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Attributes and Patterns of Mixed-Use Buildings in Ikeja Model City Planned Corridors Lagos, Nigeria

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Abstract
Several developed countries are comprised of planned cities that support and sustain the needs of their inhabitants. In the 21st century it is almost impossible to find a thriving city without mixed-use developments or buildings. The concept of mixed-use has long been incorporated into our building developmental practices spontaneously. However, planning laws and developmental processes are now emerging to standardize the kinds of mixed-use that are permissible within the built environment. It therefore suggests that mixed-use buildings are indispensable in a metropolitan city due to increasing urbanity. Meanwhile debates abound on what constitute mixed-use as generalization is difficult because localities and socio-cultural dynamics affect the development of mixed-use structures. Mixed-use buildings are notable because they are characterized with combining several functions, and it is also part of the compact city and new urbanism developmental strategy. Mixed-use attributes promote strong relationships and opportunities between residents, and provides varied job while supporting integration. In aligning with other megacities across the world, and to deal with the haphazard development as well as conversion of uses in urban areas prompted the development of Model City Plans (MCPs) for different areas in Lagos State, Nigeria. The goal of this paper is to examine the attributes of mixed-use buildings in Ikeja Model City Plan through focused observation in order to determine the emerging pattern of mixed-use for the area and its implications. After eighteen mixed-use buildings were

purposely observed, the study concluded that a well-integrated mix of use is achievable in corridors due to density. But the compliance with the maximum number of floors would take a while due to the level of income of the inhabitants of the area. The study perceived the need for attitudinal change in cultural lifestyle of continual property ownership without means to sustain it, especially in city centers. Similarly, infrastructural developments are also very imperative for the sustainability of mixed-use. Therefore, unless there are special platforms the government could use to ease implementation, the specified maximum heights by the MCP for mixed-use corridors in Ikeja is yet to be achieved due to income level of inhabitants of the area.

Keywords: Attribute, Ikeja, Mix-Use Building, Model City Plan, Patterns

Introduction

According to United Nations Population Fund, it is estimated that by 2030 about 61% of the world total population would live in the cities (UNFPA, 2001). This shows a continual growth in global population of urban residents with a resultant effect on the infrastructures and physical development that will cater for the upsurge. In view of this rise in population of urban residents, the Sustainable Development Goals (SDG) of the United Nations advocates for the creation of sustainable cities and communities (Ban, 2014). In creating these sustainable cities, built environment is a huge consumer of resources such as land and energy; thus an important entity that needs attention. Furthermore, mixed-use buildings are significant urban physical developments of the built environment commonly practiced that have thrived into the twentieth century majorly at transit and intersection (Artscape, 2013: Arizona, 2013). It re-emerged in 1960 and 70s as a tool for urban revitalization (Rowley, 1996). Mixed-use buildings are notable because they accommodate multiple functions. The most referenced classification of what constitute mixed-use according to Gentin (2009) and Wardner (2014) was championed by Urban Land Institute (ULI) that described mixed-use as a structure where uses are integrated and pedestrian oriented. Besides, according to Metropolitan Area Planning Council, Boston mixed-use building that conforms to the minimum development standard promotes strong relationships between residents, contributes access to health living, varied job opportunities and regional interaction which sustains the society (MAPC, 2010). Hence in investigating the attributes of mixed-use building, it is important to also analyze its progress toward sustainability usually credited to mixed-use.

However, the development of mixed-use and high density houses in a lot of urban centres is confronted with challenges due to zoning laws (Kellett & Tipple, 2000). Land use zoning is basically used to control physical developments. Prior to the modern zoning law and land-use policies, the most prevalent method of zoning was Euclidean (Arizona, 2013). This practice clearly has consequences and effect on the development of mixed-use buildings (Herndon, 2011). Because it zones land use into residential, industrial and commercial with each use having its own sub-categorization. Meanwhile, Foster (2003) and Herndon (2011) asserts that the ensuing effect of such zoning is urban sprawl, increase in commuting time, pollution and traffic congestion. This therefore suggests the need for flexibility in zoning laws where people's participation is highly essential (Otubu, 2012). Although zoning is practiced generally in Nigeria in accordance with the National Building Code (NBC, 2006)., however in Lagos State land use policies accommodate mixed-land use practices as well.

Lagos State is the fastest growing urban city in Nigeria with persistent rapid growth in population (Adeleke *et al*, 2016). As a result of this there are continual demands for basic infrastructure which necessitate the development of Model City Plans

(MCPs) by the Ministry of Physical Planning and Urban Development. These plans are aimed towards creating a livable, greenery and sustainable city. The plan stipulates ordering of land-use, smart development, compact city through high density development and mixed use building in order to create functional environment that reduces urban problems (Isidore & Adedapo, 2014). The plan for redevelopment of Lagos State has five MCPs and three master plans. The MCPs include Ikoyi-Victoria Island Model City Plan, Ikeja Model city plan, Apapa Model city plan, Lagos Island Model City Plan, Mainland Central Model city plan and Alimosho model city plan. While the three master plans are; Badagry master plan, Lekki Penisula master plan and Ikorodu master plan (Mainland Model City Plan, 2011-2033). Moreover, the Lagos State Development Plan (2015-2025) which specifies the provision of infrastructure and basic services at every 15 minutes walking distance (1000 meters) in settlement habited by low income earners, indicates embracement of mixed-use development (Adeleke *et al*, 2016). In line with this, Coupland (1997) opined that mixed-use is an approach towards providing functional urban spaces at different levels of development, and this has been part of developmental pattern overtime (Herndon, 2011).

The MCPs in Lagos administrative precincts include the Ikeja Model City Plans. Ikeja was the political capital of Nigeria before the relocation of the capital to Abuja in 1986 due to reasons among which is traffic congestion in Lagos State (Filan, 2012). Amazingly, Lagos State which is the most populous state in Nigeria has the smallest land area of about 385.9m^2. Consequently, the Model City Plan for Lagos tends towards verticality in terms of building development and higher density (Mainland Model City Plan, 2011-2033. The Ikeja Model City Plan proposed corridors for mixed-use building and High Street due to haphazard development and illegal conversion of building uses. These corridors are meant to legally control the haphazardness in building development with specification which varies in terms of maximum building height, percentage of mix, building density and setback. Thus, this study seeks to investigate the attribute and pattern of mixed-use building in Ikeja as well as their implication on the corridors. This is necessary in order to ascertain the attributes peculiar to Ikeja in order to facilitate the necessary development for sustainable mixed-use building in Lagos, Nigeria.

The Renaissance of Mixed-use development

Scholars have often referred to Jacob (1996) when discussing the renaissance of mixed-use development (Grant, 2002, Hoppenbrouwer & Louw, 2005; Rabianski *et al*., 2009; Rowley, 1996). The study opined that mixed-use is formed by a fine-grained mix of uses; preferably two uses and should be pedestrian oriented. Brundtland's report according to Walker, (1997) reawakened the concept of mixed-use development because its principles are in line with the new urbanism, Smart Growth and the compact city concept, and are all aimed towards improving the built environment (Herndon, 2011). Universally there is a lack of generally accepted delineation of what constitutes mixed-use development (Coupland, 1997; Grant, 2002; Hoppenbrouwer, 2005; Rabianski *et al*., 2007). In line with this Rowley (1996) asserts that mixed-use development cannot be detached from cultural priorities and lifestyle. Similarly, Dave (2010) re-established Rapoport (1997) idea that location and socio-cultural factors in developing countries are factors that inhibit the generalization of attributes of mixed-housing, which are sometimes referred to as mixed development or neighbourhood. However, Angotti and Hanhardt (2001) opined that over time development of a community has never exclusively been single use or mixed-use. It thus suggests that mixed-use building attributes might vary depending on location and inhabitants' socio-cultural needs.

Classification and Conceptualization of mixed-use Developments

There are various classifications of what constitute mixed-use. For instance, Urban Land Institute (ULI) describes development as mixed-use when mutually supporting functions co-exist (Joost, 2008; Herndon, 2011). Another classification was done in 2006 by cross-sections of associations' bodies, in a study to identify the major feature of mixed-use development (Niemira, 2007). In sum, the two studies describe mixed-use as a well-planned structure that maximize available land with functions or uses that could be well incorporated with one another, and each use should be adequate and enough to attract demand (Niemira, 2007). Despite these, there are deliberations as to what constitute mixed-use development, so also its conceptualization but the most cited concepts are (Rowley, 1996), and (Hoppenbrouwer & Louw, 2005). Therefore the variables used in this study were adapted from these two concepts. Although the variables specifically address mixed-use development or mixed-use buildings at neighbourhood level, it was adapted to look at mixed-use at building level because MCPs in Lagos were based on regeneration of an urban area, where focus was on mixed-use building in specified corridors. The parameters that were operationalized to examine Ikeja mixed-use corridors are grouped into tripartite factors. Firstly are the physical attributes that include building dimension, number of floors for vertical development, accessibility and building location. Secondly are the functional patterns with variables that include nature of combined functions, number of functions combined in a building, arrangement of activities, building texture /intensity of mix i.e. grain and density. Thirdly are the property market (demand), and public policy and regulation. These factors are necessary because they are essential to the success of any given mixed-use building.

The Ikeja Model City Plan

The emergence of Model city plans (MCPs) in Lagos was largely informed by the disorderliness in development and lack of infrastructure to cope with the ever increasing population in Lagos. The Ikeja model city plan identified corridors for mixed-use buildings; these corridors are largely along major transport routes. The MCPs specified maximum height for the corridors. Ikorodu road, Anthony-Oshodi express way, Lagos-Ibadan Express way, Mobolaji Bank Anthony Way, Obafemi Awolowo Way and Kodesoh/Oba-Akran Way are mixed-use corridors of maximum height of fifteen floors; Lateef Jakande-Ogba-Isheri Road, Kudirat Abiola Way (Oregun road), Allen-Avenue/Opebi Road, Opebi link, LASUTH to Oba Ogunjobi leading to fomer Kingsway stores, Adekunle Fajuyi, Joel Ogunnaike and Isaac John are mixed-use corridor of maximum height of ten floors; while ACME Road, WEMPCO and Billings Way, Toyin Street, Ikosi road, Mobolaji Johnson Avenue, Oregun link bridge/Osho and Olowu Street are mixed-use corridors of maximum height of six floors (Mainland Model City Plan, 2011-2033). Ikeja is significant because despite the movement of Nigeria's Federal Capital, it is still thriving in commercial and industrial activities scattered all over the area. Ikeja still accommodates the seat of government in Lagos State therefore Ikeja is indispensable when it comes to the development process in Lagos State.

Methodology

This study utilized case study strategies (Yin, 2003) as it considers and focuses on mixed use pattern and attributes as both a phenomenon and relevant contemporary issue due to its benefit of aiding the understanding of ideas clearly (Stake,2010). Thus the study area comprises of mixed-use corridors within Ikeja Model City Plan (MCPs) with limitation to corridors located within Ikeja. The study espoused exploratory approach and is part of an ongoing research on sustainability in mixed-use building development in Lagos, Nigeria. Although, there are emphases on the development of

mixed-use corridors in Lagos State, it was visibly not yet part of the mainstream development strategy which makes sample frame difficult to attain. However, utilizing the case study research approach the study extended consultation to stakeholders involved in urban development process in Lagos State in addition to the review of MCPs and follow up leads from experts. Meanwhile, the variables adopted in examining the phenomenon were investigated using an observation checklist developed from the concepts of (Rowley, 1996), and (Hoppenbrouwer & Louw, 2005). Subsequently, eighteen (18) buildings that met the criteria of multiple functions, vertical development and situated along the mixed-use corridors were purposively selected and considered fit to provide the required data. These buildings are chosen as a representative sample of identified mixed-use buildings in order to target illustrative tendencies of the mix-use patterns and attributes rather than generalize the outcome. The selections were made from the following mixed-use corridors; Mobolaji Bank Anthony, Kodesho / Oba- Akran, Ikorodu road, Obafemi Awolowo way, and Allen-Avenue / Opebi road. Further still the selection was done one after the other until saturation was attained. Thereafter the data obtained were analyzed using descriptive method by means of content analysis. Results are presented in figures as implicit findings were deduced to project explicit mix-use pattern in the study area guided by the ideals of Miles *et al.*, (2014) for generating meaning and confirming findings. Intuitively, recurring mixed-use patterns and themes (attributes) emerged from the data through the consideration of options enshrined in the factors as frequent phenomena.

Results and Discussion

The Ikeja area of Lagos State is a developed urban setting with residents comprising of moderately high and medium income earners. Nevertheless, the study discovered relatively high density in the area and continual increase in population growth. After subjecting the data derived from the evaluation of the eleven (11) variables to descriptive statistics, the study recorded the following significant outcomes.

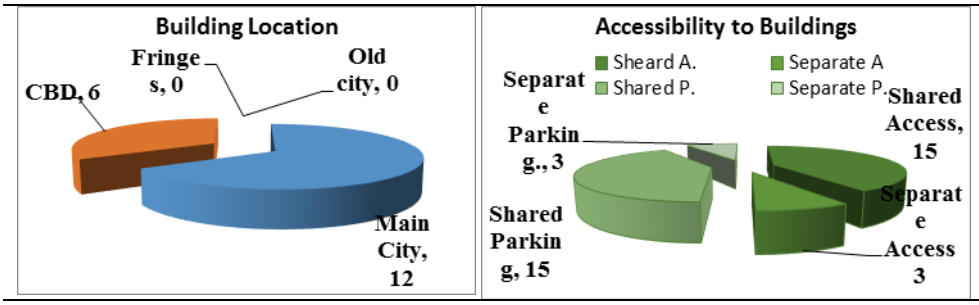
Physical Attributes Component

Building Location

The location of mixed- use buildings observed were a functions of specifications in Ikeja Model City Plan. Meanwhile, four major urban neighborhood distributions that include Central Business District (CBD), Main city, Old city and Fringes were identified. Figure 1a present the summary of mixed-use building in these quadrille locations. Twelve (12) of the buildings observed were located in the main city area while six (6) were in the Central Business District (CBD). These two areas are located within the urban center which is the nucleus of the city, thus supporting continual change in terms of demand. Therefore, this result indicates the reason as to why corridors designated for mixed-use building in Ikeja are neither in the fringes nor in the old city.

Accessibility to buildings

Access road to majority of the buildings studied are shared by different functions as summed up in Figure 1b, this perhaps is because the idea of mixed-use building are usually not conceived from the initial design stage. Meanwhile mixed-use building with shared premises has separate access roads which tend to also reflect on the provision of parking spaces. Yet there are no distinguishing parking spaces for the various functions, as only functions with separate access have separate parking spaces. The implication is manifests when the issue of shared parking spaces found not to resonate well with the users.



a. b.

Figure 1: Location and Accessibility of Mixed-Use Buildings

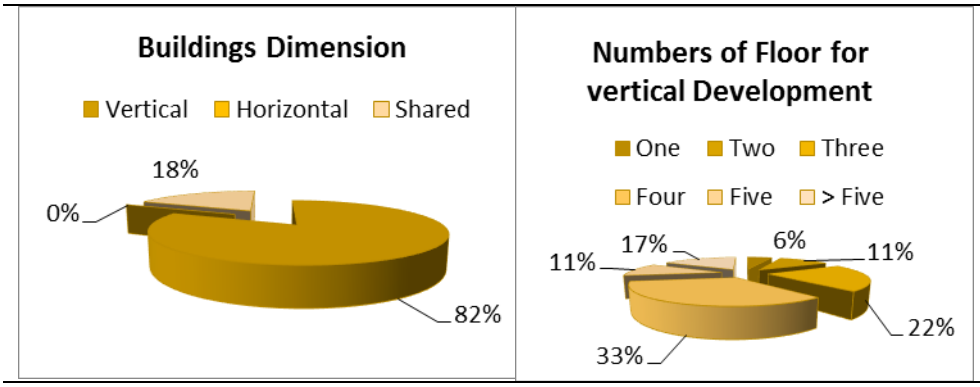
Building Dimension

All the mixed-use buildings studied are vertical in dimension as illustrated in Figure 2a and was found to be common across the neighborhoods. Lagos State is a state of aquatic splendor with limited land area compared to other states. The scarcity of land in Ikeja for instance is responsible for vertical building design practiced by developers. Although among the mixed-use buildings studied, there are four that are in shared premises, the building dimension in such cases is a combination of shared premises with verticality. Thus, the urban nature of Ikeja suggests that the horizontal dimension of mixed-use building development is inappropriate for the area as indicated by the outcome of observed buildings that is recorded in Figure 2b.

Number of floors for vertical development

The Ikeja MCP specified fifteen (15), ten (10) and six (6) floors for maximum height of mixed-use building. In Figure 2c, the result shows that four floors were common while just three out of the eighteen buildings studied had more than five floors. This is due to the fact that mixed-use building is not yet well accommodated into the mainstream of building development in the area. Additionally, the larger percentage of the residents belong to the low and middle income earners' group that could not afford the cost of higher numbers of floors as specified by the MCP. Thus, this has an impact on the nature of mixed-use building within the corridors and the demand for the scarce spaces due to limited number of floors which is definitely resulting into high rental charges. Hence, it implies that there is a need for increase in the number of vertical floors as rightly proposed by the MCP.

a. Typical Verical buildings



Corridor building dimension Number of Floors

Figure 2: Vertical building development along Ikeja MCP corridors.

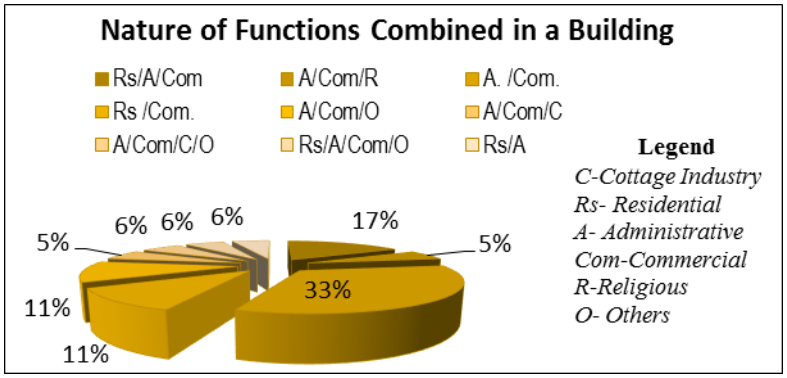
Functional Patterns

Combination of Functions in a Building

The breakdown presented in Figure 3a shows the types of functions commonly combined in mixed-use buildings. In all the nine different categories of functions identified were observed to have been combined. And all the categories do not have more than four types of functions housed in a building. This shows that the users and residents of Ikeja could cope with three to four functions combined in a building. Administrative and Commercial category (combination) is more prominent along the corridors, an indication that users do not have problem with such combination because they have similarities in terms of their day to day operational process. Residential, Administrative and Commercial category (combination) is also conspicuous in all the corridors studied with Administrative and Commercial mix-use having their peak period of services during the day while the residential part keeps the building functioning in the night when residents have retired after the day's activities. This has great impact on the corridor giving the buildings 24 hours operation duration. Therefore, in corridors for mixed-use building in Ikeja and Oshodi MCP, Administrative/Commercial and Residential/Commercial/Administrative functions are combinations that require consideration at the design stage.

Number of functions combined in a building

All the building observed had one or more functions combined which is an attribute of mixed-use development. It was observed that buildings with two functions combined are most recurring as reported in Figure 3b. This could possibly be linked to the upgraded building laws in the corridor where building in those areas are recommended for higher numbers of floors and mix of use by the provision of the MCPs. However, five functions were observed as the highest number combined in a building. Although such category is very minimal, it indicates the possibilities of having such combination in a well-planned mix-use building.



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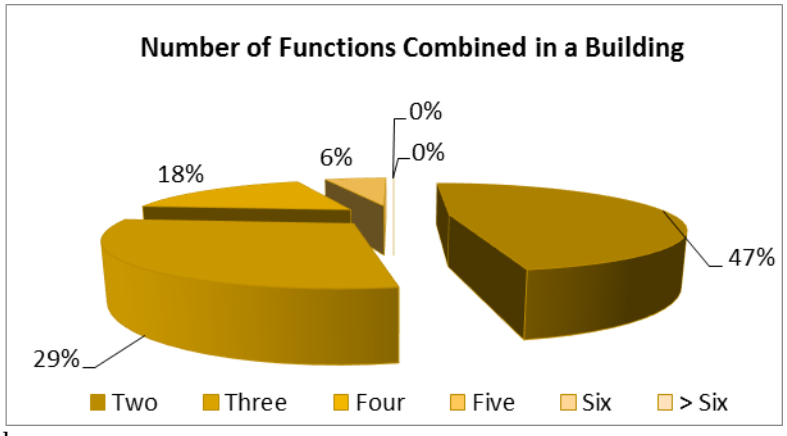


b.

Figure 3: Nature and distribution of functions in Mixed-use buildings.

Density of functions nature

Density here implies the frequency of occurrence of functions located within a mixed-use building. It signifies the amount of space or number of units of a function contained within a building and is a measure of the intensity of functions occurrence as shown in Figure 4a. The purpose of this is to establish functions that are more prominent and possibly patronized based on high, medium and low categories. Majority of the buildings observed recorded the administrative function towards a high density pattern; this suggests that it is the most frequently needed by the inhabitants. However the aggregate numbers of medium and low density for commercial use are more than that of administrative uses. This implies that some factors are inhibiting frequency of commercial uses. These factors might include level of income of the resident and high rental rate among others. Therefore, administrative and commercial uses are suggested functions that should be most considered for developments in the area.

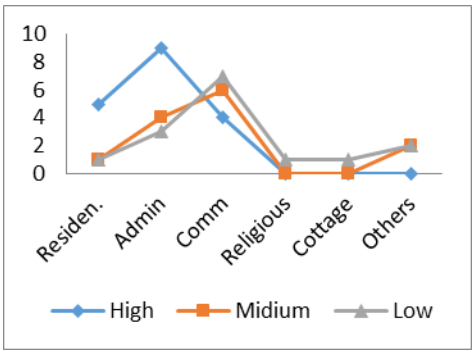
Arrangement of functions

By arrangement commercial activities are usually located on the ground floors and in some cases first and second floors as summarized in Figure 4b. This is because ground floors in particular and lower floors in general are more suitable for circulation and movement of customers therefore more peculiar to commercial activities. Administrative activities tend to be more formal, thus majority of the offices are located at the higher floors. Although administrative offices like banks are also on the ground floor, this is to ease access for customers. Most of the residential functions are located on higher floors especially on the last floors. This is

important in order to provide privacy for the inhabitants. In a mixed-use building that has shared premises residential activities are ordinarily at the back with separate access and are usually not facing the major corridor or access road.

Grain (Degree of mix)

The outcome of the degree of mix is presented in Figure 4c. The most common degrees of mix observed are basically medium (slightly separated). This is when different functions are at the same floor but not necessarily at close distance (not next to one another). Eleven out of the buildings observed have slightly separated mix of functions. While functions that are fine (close) were found in three out of all the buildings observed. This category consists of functions within a floor (next to one another). Further still four (4) of the buildings are coarse (more slightly separated) with functions separated by floors. This is perhaps due to different categories of inhabitant influencing the demand for a type of use, thus having less concern about the degree of mix of functions.



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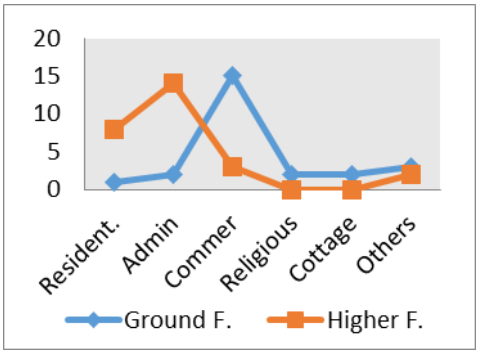

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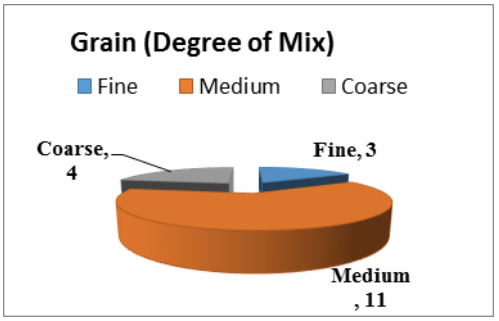

c

Figure 4: Number, Frequency and Arrangement of Functions in Mixed use developments.

Policy and Market Demand

Property Market Demand

In terms of demand for mixed-use buildings, Figure 5a indicates a high demand for administrative purposes. This is due to the concentration of the buildings within the main city and central business districts (CBD). Although same demand would have been thought about commercial uses, but it is otherwise due to the cost of rent which is high for the low and middle income earners that reside in the area. The idea of mixed-use is to bring work-live environment, where there is 24 hours use of the building. Residential use recorded low ranking in Ikeja corridors while there is also an absence of commercial functions like club house that could keep the building alive even at night hours.

Public Policy and Regulations

Public policy and regulation on mixed-use building, according to the MCP suggest areas for mixed-use corridors along with building height, density and setback. In

Figure 5b, it is noticeable that there is mixed-use building outside the corridors dedicated to it. Although, all the buildings observed are in line with previously approved setback. This will change when the owner and developer start erecting mixed-use buildings according to the maximum height specified by the MCP, which varied from 6 floors, 10 floors to 15 floors depending on corridor. Density would also definitely change as the height increases.

Identifying Attributes and Patterns.

The evaluation of the parameters provided an insight into the inherent findings where inferences were deduced that subsequently revealed the mixed-use attributes and patterns practiced along Ikeja MCP corridors. The outcome shows that verticality of mixed-use building dimension is a foremost practiced pattern in Ikeja with isolated cases of shared premises. This phenomenon is common in cities particularly where land constrain is common as the case of Lagos state, Nigeria. In Ikeja Mixed-use buildings are commonly located in the main city and the central business districts (CBD). The most popular combinations found are Administrative and Commercial functions while a combination of Administrative, Commercial and Residential functions are likely patterns that may be valued in these corridors as there exist mixed-use buildings with such combinations. Meanwhile, the functions that are distributed horizontally and vertically across the mixed-use buildings are usually closely related with compatibility of functions as a determinant of the degree of mix. Most often Commercial functions are at the lower floors while Administrative and Residential functions are sited on higher floors. In shared premises provision for access and parking are usually separated. The ordering of the density of functions that coincides with the demand is usually patterned-Administrative, Commercial, and Residential in ranking. Existing regulations advocates compliance and conformity with MCPs' building height, density and set back as long term plan towards ensuring sustainable development which requires attitudinal change in property ownership. A matrix of evolutional emergence of attribute and patterns is presented in Table 1 and illustrated in Figure 6.

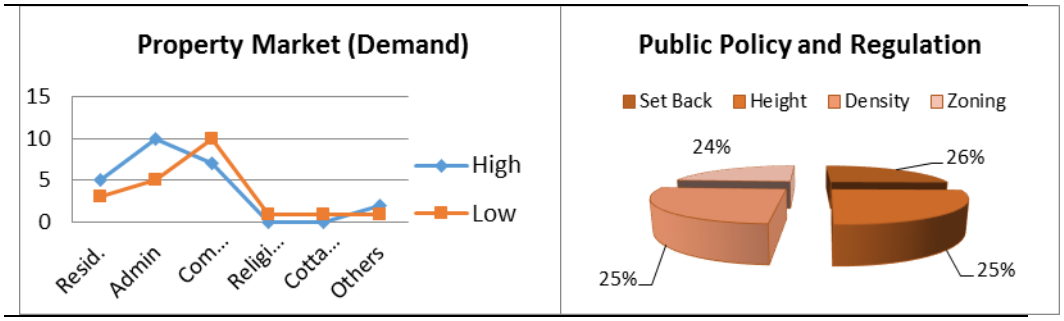

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Figure 5: Residents' Demand and Policy Regulation on Functions.

Table 1: Explicit and Implicit outcome- Derivation of Attributes and Patterns

Parameters	Explicit Findings	Implicit Inferences	Emerging Attribute/ Pattern
1. Building dimensions	Relatively high density and scarcity of land.	Verticality & shared development is practiced.	Verticality (shared premises)

2. Numbers of Floors	Four floors predominant	MCPs specification is a long time plan /strategy	Verticality inevitable
3. Functions combined	Administrative & commercial most commonly combined functions	Ability to produce 24hours usage of mixed-use buildings	Administrative & commercial. Administrative, Commercial & Residential are possible patterns
4. Number of function combined	2 to 3 numbers of functions is common	Possibility of more than 3 functions in a building	Several closely related functions should be combined.
5. Functions arrangement	Functions are mixed within floors but some functions are more common to certain floors	Function that require influx of different kind of people are located on lower floors	Commercial functions in the lower floors, while administrative and residential in higher floors
6. Accessibility and parking	Access and parking are usually shared	Need for separate access and parking especially for residential use	Shared premises provides necessary separation of access and parking
7. Grain (Degree of mix)	Slightly separated with different functions within a floor	Users' needs and compatibility influences demand for use	Compatibility should determine the degree of mix
8. Density of functions	Administrative is high, Commercial is medium and Residential is low density	Intensity of function depends on resident income and needs	Order of density of functions: Administrative, commercial, and residential
9. Location	Basically mixed-use buildings are located in main city and Central Business Districts CBDs.	Mixed-use in Ikeja MCP are peculiar to urban centers	Main (New) city area and the central business districts (CBD) have concentration of Mix-use structures.
10. Property market (demand)	High demand for administrative use than commercial	Demands are due to inhabitant income and rent fees	Significantly order of demand for functions include; administrative, commercial, and residential
11. Public regulations	Present mixed-use conform with initial buildings set back	Conformity with MCPs building height, density and set back is a long term plan	Attitudinal change in property ownership is essential

The distribution of Misused buildings along the corridors in Ikeja MCP as illustrated in Figure 6 confirms the results recorded from the observation.


Kodesoh Street


Obafemi Awolowo way


Oba-Akran way


Allene Avenue


Kudirat Abiola way


Olowu Street


Joel Ogunnaike


Olowu Street

Figure 6: Mixed-use corridors in Ikeja MCP. Source: www.instantstreetview.com

Conclusions

It is important to study the attributes and pattern that are germane and could determine the sustainability or otherwise of mixed-use building. Although scholars differ as to what constitute a mixed-use development, not much has been done in analyzing mixed-use development or building in Nigeria. This is an attempt to address the practicality in the application of the provisions made by MCPs in Lagos, Nigeria particularly the Ikeja MCP. Also, the study tried to ascertain how receptive the residents are and the overall benefit to both the affluent and the common man on the street. The study thereafter reveals that a successful integration of mixed-use could be achieved in the area through vertical building dimension. Although there are variations in the number of functions combined, apparently two is most common. Administrative and Commercial uses dominate the demand, followed by its combination with Residential uses. Also

for mixed-use in the area to be successful, the general pattern desirable is mixed-use with commercial and retail on lower floor and residential on higher floors. Nonetheless the sharing of access road in majority of the corridors as practised now is not sustainable. To achieve sustainable development access routes should be separated, especially for residential users. The grain of mixed-use building is medium (slightly separated) because it is clearly difficult to presume the kind of use within and between floors. Administrative function, followed by commercial and residential perhaps should be the order of function provision due to demand and the fact that all the corridors are located within the urban area, then other functions like eatery could also be incorporated, It is concluded that a well-Integrated mix of use is achievable in corridors due to density, but the compliance with the maximum number of floors would take a while due to the level of income of the inhabitants of the area.

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