Space Organization in High-Rise Buildings
(A Case Study of Kanti Towers, Victoria Island, Lagos State, Nigeria)

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Abstract: Conventionally, High-rise buildings served as a revelation of the power and places of identity and civic pride. Contemporary high-rise buildings are on the increase due to the scarcity of land for development purpose owning to urban density as a result of rural-urban migration. However, Working or living in high-rise building tends to limit users functions to their subscribed floors and thus reduces propinquity. This brings about boringness, separation, loneliness. It encourages crime resulting from seclusion. After a thorough analysis of existing similar facility as a case study, it's discovered that spatial planning completely restricts occupancy of this building to their workstations.It is therefore important to encourage thorough circulation and places of common usage to increase propinquity. Attention must, therefore, be given to creating and reorganizing common spaces by an introduction of interpenetrating planes, communication floors to make them serve more than just public spaces through the arrangement of vertical spaces in three clusters.

Keywords: Space organization, High-rise Buildings, Urban migration, propinquity, Communication floors, Interpenetrating planes, vertical spaces.

I. Introduction

In the time past, high rise structure such as the cities clock towers, churches steeples, and state buildings are a symbolic function in the city. They were erected as a revelation of power and identity of unique civilization and social group. A tall structure was seen as a source of identity and civic pride. This shows that tall buildings are only symbolic rather than performing any function. However, contemporary architecture has changed the tone and pace of high rise building. The contemporary role of high rise buildings has come to signify a corporate image or an affluent way of life or the existence of the power of the owners or occupants. The change in the use of the contemporary high rise building was also increased due to the scarcity of land for development purpose owning to urban density as a result of rural-urban migration. Since tall buildings have been seen to have technical and economic advantages in areas with high population density (Mazzola 2006).

Contemporary architecture, architects, in most cases, appears to spend most of their time on the exterior appearance of the high rise building. Needless to say, that is certainly important, but all often this concern for exterior appearance becomes an end in itself. The interior planning becomes less concern because the interior space of most high rise buildings is nothing but an elevator service core with the connection to free stairs all surrounded by empty flexible space to figure out by someone else. This resulted in non-relational, non-functional and artificial space that depends on active energy for usage. The interior space planning of a high rise building tends to be standardized open space without proper allocation of their basic use. Working or living in high-rise building should not limit users to their subscribed floors. There should be an introduction of public spaces and spaces of common usage that is not limited to a particular floor but spread across floors thereby giving the building a sense of place.

How can spaces in high rise building be organized to increase its capacity to accommodate varieties of function thereby giving it a sense of identity of space? Can spaces in high-rise building be distributed to create a sense of communication?

II. Review Of Related Literature

2.1 The History of High Rise Building

The history of high rises may be traced back to the pyramids of Egypt (about 48 stories in height) and the Tower of Babel. Genesis 11 in the Christian Bible briefly tells the story of the Tower of Babel. According to the account, before the tower was complete God decided that if humans could complete such a tower, they could accomplish anything causing the man to disperse horizontally in terms of a settlement. This form of development continue for several decades until the late 1600s, This means the history of tall buildings dates

back hundreds, even thousands, of years, during which ancient builders have attempted to build ever-taller structures, from ancient pyramids and cathedrals to modern-day skyscrapers (Mazzola 2006). From the beginning in the middle of the last century and right up to the present day, high-rise buildings have always been a dominant landmark in the townscape, visible from far and wide, like the towers of Antiquity. At the same time, this sky-scraping construction method has always been an ideal means of displaying power and influence in the community which the source over the years, is as a result of the development of new construction materials, construction technology and the services needed for the use of the building.

High-rise buildings provide the advantages of tall slim buildings accommodating many people while occupying less land in the land-scarcity prone urban canter locations, offering great views to the upper- level occupant and better security with the efficient controlled entrance systems which reduce crime and dissipates the fear of crime (Gifford 2007).

The fascinating thing about high rise buildings is that they have smaller footprints than the equivalent number of low-rise housing units and therefore may occupy less land area (but not necessarily, depending on siting). This, in principle, leaves more room for parks and green space (Broyer, 2002) which invariably makes judicious use of scarce urban land.

Plate 2.1: Showing Philadelphia city hall, Tallest Building in the world from 1894 to 1908, 167 meters, constructed 1871-1901, Architect: John mcArthur, jr, Thomas,U,walter, Philadelphia, Pennsylvania
Source: Google Image, 2017.

Plate 2.2: showing empire state building, world tallest building from 1931 to 1970, 102 floors, andConstructed between 1929-1931. Architect: Shreve, Lamb and Harmon, Location: New York, USA.
Source: Google Image, 2017.

2.2 History of High Rise Building in Nigeria

Nigeria is one of the most heavily populated and one of the most economically developed nations on the African continent. However, in terms of high rise, advanced development is significantly localized around two areas: Lagos and Abuja. These key marginal areas have experienced rapid growth recently and accommodated the most high rise in the country. Though, some high rise were located in several parts of the country such include the cocoa house in Ibadan.The tallest building in Nigeria is the Nigerian external communications (NECOM) building which is 160m (520ft) tall. NECOMformerly refers to as NITEL TOWER, is a 32 story building located in Marina Lagos Island, Lagos Nigeria was completed in 1979 and remains the tallest building in West Africa till date. Others include the union bank building which is 28-story building located in Lagos Nigeria is 124m (407ft) tall. It serves as the headquarters of the union bank of Nigeria. The Cocoa house which was formerly called "Ile Awon Agbe" (i.e. "House of Farmers") is seen as the first

skyscraper in tropical Africa. The building is a modest 26 Storey high-rise structure, property of Odu'a Investment Company Limited.The transference of the nation's capital to Abuja in the late 1980's has led to the degraded state of major tall buildings in Lagos.The Abuja skyline is made up of mostly mid-range buildings, with just a few tall buildings. Onlyrecently have tall buildings begun to appear (Anthony 2014). Most of the buildings are modern,thereby reflecting that it is a new city. The Millennium Tower, the Nigerian Cultural Centre, andis part of the many projects in the Central District of Nigeria's capital city of Abuja. At 170 meters, the Millennium tower would be the tallest building in Nigeria, going beyond the 160m high NITEL building upon completion.

Plate 2.3: showing Nigerian external communications (NECOM) building. The tallest building inNigeria. Source: Google Image, 2017.

Plate 2.4: showing UNION Bank building, one of the high-rise building in Nigeria. Source: Google Image, 2017.

Plate 2.5: showing the millennium tower Abuja, Nigeria under construction. Source: Google Image, 2017.

2.3 Spatial Organization in High Rise

Traditionally, high rise buildings have developed in certain patterns as a result of structural limitations, economic considerations, zoning requirements, and the desire of clients and designers to express certain cultural values regarding the image of the building. In each case, little attention has been paid to how one might organize public space in tall buildings that allow for a greater sense of social interaction.

Typical, the organizational diagram of most tall buildings is to place the service core elements in the center of the building footprint. An alternative type of organization attempts to incorporate public space as part of its service core structure. Thus, allowing the vertical core elements to function as space-defining elements.

One way to increase social interaction within the high rise footprint and provide places for propinquity would be to properly organize the space around the core and open the floors of spaces that have access to natural light to increased spatial dimension and the possibility of more natural diffused light. This can be done by developing a three-floor "cluster" with public space that opens vertically within the three floors, as a small atrium or court like space. The notion of a three-floor cluster is developed in part from the building cones, which call this concept, communicating floors.

2.4 Core designs and high-rise buildings

A Core is a spatial element for the load-bearing high-rise building system. It is also the center of the arterial part of a multistory building that integrates functions and service needs for established occupants. Such areas are normally composed of toilet facilities, elevator banks, janitors' closet, utilities, mechanical facilities, smoke shafts and stair.

It is a part of the building that is regarded as servicing facilities within the building, largely for the purpose of vertical transportation as in the case of lift and stair. It carries major function of the service needed in the building. Their arrangement determines to some extent the circulation pattern within the building. Just as important as the skeleton is to the human body, the core is also very significant and critical in the design of high-rise buildings. They serve as the frame structure for the building. Among other functions include:

(a) Serve as a bounding element that ties the building together as a unit.
(b) Help to achieve flexibility in terms of spatial organization.
(c) Act as shear wall systems to provide the necessary lateral stability for the building in case of
Lateral force and wind load
(d) Bear gravity loads
In the design of a core in high-rise buildings, considerations should be given to the following;
(a) Shape of core
(b) Number of cores
(c) Location of cores
(d) Arrangement of cores
(e) The Geometry of building as a generator of core form.

2.5 Placement of building cores

Core placements are of many types with each having their diverse advantages as well asdisadvantages. The different types of placements of a core that can exist in high-rise buildingsInclude; off-center, central, atrium, split-ends, attached, split.

I. Off-center

The off-center of building core placement is an effective means of placement in that it makesperimeter spaces of buildings to be well utilized. The placement of windows also on perimetersis also achieved thereby maximizing natural lighting and ventilation into the interior part of the building. Of course, its demerits are not inherent. The off-center placement poses some problems of access. This is because it is remote and less convenient to the farsides and corners of the building.

II. Central

This type of placement of core in high-rise buildings allows all windows and window spaces tobe fully utilized for natural lighting and ventilation. It also provides extremely convenient access because it will be equidistant for all sides enveloping it. But often times, it is always dark because it is void of natural lighting requiring artificial lighting.Other forms of core placements have their separate merits and demerits. The focus of this study is how common spaces are organized along the core. Since most high-rise buildings are patterned after an open plan which is redesign to taste depending on use, it is, therefore important to create a sense of belonging to the design of the common spaces.

III. Case Study

Case studies as research methodology are carried out a detailed analytical critique of existing structures which are similar to the proposed study. A case study of existing similar facility in Victoria Island, Lagos where most high-rise buildings in Nigeria were located was embarked upon in order to evaluate the design of such structure, to extract data and derived facts to evolve a better scheme in the project of study. A case study is considered since most high-rise building layout is similar.

3.1 Case Study: Kanti Towers, 35c AdetokunboAdemola Street, Victoria Island Lagos State, Nigeria.
3.1.1Basic information
Architects: azdecasc
Consultants: misadvisory
Date awarded: September, 2012

Plate 1: Showing satellite Imagery location of KANTI Towers
Source: Google Earth Image, 2017

3.1.2**Background information**
Kanti Towers is located in central Victoria Island, Lagos. Nigeria's most dynamic business hub, within reach of top hotels and the head offices of key multinationals. Kanti towers boost 15 floors of prestige office space. Kanti Towers not only promises a spectacular view of the city and the majestic Atlantic Ocean, but it sets a new environmental and social standard in facilitating corporate Nigeria. As the only building with a helipad Kanti Towers allow traffic-free official shuttles to and from the airport the word traffic holds no meaning.

6,500sqm of a premium office area with 5.5 floors of multi-level parking bays for over 100 cars. Kanti Towers is designed to ensure that practical security both within and outside the building for the safety of occupants; Guests/ Visitors must pass through checks at the reception before gaining access to the building, making it a practical modern design that fits into the modern use.

Plate 2: showing the exterior view KANTI Tower
Source: Researcher's archive, 2017.

Plate 3: showing the exterior view Kanti Tower
Source: Researcher's archive, 2017.

Plate 4: showing the ramp and the parking spaces on the first floor
Source: Researcher's archive, 2017.
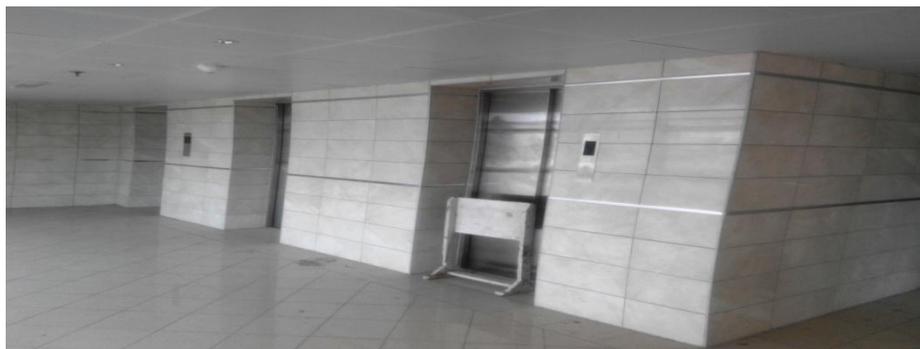
Plate 5: showing the three main Lift to access the upper part of the building
Source: Researcher's archive, 2017.

3.1.3 **Data collection**: Secondary data from internet, investigation were carried out within the estate.
3.1.4 Findings:
 I. Apart from the multi-level car parks, each floor is secluded except by vertical movement mediums through which they are being accessed.
 II. The building spatial planning gives no room for places of common usage. The spatial organization revolves around the core area which houses the lift and a small space to convey people into the offices. There is a complete omission of spaces of common usage.
III. Breakaway areas; lobby leading to foyer, corridor, terraces that can enable a glamorous view of surrounding neighborhood was omitted in the spaces organization.
IV. The spatial planning completely restricts occupancy of this building to their workstations. Nothing to inspire moving around. Propinquity was completely ignored.

IV. Discussion

4.1 Common Space
　　Common space is the space that exists between the public space and the private space. It acts to connect the two domains and to create a buffer zone as a transitional space between different sectors. The common space in the Kanti towers was tight, confined and entirely excluded from other spaces. Common spaces are should be multi-function in character; it should absorb the territorial boundaries of two domains of half public and half private. Kanti towers' common space is completely public space that conveys occupants to private spaces. It never mediates as half public and half private space. Though Kanti towers common space provide the function of allowing access from outside public spaces to private spaces within the building, It could not provide intermediate space for resting like a garden. Hence, there is a need for proper organization of the common spaces for multi-function.

4.2 Reorganization of common space
　　Why it is evident that common space in the light of high rise buildings, is done with regard to other functions it performs and they include: provision of the psychological distances between the private and the public spaces and also help to define space based on their functionality level as obtained in the Kanti towers where the common space mainly connects the lobbies with other thoroughfares and suspended parking lots. It is

paramount to reconsider the design of common spaces in the high-rise building to incorporate communicating floors such that subsequent floors can be commuted without compulsorily using the elevator and stair within the core. The common space should be a place that absorbs commuters into the private spaces and also ensuring propinquity.

4.3 Space Efficiency in High Rise Building

Creating extremely large and tall buildings is very costly, but can also provide large revenues if the spaces within it are properly and adequately maximized. The space efficiency in the high-rise building can be best achieved by

➢ Creating spaces that can serve double functions. Common spaces can also serve as break off area. Space efficiency is best achieved if spaces can be dynamic in their usage to ensure a high ratio of usable area to gross built area.

➢ Subjecting to constant use spaces such as patios, balconies etc. that are rarely use such the common spaces can rightly link them up which makes them accessible to commuters within the building. Spaces which are rarely used must be avoided to ensure space efficiency.

Recommendations

This study recommended that regardless of the pattern of core system selected for a high-rise building;

a. The introduction of communicating floors within the space of three floors in which users of such floors can have an effective vertical visual communication.

b. A well-articulated vertical space organization by the introduction of penetrating planes to allow a greater sense of social interaction and communal gathering.

c. Spaces should be made to contribute to some sense of informal socializing such as breaks-off area, eating, or unstructured conferencing for communication and idea exchange; so necessary in any work environment.

d. The arrangement of vertical spaces in three clusters sharing communal public space should be encouraged. This will make the building potentially a place capable of promoting a greater sense of community and increased social interaction.

V. Conclusion

Cities are growing two or three times faster than the country's overall population, reflecting massive migration to cities. This, however, leads to a short supply of land for development and will be more scare in timed to come. This problem is ever associated with Lagos. As such the demand for high-rise buildings will always be high. Across time, architects pay more effort to the design of the exterior. However, optimum care must be given to the manner in which spacesare organized within the building. This is the aim this study pursues. This study discourages limiting users view to a particular floor because staying in such an environment for a long period of time will often affect and impose a psychology effect on the users. The study recommended the use of communicating floors, penetrating planes, planning of common spaces by subjecting it to more usage in order to achieve space efficiency in a high-rise building.

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