READINESS OF URBAN REAL ESTATE STAKEHOLDERS FOR THE ADOPTION OF GREEN CITY CONCEPT IN NIGERIA

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Abstract

Responsive actions towards taming the ugliness, which are associated with evolving realities that are being heralded by climatic turbulence, partly caused by many challenging issues that are linked to misuse, abuse, overuse, disuse and sometimes un-use of naturally-occurring assets, on the one hand, as well as wrongly implemented artificially-devised mechanisms in the context of real estate and urban development, on the other hand. Altogether, they resultantly continue to plague the natural calmness of ecosystem and thereby place upon human beings in their manmade environments, the untold but avoidable hardship for which several innovative approaches, such as smart city concepts were birthed to address. Hence, the crux of this study investigated the readiness of various urban real estate stakeholders in accepting and also get themselves committed, by way of compliance with all sorts of regulations and even payments of charges and other associated costs, which are adduced to incorporation of greenery to urban real estate, by considering Lagos as a research setting. As an empirical study of quantitative nature, constructs and variables were evolved to measure the degree of readiness for the adoption of the green city concepts and built into 5-point Likert scaled questionnaire with 76 copies that were distributed via the deployment of simple random sampling among seven [7] categorised and carefully selected respondents: owners, users, buyers, sellers, neighbours, government and consultants, out of which 64 copies were retrieved, translating to distribution-retrieval ratio of 84.21%, from which 55 copies were found to be valid after data screening and upon which statistical analysis using third order descriptive tools were performed. Among other things, the results at Cronbach alpha value of 0.875 and level of freedom at 99.9% showed that, real estate consultant exhibited the greatest level of readiness towards adoption the smart city concepts with a significant mean item weighting of 4.87 while tenants of real estate showed the least disposition to the adoption with 3.14 mean item score weighting which is seen to be fairly significant, while costs in terms of construction and maintenance remains as the most discouraging factor towards readiness, with relative importance index of 0.587, as well as having the duo of value of the real estate asset and quality of life with 0.984 and 0.979 respectively and closely competing as the most encouraging factors for readiness in adopting smart city concepts for urban real estate in Nigeria. The research concluded that socio-economic dimension with which value is driven and by decent life is being afforded are of greater essence that bottomlines the readiness of urban real estate stakeholders, while suggesting for evolvement of robust framework that aligns in equal or near-equal terms the other stakeholders' interests in way to ensure impressive readiness for the adoption of the concepts of smart city by all Nigerians.

Keywords: Green City Concepts, Readiness, Adoption, Urban Real Estate, Nigeria

Introductory background

It is important to aver that greenery as it were, is an encapsulation of all necessities, especially environmentally defined, that are being marshalled to confront through a sustainably natural approaches all the vagaries of climate change, a bespoke concept and initiative that was birthed to address the ecological phenomenon that has come to increase the emergence of heightened climatic and weather happenings globally. It is a no gain saying to state that these climatic turbulences manifest by ways of increased heat waves, elongated periods of dryness [USEPA, 2020; Giannaros and Melas, 2022] in the preponderance, as well as the degree of intensity of heat being generated and experienced by all classes of property users across all strata of every settlement. The immensity of the thermal discomfort can be felt in a rural, supra urban and especially urban milieus, with marginal differentials as close as

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slightly above 7°C between tropical day and at night periods, drawn meaningfully to the manifested temperature scales [Alexandri and Jones, 2018; Tumber, 2022].

Also, it is being clearly expressed that vagaries of the phenomenon of climate change are being greatly felt, as well as deeply driven through several triggers in the urban areas due to pervasive presence of greenhouse gaseous emitting poles that are severally existing within the cityscape [Allen *et al*., 2021; Bartesaghi *et al*., 2018]. Along similar vein, it is equally noteworthy that geometrically increasing demographical up-scales on the global scene which has continued to push forward the urbanisation trend, with attendant smoke-generating socio-economic activities, that are directly and indirectly driven by conurbational conveyances from points A to Z, with some being heavily heralded by fossil and other non-hydrocarbons, all have led to depreciation in the mass of green, as well as well blue spaces with increased tendencies for opening of imperviousness of flora and fauna [IPCC, 2021; Jin *et al*., 2020].

In furtherance to the above, is the fact that the summation of all the climatic turbulences as reflected upon above, are all together resultantly stirring mega distortions in the ocean level culminating in exacerbated global thermal increase, with interwoven spots of differentials among several land settings [Knight et al., 2021]. It is noteworthy to state that, while some are found to be on the higher scales, especially within inner cities, others are surely discovered to be with relatively lower thermal occurrences, especially around the supra urban and typically rural environs, the totality of which underscores the relevance and significance of greeneries in improving the sum total of habitability of real estate and urban development [Marando *et al*., 2022; Akinbola and Oluwole, 2019], as the adoption and full application of the greenery codes have the spiralling potentials in leading to their increased value coefficients, among other several immense benefits (McDonald *et al*., 2018; Bosch *et al*., 2021).

Therefore, it is of impressive paramountcy to opine that, judging from the empirical confirmation from the realities drawn from a comparative juxtaposition of the thermal happenings noticed at the northern part of the globe via-a-vis what goes on at the global south, without atom of doubt, there remains copious imbalance and widening inequalities in terms of availability, as well as disparaging inequity in the level of accessibility to greeneries [Cabral *et al*., 2017]. It is also pertinent to aver that there exists a confirmed observation, that few higher socio-economically strong citizens of urban settlements are having greater share in the equation, quantum and quality of green spaces, as against the multiples of economically weaker demographics that dot global landscapes, all of which tend to portray greeneries as a class-driven resource and thus strives to push it out of the reach of everyone seen to be financially less empowered [Cao et al., 2020; UN, 2019; Ciscar *et al*., 2018).

Thence, it behoves upon scholars to continue to evolve practicable efforts to drive the initiatives of policy makers towards having an increasing larger spaces of greener domains, the consummation of which relies on field driven data from the array of stakeholders, especially within the cityscape, with a view to assessing their level of readiness as well as welcoming disposition towards the adoption of green city concepts and practices, having known or at least have insights into the relevance of the concept, this forms the crux of this research.

Materials and methods
Research Setting
This research was conducted within the urban property market of Lagos, southwest Nigeria. It was chosen justifiably, simply because it is the city where there is a noticeable degree demonstration of the awareness and understanding of what green city concept is all about. Aside this is the fact that, Lagos, being a highly-rated commercial hub where some sorts of highly net worth commercial properties are located and to which there stands to be permissible level of drive towards payment for whatever charges and dues that are potentially associated with greenery of the environment by the urban real estate stakeholders, such as owners in terms of annual levies, as well as users in terms increased rental payment, while government authorities in their various existence are waiting for collection of attendant charges on such greenery applications, etc, from numerous urban real estate owners and users. Geographically, the research setting is shown as captured in the diagram that follows, viz:

Data Collection

Being a study with some degree of homogeneity, simple random sampling technique was deployed to gather data via administration of 76 copies of 5- point Likert scaled questionnaire on seven [7] categories of respondents which were established through baseline survey. Out of which 64 copies of the distributed copies of questionnaire were retrieved, translating to distribution-retrieval ratio of 84.21%, which is considered to be excellent and after data screening exercise, 55 copies were found to be valid and upon which the analysis was conducted.

Data Analysis

Pertinently, it is hereby being stated that efforts to raise the internal consistency of the queries, their strings of interrelationships, reliability, as well as elegance, with a view to obtaining impressive validity of the responses as collated through the questionnaire, all led to attaining of 55 copies of questionnaire which formed the inputs for the analyses. With establishment of Cronbach Alpha value 0.875, through the deployment of third order descriptive and inferential statistical tools, involving mean and one sample t-test with which inherently analytical exercises of standard deviation and variance for the descriptive, as well as t-test and chi-square were performed for inferential analyses, respectively. Urban real estate stakeholders were asked to indicate the factors around which the readiness for the adoption of the green city concepts are templated. After the statistical exercise for query screening, the surviving queries came down from 22 captured for survey to 14. Meanwhile, after the first stage of analyses involving the descriptive and inferential statistical tools as earlier stated, analysis on the mean item score was obtained to further situate the degree of the readiness of each stakeholders with respect to the constructs driving them. The following tables show the statistical results denoting values of responses and degree of readiness associated with the adoption of green city concepts, variously as applicable to each stakeholders vis-à-vis the factors that drive them, viz:

Table1: Weighting of Factors around Which the Readiness for the Adoption of Green City Concept by Urban Real Estate Stakeholders Revolves

S/N	Factor Variables/ Constructs@Crobach=0.875	N	Min	Max	Mean	RII	R	Chi-Square	P-Value
1	Value	55	1	5	4.93	0.984	1st	89.75	0.000
2	Quality of Life	55	1	5	4.87	0.979	2nd		
3	Comfort	55	1	5	4.73	0.965	3rd		
4	Productivity	55	1	5	4.69	0.921	4th		
5	Thermal Condition	55	1	5	4.60	0.894	5th		
6	Aesthetics	55	1	5	4.54	0.762	6th		
7	Energy	55	1	5	4.42	0.651	7th		
8	Longevity	55	1	5	4.33	0.637	8th		
9	Durability	55	1	5	4.16	0.614	9th		
10	Vulnerability	55	1	5	3.62	0.602	10th		
11	Security	55	1	5	3.41	0.598	11th		
12	Safety	55	1	5	3.25	0.593	12th		
13	Propensity	55	1	5	2.97	0,590	13th		
14	Costs	55	1	5	2.89	0.587	14th		

Source: Researchers' Field Survey, 2023

From the outputs displayed on table 1, the descriptive analysis of the latent variables as scripted factors driving the readiness of urban real estate stakeholders towards adoption of green city concepts, as they are depicted by the varieties of responses through the deployment of mean and relative important index (RII) which were gauged with the 5point Likert scale instrument via notational strings of strongly disagree-1, disagree-2, indifferent-3, agree-4, strongly agree-5. With the outputs from the chi square statistics which stands at 89.75 and p-value of 0.000 at <0.05 precision level, a result that depicts impressive level of significant interrelatedness among the perceptions of responses on the 14 latent variables of factors driving the readiness for the adoption of green city concepts among all the urban real estate stakeholders' readiness. Also, with the internal consistency among the variables at 87.5%, that is CA=0.875, it became evident that there is impressive relative importance index which is greater than 60%, that is 0.6 averagely across all the latent variables that serve as driving factors for readiness, except in the last four [4], which are security, safety, propensity and costs. While value of real estate assets, quality of life, comfort and productivity with mean of

4.93, 4.87, 4.73 and 4.69, as well as RII of 0.984, 0.979, 0.965 and 0. 921 respectively are the most ranked as 1st, 2nd, 3rd and 4th of the factors driving the readiness of urban real estate stakeholders towards the adoption of green city concepts in Nigeria, the least ranked of the fourteen [14] factors is cost, mean and RII results of 2.89 and 0.587 respectively.

Table2: Weighting of the Size of Contribution of Each of the Factors Towards Readiness for Adoption of Green City Concept by Urban Real Estate Stakeholders.

S/N	Factor Variables/ Constructs	T-value	Df	Sig[tailed]	2-Mean difference	Quotient	Status
1	Value	2.758	54	0.015	0.851	Readiness	Sig
2	Quality of Life	5.427	54	0.012	0.857	Readiness	Sig
3	Comfort	8.615	54	0.011	0.865	Readiness	Sig
4	Productivity	3.703	54	0.009	0.885	Readiness	Sig
5	Thermal Condition	8.385	54	0.027	0.831	Readiness	Sig
6	Aesthetics	6.761	54	0.003	0.992	Readiness	Sig
7	Energy	8.794	54	0.007	0.891	Readiness	Sig
8	Longevity	7.831	54	0.010	0.881	Readiness	Sig
9	Durability	8.852	54	0.005	0.896	Readiness	Sig
10	Vulnerability	3.748	54	0.324	0.391	Readiness*	Insig
11	Security	3.935	54	0.395	0.376	Readiness*	Insig
12	Safety	4.184	54	0.015	0.851	Readiness	Sig
13	Propensity	5.147	54	0.407	0.263	Readiness*	Insig
14	Costs	9.052	54	0.437	0.211	Readiness*	Insig

Source: Researchers' Field survey, 2023

From the output of the results displayed in table 2, which is meant to capture the size of the contribution that each of the factors has on the overall readiness for the adoption of green city concept by urban real estate stakeholders, it was glaring that each of the 14 latent variables representing the driving factors have variously contributed their respective might to the overall as shown in the table. While ten [10] of the fourteen [14] latent variables denoting driving factors, are the significantly contributive towards the readiness for the adoption of green city concept by urban real estate stakeholders, with four [4] being insignificantly contributive. It is pertinent to state that, aesthetics and durability with sig.tail values of 0.003 and 0.005, as well as 2-mean difference of 0.992 and 0.896 respectively are the two most contributing factors to the readiness for adoption of green city concept, cost remains the least contributive of the 14 factors, with 0.437 and 0.211 as sig. tail and 2-mean difference values respectively.

Table 3: Weighting of the Level of Readiness Exhibited by Urban Real Estate Stakeholders Towards the Adoption of Green City Concept

S/N	Para	Urban Real Estate Stakeholders	Mean Item Score	Rank	Remark
1	URES$_{Consultants}$	Real Estate Consultants	4.87	1	Sig
2	URES$_{Sellers}$	Real Estate Sellers	4.75	2	Sig
3	URES$_{Owners}$	Real Estate Owners	4.38	3	Sig
4	URES$_{Neighbours}$	Real Estate Neighbours	4.12	4	Sig
5	URES$_{Governments}$	3 tiers of Government	3.96	5	FSig
6	URES$_{Buyers}$	Real Estate Buyers	3.32	6	FSig
7	URES$_{Tenants}$	Real Estate Tenants	3.14	7	FSig

Source: Researchers' Field Survey, 2023

It is clear from the output in table 3, that the level of readiness exhibited by each of the seven urban real estate stakeholders towards the adoption of green city concept varies, with four [4] of them, that is, real estate consultants, real estate sellers, real estate owners and real estate neighbours, with 4.87, 4.75, 4.38 and 4.12 values of mean item scores respectively, having significant level of readiness as against three others, that is, government, real estate buyers and tenants, with 3.96, 3.32 and 3.14 values of mean item scores respectively flaunting an insignificant level

of readiness towards the adoption of green city concept in Nigeria. In all, it is pertinent to state that it comes as a big surprise that real estate consultants and not the real estate owners exhibited highest level of readiness, as well as the fact that government of all stakeholders could top the class of stakeholders with insignificant level of readiness towards the adoption of green city concept in Nigeria.

Conclusions

Attempts at broadly evolving conclusions on this research, with a view to state some of the discoveries as well suggestions to address grey areas that revealed therefrom, are worded in the following sub-headings below, viz:

Conclusion

The research concluded that socio-economic dimension with which value is driven and by which quality of life is being afforded are among other things, of greater essence in the consideration of factors that bottomline the readiness of urban real estate stakeholders towards the adoption of green city concept in Nigeria.

Summary of Findings

1. Values that are possessed by fabrics of real estate assets as a result of adoption of green city concept, as well as improved level of quality of live are two most important factors that top the minds of urban real estate stakeholders as the most drivers of their readiness for the adoption of green city concept.

2. Costs are of the serious negativity on their readiness for adoption as the stakeholders consider initial construction and regular maintenance expenditure as huge and a no-go-area for them.

3. Pleasantness of the scenic beauty in terms of aesthetic viewscape that is being flaunted by every application of green city upon any fabric of real estate asset has the largest contribution of the many factors driving the readiness of every urban real estate stakeholder towards the adoption of green city concept in Nigeria.

4. It is important to emphasise that cost remains a factor with the least size of contribution to level of readiness of urban real estate stakeholders towards the adoption of green city concept in Nigeria.

5. It is most striking to discover that real estate consultants are of the highest level of readiness towards adoption of green city concept among the urban real estate stakeholders as opposed to real estate owners who by wide popular thinking, are the supposed greatest beneficiaries of values and gains attendant to application of such innovation.

6. It was also revealed that says that government tops the class of stakeholders that have shown insignificant readiness for the adoption of the green city concept in Nigeria.

Recommendations

1. There is urgent need for the evolvement of framework that is of sufficient robustness in capturing the other interests of stakeholders beyond values of real estate and quality of life so as have a balanced set of benefits from the adoption.

2. The capital intensiveness of adopting the green city concept in terms of expenses associated with initial construction and lifecycle maintenance should be a thing of concern, partnership model of financing or any other highly liberalised vehicle of funding is hereby proposed.

3. Government should display an increased level of readiness towards the adoption of the green concept because of arrays of opportunities associated with it.

4. People who are stakeholders in the context of urban real estate tenants should not be constrained to be lukewarm towards the green concepts on the basis of increased costs it stands to add to lease terms, rather other good aspects of the adoption such as improved quality of life should be of paramountcy among others.

References

Akinbola, K.B and Oluwole, T.G (2019). Benchmarking of Real Estate and Facilities Management Strategies for Higher Educational Institutions in Nigeria. *In Sustainable Environment and Economic Development Challenges: Options and Prospects.* Proceedings of the 7th National Environmental Research

Conference, organised by The School of Environmental Studies and to be held at the International Conference Centre of The Federal Polytechnic, Ilaro between 22nd and 25th April, Ilaro, Nigeria.

Alexandri E., Jones P., [2018]. Temperature Decreases in an Urban Canyon Due to Green Walls and Green Roofs in Diverse Climates, *Building and Environment*, 43 (4), 480 – 493.

Allen, M. A., Roberts, D. A., and McFadden, J. P. (2021). Reduced Urban green Cover and Daytime Cooling Capacity during the 2012-2016 California Drought. *Urban Clim*. 36, 100768. doi:10.1016/j.uclim.2020.100768.

Bartesaghi K, C., Osmond, P., and Peters, A. (2018). Evaluating the Cooling Effects of green Infrastructure: A Systematic Review of Methods, Indicators, and Data Sources. Solar Energy 166, 486–508. doi:10.1016/j.solener.2018. 03.008.

Cabral, I., Keim, J., Engelmann, R., Kraemer, R., Siebert, J., and Bonn, A. (2017). Ecosystem Services of Allotment and Community Gardens: A Leipzig, Germany Case Study. Urban For. Urban Green. 23, 44–53. doi:10.1016/j. ufug.2017.02.008

Cao, C., Yang, Y., Lu, Y., Schultze, N., Gu, P., Zhou, Q.,(2020). Performance Evaluation of a Smart Mobile Air Temperature and Humidity Sensor for Characterizing Intracity Thermal Environment. J. Atmos. Oceanic Tech. 37, 1891–1905. doi:10.1175/JTECH-D-20-0012.1

Ciscar, J. C., Ibarreta, D., Soria, A., Dosio, A. A. T., Ceglar, A., Fumagalli, D., (2018). Climate Impacts in Europe: Final Report of the JRC PESETA III Project. Luxembourg: Publications Office. doi:10.2760/93257

Bosch, M., Locatelli, M., Hamel, P., Remme, R.P., Chenal, J., and Joost, S.(2021). A Spatially Explicit Approach to Simulate Urban Heat Mitigation with InVEST (v3.8.0). Geosci. Model. Dev. 14, 3521–3537. doi:10.5194/gmd-14-3521

Giannaros T.M., Melas D., 2022. Study of the urban heat island in a coastal Mediterranean City: The case study of Thessaloniki, Greece, *Atmospheric Research*, 118, 103–120.

IPCC (2021). Climate Change 2021: The Physical Science Basis. Summary For Policymakers. *Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*.

Jin, L., Schubert, S., Hefny Salim, M., and Schneider, C. (2020). Impact of Air Conditioning Systems on the Outdoor Thermal Environment During Summer in Berlin, Germany. *Ijerph* 17, 4645. doi:10.3390/ijerph17134645.

Knight, T., Price, S., Bowler, D., Hookway, A., King, S., Konno, K., et al. (2021). How Effective Is 'Greening' of Urban Areas in Reducing Human Exposure to Ground-Level Ozone Concentrations, UV Exposure and the 'Urban Heat Island Effect'? An Updated Systematic Review. *Environ. Evid*. 10, 1–38. doi:10.1186/ s13750-021-00226-y

Marando, F., Heris, M. P., Zulian, G., Udías, A., Mentaschi, L., Chrysoulakis, N.,(2022). Urban Heat Island Mitigation by green Infrastructure in European Functional Urban Areas. *Sust. Cities Soc*. 77, 103564. doi:10.1016/j.scs.2021. 103564.

McDonald, R. I., Colbert, M., Hamann, M., Simkin, R. D., and Walsh, B. J. C. (2018). Nature in the Urban Century: A Global Assessment of Where and How to Conserve Nature for Biodiversity and Human Wellbeing.

Tumber, C. (2022). Small, Gritty and Green: The Promise of America's Smaller Industrial Cities in a Low-Carbon World. Boston: MIT Press.

United States Environmental Protection Agencies. 2020. Greenhouse Gas Equivalencies Calculator. [Online]. From: *http://www.epa.gov/energy/ greenhouse-gas equivalencies-calculator*. [Accessed on 27 August 2023]