helpful Factors**	**Threats (T) Harmful Factors**
1.	Less vigorous	Relied on land area only.	Suitable where property market is not active.	Boundaries not well demarcated.
2.	Relatively cheaper (less of cost of administration)	Levied on land area per m^2	Where recent records, comparable properties etc are not available.	Most properties are not numbered/registered (no cadastral data).
3.	Requires less information from payers.	Disregards any improvement.	Tax payers can comprehend the process easily.	Ground truthing may require house to house visitation.
4.	Required limited data	Disregards both capital & rental value	O_4 Required data can be obtained Remotely	Unsuitable in highly advanced nations.
5.	Easy to collect data	Disregards the concept of highest & best uses. (parity taxation)	Provide hedge against cultural/religious barriers.	Data collected by Google Map with a computer software can be vulnerable to viruses.
6.	Google map enable fast data collection.	Can generate low revenue.	Can operate with few experts.	Ignoring all improvements may result to low revenue
7.	Data can be collected remotely, as only land is considered.	Does not satisfy horizontal equity		
8.	No periodic revaluation.	W_8 Does not satisfy vertical equity.		
9.	No need for: Reconnaissance survey, Physical Inspection, Enumeration, Measurement & Valuation.	Does not consider land/soil fertility		
10.	Not affected by volatility in value.	Does not consider all locational attributes		

In Sepulveda & Martinez-Vazquez (2009) and Grover (2015) value-based taxation was mainly the predominant approach, but it is difficult and expensive compared to AbRA, the value based approach requires well-trained Valuers to perform the task (Hefferan & Boyd, 2010; Slack, 2011), it also requires entry into individual properties where the restrictions due to the religious and traditional beliefs may affect the smooth running of the exercise. These considerations suggested the compatibility of AbRA for the study area depending on the existing local realities, as classified in Table 1 above.

The property rating on the basis of land value has become less attractive in the United States and some advanced nations (Mangioni, 2010); generating the internal revenue on the basis of the land area may not yield substantive revenue, because the large scale real estate investment, that accommodates high storey-buildings may require a value-based or robust scheme, that could bring the best out of the ever-increasing value of the property, as *ad velorem* tax is based on the value i.e. the value determines the payable tax (Bird & Slack, 2002; Connolly & Bell, 2009; Plimmer & McCluskey, 2010; Jacobus, 2010).

It was posited in Hu & Dai (2013) that Google Earth/Map have been equipped with a measurement tool that can remotely measure land area anywhere in the world without a physical contact to the site. In Kumar *et al. (2015)*, the remote sensing tools could measure and collect the information needed for AbRA in short time, at the lower cost, thus, making it suitable for the land area assessment for the rating purposes. It was found to be good in Vietnam, Central and Eastern Europe mainly due to the weak property market (Bahl, 2009). The reconnaissance survey of the properties could be conducted effectively with Google Earth/Map at lower costs (Kamel Boulos, 2005; Kamadjeu, 2009) without entry into the properties, thus, required less personnel, time, equipment and cost. In Bahl (2009), it was suitable in developing nations.

Materials and Methods

This study derived its themes for the investigation from a SWOT analysis, whose variables under each theme were used as measurement items for the primary data collection, and experimentally tested the helpful factors under both internal and external variables and subsequently, tested the harmful factors under the internal and external variables which were all derived from SWOT analysis, and measured their effects on the endogenous variables(AbRA); a population of 1200, gave a sample size of 291 (Krejcie & Morgan, 1970); the samples were randomly picked. Reliability analysis was conducted to check the level of consistency in the measuring items. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were also conducted to make sure that the measurement items were loaded on their underlying factors, and finally Structural Equation Modelling (SEM) was used to analyze the impact of the variables on the implementation of AbRA in the study area.

Hypothesis

The study focused on analyzing and testing the helpful factors under SWOT that could aid the implementation of AbRA in Bauchi metropolis; and the harmful factors under SWOT that affected the implementation in the study area. To get a precise answer, some hypotheses were specifically stated in line with the characteristics outlined in Table 1. The hypotheses were as follows: -

H_1: The low cost of the area-based rating administration significantly increases the strengths of AbRA.
H_2: The limited data collected for the area-based rating significantly increases the strengths of AbRA.
H_3: The absence of the periodic reassessment in area-based rating significantly increases the strengths of AbRA.
H_4: The strengths inherent in AbRA have a significant influence on the implementation of AbRA in the study area.
H_5: The land area measurement in the area-based rating significantly increase the opportunities of AbRA.
H_6: The rates collected on the land along are minimal, and may significantly affect the opportunities of AbRA.
H_7: The opportunities inherent in AbRA have a significant influence on the implementation of AbRA in the study area.
H_8: AbRA's disregard to the optimum use of land significantly increases the weaknesses in AbRA.
H_9: AbRA's disregard to the principles of the equity significantly increases the weaknesses in AbRA.
H_{10}: The weaknesses inherent in AbRA significantly affect the implementation of AbRA in the study area.
H_{12} AbRA's disregard to the improvements on the land significantly increases the threats on AbRA.
H_{11}: The lack of cadastral data significantly increases the threats on AbRA.
H_{13}: AbRA's disregard to highest and best use of the land significantly increases the threats on AbRA.
H_{14}: The threats inherent in AbRA significantly affect the implementation of AbRA in the study area.
H_{15}: The remote data collection on the land area significantly increases the ease of the implementation of AbRA.
H_{16}: The absence of the necessity for the periodic reassessment in area-based rating significantly increases the ease of the implementation of AbRA.
H_{17} The privacy maintained in AbRA data collection significantly increases the ease of the implementation of AbRA.

Analysis

The analysis had 55 measurement items that were subjected to the reliability, the confirmatory factor analysis and the structural model sieved and reduced the items to eighteen (18). The most relevant and consistent measurement items have been shown in Table 2.

Table 2. Reliability Analysis

S/N	Factors (Main Constructs)	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
1.	Strengths	0.909	0.910	4
2.	Opportunities	0.902	0.903	3
3.	Weaknesses	0.743	0.946	3
4.	Threats	0.903	0.905	4
5.	AbRA	0.814	0.816	4
Total Items				18

The test of the internal consistency using Cronbach's Alpha indicated a good reliability of items (Table 2), Alpha values for the five (5) constructs fell within the required range of 0.7 to 0.95 (Gliem & Gliem, 2003; Gencturk *et al.* 2010; Tavakol & Dennick, 2011). Figure 1 below shows the confirmatory factor analysis (measurement model) with the fitness indexes.

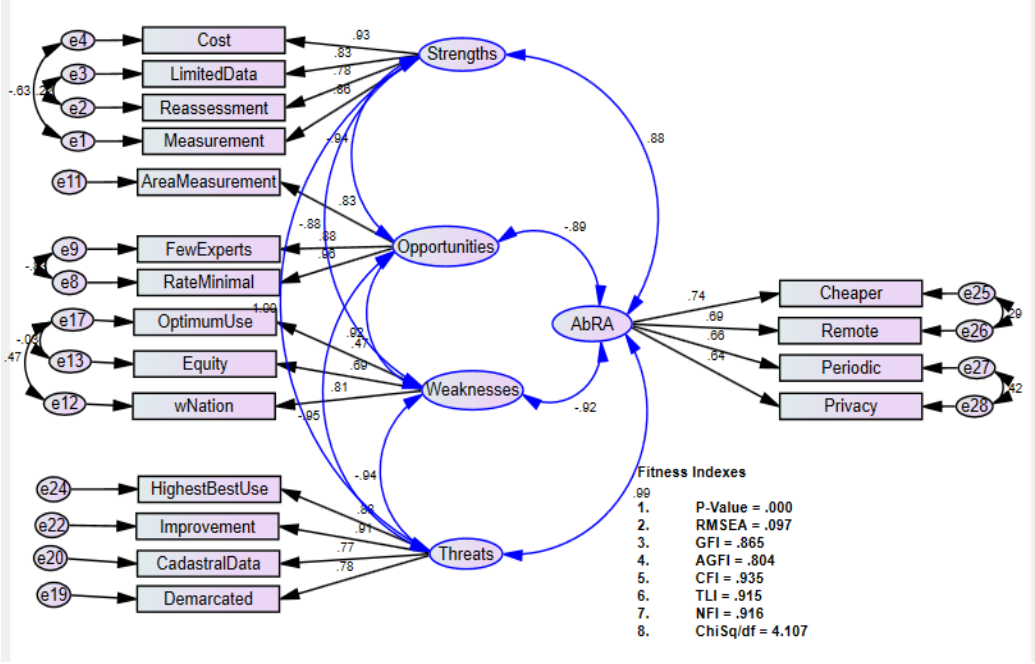

Figure 1: Confirmatory Factor Analysis (Measurement Model)

The fitness indexes shown on the path analysis have achieved the required level fitness except for RMSEA with .097, which was slightly above the threshold value of 0.80; it was however accepted because the fitness was not weak, according to (Alavifar et al., 2012) a model could be considered weak when RMSEA was greater than 1.0; also in (Browne et al., 1993 cited in Akinyode, 2016) that RMSEA at less than 0.10 was acceptable. In (Chau & Hu, 2001 & Hair *et al.*, 2010 cited in Akinyode, 2016) that for AGFI and GFI value > 0.80 was accepted as a recommended value for a good fit. The CFI, TLI and NFI were recommended to be ≥ 0.90 (Awang, 2014; Akinyode, 2016); from Figure 1 above, the fitness indexes have achieved the required level of ≥ 0.90; and the ChiSq/df was required at less than 5.0 (Wan Afthanorhan, 2014; Awang, 2014).

The structural model shown on Figure 2 below, depicted the relationship between the latent unobserved variables, with single head arrows. The model showed the causal effects or influences the exogenous variables have on the endogenous variables (Byrne, 2010, Awang, 2014); and provided a means for testing the hunch of hypotheses formulated in line with the latent unobserved constructs and the measurement items under them.

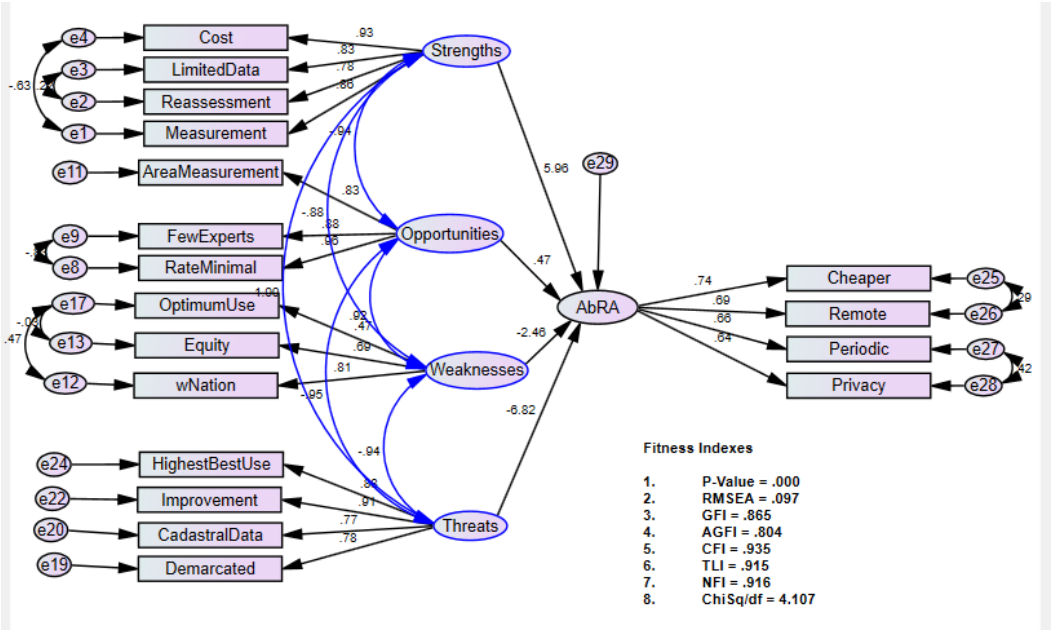

Figure 2: Structural Model

Results and Discussion

The results from the estimates on Table 3 below provided answers to the hypotheses. The hypothesis whose P-values were reported with three asterisks meant that the hypotheses were accepted in that the values were less than 0.001; furthermore, the threshold at any value of <0.05 was accepted, thus, H_4 with P-value 0.396, H_7 with P-value 0.556, H_{10} with P-value 0.252 and H_{14} with P-value 0.435 were not accepted as their P-values were greater than 0.05. These were further elucidated in line with their respective propositions, accordingly.

Table 3. Estimates

Path	Estimates	S. E.	C. R.	P-Value	Remark
H_1: Cost-Strengths	0.972	0.048	20.227	***	Accepted
H_2: Limited Data-Strengths	0.998	0.050	19.860	***	Accepted
H_3: Reassessment-Strengths	0.872	0.049	17.878	***	Accepted
H_4: Strengths-AbRA	4.331	5.105	.848	0.396	Rejected
H_5 Area measurement-Opportunities	0.851	0.042	20.191	***	Accepted
H_6:Rate Minimal -Opportunities	1.044	0.048	21.966	***	Accepted
H_7:Opportunities-AbRA	0.366	0.622	0.589	0.556	Rejected
H_8:Optimum Use-Weaknesses	0.562	0.055	10.219	***	Accepted
H_9:Equity-Weaknesses	0.916	0.069	13.299	***	Accepted
H_{10}: Weaknesses-AbRA	-2.410	2.102	-1.146	0.252	Rejected
H_{11}:Cadastral Data-Threats	1.143	0.072	15.767	***	Accepted
H_{12}:Improvement-Threats	1.309	0.066	19.905	***	Accepted
H_{13}:HighestBestUse-Threats	1.225	0.065	18.939	***	Accepted
H_{14} :Threats-AbRA	-6.814	8.731	-0.780	0.435	Rejected
H_{15}:Remote-AbRA	1.048	0.070	14.932	***	Accepted
H_{16}:Periodic-AbRA	0.956	0.080	11.950	***	Accepted
H_{17}:Privacy-AbRA	0.857	0.074	11.639	***	Accepted

The results of the hypothesis test (Table 4 below) revealed that in H_1: the impact of 'the less cost of management in area-based rating', H_2: the impact of 'the limited data needed in the area-based' and H_3: the fact that 'the periodic reassessment' has been obviated in the area-based rating, all had a significant influence on the 'strengths' as the internal and helpful factor; and as a result, these could aid the implementation of the

area-based assessment in the study area; this could go a long way to buttress the proposition that the low cost rating assessment associated with the area-assessment puts it at a kind of advantage over ad velorem rating. However, the empirical data collected and also analyzed in this study has repudiated the exogenous variable *strengths* from influencing the implementation of AbRA in the study area.

In H_5, the 'area measurement' constituted more opportunities which were helpful to enable AbRA to perform well in generating more local revenues, this hypothesis was therefore upheld based on the empirical analysis. H_6 contemplated the adequacy of the proceeds from AbRA being tax assessed on the basis of land area only, not the value and not any improvement thereon, the assumption was that the proceeds may not be adequate compared to value-based rating; this proposition was supported by the results of the analysis. H_7 considered 'opportunities' as an external but helpful factor, tried to establish whether the opportunities inherent in AbRA had a significant influence on the implementation of AbRA in the study area, this hypothesis was not supported. H_8 envisaged the disregard to the optimum use to which an area of land has been put to, could reduce the cost of the administration, but could also reduce the revenue as the assessment has been non-ad valorem, however, this proposition was supported. In H_9, AbRA's disregard to the principles of the equity significantly increased the weaknesses in AbRA, this was also supported. H_{10} considered the 'weaknesses' as the internal but harmful factor, the weaknesses inherent in AbRA significantly affected the implementation of AbRA in the study area, was not supported. This was a strong backing for AbRA implementation in the study area.

H_{11}: The lack of cadastral information significantly increases the threats on AbRA was supported, the threats were external and harmful factors. H_{12} and H_{13}, i.e, AbRA's disregard to the improvements on land significantly increases the threats on AbRA and AbRA's disregard to the highest and best use of land significantly increases the threats on AbRA; respectively, both were supported in effects; the failure to consider the values of all the improvements and the highest and best use put on any subject land could jeopardize the performance of AbRA. H_{14} looked at the threats in general perspective, and decided whether the threats inherent in AbRA significantly affected the implementation of AbRA in the study area or not, and found the proposition not supported. H_{15}, H_{16} and H_{17}, which stated the remote data collection on the land area significantly increase the implementation of AbRA, the absence of the need for the periodic reassessment in the area-based rating significantly increase the implementation of AbRA, and the privacy maintained in AbRA data collection significantly increase the implementation of AbRA; respectively, were supported in the results of the analysis (Table 4).

Table 4: Hypothesis Testing Results

Path		Remark
H_1: Cost-Strengths	Low cost of area-based rating administration significantly increase the strengths of AbRA.	Supported
H_2: Limited Data-Strengths	Limited data collected for area-based rating significantly increase the strengths of AbRA.	Supported
H_3: Reassessment-Strengths	Absence of periodic reassessment in area-based rating significantly increase the strengths of AbRA.	Supported
H_4: Strengths-AbRA	**STRENGTHS** inherent in AbRA has significant influence on the implementation of AbRA in the study area	Not Supported
H_5 Area measurement-Opportunities	Land area measurement in area-based rating significantly increase the opportunities of AbRA.	Supported
H_6:Rate Minimal - Opportunities	Rates collected on land along is minimal and may significantly affect the opportunities of AbRA	Supported
H_7:Opportunities-AbRA	**OPPORTUNITIES** inherent in AbRA has significant influence on the implementation of AbRA in the study area	Not Supported
H_8:Optimum Use-Weaknesses	AbRA's disregard to optimum use of land significantly	Supported

	increase the weaknesses in AbRA.	
H_9:Equity-Weaknesses	AbRA's disregard to principles of equity significantly increase the weaknesses in AbRA.	Supported
H_{10}: Weaknesses-AbRA	**WEAKNESSES** inherent in AbRA significantly affects the implementation of AbRA in the study area	Not Supported
H_{11}:Cadastral Data-Threats	Lack of cadastral data significantly increase the threats on AbRA	Supported
H_{12}:Improvement-Threats	AbRA's disregard to improvements on land significantly increase the threats on AbRA	Supported
H_{13}:HighestBestUse-Threats	AbRA's disregard to Highest and Best Use of land significantly increase the threats on AbRA.	Supported
H_{14} :Threats-AbRA	**THREATS** inherent in AbRA significantly affects the implementation of AbRA in the study area	Not Supported
H_{15}:Remote-AbRA	Remote data collection on land area significantly increase the implementability of AbRA.	Supported
H_{16}:Periodic-AbRA	Absence of necessity for periodic reassessment in area-based rating significantly increase the implementability of AbRA.	Supported
H_{17}:Privacy-AbRA	Privacy maintained in AbRA data collection significantly increase the implementability of AbRA	Supported

Conclusion

Unlike the value-based rating assessment, the area-based assessment required limited information to conduct the rating assessment; and being non-ad valorem tax, the area assessment did not require the periodic revaluation in order to update the valuation list with volatilities in property value. This was in line with the fact that the real estate appreciates the values; these qualities made AbRA to demand less cost of administration, in that only the land area was measured exclusively for any improvement thereon, thus, paid no attention to the optimum or the highest and the best use of land. The possibility that data on land area could be collected remotely without physical entry into the individual properties, meant that the assessment process did not defy the residents' privacy, in addition to that, the remote data collection using the relevant tools available like Google Earth/Map allowed for the ease of the reconnaissance, faster inspections and measurements, hence, this study recommended the area-based rating assessment (AbRA) for Bauchi metropolis of Nigeria.

Limitation

This study focused on the factors that can aid the implementation of area-based rating assessment in Bauchi metropolis of Nigeria, the study became pertinent in the study area given the fact that a legal instrument provided the property rating existed, but without meticulously analyzing the appropriate assessment pattern for the study area. This study was therefore confined to analyzing the helpful internal and external factors (in SWOT) that could foster the implementation of the area-based assessment. The study however, did not make any attempt to find the time frame necessary to conduct area-based rating assessment for the metropolis; the study also did not investigate the actual cost of the area assessment in Bauchi metropolis of Nigeria

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