Evaluation of Sustainable Urban Renewal Strategies in an evolving Residential District of Lagos Island, Nigeria

View the article online for updates and enhancements.

Evaluation of Sustainable Urban Renewal Strategies in an evolving Residential District of Lagos Island, Nigeria.

F O Jegede [1], foluke.jegede@covenantuniversity.edu.ng

B A Adewale [2], bukola.adewale@covenantuniversity.edu.ng

O D Olaniyan [3], olaniyanseun92@yahoo.com

[1,2,3,] Covenant University, Ota, Nigeria.

Abstract. Population growth and Urbanization are part of the attributes of a developing city. These attributes impact on the environment and the living condition of its inhabitants. The need to have a mechanism for sustainable development of cities is of necessity. One of such mechanism is the creation of a smart city. This development plan is an agenda for cities such as Lagos State, Nigeria. A study was done on some selected existing buildings found in the residential district areas of Lagos Island with the aim to identifying the housing and planning characteristics found in these residential areas to aid smart city implementation. The history of the buildings and factors that have influenced the change in housing types was studied; how these can influence and affect any agenda of smart city implementation or reform was explored. Survey methodology was used in carrying out the research with the use of questionnaire administered to residents; observation and photographic materials were also used as research instrument. Statistical methods using frequency and percentages were used to analyze the data collected. The result showed that a large percentage of the buildings investigated, had not been renovated in the last ten (10) years and are mixed used buildings. It was observed that the present state of housing in Lagos Island has been greatly influenced by increasing commercial activities in the area. Also, the result showed that the purpose and types of housing found in this area had evolved over time, a once resting place for a man and his family is now a place of several functions. Sustainable urban renewal and planning were suggested to enable the implementation of a smart city.

1. Introduction

Sustainable urban development and growth in the face of developing the economy has been an issue of concern to government and policy makers in different countries, especially in developing countries such as Nigeria. This is due to the continuous influx of people into urban centers, which is usually an outcome of the push of the rural areas to the pull of the urban area, seeking for a better living condition. This creates a rapid population growth, which depends on housing developments and facilities available in these urban areas. Now the population of people living in cities has increased, making the global urban population to be put at 54% in 2014 and projected to rise to 70% by 2050 (UN-Habitat III, 2015). This is coupled with the emergence of new cities, as the number of urban population is expected to increase. The increasing population in the urban areas will need shelter, which would increase the housing deficits and would require a proper organization and planning of the cities for human ideal habitation as stated by Jegede, Ibem and Oluwatayo (2018) that home environment needs to be planned, designed, constructed, and managed in such a way that it protects the residents from dangerous insects, animals, and human intruders. However, housing is not only about a place of abode, but housing requires the totality of both the house and the environment as explained by Ajanlekoko (2001). He opined that housing is not only the individual dwelling units or group of dwelling units, but also the entire neighbourhood system. Its components include both the physical infrastructures, services and the people. These are transportation networks for both pedestrian and vehicular movement, power supply, water supply, waste disposal, drainage, commercial outlets and health facilities. In line with these, the issue of

planning and re-planning of cities, requires not only solving the fundamental needs of shelter by housing provision, but also the need for comfort, serene environment and security within the housing environments.

The growth of towns and cities in Nigeria urban area and metropolitan areas has risen, with diverse planning problems such as waste management, pollution, slum, shanty towns, housing availability, poverty and several others as described by Ibem, Anosike and Azuh (2011) on the challenges in public housing provision in Nigeria. The need for proper management of these problems and creating sustainable solutions to solving them is of necessity.

Lagos Island is the heartbeat of the Lagos metropolis. In the 17th, 18th and 19th centuries, it was the living place for different people from different continents of the world, precisely during the slave trade activities of the 17th century. Though, the activities of the Europeans in the slave trade business is no more, the indelible marks left by these activities of the slave trade is still visible. These marks have become part and parcel of the history of Lagos State, one of such is in the housing types and designs, street layouts found in Lagos Island and some of these marks have become an unkempt remains. Various ideas and strategies had been used in the past by the authorities concerned, especially in Lagos State metropolis, such as Lagos Island. Lagos Executive Development Board (LEDB), which was initially given the responsibility of clearing slums and ghettos in Lagos and transforming them into a planned and habitable environment in the late 1920s. Other government agencies such as Ikeja Area Planning Authority (IAPA) and Epe Town Planning Authority (ETPA) were involved with the planning issues at the time (Lagos State Bureau of Statistics, 2013).

Also, different governments in Lagos State in the last five decades had used measures such as slum clearance, urban renewal, urban development amongst others, in bringing a serene urban development to the city, as explained in studies such as Agbola and Jinadu (1997); Gandy (2006); Ilesanmi (2010). In recent time, the issue of smart city agenda is on the increase. This study undertook a documentation of the characteristics of the existing buildings in the residential district areas of Lagos Island. Considering the changes in the building types found in these areas from their initial construction. Studying how these buildings characteristics fit into the smart city agenda. Also, the study investigated the factors that have influenced the changes in the building types, how it can affect smart city agenda, it implementations and reforms. This is viewed in correspondence with the strategy of urban renewal on the existing building types found in the selected Lagos Island residential district areas.

2. Literature review
2.1. The History and Architecture of Lagos Island.

Lagos Island is located within Lagos State. The state was created on May 27, 1967, although Lagos Island had existed since the 17th century, an island discovered by the Portuguese. Lagos Island is a traditional Central Business District (CBD) of Lagos State and is the birthplace of purpose-built office buildings in Lagos during the colonial era. This was due to its unique position of being sited off the coast of the Atlantic Ocean and proximity to the Lagos Apapa port. Lagos Island is popularly known as "*Isale- Eko*" in the Yoruba dialect (Akinlose, 2016).

Lagos Island architecture is a mix of different types, styles and periods, which features traditional/vernacular architecture, old European-styled buildings, Portuguese architecture and Brazilian styles. Some of these buildings dated back to the 17th century (Lagos State Bureau of Statistics, 2013).The modernization of Lagos, especially in the built environment was greatly influenced by the ex-slaves known as *Creoles*, they are the returnees from Sierra Leone, Freetown, the West Indies and Brazil. This had contributed to the diffusion of these styles in architecture from these returnees, which are seen in Lagos Island up till today (Lagos State Bureau of Statistics, 2013). Some of these notable building are spread out across the streets of Lagos Island, such as in Broad street, Marina, Ikoyi, Tinubu square, Lewis , Igbosere, Tom Jones, Bamgbose and others. Figure 1a and 1b shows the map of Lagos Island and some of the streets.

Figure 1a: Map of Lagos Island showing some streets layout.
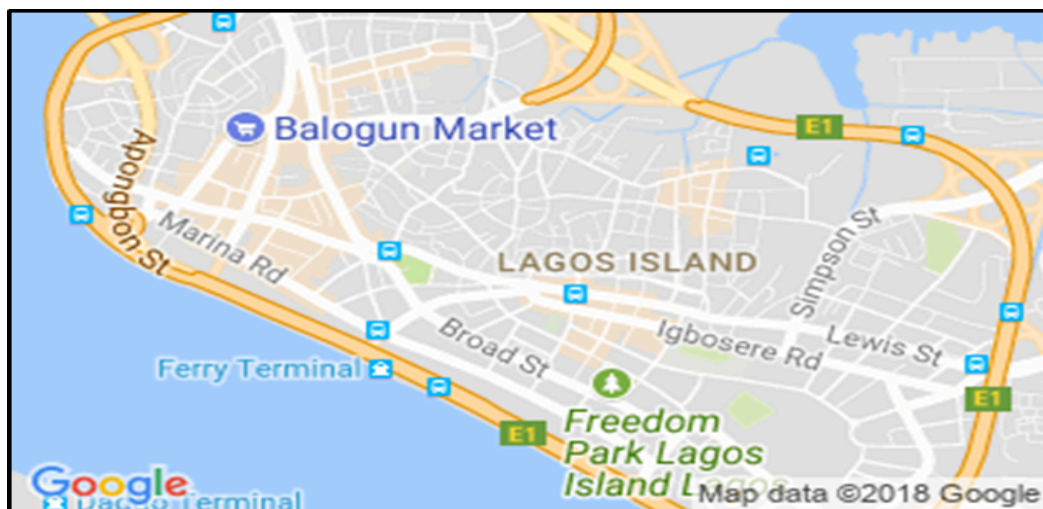Source: nairaland.com (Accessed 2019).

Figure 1b: Map of Lagos Island with some of the streets.
Source: www.google.com. (Accessed 2018).

2.2. *Evolution of Housing types in Lagos Island.*

Houses types in Lagos Island have gradually evolved, from different epoch. The evolution of housing characteristics in Nigeria especially Lagos Island is one that has not been critically documented over the years. However, Nigerian houses can be traced to specific geographical areas, stylistic trends or periods.

The prevailing influence in the houses in *Isale-Eko* area of Lagos, being the oldest inhabited part of the Lagos Island, is the Portuguese. This is noticeable in the arched doorways and windows as shown in figure 2 and figure 3. These houses have over time evolved to accommodate some forms of modernism with the availability of modern building materials and the increasing commercial activities in the area, shown in figure 4 and 5 where the walls are curtain walls, although, some of the buildings still retained its building styles. However, the changes in the building types in the area and the factors that have influenced these changes in the housing types and its surroundings would impress on how it can affect smart city agenda implementations and reforms.

Figure 2.   Figure 3.

Figure 2 and Figure 3: Brazilian styles of arched doorways and window of building on Lagos Island.

Source: tour2nigeria.com. (Accessed 2018).

Figure 4.   Figure 5.

Figure 4 and 5: Use of modern building material of Glass facing (curtain wall) for building on Lagos Island.

Source: Figure 4: primelocation.com, Figure 5: agoda.com   (accessed 2019).

2.3. The Concept of Smart City.

There are different definitions of smart city as postulated by different authors. Basiri, Azim and Farrokhi (2017) observed that alternative adjectives such as "intelligent" or "digital" are substituted for the word smart by some authors and also noted that multi-variant templates of framing a smart city do exist. Likewise, Cocchia (2014) had earlier used words such as knowledge city, ubiquitous city, and sustainable city for smart city. Bakıcı, Almirall and Wareham (2013) also had agreed that there is no definite description about what smart cities are, but it can be said to be those cities that make use of information and communication technologies (ICT) to increase quality of life of their inhabitants while providing sustainable development. Also, the idea can be referred to as the safe, secure, environmental and efficient urban centre of the future (Bakıcı *et al*., 2013). Dameri, (2013) also stated that a very clear definition of smart city is still lacking, not only in the academic studies, but also in empirical applications of smart concepts and projects. It is a contested concept without a unified definition.

However, generally smart city as it were, can be summarised as an urban area that make use of different electronic data collection sensors to disseminate and manage information by collecting, processing and analysing data, used in traffic managements, transportation system, power plants, waste management, water supply, the law enforcement services, schools, hospitals, information system, libraries and many other facilities within the city. The concept includes both the social, Information and Communication Technology (ICT), design and planning of an area. The concept could be defined from the ICT view or from urban reform and renewal perspectives. However, in actualization of these processes, the involvement of the government is apparent in the implementation of smart city as noted by Bakıcı *et al*. (2013).The popular definition of the concept involves implementation and deployment of information and communication technology infrastructures to support social and urban growth through improving and upgrading the economy, citizens' involvement and governmental efficiency**.** Therefore, smart city can be summarised and described as a form of sustainable city or urban development method. In addition, Giffinger *et al*. (2007); Anthopoulos and Fitsilis (2014) presented a model for smart city that contained the following six characteristics, which interrelate and comprise the entire urban intelligence, which are smart people, smart economy, smart environment, smart living, smart governance and smart mobility. This is illustrated in Figure 6. Examples of cities where smart city are being implemented are Amsterdam, Singapore, Dubai, China, Milton Keynes, Barcelona, Madrid, Stockholm and New York cities.

2.4. Requirements and operations for smart city implementation.

The geographical nature and the physical environments of the area where smart city projects are to be executed and operated is very important as stated by Dameri (2013). This is because smart city technology allows for city officials and managers to interact directly with both the community where it is effected, and the city's infrastructures. This is to monitor the activities and happening in the city, how the city is changing and evolving. Based on this premise, the principle requires that some basic aspects of the community be in the desired shape for proper running of a smart city project. Example of such aspects are good planning system, the state of the buildings and the environment, proper census of community occupants using facilities in the community, the use of buildings, regular supply of electricity to accommodate ICT characteristics of smart city concept.
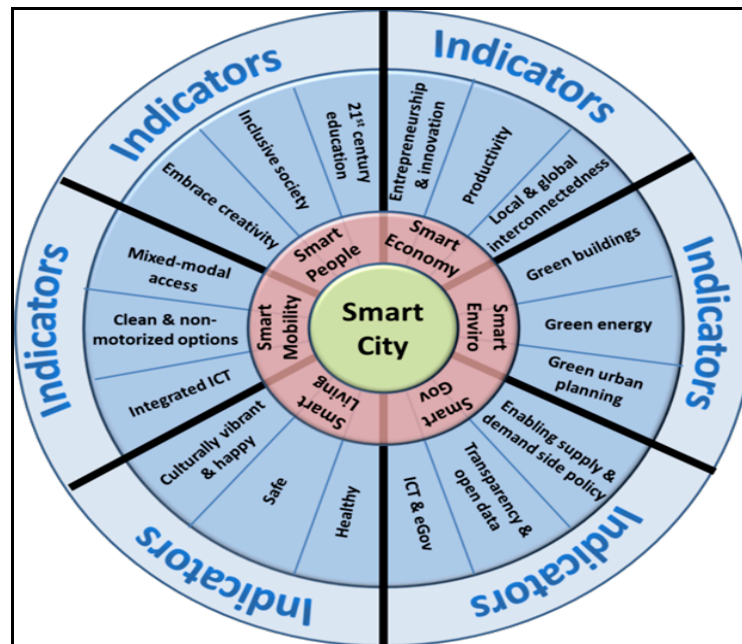
Figure 6: Illustration of the subjected components for smart city actualization.
Source: enterpriseresillienceblog.typedad.com. (Accessed 2018).

Furthermore, Basiri *et al*. (2017) highlighted some of the enabling characteristics of making a smart city, which are: (i) the ability of the city and its systems to be instrumental and give allowance for collection of data about the city life form different sources according to the need of the city. Having a proper knowledge about the city, knowing which technical system or person would be right to fulfil their role or achieve their goals, which would be within the context of the overall effective functioning and ability of the city, (ii) The ability to make the city automated to enable appropriate city functions to be delivered reliably, and effectively, not relying on the need of direct human intervention, (iii) A network of collaborative space, which is to enable a dynamic communities that will spur innovation, growth and enhance the well-being of the citizen and (iv) there should be a continues interaction between the digital world and the physical to enable the process of decision open and inclusiveness, by having this, the residents, businesses and the government will be able to work together to make the smart city idea work. However, in the pursuit of these, there is the need to input urban development and renewal that would foster the proper managements, collaborative infusion of all the necessary entities that would make a city smart, which is explained in Figure 7. Here, the infrastructure, human factor (capacities), planning and management, work together to give a smarter building and urban planning, good environment, government and agency administration that works, public safety, a social, healthcare and education programme, that incorporate the whole community, and provision of good transportation, energy and water supply.
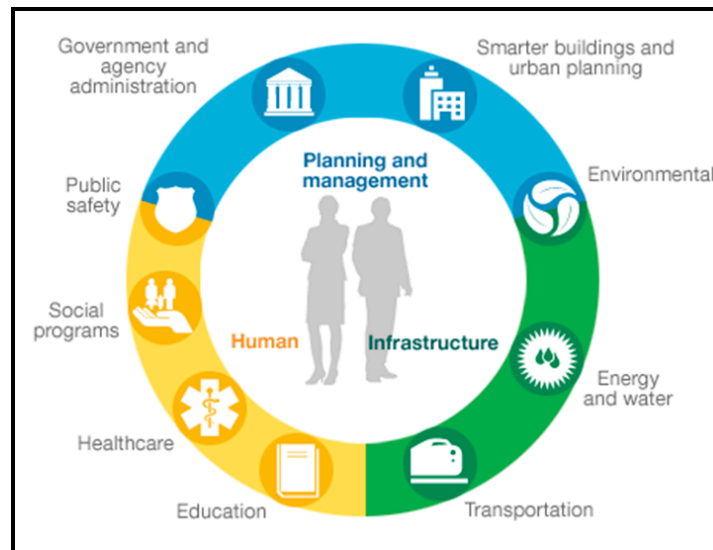
Figure 7: Compositions of smart city to enable functioning
Sources: www.enterrasolution.com. (Accessed 2018).

2.5. Housing and Urban Planning Characteristics that Depicts Smart City.

The concept of smart city varies from cities to cities. This is determined by the level of development in each city and the likelihood of changes, reforms and developments that the city and it residence embraced. To actualize smart city, some studies such as Giffinger *et al*. (2007) are of the opinion that there is need for the development of the entire urban system, which are the physical nature, the social infrastructure and the economic infrastructure. Such features would enable application of a smart city, which are the city:

1. Having flexibility in land use and the ability of the building regulations and bye-law to adapt to change.
2. Having an inclusive housing schemes, in this case, making housing available to everyone, whereby the circumstances of slums and shanties are eliminated.
3. Planning that develops open space into parks, recreational spaces and play ground. Planting of trees within these areas to reduce urban heat and noise effects.
4. Community having a walkable environment, where there is reduced congestion of persons and vehicles on the roads, good road network, motorable tarred roads in every area for vehicles and pedestrians and a good, well manage public transport system in operation.
5. Creation of a reliable online system and internet facility that brings governance closer to the people through the use of phone and mobile gargets. This reduces people going always to the municipal offices.
6. Promotion of the city identity, the distinct features that describes that city, its arts and crafts, culture, sport, health services, local cuisine, textile and furniture.

Another study, Angelidou (2017) had dwelled on this last feature as being very important. It advocated for traditional or old cities where smart city is to be incorporated, to incorporate smart city into the existing forms of such city. In the 15 cities studied by Angelidou, Amsterdam, seems to be different from others because the local needs of this area were not properly captured in the implementation of smart city, thereby leading to other problems such as security challenges. Also, the study by Dhingra and Chattopadhyay (2016) investigated the application of smart city into traditional planned and grown cities in India and Arab cities. It concluded that there is need for inclusiveness and interactive ICT and urban engineering solutions to make smart city work in this

area, due to the nature of the city which included the presence of old buildings and streets, close community dwelling pattern. This case is similar to Lagos Island that is an old, traditional area.

2.6 Housing Developments and Planning in Lagos Island and the Concept of Smart city

Development and upgrading of a city is an agenda for any government in order to move forward in planning or developmental strategies. The case of Lagos Island requires that the various problems with its housing and environmental planning condition be considered. This is to give enabling platform for implementing policies, agenda, and programme for its developments, even with the continuous rise in the population of Lagos Island, which is also a global phenomenon. The world's population living in urban areas is forecast to rise to 75% by 2050 as against 50% in 2010 (UN-Habitat III, 2015). Due to this escalating population increase, governments are required to come up with how to create future spaces and its management for the citizens. This is the reason governments base their economic development policies on building advanced infrastructures management strategies such as smart city projects. Not only are policy makers involved in this initiative but also citizens are engaged in the project, as their future quality of life depends on this (Bakıcı, Almirall and Wareham, 2013). Lagos state is not an exception to this, as more and more people come into the state every day.

Planning for housing and setting standards for the regulation of buildings and its construction is a task that seems to overwhelming to the relevant government authorities in Nigeria and to many parts of the developing world. Rapid urbanization create an urgency for cities to find smarter ways to manage the accompanying challenges like high crime rate, traffic congestion, difficulty in waste management and many others of such problems (Nam and Pardo, 2011). The concept of smart city is emerging as a new idea and approach to alleviate and cure current urban problems as stated and to make urban development more sustainable (Alawadhi, Armando and Hafedh, 2012). The process of physical development in Lagos State is one that had over time witnessed various adoptions of concepts and strategies and ideas with various authors and publications propounding great ideas to foster these developments. Smart city development is another area in which most cities delve into. However, in the light of this developmental agenda, it is good to examine how cities fit into the concept of smart city programme; how the housing characteristics and the planning nature of the area can be adapted to a smart city.

3. Research methodology

This study used survey method to derive its data, which were primary data. Questionnaires were distributed to residents of 100 buildings within the residential district areas of Lagos Island, with one representative for each building. The study took place between February and March 2017, it was administered and retrieved by hand. The buildings were randomly selected from 11 streets, which are Tokunbo, Bamgbose, Mobolaji Bank Anthony, Campbell, Kakawa, Campos, Odunlami, Glover, Igbosere, Joseph and St Catholic Mission Streets of Lagos Island. The questionnaire was sectioned into two parts. First to collect data on the respondents profile and their relationship with the building and the other part of the questionnaire collected data on the building characteristics. Out of the 100 questionnaires distributed in these buildings, 77 were returned valid for further analyses. In addition to the research instrument of the questionnaire, photographic material and observation schedule were used to carry out the survey. The data were processed and analysed using descriptive statistical analytical methods with the use of statistical package for social science (SPSS) software.

4. Findings and discussion

The result showed that about 44 (57%) of the respondents were males, while 33 (43%) were females. This shows that the household heads are mostly male than female, either as house owners or tenants represented the house owners. Many of the respondents had stayed for more than ten years in the buildings, which validated the claim that most of them or their late parents are the owners of the buildings, or there were certain activity or reasons which had made them stayed in these buildings for

that length of time. Also, many of them had chosen to remain in those buildings for that number of years because of the good locations, a suggestion that this could be for commercial activities as presented from the response to the question on if shops are attached to the buildings or not, having 56 (72.7%) positive response, shown in Table 2. A considerable number of 10 (13.2%) also preferred to live in those buildings due to security reason. Other reasons are closeness to commercial activities, closeness to social amenities, closeness to friends and religious houses, which are other reasons given. (Table 1). Figure 8 shows the display of respondents stay in the building.

Table 1: Respondents' characteristics

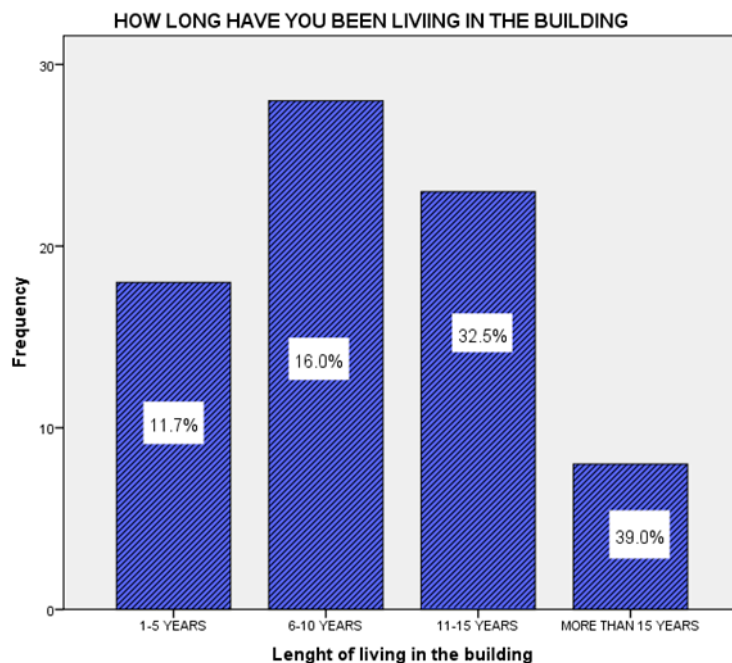| Respondents' Characteristics	Variables	Frequency (N=77)	Percentage
Sex	Male	44	57.1
	Female	33	42.9
Length of stay	1-5 years	9	11.7
	6-10	13	16.9
	11-15	25	32.5
	Over 15 years	30	39.0
Reasons for living in the house	Good location	39	50
	Security	10	13.2
	Nearness to friends	5	6.6
	Others	23	30.3

Figure 8: Respondents length of living in the building.
Source: Authors field study.

A survey of the buildings showed that 55 (71.5%) of the buildings had existed for over 10 years; 13 (16.9%) for 6-10 years, and 9 (11.7%) for 1-5 years. Only about 8 (10.4%) of the buildings have been

renovated in the last 10 years, which are very few number as shown in figure 9. This is evident in the appearance of the buildings components (Table 2). It should be noted that most of these components (especially roofs, doors and windows) have not been changed in the last 10 years. Also, only 14 (18.2%) of the buildings have been painted in the last 5 years. It could be inferred that the buildings lack proper maintenance, they are left to the point where corrective maintenance is expedient. This is in variance with one of the agenda of smart city development as propounded by Hall (2000); Nam and Pardo (2011), according to these studies, a smart city should plan its preventive maintenance activities. Another characteristic of the surveyed buildings that is worth noting is the mixed use property. Majority 56 (72.7%) of the buildings had shops attached to them. This, of course, is in tandem with the opinion of Giffinger *et al*. (2007) that a smart city should perform well in a forward looking way, in economy, people, and environment, amongst others. Asides the 56 (72.7%) that are mixed-use buildings, 11 (14.3%) are exclusively for commercial activities like shops, banks, offices, church, mosque, clinic and schools. This is shown in figure 10 and figure 11. These activities are part of what make for life satisfaction and happiness. Also, as Guan (2012) had posited that a smart city must be set to provide conditions for a healthy and happy community.
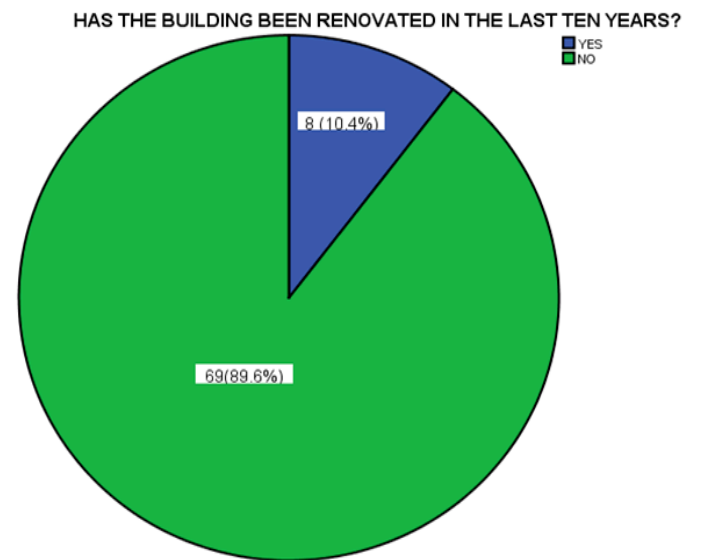

Figure 9: Proportion of building renovated in the last ten years.
Source: Authors field study.

Table 2: Building characteristics

Building Characteristics	Variables	Frequency (N=77)	Percentage
No of years the building has been existing	1-5 years	9	11.7
	6-10	13	16.9
	11-15	25	32.5
	Over 15 years	30	39.0
Renovation in the last ten years	Yes	8	10.4
	No	69	89.6
Shops attached to the building	Yes	56	72.7
	No	21	27.3
Number of shops in the building	None	21	27.3
	1-2	31	40.3
	3-5	18	23.4
	More than 5 shops	7	9.1

Other use of building	Yes	11	14.3
	No	66	85.7
Other uses of the building aside residential	None	66	85.7
	Business centre	1	1.3
	Clinic	1	1.3
	Commercial	1	1.3
	Legal practitioner	1	1.3
	Microfinance bank	1	1.3
	Office	1	1.3
	Religious (mosque)	1	1.3
	Religious us (church)	1	1.3
	School	2	2.6
	Shop	1	1.3
Change of building use in the last ten years	Yes	13	16.9
	No	64	83.1
Reason for change of use	**None**	64	83.1
	Commercial	9	11.7
	Storage	2	2.6
	Others (Clinic and school)	2	2.6
Change of entrance door	Yes	5	6.5
	No	72	93.5
Change of windows	Yes	11	14.3
	No	66	85.7
Change of roof	Yes	9	11.7
	No	68	88.3
The last time the building was painted	Never	3	3.9
	1-5 years ago	14	18.2
	6-10	34	44.2
	11-15	24	31.2
	Over 15 years	2	2.6

Figure 10:   Figure: 11

Figure 10 and Figure 11: Buildings at Igbosere, used for both residential and commercial activities.

Source: Authors field study.

5. Conclusion, and recommendations

This study was on identification of the housing and planning characteristics found in Lagos Island residential district. The history of the buildings and factors that have influenced the changes in housing types and how they can influenced the agenda of smart city implementation or reform were examined. It could be concluded that the study area does not exhibit much of smart city characteristics elements. However, some characteristic of the areas that exhibits activities that make for life satisfaction and happiness could aid smart city program, but others characteristics, which are negative such as low maintenance of building could hinder the implementation of smart city agenda. It is therefore recommended that there is need for the transformation of the city for the operation of a smart city. Comprehensive urban renewal should first be implemented, like in the case of Barcelona, which has undertaken significant reforms and has a special significance, which is as a result of apparent tendency in its urban policies and reforms. Making it to become a leading smart city among the European cities. Hence, an assessment of the smart city initiative should cast light on current urban renewal policies and reforms which would make the implementation of smart city possible. However, developmental efforts should add value to any existing area, especially residential areas of the city. The study results showed a mixed use dwellings for both commercial and residential activities, which has become the life style of the dwellers. In view of this, the application of smart city in Lagos Island should be done without disturbing the economic, social and the daily activities of its dwellers. This is due to the peculiarity of the area, considering some of the identified problems of Lagos Island as stated by Aluko (2011) which ranges from uncontrolled use of property, non-adherence to approved designs and standards, and bouycourting of building regulations, this also, needs to be addressed for proper implementation of smart city agenda. A large percentage 69 (89.6%) of the building investigated in this study had not been renovated in the last ten (10) years and are mixed used buildings, greatly influenced by increasing commercial activities in the area. The buildings are in need of renovations and the environment needs reforms that would enable the mixed-use building nature of the houses work to implement smart city norms. Basic infrastructure requirements necessary for implementing of smart city as described in Figure 6 and figure 7 is found to be lacking in the studied area. Also, the commercial activities was found to influence the changes in the building found in the area, which in turn can affect the smart city agenda if the appropriate urban renewal and reforms process are not embarked on. Sustainable urban renewal and planning should be implemented by the government. Studies on the human capacity and the literacy level of the residents of this study area, which can make them to be active participatory partners to the implementations of smart city agenda is recommended for further study.

6. Acknowledgements

Reference

[1]   Agbola, T. and Jinadu, A. (1997). Forced eviction and forced relocation in Nigeria: The Experience of those evicted from Maroko in 1990. *Environment and Urbanization*, *9*(2), pp 271-288.

[2]   Ajanlekoko, J. S. (2001). Sustainable Housing Development in Nigeria–the Financial and Infrastructural Implication. *International Conference on Spatial Information for Sustainable Development in Nairobi, Kenya*. pp. 2-5.

[3]   Akinlose, R. (2016). Focus on the Lagos Island Office Construction Market Report. https://www.slideshare.net/Rotimi**Akinlose**/focus-on-the-**lagos**. Accessed: June 21, 2018**.**

[4]   Alawadhi, S., Aldama-Nalda, A., Chourabi, H., Gil-Garcia, J. R., Leung, S., Mellouli, S. and Walker, S. (2012). Building Understanding of Smart City Initiatives. *International Conference on Electronic Government*. pp. 40-53. Springer, Berlin, Heidelberg.

[5]   Aluko, O. (2011). Development Control in Lagos State: An Assessment of Public Compliance to Space Standards for Urban Development. *African Research Review*, *5*(5), pp169-184.

[6]   Angelidou, M., and Psaltoglou, A. (2017). An Empirical Investigation of Social Innovation Initiatives for Sustainable Urban Development. *Sustainable Cities and Society*, *33*, pp113-125.

[7]   Anthopoulos, L., and Fitsilis, P. (2014). Exploring Architectural and Organizational Features in Smart Cities. In *Advanced Communication Technology (ICACT), 16th International Conference on*. pp. 190-195. IEEE.

[8]   Bakıcı, T., Almirall, E. and Wareham, J. (2013). A Smart City Initiative: The Case of Barcelona. *Journal of the Knowledge Economy*, *4*(2), 135-148.

[9]   Basiri, M., Azim, A. and Farrokhi, M. (2017). Smart City Solution for Sustainable Urban Development. *European Journal of Sustainable Development*, 6, 1, 71-84, ISSN: 2239-5938

[10]   Brazilian styles of Arched doorways and window of building on Lagos Island: tour2nigeria.com. Accessed: June 20, 2018.

[11]   Cocchia, A. (2014). Smart and Digital City: A Systematic Literature Review. In *Smart City*. pp. 13-43. Springer, Cham.

[12]   Compositions of smart city to enable functioning. www.enterrasolution.com. Accessed: June 20, 2018.

[13]   Components for smart city actualization. enterpriseresillienceblog.typedad.com. Accessed: June 20, 2018)

[14]   Dameri, R. P. (2013). Searching for Smart City Definition: A Comprehensive Proposal. *International Journal of Computers and Technology*, *11*(5), 2544-2551.

[15]   Dhingra, M. and Chattopadhyay, S. (2016). Advancing Smartness of Traditional Settlements- Case Analysis of India and Arab Old Cities. *International Journal of Sustainable Built Environment*. (5)2, pp 549-563.

[16]   Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanovic, N. and Meijers, E. (2007). Smart Cities: Ranking of European Medium-sized Cities. Vienna. *Austria: Centre of Regional Science (SRF), Vienna University of Technology.*

[17]   Gandy, M. (2006). Planning, Anti-planning, and the Infrastructure Crisis Facing Metropolitan Lagos. In *Cities in contemporary Africa*. pp. 247-264. Palgrave Macmillan, New York.

[18]   Guan, L. (2012). Smart Steps to a Better City. *Government News*, *32*(2), 24. Hall, R. (2000). The Vision of a Smart City." Proceeding of the 2nd International Life Extension Technology Workshop, Paris, France, 2000.

[19]   Ibem, E.O; Anosike, M.N. and Azuh, D.E (2011). Challenges in public housing provision in the post- independence era in Nigeria. *International Journal of Human Sciences*, **8(2):** 421-443

[20]   Ilesanmi, A. (2010). Urban Sustainability in the Context of Lagos Mega-city. *Journal of Geography and Regional Planning*, *3*(10), 240.

[21]   Jegede, F.O, Ibem, E.O, Oluwatayo, A.A (2018), Manifestation of Defensible Space in Lagos State Development and Property Cooperation Housing Estates, Lagos, Nigeria. I*nternational Journal of Civil Engineering and Technology* (IJCIET) **9(12)**, pp. 491–505.

[22]   Lagos State Bureau of Statistics (2013). Digest of Statistics. www.mepb.lagosstate.gov.ng. Accessed: June 20, 2018.

[23]   Map of Lagos Island. www.google.com. Accessed: June 19, 2018.

[24]   Nam, T. and Pardo, T. A. (2011). Conceptualizing Smart City with Dimensions of Technology, People, and Institutions. In *Proceedings of the 12th annual international digital government research conference: digital government innovation in challenging times*. pp. 282-291. ACM

[25]   Smart City. enterpriseresillienceblog.typedad.com. Accessed: June 25, 2018.

[26]   UN-Habitat III (2015), 21 – New York Smart Cities, Paper has been co-/led by UN-Habitat, UNDP and ITU with contributions from CBD.

[27]   What is Smart City? smartcities.gov.in/content/innerpage/smart-city-features.php. Accessed: June 23, 2018.