

ENHANCING CIRCULATION AND MOVEMENT TO OPTIMIZE EFFICIENCY IN SHOPPING MALLS IN ABAKALIKI.

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ABSTRACT

Shopping malls are enclosed shopping streets established for the purpose of public shopping and execution of other leisure activities. Shopping malls are not just designed for shopping activities alone, but are versatile and contains other facilities such as entertainment, cultural and recreational facilities that are well arranged together in an enclosure. The internal spaces of regional shopping malls are usually designed in such a way that it imitates the metropolitan streets and lifestyle which creates the impression of shops scattered along the streets. The layout and circulation patterns used as well as the links between the different spaces in a shopping mall forms a composite system which users are required to move through in and within the facility. Most times, improper circulation in a shopping mall creates an uneasy shopping atmosphere, poor wayfinding and difficulty in movement in and within the shopping mall either by poor orientation of spaces or improper positioning of vertical circulation systems in the facility. These factors above are some of the demerits of adopting a complex circulation plan. Hence it is essential to link all the spaces and services together in and within the facility. The priority of this study is to integrate the researched circulation and movement patterns into the designs of shopping malls in Abakaliki. Deductive research method was adopted (collection of data from primary sources and secondary sources). From the research, the results showed that there are different circulation patterns that enhances movement and circulation consistency. From the research, it is also proven that circulation design is one of the determinant factors to achieve success or failure in the design of shopping malls. Thus, I recommend that circulation and movement pattern should be put into serious consideration during the preliminary design stages of any mega design project such as a shopping mall in Abakaliki.

Key words: Shopping mall, circulation, movement, wayfinding.

INTRODUCTION

Centuries ago, trade by barter was the major system of trading goods and services. This proves the existence of interchange of money for goods and services, which provides humans

an enabling atmosphere for both work and pleasure. The interchange of money for goods have been in existence for eras and has been proved in various systems, through the creation of distribution channels such as: shop lets, markets, piazza, stalls etc. The consistent modification of this process has magnified the proficiencies together with it. The constant consciousness of the necessity to establish extra dedicated spaces for these activities, extra structures were established to house these extra activities such as shops, departmental stores etc. Shopping mall was created to serve the need of having enclosures where humans can make possible exchange of money for unavailable goods and services as well as create an efficient relationship between work and play. “The creation of mall attempts to create pedestrian environments and destinations where the public can ‘go shopping’ rather than just ‘do the shopping’ in an environment offering personal and social attractions” (Buttle, 1992 in McGreevy, 2016).

Considering the constant growth and modification of shopping malls and it’s wide-ranging amenities, this progression and complexity created critical problems in the circulation models, designing, and plan layouts. Shopping environments such as regional shopping malls has magnet/anchor shops, support amenities, leisure amenities and numerous shops. These spaces are fit in together in a confined space. Hence, a composite arrangements of links between the diverse spaces and functions are established.

The objective of this study is to examine and evaluate the diverse circulation patterns to enhance wayfinding in the designs of proposed shopping malls in Abakaliki.

AIM OF THE STUDY:

To study and derive enhanced circulation and wayfinding pattern in other to enrich user satisfaction and improve efficiency in the designs of proposed shopping malls in Abakaliki.

OBJECTIVES OF THE STUDY:

- i. Studying circulation models to know the effect on the general layout of malls.
- ii. Assessment of and Case studies of some existing shopping malls, highlighting on the circulation model and identifying flaws in other to avoid repeats .
- iii. The application of data in proposed designs of shopping malls in Abakaliki.

STATEMENT OF THE PROBLEM:

Shopping malls are enclosed shopping streets established for the purpose of public shopping. The services provided in the mall includes shopping activities, entertainment activities,

leisure activities, recreational activities and cultural activities. These activities in the different amenities are being properly arranged together in an enclosure. The customers are required to pass through the link between the different layouts and spaces of these various amenities which establishes a composite circulation technique. Dissatisfaction resulting from disorientation and poor wayfinding in a shopping mall reduces the shopping efficiency and experience which may impede frequent visit of the facility to a large extent which might definitely affect the financial aspect of the facility.

SIGNIFICANCE OF THE STUDY

In shopping mall designs, the movement and circulation pattern adopted is one of the numerous factors that determines the success and or failure of that design. Shopping malls are enclosed shopping streets that consist of numerous shops where there are consistent shopping and leisure activities going on. Ease of movement through the malls and navigation is key. Hence, there is an immense need to be wholly familiar with the concept of circulation and it's method of application in the design of large malls such as regional malls, to ease shopping anxiety and distraction of the shopping experiences which results from problems of poor orientation of spaces and improper positioning of vertical circulation systems.

SCOPE OF THE STUDY

The study scope is limited to the study of circulation models and identifying the flaws to avoid repeats; Case studies of and Assessment of existing shopping malls, emphasizing on the circulation models adopted, and implementing the study data as a foundation for the designs of shopping malls in Abakaliki.

THE SITE STUDY.

Site and Environmental Analysis. Ebonyi State lies in the tropical climatic region in Nigeria. This climate is considered to be Aw according to Koppen-Geiger climate classification. The vegetation of Ebonyi State is a mixture of eastern prototypes comprising of semi-savannah grassland with forests and swamps. The Site and environmental analysis of the study area is very essential in this study because it helps to disclose the different facts within the site such as the vegetation, the nature of the soil, the topography, the climatic impacts etc. With these relevant information gathered, the type of foundation, method of construction, materials to be used for construction etc, will be well determined.

Analysis of the Geographical location and Topography of study area; Ebonyi State is geographically located within the coordinates latitude 5°40' and 6°45' North of the Equator

and longitudes 7°30' and 8°30' East of the Greenwich meridian. The state is bordered to the north and north east by Benue State, to the west by Enugu State, to the east by Cross River State and to the southwest by Abia State.

Geology; “The study area is mainly characterized by rather poorly bedded shale, occasionally sandy, splintery metamorphosed mudstone. Lenses of sandstone and sandy limestone are highly jointed and fractured. It has been noted that the influence of tectonic activities which introduced the discordance dip between the Asu River Group and the overlying Turonian Eze-Aku Formation (Afikpo basin). Younger intrusive bodies in combination with numerous faults and joint systems have the secondary porosity in the shale Formation.” (Adelekan Adeyinka. Geology of Ebonyi State)

Soils: The soil type in Ebonyi State is predominantly clay loam and little loamy soil, it has a poor drain ability and rocky (granite) subsoil in some locations mostly in the uplands that are adjacent to some lowland areas.

BIOCLIMATIC DATA

Rainfall; Ebonyi State experiences a great seasonal variation in monthly rainfall. Mean annual rainfall of between 2,500 mm per annum in the south and 1,500mm in the northern part of the study area. The rainy period of the year lasts for about 6 months, which usually come between April to October, with a sliding 31-days rainfall of at least 0.5 inches. The month with the most rain in Ebonyi State is September, with an average rainfall of 8.9 inches. The period of the year with the least or no rainfall lasts for about 2.5 months, which is from December to February. The month with the least rainfall in Abakaliki is December, with an average rainfall of 0.1 inch.

Temperature; The average temperature in Ebonyi State is about 27°C with relative humidity of 85%. The temperature in Abakaliki varies very little throughout the year. December to March are the hottest months in Abakaliki with a temperature between 30°C to 37°C.

Humidity; Abakaliki experiences extreme seasonal variation in the perceived humidity. The muggier period of the year lasts for about 11 months, from the end of January to mid December, during which time the comfort level is muggy, oppressive, or miserable at least 50% of the time. The month with the fewest muggy days in Ebonyi State is January, with 13.3 days that are muggy or worse.

Wind; The average hourly wind speed in Ebonyi State experiences significant seasonal variation over the course of the year. The windier part of the year lasts for about 6.8 months, between March and September, with average wind speeds of more than 5.7 miles per hour.

August has the strongest wind periods in Ebonyi State, with an average hourly wind speed of 7.2 miles per hour. The calmer time of the year lasts for about 5.3 months, between September and March. The calmest month of the year in Ebonyi State is November, with an average hourly wind speed of 4.2 miles per hour. The prevailing wind speed in Abakaliki is from 12km/h to 19km/h. The minimum wind speed is from 1km/h to 5km/h and the maximum wind speed is from 19km/h to 28km/h.

Vegetation; Ebonyi State is located in the mosaic of lowland rainforest and secondary grassland vegetation zone. The vegetation of the state is a mixture of savanna and semi tropical forest with agriculture as the mainstay of the residents.

LITERAURE REVIEW. Mall Definition and Background

The term shopping mall has two words; shopping and mall. Shopping can be described as those activities, which involves the exchange of money for goods and services. Kuria (1975), expresses it as pricing and buying merchandise which are displayed for sale. Shopping is an activity that comprises both a purchaser and a vendor.

A mall is described as an open space provided for the public to walk. It is a street concept used by the public for shopping and recreational activities.

Hence, a Shopping mall can be said to be a facility that provides pathways for the users to move from one point to another within the facility as users transact their businesses of exchange of money for goods and services.

IDECK (2010), defines a shopping mall or shopping centre as a building or set of buildings which contain retail units, with interconnecting walkways enabling visitors to easily walk from unit to unit.

Lousberg (2009) defines shopping malls as "...premises selling general merchandise or fashion related goods. They are enclosed inward facing stores, connected by a common walkway. Parking surrounds the outside perimeters."

The Concise Encyclopedia defines shopping malls as a collection of independent retail stores, services and parking areas constructed and maintained by a management firm as a single unit. It is regarded as a modern adaptation of the marketplace.

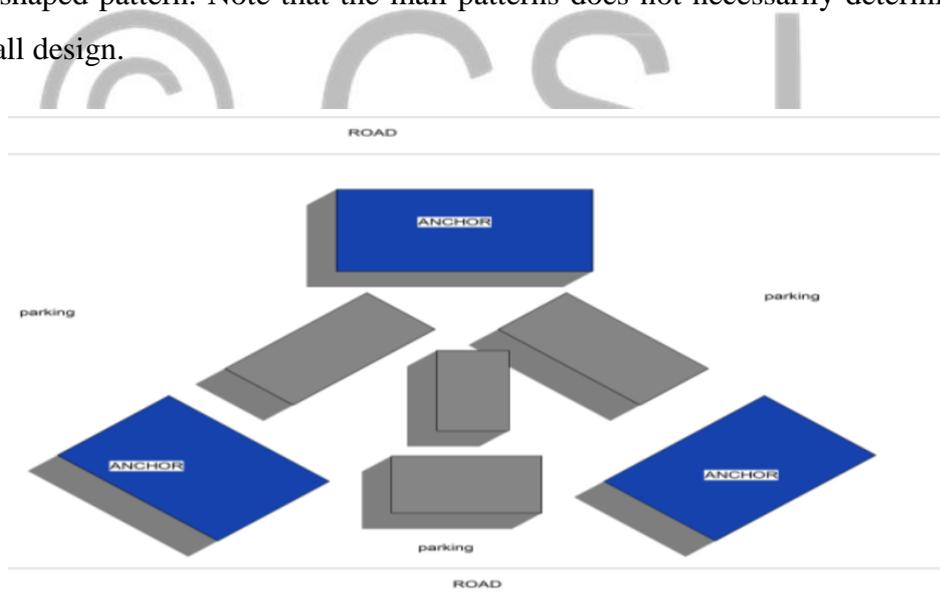
IDECK (2010) opines that most shopping malls have one or more larger stores (Anchor stores / Magnet stores) which are very essential for the monetary strength of the malls. It also

helps to draw the retail traffic that results in visits to the smaller stores in the mall as well. If a shopping mall has more than one anchor store in it, they are usually located far from each other to increase the amount of traffic between each other. Thus, the traffic flow benefits the smaller stores.

MALL DESIGN PATTERNS

Mall patterns are used as the tool to facilitate a proper arrangement and location of the various amenities and facilities in the design such as the position of the anchor stores, satellite stores, parking, mall and service areas. There are different mall design patterns such as the Cluster shaped pattern, U shaped pattern, L shape pattern, Striped shaped pattern, Dumb bell shaped pattern, Double-dumb bell shaped pattern, T shaped pattern and Triangle shaped pattern.

The Mall design patterns is a major determinant factor of the specific circulation path to be adopted in mall designs. Example, the radial circulation path is best suited for the triangular shaped pattern. The linear circulation path is best suited for the Dumb bell shaped pattern as well as the L shaped pattern. Note that the mall patterns does not necessarily determine the form of the mall design.



Triangular shaped mall pattern

Source: Time Savers for Building Types, (1991).

CIRCULATION IN MALLS

Circulation is the movement of people from one place to another in, around and within a building and a built environment three-dimensionally.

Shopping malls attract great attention and inflow of people and goods in and within the facility. Hence, an efficient circulation model is essential in the design of shopping malls to ease the shopping anxiety and create a nice shopping experience and use of other leisure amenities within the facility. To achieve this, circulation spaces should be properly created to enhance easy movement horizontally and vertically as well as within and outside the shopping malls. Simple layout patterns should be adopted during the design of the layout plan of shopping malls in Abakaliki.

Circulation is enhanced in shopping malls through the provision of circulation elements and vertical circulation systems such as escalators, elevators and staircases. These circulation elements must be properly designed and oriented to enhance the movement of users in and within the shopping mall. The spaces that are mainly used for circulation purposes are called Circulation spaces such as entrances, corridors, lobbies and foyers.

Circulation spaces in shopping malls can be categorized by the movement it facilitates, which is either horizontal circulation such as lobbies, corridors etc. and vertical circulation such as escalators, elevators, ramps and stairs. In public buildings such as shopping malls, circulation spaces can also be categorized by specific user groups such as public circulation spaces and private circulation spaces. Circulation is broken down into 4 factors which are;

Type of use (public use or private use),

Direction (vertical movement or horizontal movement),

Time of use (morning, noonday, evening or continuous) and

Frequency of use (common use or emergency use).

The Direction of circulation and the Type of use are the most essential components of circulation in the building layout of large facilities such as a shopping malls. The both components determines the success of the of the facility to a large extent.

DIRECTION OF CIRCULATION

The direction of circulation has a great effect on the design of circulation pattern for a large facility such as a shopping mall. There are two basic direction of circulation such as horizontal circulation directions and vertical circulation directions.

Horizontal circulation; This has to do with the movement of people in and around a particular floor level in the shopping mall. The methods involved in this type of circulation are pedestrian walkways, entrances, lobbies and corridors.

Vertical circulation; This has to do with the movement of people between different floor levels in the shopping mall. The methods involved in this type of circulation includes all vertical circulation systems such as elevators, lifts, stairs and ramps.

TYPE OF USE

There are different circulation zones such as; Private circulation zones which are designed for private or restricted movement in the facility such as staff passageways, storage zones and service routes in the building. While the Public circulation zones are designed for public use or areas that are widely accessible by the public such as lobby, public passageways, entrance lobbies and galleries etc.

TYPES OF CIRCULATION PATHS FOR SHOPPING MALL DESIGNS.

There are different circulation paths suitable for the design of an efficient circulation plan for shopping mall designs. They are the Linear Circulation Path, Radial Circulation Path, Spiral Circulation Path, Grid Circulation Path, Network Circulation Path and Composite Circulation Path.

Linear Circulation Path; It is primarily a straight path which then gets intersected and segmented based on the need - linear, curvilinear, segmented, branched, loop, etc.

Radial Circulation Path; A single point from which paths are branched out in different directions and lengths.

Spiral Circulation Path; Originating from a single point, the spiral is a single path that revolves around the point and gradually keeps getting distant from the center.

Grid Circulation Path; Two sets of paths - vertical and horizontal, that intersect each other at regular intervals in a grid-like pattern.

Network Circulation Path; Multiple points are connected with paths heading in any direction in space.

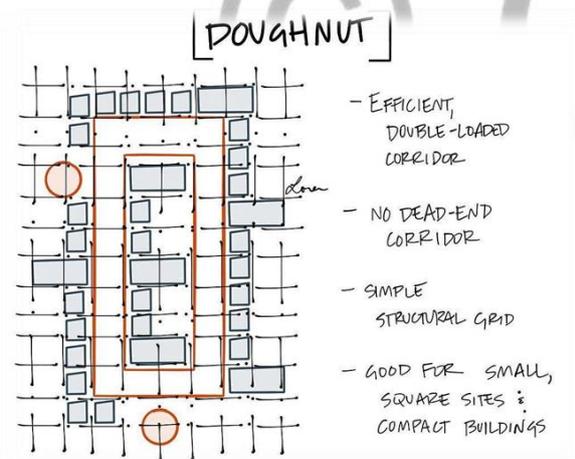
Composite Circulation Path.; A combination of the above mentioned paths in any ratio forms a composite path.

Linear Circulation Path.	Radial Circulation Path.	Spiral Circulation Path.
Grid Circulation Path.	Network Circulation Path	Composite Circulation Path.

Types of Circulation Paths

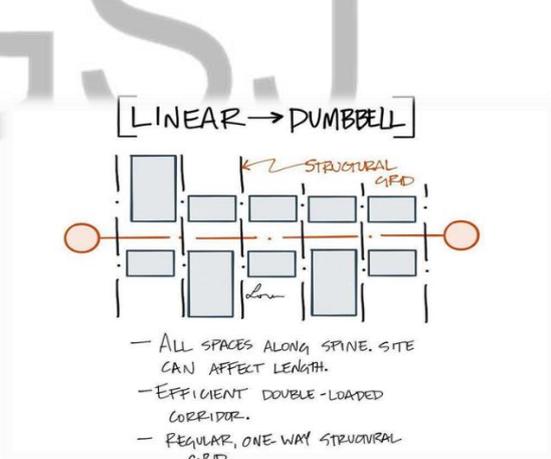
Source: Ching (2004)

Graphic illustrations of few circulation plans that can be used for large projects such as a shopping mall.



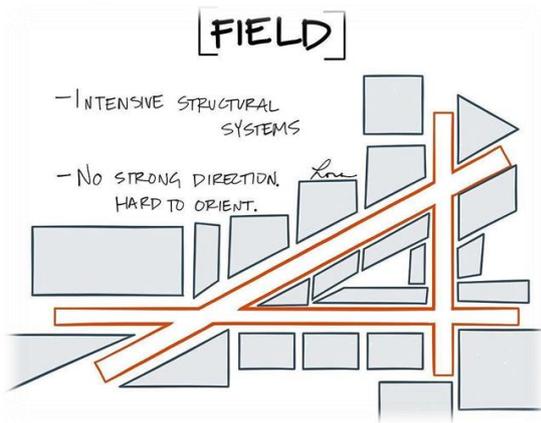
Doughnut Circulation plan

Source; Google.com (2021)



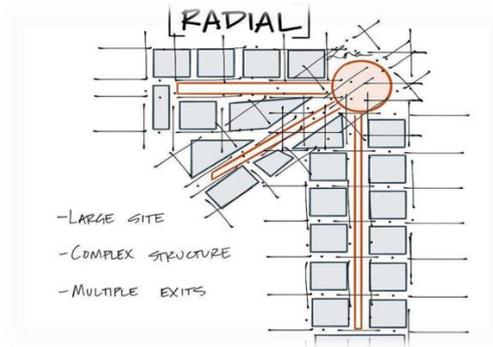
Linear Circulation plan

Source; Google.com (2021) Source:



Doughnut Circulation plan

Source; Google.com (2021)



Radial Circulation plan

Source; Google.com (2021)

Designing Circulation

There are two rules of thumb that must be applied when it comes to designing circulation. They are;

- The key circulation pathways should be clear and unobstructed;
- The key circulation pathways should follow the shortest distance between two points.

The reason for these two rules of thumb is fairly obvious: people want to be able to move around a building with ease and efficiency, and without feeling or being lost.

RESEARCH METHODOLOGY

This presents the different methods of data collection and how they have been presented and analyzed. There are different research methods that were used in this research such as Interviews, Direct Observation (case studies), and surveys. The research methodologies used in this study includes.

Deductive research; which comprises of the data gathered from both primary sources (literary works, thesis, physical examination of existing malls and site visits) and secondary sources (all data gotten from online publications, journals and articles).

Case Studies; Case studies of existing malls were carried out, highlighting the different types of circulation plans adopted.

DATA PRESENTATION AND ANALYSIS

Proper researches were carried out on existing modern shopping malls and the impacts of the studies are examined here.

Selection of the Study Areas; The facilities mentioned below were chosen as case studies based on the research topic and it's ability of meeting the space functionality requirements of the spaces in a shopping mall. They are; The Jabi Lake Mall, Abuja, Nigeria.; The Shoprite (Polo Park Mall), Enugu, Nigeria.; The Port Harcourt Mall, Rivers State, Nigeria.; The Silver Bird Entertainment Centre, Abuja, Nigeria; Smiralind Shopping Mall Ice; The Dubai Mall, Dubai, United Arab Emirates.

Criteria for Assessment of Case Studies; The basis for the assessment of the selected case studies includes the terms considered below. **Plan Layout:** The design layout should be done to best suit the project. **Accessibility:** The users of the mall should be able to access the mall with ease. **Location:** The site location of the mall should be feasible. **Aesthetics:** The physical appearances of building elements and spaces should be pleasing to the eyes. **Sustainability:** Environmental performance of the building elements and strategies should be energy efficient. **Human Factors:** The users of the mall should be psychologically and physically comfortable at all time in the mall. **Functional Requirements:** The durability, spatial and functional needs, and also proper maintenance should be put into special consideration.

CASE STUDY DEDUCTION

Nature of site: the site should be set free from significant streams, interceding streets, easements etc.

Zoning: existing zoning most allow shopping center development within that zone.

Location: the site should be located in the most suitable area as proven by the economic survey.

Land area: the site must cover enough land space to enhance proper construction of facilities and also allow for future expansion.

Architectural character: The use of glazing highlighted the need for transparency which is necessary to the architecture of a shopping mall.

Traffic resolution: The separation of the various traffic routes such as vehicular routes, pedestrian walkways and service routes were used to achieve good traffic resolution in the designs.

Structure and materials; Main materials used in the studied facilities includes steel, light metal cladding, PVC tensile fabric, reinforced concrete and glass. The facilities were mainly of reinforced concrete framed construction. The interior spaces were predominantly open plan hall spaces that are partitioned with light weight partition walls or sand crete walls. Steel

trusses were mostly used as roof members. Coated and well treated wooded trusses were also used.

DESIGN CONSIDERATION ABNORMAL TO PROPOSED SHOPPING MALLS

Circulation Spaces; This is the most important consideration among the design considerations. It is essential to provide both private and public spaces for shopping malls. Spaces for circulation and movement of customers in and within the shopping mall is the priority function of the shopping mall design. These spaces are mainly accessible during the operating hours by the general public and intending users. The private spaces such as the services zones through which the facility is serviced is very important and needs to be well located for easy access by delivery vehicles and also should be located out of the sight of customers. Also the location of these service zones should not interfere with customers and vehicular movement within the site.

Fire Precautions; Fire precautions provisions have to be taken into serious consideration to curb or reduce fire outbreaks such as, providing emergency exits and fire services installations such as water sprinklers and smoke detectors.

Firefighting Access; An access for fire fighting vehicles should be considered during the design to allow quick access to the scheduled points within the facility. Hose reels will be extended from the fire-fighting vehicles to cover all parts of the facility from the scheduled points of access.

Contribution to Knowledge

1. This study proves the possibility of creating unique shopping malls which can satisfy the need of the people in Abakaliki and the neighboring regions.
2. This study proves the importance of good circulation pattern and movement in shopping malls.
3. In a shopping mall facility, the mall streets are made wide enough to enhance easy and free flow of internal traffic in shopping mall.
4. An effective shopping mall design must have the service area separated from the customers area and a service route through which the shops can be serviced at any time without having customers and service conflict in the shopping mall.
5. In a shopping mall design, the anchor shops are placed at strategic locations to enable shoppers observe the satellite shops and feel the esthetic atmosphere while locating the anchor shops.

CONCLUSION

Shopping malls are enclosed shopping streets established for the purpose of public shopping and execution of other leisure activities. Shopping malls are not just designed for shopping activities alone, but are versatile and contains other facilities such as entertainment, cultural and recreational facilities that are well arranged together in an enclosure. The internal spaces of shopping malls are usually designed in such a way that it imitates the metropolitan streets and lifestyle which creates the impression of shops scattered along the streets. The layout and circulation patterns used as well as the links between the different spaces in a shopping mall forms a composite system which users are required to move through in and within the facility. Most times the use of complex circulation plan and improper circulation in a shopping mall creates an uneasy shopping atmosphere, poor wayfinding and difficulty in movement in and within the shopping mall either by poor orientation of spaces or improper positioning of vertical circulation systems in the facility. Hence it is essential to properly link all the spaces and services together in and within the facility. The priority of this study is to educate designers on the merits of adopting a good circulation model that is affiliated with their proposed mall design pattern and to integrate the researched mall circulation patterns into their proposed designs to optimize efficiency in shopping malls in Abakaliki.

RECOMMENDATIONS

Circulation in design is one of the determinant factors to achieve success or failure in the design of large projects such as a shopping mall. Hence, I recommend that circulation and movement pattern should be put into serious consideration during the preliminary design stages of any proposed shopping mall design in Abakaliki and other regions in Ebonyi State. The government of Ebonyi State should consider the gains of investing in such project as it will propel the economic growth of the state as well as create chances of employment to the residents of the state.

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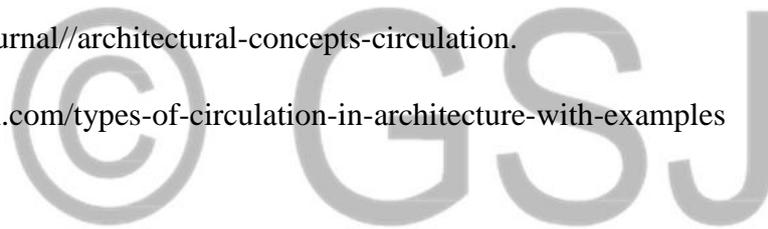
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