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INTEGRATION OF SUSTAINABILITY INDICATORS IN URBAN FORMATION: A GAP ANALYSIS

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Abstract

Cities and urban centers are made for people and not vice versa. However, many policies on urban formation fail to take cognisance of human factors in their design and planning. Restructuring of cities to accommodate the economics and environmental demand of urbanisation alters the organic urban form. Modernists often concentrate on road construction, fresh air circulation, light, space, space for vehicles, etc., but ignore city architecture's social dimension. This study explores the psychological aspect of cities and housing due to the trends in the land-use change in sustainable city agenda with specific reference to Ibadan City. This work is an extract of research on the community perspective of land-use change on social sustainability. Data were collected through a structured questionnaire from 397 residents of the Central Local Government and analysed using Partial Least Square - Structural Equation Modelling (PLS-SEM) and Relative Importance Index (RII). The results show the urban form characterised by land-use change and its consequential effects on social sustainability. The alteration of the urban form through land-use changes by individual landowners' decisions impacts others' social sustainability. It was recommended that policymakers incorporate the sustainable social elements into the planning procedure.

***Keywords**:* Urban Form, Social Sustainability, Liveable Community

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INTRODUCTION

The urban form explains the characteristics of a city and displays its whole layout, location, and potential growth in relation to other cities and settlements. The urban form may be influenced by planning regulations and the land-use change process. The land-use change process may have a consequential effect that may be positive or detrimental to the community's social sustainability. Many factors sum up to consider a community liveable. These factors include the natural and built environment, social stability, equity, safety, economic stability potential, educational prospect, and cultural and recreational advantages (Aulia, 2016).

Countries worldwide have adopted different approaches towards creating a liveable community; some approach it by monitoring the newly developing communities, while some focus on developing the existing neighbourhood to create a new setting. For instance, the US' direction is more of an increasing density, promoting land mix and functioning transport to create a liveable environment. At the same time, the UK concentrates on renewing the old existing community to meet a modern, liveable environment (Stevens, 2009). Liveability is a combined effort of urban activists, including the architect, planners, and community inclusiveness. Liveability is confirmed when the residents are part of the decision and management of the environment.

LITERATURE REVIEW

Urban Form

The word' urban form' defines the characteristics of a city. Urban form involves the city's entire layout, current location, and potential growth connected to other towns and settlements in the more extensive network of towns and urban regions (Sharifi and Yamagata, 2018). Urban form refers to the urban area or its parts' scale, shape, and configuration.

Understanding urban form is necessary to understand the attributes of a city, metropolitan area, or village. This understanding is achieved by examining the components' characteristics, the control or occupation, and ownership pattern. Urban type is carefully linked to scale and is defined as the morphological features of a city environment (Williams et al., 2000). The scale of urban form involves individuals' building, urban block, the street, city, and neighbourhood, which explains how an urban form is measured, understood, shaped, and analysed (Dempsey et al., 2011). Other approaches to explaining urban form include physical facilities and the person acting (Lynch, 1984). Hence, urban form is made up of the environment and the people. Urban land-use theories have been subjected to series of critiques and amendments. The urban environment is complex; classifying it as an easily understandable and explainable concept might be a gross mistake.

Scholars have attempted to explain urban land-use theories to clarify it, and despite their efforts, it remains challenging to leap into a particular definition

or theory of urban environment. Cities are complex, and the driving forces of urban formation and expansion vary from city to city. Thus, the number of city nuclei and their purpose differ from one city to another. The bigger the population, the larger the nuclei. On this note, Fabiyi (2006) studied city centres in the African setting, particularly Nigerian urban settlements, the scholar discovered many city nuclei, including traditional, commercial, new, administrative, political, and industrial centres. Research evidence clarified that no city theory could unilaterally predict a city's formation, creation, and structure. Each theory is unique and has a unique history, pattern of transition, and structure. As urbanisation sets in, the city undergoes a series of land-use changes from the initial concept.

Concern about land-use change in the holistic direction has been a matter of great concern in recent times. Nkolika et al. (2018) reasoned that change is a regular occurrence and inevitable. Land-use transition is unanimous with the development of any emerging economies, such as Nigeria (Chen *et al.* (2014); Hertel *et al.* (2011). Land use changes is a continuous development due to insatiable human character and the highest and best use (Nkolika et al., 2018). Where land demand is strong, its immobility and limitations bring competition amongst its numerous uses (Rösch *et al.*, 2010). Landowners act rationally by switching use from low-use demand profile to highly competitive use profile to maximise benefit from an economic perspective. Economic sustenance and benefit and the local planning authority's need to accommodate the new development determine land-use reform (Hertel *et al.*, 2011).

Urban Social Sustainability

Urban social sustainability planning is not a straitjacket nor a mere adoption of a particular country's planning concept. It embraces cross-examination of the variables for making a community liveable, which varies from place to place, hence the need for collective efforts of all community stakeholders. A sustainable community does not focus on a single building concept; the focus is on the neighbourhood and the community. The concept of a single building or a single-use is the cause of land-use conflict expressed in most urban cities. The absence of a master plan for the community is responsible for the haphazard development of most urban neighborhoods in developing urban environments.

Sustainability has been a central philosophical paradigm for urban growth since 1987 when advocation for sustainable development became more pronounced. The World Commission on Environment and Development (WCED) introduced sustainable development in the Brundtland report popularly referred to as *Our Common Future.* The aim was to initiate a global agenda to resolve the degradation of social and natural environments that have aggravated right from the industrial revolution (Hall et al., 2015).

Sustainable urban development is a big task to achieve due to its dynamism, complexity, and continuously evolving nature (Lützkendorf and Balouktsi, 2017). Many urban communities find it challenging to attain sustainability, and the introduction of urban renewal exercises performed by the government in urban communities sometimes ended up being unsustainable. More often than not, the reason may be sidelining the local institution, homeowners, unions, and associations in the development process and managing the urban revitalisation facilities.

Social sustainability is still under-theorised and vague in definition, criteria, and measurement system. Woodcraft (2012) reasoned that moving from theoretical and abstract debate ascribed to social sustainability's definition to the investigation and operational aspect of urban social sustainability is expedient. Community sustainability is the urban community's capacity to maintain and replicate to operate at a scale appropriate to community members (Dempsey et al., 2011; Yiftachel and Hedgcock, 1993).

Although social sustainability has several definitions, Eizenberg and Jabareen (2017) noted that it lacks a coherent and useable definition. Rashidfarokhi et al. (2018) added that it is hard for social sustainability to have a precise definition, the scholar has a divergence of opinion that the social sustainability definition does not offer a definite tool for the planning process. The scholar proposed a tool or series of indicators that can guide the planners in their planning process. Rashidfarokhi et al. (2018) proposed 26 social sustainability indicators under six themes as presented in Table 1.

The grouping of indicators into general themes improves the comprehension and applicability of instruments when assessing real-life planning. The scholars' claims premised on (Pearce and Vanegas, 2002) belief that a restricted scope and few requirements enhance adequate monitoring and evaluation of a physically and economically feasible procedure. The sustainability indicators under the six (6) groups identified by Rashidfarokhi *et al.* (2018) are adopted in this research work. The choice is to make it focus principally on the land-use social sustainability-related issue.

Table 1: The Six General Themes and the 26 Related Social Sustainability Indicators (Rashidfarokhi *et al.*, 2018)

Indicators	Themes
Community Vitality	Social Cohesion
Active Community Organisations	
Citizen Perception of Government Performance	
Innovation and Provess	
Social Solidarity	
Civic Enggagement and Colunteerism	
Trust and Optimism	Social Capital
Access to Civic and Public Spaces	

Indicators	Themes
Social Civic Networks	
Social Values	
Social Norms	
Diversity	Social Inclusion
Arts and Culture	
Social Integration	
Social Mixing	
Edual Opportunities and Access to Resources	Equity
Gender Equality in the Economy	
Equity for Minorities and Disadvantaged Groups	
Inter and intragenerational Equity	
Knowlegde Management	Community Participation
Partnership and Collaboration	
Community Empowerment	
Security	Safety
Freedom	
Resilience	

METHODOLOGY

The research was based on interviews, observation, and documentary analysis. Survey research was conducted, and 397 community residents were served with structured questionnaires to obtain data towards answering this research question. The study focused on the impact of land-use change on Ibadan central-local government community social sustainability. The survey included both males and females: 52.1% males and 47.9% females. 92.2% of respondents had an income source. Among the respondents, 98.2% were married, signifying responsibility and reliability. The study is exploratory with a sequential mixed model methodology. Data obtained from respondent data were organised, presented, and summarised by descriptive statistics using statistical parameters including frequencies, means, standard deviation, and confirmatory factors analysis using IBM SPSS statistics version 22 and Partial Least Square - Structural Equation Modeling (PLS-SEM). The experts in the land-use-related field were relied on for the model validation.

Ibadan Land-use Pattern

The case study is the Ibadan central-local government, Oyo State, Nigeria. As shown in Figure 1. Based on the 2006 population census, Ibadan city recorded 3.8 million people (Olowoporoku et al., 2017). Its rapid growth is traceable to its 19th-century refuge city and the advantage of being Nigeria's former western province headquarters (Oladele and Oladimeji, 2011). Ibadan's nodal location advantage made it a business zone. The railroad from Lagos to the northern part of the country arrived in Ibadan in 1901; the roads from Kano, Kaduna, Sokoto

Ilorin Oyo, Oke Ogun, Ondo, Ilesha Ife, and Oshogbo all converged at Ibadan on the way to Lagos.

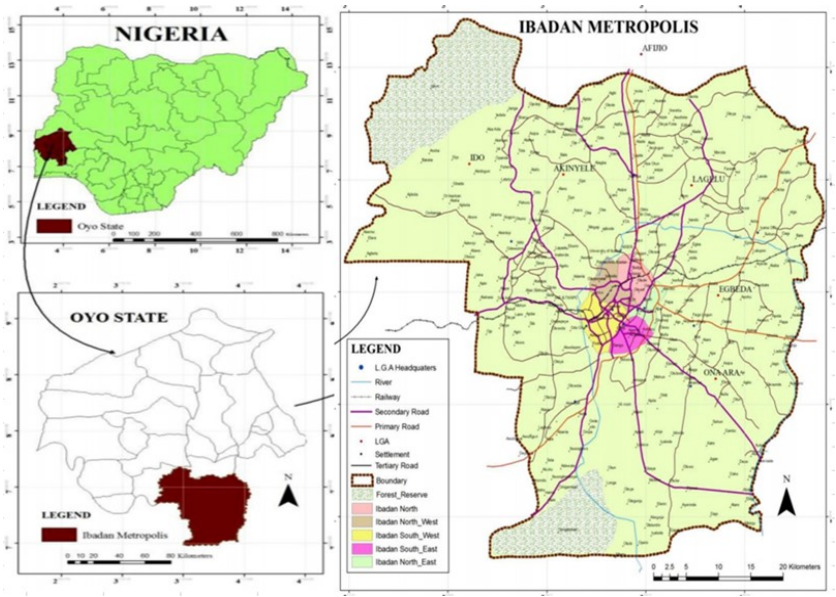

Figure 1: Map of Oyo State xhowing the understudied five Local Government Areas in Ibadan City.
Source: International Institute of Tropical Agriculture, Geospatial Unit (2013)

There is virtually no low-density sprawl in the Ibadan metropolis. Since 2003, the low-density sprawl was built as high-density or medium sprawls, as indicated in Figure 2. Ibadan metropolis' development represents an unscheduled and ill-structured condition. To a large degree, urban growth in Ibadan took place without regard for urban legislation (Adelekan, 2016). Over the years, over 826 km of vegetation covers have been used for urban construction. It is also worth noting that the old airport, which was initially designated as the open fields and low-density areas in 1984, was subdivided for commercial land use and surrounded by a medium-density outlook (Fabiyi, 2006).

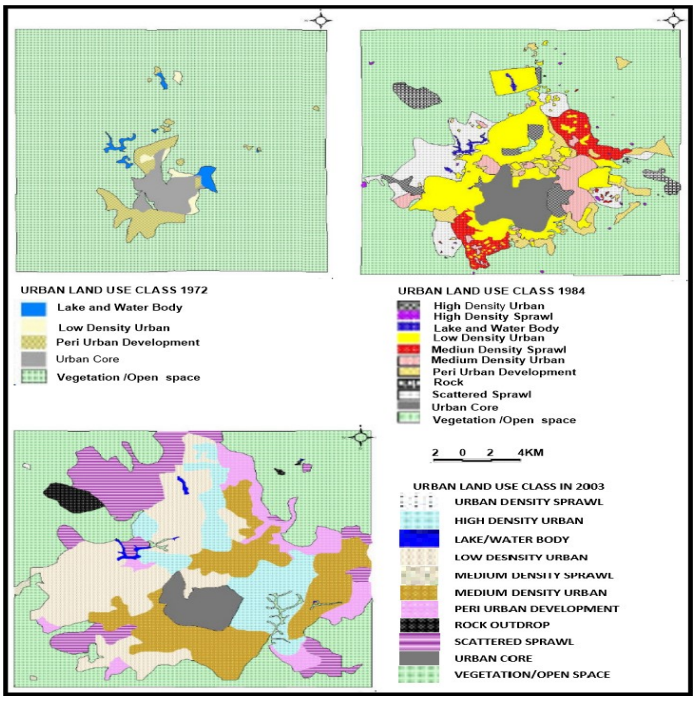

Figure 2: Urban Land-use Classes in Ibadan Region, 1972 to 2003
Source: Fabiyi, 2006

Some salient factors underpin Ibadan's unplanned land-use shift. Fabiyi (2006) identified industrialisation and culture as part of Ibadan's land-use transition triggers, and its fallout is ill.

RESEARCH FINDINGS AND DISCUSSION

The survey revealed that communities are aware of the social sustainability indicators relevant to urban form and land-use planning. The RII result on the social sustainability indicators analysis falls within 0.6388 and 0.9154. The RII value obtained passed the threshold value of RII ≥ 0.6000, showing that all the indicators are fundamental as assessed by the community. Social value was rated 1st with RII 0.9103 by the sampled respondent members of the community. The issue with land-use planning and development is that governments and individuals assign more importance to economic benefit and development and less importance to the effect of land use on humans in the planning process. However, people are the centre of any planning and development. Kenter et al. (2015) described social value as community price, i.e., cultural value, mutual interest, and things contributing to public welfare or well-being. Accessibility to institutions, community networks, community engagement and volunteerism, and trust and optimism have RII values of 0.9113, 0.9103, 0.9098, and 0.8891,

respectively. Security has RII 0.7476 with 21st in ranking; this speaks that when other factors are well cared for, the community's safety is guaranteed. Social mixing is last in the ranking with RII 0.6675, although it is not a sign of weakness as the RII value far exceeds the threshold value of RII ≥ 0.6000, as shown in Table 2.

The social sustainability factors assessed include social capital, social cohesion, social inclusion, equity, safety, and community participation. Social capital has a mean score value of 4.48, ranked 1st, social cohesion with a mean score value of 4.02, ranked 2nd, equity, safety, community participation, and social inclusion with mean score values of 3.9, 3.83, 3.67, and 3.54, ranked 3rd, 4th, 5th, and 6th, respectively. All the constructed mean score exceeded 2.333 which imply that they are crucial factors to urban changes as shown in Table 2.

Table 2: Sustainability Indicators Relative Importance Index (RII)

Indicators	X	X/Rank	Construct	RII	SD	Rank (overall)
Community Vitality	3.846	4th	4.02 Cohesion	0.7693	0.674	16th
Active community organisations	3.657	6th		0.7315	0.748	22nd
Innovation and process	3.652	7th		0.7305	0.732	23rd
Social solidarity	4.005	3rd		0.8010	0.905	10th
Citizen perception of government performance	3.829	5th		0.7657	0.732	17th
Accessibility to institutions	4.557	1st		0.9113	0.636	2nd
Community engagement and volunteerism	4.549	2nd		0.9098	0.578	4th
Social Values	4.577	1st	4.48 Social Capital	0.9154	0.605	1st
Access to public spaces	4.395	5th		0.8791	0.854	7th
Community Networks	4.552	2nd		0.9103	0.628	3rd
Trust and optimism (not breaking social tie)	4.448	3rd		0.8897	0.689	5th
Social Norms	4.411	4th		0.8821	0.655	6th
Diversity	3.370	3rd	3.54 Social Inclusion	0.6741	1.242	25th
Arts and culture	3.965	1st		0.7929	1.344	12th
Social integration	3.481	2nd		0.6962	1.294	24th
Social Mixing	3.338	4th		0.6675	1.382	26th
Security	3.738	3rd	3.9 Equity	0.7476	1.420	21st

Indicators	X	X/Rank	Construct	RII	SD	Rank (overall)
Freedom of expression	3.849	2nd		0.7698	1.466	15th
Community Resilience	4.108	1st		0.8217	1.398	8th
Partnership & collaboration	4.045	1st	3.67 Com. Participation	0.8091	0.815	9th
Knowledge Sharing	3.194	3rd		0.6388	0.880	18th
Community Empowerment	3.778	2nd		0.7557	0.756	20th
Equal Opportunities and access to resources	3.783	3rd	3.83 Safety	0.7567	0.936	19th
Inter & intragenerational equity	3.947	1st		0.7894	0.678	13th
Equity for minorities and disadvantaged groups	3.892	2nd		0.7783	0.702	14th
Gender Equity	3.680	4th		0.7360	1.454	11th

Table 3: Side Effects of Land-use Change and Social Sustainability by Bootstrapping

Construct-> Social Sustainability	Original Sample (O)	Sample Mean	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Social Cohesion Factor	0.629	0.622	0.043	14.493	0
Social Capital	0.132	0.13	0.051	2.577	0.01
Social Inclusion	0.189	0.185	0.049	3.817	0
Social Factor	0.116	0.114	0.041	2.844	0.005
Community Participation	0.223	0.219	0.023	9.814	0
Equity	0.322	0.317	0.029	11.039	0

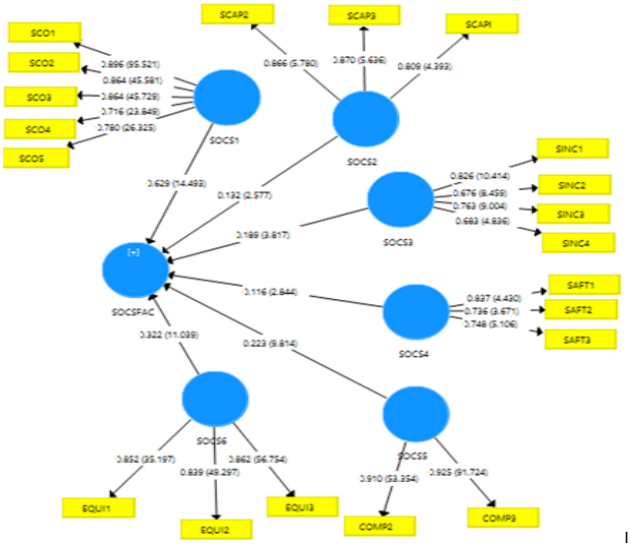

Figure 3: Social Sustainability Indicators Bootstrapping

Further analysis was conducted on social sustainability construct by bootstrapping. The result of the investigation is presented in Table 3 and Figure 3. Social cohesion factors with its indicators, such as community vitality, active community organisations, innovation and process, social solidarity, citizen perception of government performance, accessibility to institutions, and community engagement and volunteerism, were operationalised on the endogenous construct (social sustainability construct). These metrics with T-statistics of 14.493 at a p-value of 0.000 cooperatively represented a direction coefficient of 0.629 on social sustainability. This finding suggests that social cohesion largely influences social sustainability. The results correlate with Schiefer and van der Noll (2016) view that sustainable development is achievable in an atmosphere of social cohesion, where people have strong family and personal relationships, a sense of belonging, protection, and help and value differences.

The social capital component with T-statistics 2.577 at a p-value of 0.001 represented a social sustainability coefficient of 0.132, as seen in Figure 3. This outcome shows that social capital impacts social sustainability. Society views social capital as a key factor in social development; social capital creates social ties and improves lives (Schiefer and van der Noll (2016).

Collectively, with T-statistics of 3.817 at a p-value of 0.000, social inclusion metrics presented a social sustainability path coefficient of 0.189. The outcome suggests that social inclusion is significant in social sustainability. Stakeholders view social inclusion as a critical element in social sustainability.

This finding is in line with the study by Polèse et al. (2000), which stressed that all community stakeholders must be all-inclusive for the community's well-being.

Aggregately, safety factor metrics revealed a path coefficient of 0.116 on social sustainability with T-statistics of 2.844 at a p-value of 0.000. This finding shows that the safety factor has a major effect on social sustainability. More importantly, the safety concept is the ontological foundation of social sustainability (Eizenberg and Jabareen, 2017). The value of safety to the socio-environmental needs is acknowledged as one of the ingredients of sustainable development.

Community participation was operationalised on social sustainability. The indicators collectively gave t-statistics of 9.814 at a p-value of 0.000 with a social sustainability path coefficient of 0.233. This finding suggests that community involvement significantly affects social sustainability (Figure 3 and Table 3). The stakeholders consider the involvement of the community essential for social sustainability.

The social sustainability characteristics of the equity factor were assessed. Equity variables with T-statistics of 11.039 at a p-value of 0.005 represented a social sustainability direction coefficient of 0.322. Consequentially, fairness has an enormous impact on social sustainability. Equity is seen as a critical element in the community's social survival in this report. Discrimination is a conflict promoter within and between groups in society (Berg *et al.*, 2018)

CONCLUSION

Social sustainability factors such as public health, economic growth, distribution of wealth, social value, and cities' attractiveness can be influenced by urban form. Public and private interests linked to land use need to be balanced to enable social sustainability. The alteration of the urban form through land-use change by individual landowners' decisions impacts others' social sustainability.

Recognition should be given to factors transforming the urban form. Land-use planners should be proactive in managing urban land use. The interconnectivity between the causes of changes in land-use and social sustainability measures should be observed and valued.

Policymakers should incorporate the sustainable social element that comprises social cohesion, capital, inclusiveness, equity, and safety into the planning procedure.

Prioritising physical or economic interest over the community social sustainability should be discouraged.

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