CHAPTER 1

INTRODUCTION
1.0 INTRODUCTION

Shopping complex is one or more buildings for merchandising, with interconnecting walkways enabling visitors to easily walk from unit to unit, along with a parking area—a modern, indoor version of the traditional market place within visually distinct scenery.

Shopping centres have become the most common of shopping environments and have influenced the makeup of cities around the world. However, in recent years, the enclosed mall has evolved and diversified with new types of retail environments that were developed to better suit their locale and meet public expectation.

1.1 BACKGROUND OF STUDY

Shopping malls are typically known to be indoor shopping, though some have outdoor areas with the shops having their own indoor space. The idea came from old covered market places that were popular between the 10th and 15th centuries, and are even still around today. In 1785, the first purposely-built shopping mall was created, but it was not until 1916 that a shopping mall as we consider them today was built in the United States. During the 1950s, large indoor shopping malls began to spring up in major cities across the world, with famous ones being built in Paris and London. As automobiles and suburbs sprung up, strip malls were created, which the first shopping mall were built outside of downtown areas.

1.2 STATEMENT OF ARCHITECTURAL PROBLEM

Awka, has no standard shopping mall, except for make shift or converted structures to serve the purpose of merchandising. Hence, the proposed design project is to come up with one for the state capital considering the factors; Space syntax, security, parking, access to site, and landscape.
• Space Syntax: To deal with the problem of space, the project will focus on deliberate design of spaces that are intuitively accessible to a wide range of users and to promote specific types of behaviours like communal interaction between people. The key node shops will be positioned at the ends of the complex with the ancillary shops to benefit patronage.

• Security: The problem of security and crime in shopping center will be considered, through the following ways.

  Bright lighting along the walkways; Siting security post just inside the entrance from an exterior walkway; limiting the distance people have to walk from the car to the mall entrance; Planting detectives within the site, inside and outside the shopping center.

• Parking: Shops in Awka have little or no adequate planned parking lots. This problem of parking space will be dealt with by providing adequate parking facilities.

• Access to the site: The project design, shopping complex will consider the following.

  i. Vehicular driveway must be located no closer than 1.5 metres from the boundary of the site and no closer than 6 metres to a corner boundary.

  ii. Vehicular driveway must not be located within 12 metres on the approaches to a “stop” or “give way” sign.

  iii. Vehicular driveway must cross the footpath or footway at right angles to the centerline of the road.

  iv. Vehicular driveway must be located so that any vehicle entering or leaving the site can be readily seen by the driver of an approaching vehicle in the street.

  v. Vehicular driveway must be clear of obstructions which may prevent drivers having a timely view of pedestrians.
1.3 AIM OF THE STUDY

The aim of this research is to design a functional shopping complex where vehicular and pedestrian movement will be reasonably resolved.

1.4 OBJECTIVES OF THE STUDY

- To develop an ultra modern shopping complex, providing complex and maximum satisfaction.
- To improve circulation in and around the shopping complex.
- To provide traffic arterials.
- To ensure pedestrian connections.
- To ensure vehicular parking areas are designed in such a manner as to be functional, aesthetically pleasing in terms of landscaping and safe for motorists and pedestrians.
- To ensure adequate car parking facilities are provided in association with developments.

1.5 MOTIVATION

From observations, Awka has no outstanding purposefully built shopping complex with adequately and planned vehicular and pedestrian movement which discourages users, especially car users.

1.6 SIGNIFICANCE OF THE STUDY

This project has been considered practicable with the reasons:

- Shopping center functions for money making, cater for customers ‘immediate pleasure and enjoyment.
The shopping center will stand as a structure that will improve the urban imagery of its environment which is an aspect of urban development.

- It will boost the development of governmental and private establishments in the environment. Such as banks, security companies, fire fighters etc.
- It will lead to mutual communal interaction between people from varying race and culture.

Hence, the study will ensure effective and efficient design to provide function, vehicular parking areas designed in such a manner as to be functional, aesthetically pleasing and safe for motorists and pedestrians.

1.7 SCOPE OF THE STUDY

The scope of the study is limited to the study area for shopping complex also, to consider the vehicular and pedestrian movement for the shopping complex.

1.8 LIMITATIONS OF THE PROJECT

Access to some local case studies to source for detail information was quite security tight except, with the help of letter of identification.

1.9 RESEARCH METHODOLOGY

Selection of an appropriate site and good conducive environment,

Means to source information:

i. Direct interview and inquiries from people.

ii. Personal observations.
iii. Case studies carried out on an existing similar project(s) in and outside Nigeria.

iv. Reference to textbooks, journals, newspaper, published and unpublished Master’s thesis reports.

v. Internet search engines

1.10 REFERENCES


UNPUBLISHED MASTER’S THESIS REPORT

- Unpublished Thesis:
Elisha, PG/MSC/08/53312. (2011), *Shopping Mall a Study on Spatial Syntax*. University of Nigeria Enugu Campus: A Thesis Submitted to Department of Architecture, Faculty of Environmental Studies.

WEBSITES

- http://www.wikipedia.encyclopedia
CHAPTER 2

LITERATURE REVIEW
2.0 INTRODUCTION

The shopping mall is a global phenomenon that has its roots in ancient outdoor bazaars where people would go to buy goods from local artisans, farmers and craftsmen. The shopping malls that we know today were birthed in the beginning of the 20th century and have since cover the major cities of the world in a few different forms. Not only has the shopping mall become a place to find and purchase goods, it is also known as a cultural hot spot where people of all ages can come to interact.

2.1 HISTORICAL BACKGROUND

The first structure which is considered to be a "shopping mall" in the present-day is located in The City of Damascus, the capital city of Syria. It is called Al-Hamidiyah Souq in old Damascus and dates back to the seventh century. Isfahan's Grand Bazaar, which is largely covered, dates from the 10th century. The 10 kilometer long covered Tehran's Grand Bazaar also has a long history. The Grand Bazaar of Istanbul was built in the 15th century and is still one of the largest covered markets in the world, with more than 58 streets and 4,000 shops.

Gostiny Dvor in St. Petersburg, which opened in 1785, may be regarded as one of the first purposely-built mall-type shopping complexes, as it consisted of more than 100 shops covering an area of over 53,000 m² (570,000 sq ft).

The Oxford Covered Market in Oxford, England opened in 1774 and still runs today.

The Burlington Arcade in London was opened in 1819. The Arcade in Providence, Rhode Island introduced the retail arcade concept to the United States in 1828. This was a forerunner of today's shopping mall (The Arcade, Providence RI). The Galleria Vittorio Emanuele II in Milan, Italy followed in the 1870s and is closer to large modern malls in spaciousness. Other large cities created arcades and shopping centres in the late 19th century and early 20th century, including the Cleveland
Arcade, Dayton (Ohio) Arcade and Moscow's GUM, which opened in 1890. Early shopping centers designed for the automobile include Market Square, Lake Forest, Illinois (1916) and Country Club Plaza, Kansas City, Missouri (1924).

An early indoor mall prototype in the United States was the Lake View Store at Morgan Park, Duluth, Minnesota, which was built in 1915 and held its grand opening on July 20, 1916. The architect was Dean and Dean from Chicago and the building contractor was George H. Lounsberry from Duluth. The building is two stories with a full basement, and shops were originally located on all three levels. All of the stores were located within the interior of the mall; some shops were accessible from inside and out. In the mid-20th century, with the rise of the suburb and automobile culture in the United States, a new style of shopping centre was created away from downtown. (www.clevelandmagazine.com) below is Plate 2.1.1 showing the "Sevens" shopping mall in Düsseldorf, Germany.

Plate 2.1.1: The "Sevens" shopping mall in Düsseldorf, Germany.

Source: www.wikipedia.com

**EARLY EXAMPLES**

The Arcade of Cleveland was among the first indoor shopping arcades in the US and an architectural triumph. When the building opened in 1890, two sides of the arcade had 1,600 panes of glass set in
iron framing. An early shopping center in the United States was Country Club Plaza, which opened in 1924 in Kansas City, Missouri. Other important shopping centers built in the 1920s and early 1930s are the Highland Park Village in Dallas, Texas; River Oaks in Houston, Texas; and Park and Shop in Washington, D.C. The suburban shopping mall, as Americans—and the world—came to know it, debuted in King County (Seattle), Washington in April 1950. Originally known as Northgate Center {now as Northgate Mall}, it was an open-air complex of eighty stores and services, anchored by a Seattle-based The Bon Marche. This idea was quickly copied in several American cities, such as with Lakewood Center (1951), in Lakewood, California, Shoppers’ World (1951), In Framingham, Massachusetts, Stonestown Center {now Stonestown Galleria} (1952) in San Francisco, California and Northland Center (1954), in Southfield, Michigan. Open-air-type malls were also built in Canada and Australia. Don Mills Convenience Centre {now Shops at Don Mills} opened in 1955, in Toronto, Ontario. Top Ryde Drive-In Shopping Centre {now Top Ryde City}, started trading to the public in 1957, in the environs of Sydney, New South Wales.

The fully-enclosed shopping mall did not appear until the mid-1950s. The idea of a regional-sized, fully-enclosed shopping complex was pioneered in 1956 by the Austrian-born architect and American immigrant Victor Gruen, although at least two community-sized, enclosed centers had been built in the United States: The Center in Omaha, Nebraska and Valley Fair Center in Appleton, Wisconsin. Both of these were completed during 1955.

This new generation of regional-sized shopping centers began with the Gruen designed Southdale Center, which opened in the Twin Cities suburb of Edina, Minnesota, USA in October 1956. For pioneering the soon-to-be enormously popular mall concept in this form, Gruen has been called the "most influential architect of the twentieth century". The first retail complex to be promoted as a "quote-unquote- "mall" was Paramus, New Jersey's Bergen Mall. The center, which opened with an
open-air-format in 1957, was enclosed in 1973. Aside from Southdale Center, significant early enclosed shopping malls were Harundale Mall (1958), in Glen Burnie, Maryland, Big Town Mall (1959), in Mesquite, Texas, Chris-Town Mall (1961), in Phoenix, Arizona, and Randhurst Center (1962), in Mount Propect, Illinois.

The early malls moved retailing away from the dense, commercial downtowns into the largely residential suburbs. This formula (enclosed space with stores attached, away from downtown, and accessible only by automobile) became a popular way to build retail across the world. Gruen himself came to abhor this effect of his new design; he decried the creation of enormous "land wasting seas of parking" and the spread of suburban sprawl.

In the UK, Chrisp Street Market was the first pedestrian shopping area built with a road at the shop fronts. Developers such as Alfred Taubman of Taubman Centers extended the concept further, with terrazzo tiles at the Mall at Short Hills in New Jersey, indoor fountains, and two levels allowing a shopper to make a circuit of all the stores. (Caitlin, 2007). Taubman believed carpeting increased friction, slowing down customers, so it was removed. (Caitlin, 2007). Fading daylight through glass panels was supplemented by gradually increased electric lighting, making it seem like the afternoon was lasting longer, which encouraged shoppers to linger. (Thane, 2007) Ala Moana Center in Honolulu, Hawaii is currently the largest open-air mall in the world and was the largest mall in the states when it was built in 1957. It is currently the sixteenth largest in the country.

The Bergen Mall, the oldest enclosed mall in New Jersey, opened in Paramus on November 14, 1957, with Dave Garroway, host of the Today Show, serving as master of ceremonies. (The New York Times, 1957) The mall, located just outside New York City, was planned in 1955 by Allied Stores to have 100 stores and 8,600 parking spaces in a 1,500,000 sq ft (139,000 m²) mall that would include a 300,000 sq ft (28,000 m²) Stern’s store and two other 150,000 sq ft (14,000 m²) department
stores as part of the design. Allied's chairman B. Earl Puckett confidently announced the Bergen Mall as the largest of ten proposed centers, stating that there were 25 cities that could support such centers and that no more than 50 malls of this type would ever be built nationwide.

(The New York Times, 1955., Time magazine, 1955). Below is Plate 2.1.2 depicting Amusement park at the center of the Mall of America in Bloomington, Minnesota, the largest shopping mall in the United States.

Plate 2.1.2: Amusement park at the center of the Mall of America in Bloomington, Minnesota, the largest shopping mall in the United States.

Source: www.wikipedia.com

2.1.1 TYPES: There are few different types of shopping malls that should be noted. The average shopping mall is less than 400,000 square feet, with those between 400,000 and 800,000 square feet being known as **regional shopping malls**. Because they are larger, they can accommodate higher end stores that may need more space for their stores.

**Super-regional malls** are those that are over 800,000 square feet. These are the premier shopping mall for the surrounding areas and suburbs.

**Strip malls** are strictly suburban and usually consist of large parking lots surrounded by single story shops.
Outlet malls are special shopping malls where manufacturers sell their products directly through their own stores.

2.1.2 FEATURES: The first shopping malls were composed mainly of independent shops with some food vendors scattered throughout. It wasn't long before food courts were added to give consumers a central place to eat. This also offered more choices of food. Other additions that were made to shopping malls through the 20th century included the addition of department stores. These were added when large finances were needed to keep bigger shopping running.

2.1.3 SIZE: From 1986 to 2004, the West Edmonton Mall in Alberta, Canada was considered the largest shopping center in the world. In less than four years it became the fourth largest, which shows the rapid growth of shopping malls during recent years. The largest mall in the world is the recently opened Mall of Arabia in Dubai, which will be 929,000 square meters in size. The second and third largest shopping malls are all located in China and Malaysia respectively.

2.1.4 POTENTIAL: The most recent history of shopping malls paints two very different pictures of the future of the buildings. Strip malls have quickly fell out of popularity and power shopping centers have taken their place. These feature big box retailers that often supply goods at lower prices than smaller local shops. In downtown districts, where land is expensive, vertical shopping malls are popping up, which include the design of skyscrapers. In the future, it is thought that most new malls will expand vertically rather than horizontally, including parking spaces for the mall.
2.1.5 MARKET PLACES IN NIGERIA

Markets have been in existence from the beginning of time, and form an integral part of any Nigerian town or village. Markets as an economic institution play a vital role in the economies of the nation as a whole. The relevance of the market is not only for its role in the economic life of rural and urban communities, but also as a social entity. Through the years, markets have acquired this distinctive social-cultural value (Vagale, 1974). The Nigerian economy is a developing one, as such small-scale retail trades, forms the bulk of the economic activity for the majority of the populace. Therefore, markets are very important, essential and indispensible. The present development plan of Nigerian government is geared towards industrialization with emphasis on rural area industrial development. The developing nations intend to develop in a sustainable manner and sustainable development is defined as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundland Report, 1987). In line with this, planned and orderly development of the old market places with some kind of permanent structure with a fixed location are now taking over the old places (Uzuegbunam, 1990).
2.1.6 MODERN SHOPPING MALLS GAINING MOMENTUM IN NIGERIA

Plate 2.1.3: The Palms shopping mall in Lagos was one of the first modern shopping centres in Nigeria.


The Palms mall in Lagos was one of the first modern shopping centres in Nigeria and is home to foreign brands such as Shoprite, Game and Nando’s. This world-class project was first conceived by Persianas Properties Limited which recently announced plans to expand the mall.

Brief history of the palms shopping mall: The Persianas Group consists of various businesses, of which Persianas Properties Limited is the largest. The Palms project was first conceived in 1999 by the chairman and managing director, Tayo Amusan. He was able to put together the team of architects, engineers and investors. Persianas launched this ground-breaking retail project in partnership with Actis in 2003 and it is now the premier shopping destination for all Nigerians. In 2007, Persianas bought out Actis’ stake, thus gaining 100% ownership of the project.

Significant increase in the construction of modern shopping centres in Nigeria over the coming years: The resounding success of The Palms has demonstrated to everybody – including retailers and investors – the pressing need for modern shopping malls, operated along international
standards. This ensures a clean, safe and quality shopping experience, as compared to the dirty environment offered by the unorganised markets. The Persianas Group has embarked on the development of six new malls in various locations in Nigeria and these are expected to be completed by 2011. By 2014 Persianas expects to own and operate 15 shopping malls across Nigeria. The various state governments have been displaying keen interest in partnership to develop modern shopping malls in their states, and have been evaluating various options on how to partner with them.

**Traditional markets coexist with modern shopping centres:** Internationally, in both developed and developing countries, traditional markets continue to co-exist with the modern shopping malls. Each offers its own unique proposition to the consumer. In any emerging market around 10-20% of the retail business is accounted for by the organised sector, while in Nigeria the organised sector is just emerging. The absence of modern shopping malls has been hampering the growth of the organised sector, and it is this need that Persianas propose to meet by developing the infrastructure required. The banks in Nigeria have also recognised the emergence of the organised retail sector and are aggressively supporting the development of more shopping malls. In the last couple of years, quite a few retailers have tasted success. This has shown them the power of organised retailing, and they have been putting in place systems and funds to expand across Nigeria. The recent turmoil in the international financial sector has however dampened the real estate sector in Nigeria but expects the situation to improve in the near future.

**Why the Palms shopping mall have been so successful:** The absence of any modern shopping malls in Nigeria has led to a great demand for such a development, and most importantly, The Palms have managed to maintain the international standards of operations and maintenance
consistently through the years, providing the retailers an opportunity to invest and grow their businesses over a longer period of time. The Palms have been very particular about the product/category mix, ensuring that all categories are well represented. This was achieved by a smart mix of positioning and tariffing for the various segments. For instance, the lease rentals would vary across segments and would also be determined by the profitability of each business. The Palms’ success is determined by the success of tenants.

**Demand from retailers to have a space in shopping malls like The Palms:** For each shop in the Palms, at least three to four prospective new retailers demands for the space. However, The Palms have decided to ensure that the mall has the right product/category mix, and do not necessarily rent space to the highest-paying bidder. Selection of the tenant/retailer is decided by the products being sold and the capability of the retailer to run the most efficient and profitable business.

**Persianas’ planned expansion of The Palms:** Persianas has embarked on the expansion of The Palms largely because of the great demand for retail and office space in Lagos. Land has been acquired adjacent to The Palms and have put together an international consortium of consultants and engineers to work on this project. The expansion will add approx 40,000 m² to the retail section, and plan to add two office towers with a total of 30,000 m² and a small hotel with 100 rooms to the project. The necessary parking space will be created by a multi-level car park with space for an additional 2,300 cars. The entire project will be self-reliant in respect of power back-up, water and sewage treatment, security, etc. The Palms expect the construction to start in the 1st quarter of 2010 and to be completed by 2014, though the retail component will be ready by 2012.

**Challenges Persianas face in property development in Nigeria:** The biggest challenge faced is getting financing at competitive rates and the severely fluctuating exchange rates, especially now
with the turmoil in the financial sector. There are other challenges too such as capacity in the construction industry and the availability of building materials and specialised skills; however these are manageable given to the Persians experience in the Nigerian environment.

**Foreign property developers looking to invest in Nigeria:** With a population of 140 million and growing, Nigeria offers an excellent opportunity for investors to cash in on the growth expected to occur in the next decade or two. The success of the telecom industry in Nigeria, which today is the largest market in Africa, is testimony to this. Those operators who came in early and took the risk are laughing all the way to the bank. Those who shield away in those days are ready to pay a fortune to enter this market now. Many state governments have actively started developing their states by creating a friendly environment for investment. The consumers in this country are very sophisticated and are capable of paying for quality products and services. All that it requires is for somebody to offer them the quality consistently. There are two ways to look at Nigeria’s absence of infrastructure – either viewing it as an opportunity to develop it, or waiting till somebody does it.

The Nigerian economy is growing, and this is leading to a demand for quality housing, office space and other related real estate infrastructure. Currently the rentals in certain areas of Lagos are probably the highest in the world, mainly because of the shortage of quality property. There is a huge gap in demand and supply, and the market is open to developers to fill the gap.
2.2 THEORETICAL FRAMEWORK

2.2.0 INTRODUCTION

In the last half-century, shopping formats in the west have evolved from the open precincts of the 1950’s, to the universal adaptation of enclosed centres, returning once again to favour more open natural shopping environments (Coleman, 2006). The enclosed shopping centres of mid 20\textsuperscript{th} century seem to become less popular in time as being monolithic, stand-alone buildings especially in city centres. A general criticism of the enclosed shopping developments refers to their physical isolation from the surrounding urban context (Maitland, 1990). They seem to destroy the natural permeability of an urban block [figure 2.2.1]. This set the agenda for a new generation centres in central area redevelopment projects, to bring back the essential relationship between the shopping mall and the city centre. This idea has been tackled by insulating the enclosed retail buildings into the surrounding texture of the city to enhance movement pattern and densities in shopping areas. Many urban design theorists, from Jane Jacobs to Leon Krier, have argued that a healthy urban fabric needs to be highly permeable). Hillier describes ‘Disurbanism’ as the breaking of the relation between buildings and public spaces by breaking the relation between scales of movement i.e. the breaking of the interface between the inhabitant and stranger (Hillier, 1996). In fact an integrated internal external movement system not only increase the accessibility and permeability of the internal shopping environment but also contributes to the formation of city environments, which are rich and successful in physical and social, as well as in commercial terms. Therefore, the evolution of shopping centre forms in the past few decades has focused on the way they interact with their surrounding urban context to make them more commercially and environmentally sustainable.
Figure 2.2.1: Modern shopping developments seem to destroy the natural permeability of an urban block.

Source: Time Saver for Building Types.

2.2.1 RETAIL ENVIRONMENT IN A DEVELOPING CONTEXT

The situation is more critical in developing countries. The more rapidly the countries urbanise the more difficult becomes the question of provisioning the city. This problem is accentuated by virtue of the rapid growth of urban populations in developing countries. Rural to urban migration has continued to be a major contributor to urban growth, whilst the economics of Third World cities have failed to generate sufficient employment for their growing population. The ‘surplus population’ has been forced to generate its own employment in the so-called ‘informal sector’. Among various types of occupational patterns in the informal sector, retailing activities as an entry point are attractive to immigrant groups, since they provide the opportunity of self employment with minimal capital investment and technical constraints (Paddison, et. al., 1990). These factors contribute to the extensive growth of informal hawking activities within and around urban retail centres. Thus, retail areas in developing countries are characterized by varying group of retailers and consumers and involves a wide variety of institutions; which have, for research purposes, often been reduced to the
‘formal’ and ‘informal’ sectors. The spatial changes in the former one reflects the penetration of western consumer values; whereas the informal sector represents a potential solution to unemployment in developing countries (Mortuzza; 1987). Thus, in less developed countries retail outlets with western characteristics seem to coexist uneasily alongside ‘informal’ traders. In general, ‘place-specific’ retail developments in various developing context appears to be more integrated with their urban context by accommodating formal and informal retail functions within a shopping development; whereas, the imported ideas from the west fails to ensure an interactive retail environment as they tend to accommodate a specific economic class of retailer and consumer, hence, physically isolate themselves from a specific urban context (Paddison, et al., 1990).

2.3 CIRCULATION SYSTEM

Retail may appear very different; the underlying principles regarding circulation are the same.

The following floor plan of Bluewater (Fig 2.3.1) is one of the best examples of a properly laid out enclosed shopping centre.

![Floor plan of Bluewater shopping centre](image)

Figure 2.3.1: Floor plan of Bluewater shopping centre

Source: Time Saver for Building Type
“Anchors” is the term used to describe the largest draws for a retail centre. Typically in a mall these anchors are department stores and movie theatres, although this is now changing to include other users such as clusters of restaurants and innovative entertainment concepts.

“Sub-anchors” apply to large stores (often around 10,000 ft²) which are generally not the primary reason people visit a shopping centre, but may be a destination for visitors after arriving.

Smaller stores are called “inline tenants” which, although they may only make up 40% of the leased floor space, are the largest rental revenue generators. Inline tenants will pay a significantly higher premium for the privilege of being located near foot traffic generating anchors. Anchor stores know this and subsequently negotiate heavily subsidized leases from mall owners.

The most important principle to adhere to in retail planning is to encourage circulation of visitors. Retailers depend heavily on the flow of foot traffic past their windows: “window shopping” often does translate into actual shopping. The best place to learn about circulation is from already planned shopping centres.

Although a mixed use project may not include the same retail anchors as in a mall, it still operates on the basis that visitors must be attracted in some way and circulates past inline tenants. Mixed use projects that expected visitors to come simply because they offer such an amazing environment failed badly during the last recession. Anchors and circulation are needed. The same applies equally to outdoor street shopping environments.

These principles are relatively easy to apply in a greenfield pure retail project which lacks barriers and constraints seen in mixed use projects. In denser, more urban environments with a mix of vertically integrated uses, circulation becomes increasingly difficult to implement effectively. Far
too many examples exist where developers tried to squeeze in extra retail floor space with little understanding as to how customers will actually access it. Vacant space is worse than no space. When creating a plan, think about the project from the perspective of a customer. Where are they going to park, where are they headed, and what will they pass on the way there?

At the end of the day, it is the anchoring and circulation system which defines the success of retail – mixed use or otherwise. Attractive architecture, public spaces, fountains, benches all help, but alone these do not make retail successful. Some of the world’s most successful retail projects are also some of the most unattractive.

How can street and block design reconnect urban neighborhoods? How can workplace design make knowledge-work more productive? How can office layouts express organizational culture and improve employee satisfaction? These are very diverse questions concerning design, the evaluation of design, and our understanding of the principles of form. However, they all require that we think of space as a pattern of relationships whose structure we want to understand and work with in some way.

Space syntax is about identifying, representing, and measuring the spatial relationships that help us get on with our lives. The creation of these relationships is among the main purposes served by our built environment. And while we would not be able to live our everyday lives without a working understanding of the principles and constraints that govern these relationships, their deliberate creation or transformation through architectural design requires theory. The aim of space syntax is to arrive at an understanding of principles of spatial design and a critical evaluation of precedents and prospects.
2.3.1 SPACE SYNTAX

The term space syntax encompasses a set of theories and techniques for the analysis of spatial configurations. Originally it was conceived by Bill Hillier, Julienne Hanson and colleagues at The Bartlett, University College London in the late 1970s to early 1980s as a tool to help architects simulate the likely social effects of their designs.

The general idea is that spaces can be broken down into components, analyzed as networks of choices, and then represented as maps and graphs that describe the relative connectivity and integration of those spaces. It rests on three basic conceptions of space:

- **An isovist** (popularised by Michael Benedikt at University of Texas), or view shed or visibility polygon, the field of view from any particular point.
- **Axial space** (idea popularized by Bill Hillier at UCL), a straight sight-line and possible path, and
- **Convex space** (popularized by John Peponis and his collaborators at Georgia Tech), an occupiable void where, if imagined as a wireframe diagram, no line between two of its points goes outside its perimeter, in other words, all points within the polygon are visible to all other points within the polygon.

The three most popular Space Syntax analysis methods of a street network are **Integration, Choice** and **Depth Distance**.

- **Integration** measures how many turns one has to make from a street segment to reach all other street segments in the network, using shortest paths. If the amount of turns required for reaching all segments in the graph is analyzed, then the analysis is said to measure integration at
radius 'n'. The first intersecting segment requires only one turn, the second two turns and so on. The street segments that require the least amount of turns to reach all other streets are called 'most integrate' and are usually represented with hotter colors, such as red or yellow. Integration can also be analyzed in local scale, instead of the scale of the whole network. In case of radius 4, for instance, only four turns are counted departing from each street segment. Theoretically, the integration measure shows the cognitive complexity of reaching a street, and is often argued to 'predict' the pedestrian use of a street. It is argued that the easier it is to reach a street, the more popularly it should be used. While there is some evidence of this being true, the method is also biased towards long, straight streets that intersect with lots of other streets. Such streets, as Oxford street in London, come out as especially strongly integrated. However, a slightly curvy street of the same length would typically not be counted as a single line, but instead be segmented into individual straight segments which makes curvy streets appear less integrated in the analysis.

- **Choice** measure is easiest to understand as a 'water-flow' in the street network. Imagine that each street segment is given an initial load of one unit of water, which then starts pouring out of the starting street segment onto all the other segments that successively connect to it. Each time an intersection appears, the remaining value of flow is divided equally amongst the splitting streets, until the other entire street segments in the graph are reached. For instance, at the first intersection with a single other street, the initial value of one is split into two remaining values of one half, and allocated to the two intersecting street segments. Moving further down, the remaining one half values are again split among the intersecting streets and so on. When the same procedure has been conducted using each segment as a starting point for the initial value of one, then a graph of final values appears. The streets with the highest total values of accumulated flow are said to have the highest choice values. Like Integration, Choice analysis too can be restricted to limited local radii,
for instance 400m, 800m, 1600m etc. Interpreting Choice analysis is trickier than Integration. Space Syntax argues that these values often predict the car traffic flow of streets. However, strictly speaking, Choice analysis can also be thought to represent the number of intersections that need to be crossed to reach a street. However, since flow values are divided, not subtracted at each intersection, the output shows an exponential distribution. It is considered best to take a log of base two of the final values in order to get a more accurate picture.

- **Depth Distance** is the most intuitive of the three analysis methods; it explains the linear distance from the center point of each street segment to the center points of all the other segments. If every segment is successively chosen as a starting point, then a graph of accumulative final values is achieved. The streets with lowest Depth Distance values are said to be nearest to all the other streets. Again, the search radius can be limited to any distance.

### 2.3.2 INTERIORS

Our analyses of building interiors often look at lines of movement, similar to the analysis of streets. In addition, we analyze visual fields. We consider the visibility polygons (or “isovists,” to use the term coined by Michael Benedikt, University of Texas at Austin) from each tile on a grid superimposed over usable space, and we measure their properties and patterns of intersection. The study of visual fields in conjunction with the study of how users occupy and move through space allows us to assess the patterns of what users are likely to be aware of and encounter in a setting. This is particularly relevant when we deal with work environments.

A workplace design suggested three principles for supporting knowledge work and innovation.

- First, spatial design supports knowledge-work by sustaining *frequent work-related informal interactions.*
Such interactions can be encouraged locally through controlled visual openness and the spatial grouping of workstations. Interactions across larger organizational units are supported by making the organization more spatially intelligible.

This is achieved by designing legible plans with clear integrating cores or circulation spines, by distributing the people who are hubs of interaction networks in more prominent and accessible locations, and by bringing frequent paths of movement in contact with meeting spaces and informal gathering areas. It is not a matter of minimizing the distance between particular individuals to facilitate communication, as it was thought in the 1960s and 1970s. Rather, it is a matter of distributing opportunity for the organization as a whole.

• Second, spatial design supports knowledge-work by allowing visual traces of thought processes to be available in the background of commonly used spaces. This is further assisted by devices and equipment that help to carry and redeploy visual displays from one area to another as dictated by schedules of space-use.

• Third, spatial design supports knowledge-work by providing settings for different work styles, some proximate to the main spines of movement and hubs of activity and some at a distance from them, but all within the compass of a well integrated plan. Should space syntax principles survive further testing, we have to ask why they work.

Is it because they increase the speed at which successful ideas become known and absorbed by an organization?

Is it because they make human resources, individual knowledge, experience, and skills easily available to other people?
WHY AND WHEN TO USE SPACE SYNTAX

With these caveats in mind, why and when would a practitioner or researcher use space syntax? Practitioners should consider using space syntax to evaluate how alternative design options meet explicit design objectives or to help generate design alternatives that address a specific problem. Space syntax is also applicable in fields of design practice that require collaboration, for example, designing pedestrian-friendly environments in cities, or improving the intelligibility of complex wayfinding systems in hospitals. Space syntax researchers have made extensive inquiries into urban design, museum and exhibition design, work environments, and hospital design. Researchers should consider using space syntax when their research requires that they describe with precision how spatial environments enable or impede users’ behaviours. Their research can contribute to the development of space syntax by making it increasingly sensitive to the spatial properties of the environment under investigation. Space syntax provides a unique foundation for evidence-based learning and design precisely because it provides a systematic framework for comparing environments and their performance.

2.3.3 SOCIAL ACTIVITIES IN SHOPPING MALL

With the spread of globalization, shopping mall are becoming a part of the urban lifestyle in many countries, their numbers are increasing rapidly in metropolitan areas. In addition to their retail outlets, these newly designed, well-kept shopping centres do not offer facilities that enable people to pursue leisure activities and engage in social interaction especially in Nigeria. The research would help the people using the shopping mall as a social space rather than simply a shopping space.

For example, a field survey was carried out in EGE Park Maviehir shopping centre in Izmir, the third largest city in Turkey. The centre is in a suburban area that was recently established as a high-income housing settlement. The results of statistical analysis of the data show that shopping centres
corporate community space functions in, and attracts their users especially teenagers for its physical attractiveness, entertainment and leisure facilities and social interaction more than the shopping activities.

The activities and characteristics important to consumer behaviour about shopping centres, the results tend to converge on 5 dominant factors which are-

1 **Attractiveness**: Atmosphere (Downs, 1970; Bearden, 1977; Davies et al, 1978; Van Raaij, 1983; Dawson et al, 1985; Robertson, 1994; Brown, 1994; Loukaitou-et al., 1997; Oppewal et al, 1999; Severin et al., 2001; Frasquet, 2001; Erkip, 2005; Anselmsson, 2006, Puccinelli et al., 2009),

2 **Socializing** (Van Raaij, 1983; Goss, 1993; Southworth, 2005; Staeheli et al., 2006),

3 **Leisure and Entertainment** (Tauber, 1972; Goss, 1993; Bloch et al., 1994; Arnold et al., 2003 Erkip, 2005; Mugan et al., 2009 ),

4 **Importance of the location**: (Bearden, 1977; Van Raaij, 1983; Severin et al., 2001; Frasquet et al., 2001, Yilmaz, 2004., Cheng 2007),

5 **Retail Environment** (Frasquet et al., 2001).

1. Attractiveness (atmosphere, attention to lighting, seating and toilets, interior design, neat and well cared for, air conditioned, security provided, car park facility): To assess the effectiveness of shopping center upgrading plans, interest may focus on the various attributes that underlie consumer evaluations of public space appearance and atmosphere in shopping centers (Oppewal et al., 1999; Brown, 1994; Davies et al., 1978; Dawson et al., 1985; Loukaitou et al., 1997; Robertson, 1994). Though it is not the most important factor in determining consumer choice of retail destination, it is the atmosphere and appearance of store environment may nevertheless contribute to the attractiveness of a store or shopping centre. This is exemplified by Downs (1970), who proposes in
his seminal paper that nine component constitute the image of urban downtown shopping centres. Among these nine, he distinguished four public space characteristics (structure and design, ease of internal movement and parking, visual appearance, and atmosphere) (Oppewal et al., 1999). A good atmosphere motivates people to stay longer and purchase more. Atmosphere has been found to be a significant factor in people’s decisions to visit a shopping centre (Bearden, 1977; Severin et al., 2001; Frasquet, 2001). Public spaces that are clean, fresh, and visually appealing with a modern appearance attract many visitors. Specifically, environmental stimuli (e.g., store lighting) can influence a consumer's emotional state (e.g. pleasure, arousal), which in turn drive the consumer's approach or avoid behavior (e.g., willingness to buy). For example, a retail store with soothing, dim lights might lead a consumer to experience the store as more pleasant and stay longer (Puccinelli et al., 2009). Decorations are important and spaces should be kept as bright and spacious as possible (Anselmsson, 2006). However some of the researchers claim that the role of atmosphere in the choice of a particular mall seems to be more limited than the social/cultural concerns (Erkip, 2005).

2). Socializing (make friends, to meet and getting together with friends): Shopping centers provide opportunities for their users to socialize. Although they are privately owned, such spaces are used by the public. Some of them are almost real community centers (Southworth, 2005). In North American cities, shopping malls are heralded as the new town square. Shopping is the most important contemporary social activity, and, for the most part, takes place in the shopping center (Goss, 1993). Shopping centers, which are separated from the old downtown by distance or design, seem for many people to be the new heart of public and social life (Staeheli et al., 2006). Later research extends to cover wider aspects of consumer behavior (Feinberg et al.,1991).It is found that malls serve as a place for stimulating social behavior.
3). Entertainment and leisure (billiard hall, bowling alley, market stall, cafes, restaurants, cinemas, fitness centers, art exhibitions, shows and music concerts): Shopping centers are designed as a complex, which provide a new experience for post modern users/citizens in Western cultures. This experience changed the nature of shopping, now merged into leisure and entertainment (Erkip, 2005). Shopping is also a form of leisure. Some researchers have noted that shoppers in shopping centers are generally more like leisure seekers. As (Mugan et al., 2009) teenagers spend much of their leisure time at shopping malls. Entertainment quickly became an industry in the early 1990’s. Bloch et al. (1994) found that malls are viewed by consumers as a place not only for shopping, but also for other activities, such as entertainment. Many shopping centers now enjoy children’s play spaces, virtual reality games, live shows, movies in multiplex cinemas, a variety of food in either food courts or themed restaurants, and interactive demonstrations. Also shopping is a major leisure activity of Americans and in fact it is the second most important leisure activity, after television watching (Goss, 1993). Consumers shop for various reasons, which may not include a specific need for a product or service (Tauber, 1972); for example, they may need entertainment, recreation, social interaction, or intellectual stimulation (Arnold et al., 2003).

2.3.4 ANALYSES IN STORE MOVEMENT AND SALE PATTERN:

A procedure for deriving maps of shopper movement within a store by analyzing the items a shopper purchased. Movement within a store is conceptually similar, but the geographic factors and basic approach are different. The analysis scale collapses from miles along a road network, to feet through a maze of aisles and fixtures. Since the rules of the road and fixed widths of pavement don’t exist, shoppers can (and do) move through capricious routes that are not amenable to traditional network analysis. However, at least for me, the objective is the same-get to the place(s)
with the desired products, then get out and back home as easily as possible. What has changed in the process isn’t the concept of movement, but how movement is characterized.

Figure 2.3.2: Establishing Shopper Paths. Stepped accumulation surface analysis is used to model shopper movement based on the items in a shopping cart.

Source: www.innovativegis.com/basis/mapAnalysis/Topic6/Topic6_files/image003.png

The floor plan of a store is a continuous surface with a complex of array of barriers strewn throughout. The main aisles are analogous to mainline streets in a city, the congested areas are like secondary streets, and the fixtures form absolute barriers (can’t climb over or push aside while maintaining decorum). Added to this mix are the entry doors, shelves containing the elusive items, cash registers, and finally the exit doors. Like an obstacle race, your challenge is to survive the course and get out without forgetting too much. The challenge to the retailer is to get as much
Data analysis originally focused on reordering schedules, then extended to descriptive statistics and insight into which products tend to be purchased together (product affinities). However, mining the data for spatial relationships, such as shopper movement and sales activity within a store, is relatively new. The left portion of figure 2.3.2 shows a map of a retail superstore with fixtures (green) and shelving nodes (red). The floor plan was digitized and the fixtures and shelving spaces were encoded to form map features similar to buildings and addresses in a city. These data were gridded at a 1-foot resolution to form a continuous analysis space. The right portion of figure 2.3.2 shows the plausible path a shopper took to collect the five items in a shopping cart. This technique constructs an effective proximity surface from a starting location (entry door) by spreading out (increasing distance waves) until it encounters the closest visitation point (one of the items in the shopping cart). The first leg of the shopper’s plausible path is identified by streaming down the truncated proximity surface (steepest downhill path). The process is repeated to the establish the next tier of the surface by spreading from the current item’s location until another item is encountered, then streaming over that portion of the surface for the next leg of the path. The spread/stream procedure is continued until all of the items in the cart have been evaluated. The final
Figure 2.3.3: Shopper Movement Patterns. The paths for a set of shoppers are aggregated and smoothed to characterize levels of traffic throughout the store.

Source: www.innovativegis.com/basis/mapAnalysis/Topic6/Topic6_files/image003.png

Similar paths are derived for additional shopping carts that pass through the cash registers. The paths for all of carts during a specified time period are aggregated and smoothed to generate an accumulated shopper movement surface. Although it is difficult to argue that each path faithfully tracks actual movement, the aggregate surface tends to identify relative traffic patterns throughout the store. Shoppers adhering to “random walk” or “methodical serpentine” modes of movement confound the process, but their presence near their purchase points are captured.
The left portion of figure 2.3.3 shows an aggregated movement surface for 163 shopping carts during a morning period; the right portion shows the surface for 94 carts during an evening period of the same day. The cooler colors (blues) indicate lower levels of traffic, while the warmer colors (yellow and red) indicate higher levels. Note the similar patterns of movement with the most traffic occurring in the left-center portion of the store during both periods.

The previous section described a procedure for deriving maps of shopper movement within a store by analyzing the items a shopper purchased. An analogy was drawn between the study of in-store traffic patterns and those used to connect shoppers from their homes to a store’s parking lot… aisles are like streets and shelving locations are like street addresses. The objective of a shopper is to get from the entry door to the items they want, then through the cash registers and out the exit. The objective of the retailer is to present the items shoppers want (and those they didn’t even know they wanted) in a convenient and logical pattern that insures sales.

Though conceptually similar, modeling traffic within a store versus within a town has some substantial differences. First the vertical component of the shelving addresses is important as it affects product presentation. Also, the movement options in and around store fixtures (verging on whimsy) is extremely complex, as is the characterization of relative sales activity. These factors suggest that surface analysis (raster) is more appropriate than the traditional network analysis.
(vector) for modeling in-store movement and coincidence among maps.

Figure 2.3.4: A shopper’s route is the steepest downhill path over a proximity surface.

Source: www.innovativegis.com/basis/mapAnalysis/Topic6/Topic6_files/image003.png

Path density analysis develops a “stepped accumulation surface” from the entry door to each of the items in a shopper’s cart and then establishes the plausible route used to collect them by connecting the steepest downhill paths along each of the “facets” of the proximity surface.

The figure 2.3.4 illustrates a single path superimposed on 2-D and 3-D plots of the proximity surface for an item at the far end of the store. The surface acts like mini-staircase guiding the movement from the door to the item.
Figure 2.3.5: Analyzing coincidence between shopper movement/sales activity surfaces.

Source: www.innovativegis.com/basis/mapAnalysis/Topic6/Topic6_files/image003.png

The procedure continues from item to item, and finally to the checkout and exit. Summing and smoothing the plausible paths for a group of shoppers (e.g., morning period) generates a continuous surface of shopper movement throughout the store - a space/time glimpse of in-store traffic. The upper left inset of figure 2.3.5 shows the path density for the morning period described last time. The lower left inset identifies sales activity for the same period. It was generated by linking the items in all of the shopping carts to their appropriate shelving addresses and keeping a running count of the number of items sold at each location. This map summarizing sales points was smoothed into a continuous surface by moving a “roving window” around the map and averaging the number of sales within a ten-foot radius of each analysis grid cell (1 square foot). The resulting surface provides another view of the items passing through the checkouts— a space/time glimpse of in-store sales
action. The maps in the centre identify locations of high path density and high sales activity by isolating areas exceeding the average for each mapped variable.

As you view the maps note their similarities and differences. Both seem to be concentrated along the left and centre portions of the store, however, some “outliers” are apparent, such as the pocket of high sales along the right edge and the strip of high traffic along the top aisle. However, a detailed comparison is difficult by simply glancing back and forth. The human brain is good at a lot of things, but summarizing the coincidence of spatially specific data isn’t one of them.

The enlarged inset on the right is an overlay of the two maps identifying all combinations. The darker tones show where the action isn’t (low traffic and low sales). The orange pattern identifies areas of high path density and high sales activity—what you would expect (and retailer hopes for).

The green areas are a bit more baffling. High sales, but low traffic means only shoppers with a mission frequent these locations a bit inconvenient, but sales are still high.

The real opportunity lies in the light blue areas indicating high shopper traffic but low sales.

But the strip in the lower centre of the store seems to be an “expressway” simply connecting the high/high areas above and below it. The retailer might consider placing some end-cap displays for impulse or sale items along the route, or maybe not. It would be silly to make a major decision from analyzing just a few thousand shopping carts over a couple of days. It allows retailers to gain insight into the unique space/time patterns of their shoppers without being obtrusive or incurring large data collection expenses. The raster data structure of the approach facilitates investigation of the relationships within and among mapped data. For example, differences in shopper movement between two time periods simply involve subtracting two maps. If a percent change map is needed, the difference map is divided by the first map and then multiplied by 100.
If average sales for areas exceeding 50% increase in activity are desired, the percent change map is used to isolate these areas, and then the values for the corresponding grid cells on the sales activity map are averaged. From this perspective, each map is viewed as a spatially defined variable, each grid cell is analogous to a sample plot, and each value at a cell is a measurement—all just waiting to unlock their secrets.

The first part of this series described a procedure for estimating shopper movement within a store, based on the items found in their shopping carts.

The second part extended the discussion to mapping sales activity from the same checkout data and introduced some analysis procedures for investigating spatial relationships between sales and movement.

Recall that the raster data structure (1-foot grids) facilitated the analysis as it forms a consistent “parceling” of geographic space. Within a “map-ematical” context, each value at a grid cell is a measurement, each cell itself is analogous to a sample plot, and each gridded map forms a spatially defined variable.
Figure 2.3.6: Snapshots from a movie of hourly maps of shopper movement and sales activity.

Source: www.innovativegis.com/basis/mapAnalysis/Topic6/Topic6_files/image003.png

The recognition that maps are data as well as pictures fuels this “data mining” perspective. Cognitive abstractions of data coupled with physical features for geographic reference form new and useful views of the spatial relationships within a data set. For example, the insets in figure 2.3.6 show three “snapshots” of an animated sequence of the surfaces depicting shopper movement (left side) and sales activity (right side). The checkout data for a twenty-four hour period was divided into
hourly segments and the movement and sales surfaces generated were normalized, and then assigned a consistent color ramp for display. When viewed in motion, the warmer tones (reds) of higher activity appear to roll in and out like wisps of fog under the Golden Gate Bridge. The similarities and miss-matches in the ebb and flow provide a dramatic view (and new insights) of the spatial/temporal relationships contained in the data. Data visualization techniques, such as animation and 3-D datascapes, render complex and colorless tables of numbers into pictures more appropriate for human consumption. Although the human brain is good at many things, detailed analysis of mapped data is not one of them. Visualizing the hourly changes provides a general impression of the timing and patterns in shopper movement and sales activity. However, additional insight results from further map identifying locations of “significant” difference at each time step. This is accomplished by subtracting two surfaces (e.g., movement at midnight minus movement at 1am), calculating the mean and standard deviation of the difference surface, then isolating and displaying the locations that are more than one standard deviation above and below the mean. When animated, the progression of the pockets of change around the store forms yet another view of the checkout data.

Segmentation of a data set forms the basis of many of the extended data mining procedures. In addition to time (e.g., hourly time steps) the data can be grouped through spatial partitioning. For example, each department’s “footprint” can be summarized into an index of shopper “yield” as a ratio of its average sales to its average movement - calculated hourly shows which departments are performing best at each time step.

A third way to segment a data set is by data characteristics. For example, traditional product “affinity” analysis that notes which items tended to be purchased together can be extended to its
spatial implications. Common sense suggests that items with a high product affinity, such as shampoo and conditioner, should have a high spatial affinity (shelved close together).

Proximity analysis is used to determine effective distance between items, normalized to an affinity index, and then compared to the pair’s product affinity index. Miss-matches identify inconveniently shelved items - similar products shelved far apart or dissimilar products close together. The affinity information also assists in optimizing the shelving of impulse and sales items for frequently changed action aisle and end-cap displays.

Figure 2.3.7 shows another data characteristics segmentation analysis. The top left map summarizes all of the shopper paths that contained items from Department 5 (Electronics delineated by the dotted rectangle). Note the concentration of paths within the vicinity of the Department indicating that purchasers of these items tended not to venture into other departments. The bottom left inset is a similar map for Department 3 (Card & Candy). Note the larger number and greater dispersion of paths compared to Department 5.

Figure 2.3.7: Departmental comparison of shopper movement patterns.

Source: www.innovativegis.com/basis/mapAnalysis/Topic6/Topic6_files/image003.png
The large map on the right shows areas of large differences in path density between Shopping Carts containing items from Departments 3 (orange) and 5 (blue). It is expected that the areas within the departments (dotted rectangles) show large differences. The blue areas at the top, however, show more shoppers purchasing electronics traveled to men’s wear that those purchasing cards & candy. Common sense verified by empirical data. It leads one to wonder what insights might be gained from analysis of the orange area (more cards & candy traffic) or other departmental comparisons.

2.4 VEHICULAR MOVEMENT AND TRAFFIC IN THE SHOPPING CENTRE.

Unless the car park provides free or subsidised parking, its location is of utmost importance. An inconvenient location may have serious consequences on the commercial success of a car park within the shopping centre. The difference of one city block could mean a loss of commercial attraction and possible failure of the car park operation. Generally speaking, the level of occupancy and revenues to be derived from a car park are contingent upon its location, its convenience to the generator(s) it serves and to other centres of attraction, the road network, and last but not least on the parking convenience in the facility itself. A car park should be located within walking distance of the main places of destination. (A point to remember is the fact that people are prepared to walk longer distances when they park free of charge.) If possible it should not be tucked away out of sight or its entrance located in secondary streets. If the car park entrance is to be located away out of sight, then access to it should be clearly signed and the car park occupancy advised on route (by dynamic parking guidance signs) so that redundant traffic circulation within the street system can be minimized and, if necessary, alternative car parks directed to. However, in small cities or suburban shopping districts, where the knowledge of parking areas is more prevalent, car park entrances may be located in secondary streets. As mentioned above, car
park entrances should be clearly defined and obviously distinguishable from exits. Increased attention should be paid to the architectural design of entrances as the pleasing and inviting “first impression” can contribute to successful parking operation. The number of entries and exits should be restricted to what is actually required. Broadly speaking, the number of entry and exit lanes is determined by the maximum number of vehicles that can be processed through a lane in one hour. Providing more than the required number of access ways may not necessarily alleviate traffic problems and could, on the contrary, create operational difficulties and security problems inside the car park. Where possible, both entries and exits should be orientated to favour left-hand turns for incoming and outgoing traffic.

Vehicular access to the site should be planned so as:

To provide easy access to parking by means of a satisfactory rate of receiving, storing and discharging vehicles,

To minimize conflicts between vehicles and pedestrians,

To minimize the impact of driveways and ramps on the building frontage, and

To diffuse traffic onto surrounding streets in a satisfactory manner.

2.4.1 QUEUING AREAS, INTAKE AND DISCHARGE CAPACITY

The efficiency of a car park’s design and its subsequent operation is conditional on the provision of adequate entrance and exit capacities. They depend on the expected flow of traffic, extent of the queuing reservoir (particularly on entry), and the service rate of the control equipment installed and on the street absorption capacity particularly at exit. Sufficient queuing capacity should be provided at entry between vehicular control points and the street alignments so that cars can queue inside the site and not adversely affect traffic flow in surrounding streets or obstruct movements in other parts of the car park. Good design practice would also call for the provision of a queue length on exiting,
between the exit control points and street alignment. This would not only accommodate cars waiting to enter the road flow but it also enable a driver to draw clear immediately when the boom gate opens. It would also alleviate cars from stacking up and hampering the check-out procedures in case pedestrians are crossing the driveway. The length of queuing / holding reservoir on exiting can be determined on the basis of traffic engineering analysis of a car park exit onto a road as for a T-junction. Ideally car parks should be capable of receiving and discharging their static capacity within a maximum of one hour. However, we don’t live in an “ideal “world and this desired aim is frequently impossible to achieve. Consequently car parks are usually designed to receive and discharge the projected peak inflows and outflows (determined by traffic impact studies and usually expressed as a % of the static capacity) within one hour. The term static capacity relates to the total number of parking spaces in a car park. Special event car parks, i.e. the ones that cater to a surge type of parking demand should be able to empty in less than one hour. It is not unusual for the discharge capacity of such facilities to be 30 minutes.

2.4.2 LEVELS OF SERVICE

Each and every part of a car park can be assessed by its dynamic performance, which is characterised by its dynamic capacity, sometimes referred to as service capacity or handling capacity. These terms are applied to the maximum flow of cars (or people) which can be processed through the car park, or its part under examination, in an hour. Analysis of car park dynamic capacities is entailed in the level of service concept, which in principle is similar to the concept used in traffic engineering for roadway traffic. Level of service is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and passengers. For example, the parking space dimensions recommended in some countries are based on a level of service range “C” to “D” which
is considered adequate for low turnover operations. Other parking consultants using the same concept of dynamic performance define the levels of service for car parking facilities thus:

High Level of Service - when the traffic flows are below the dynamic capacity.

Satisfactory Level of Service - when the traffic flows are equal to the dynamic capacity.

Unsatisfactory Level of Service - when the traffic flows are in excess of the dynamic capacity.

It is obvious that the establishment of dynamic capacities is of paramount significance in the level of service concept. Dynamic capacities of aisles and parking areas can be expressed by a number of formulas as applicable for inbound and outbound flows. They are subject to numerous variables such as aisle width, space dimensions, percentage of cars reversing into spaces, etc. A good example is presented in Exhibit 2 depicting the floor plan of an underground multi-level car park for 2500 cars with which the author was involved some years ago. Dynamic capacity of the principal circulation aisle was calculated as 1100 cars inbound and 900 cars outbound. In order to accommodate the projected peak traffic flow (particularly on the levels nearest to the entry and exit control points) there were two circuits of express vertical travel employed catering to both the inbound and outbound traffic. Adoption of this measure resulted in achieving a high level of service inside the car park. An interesting application of dynamic capacity is for entries and exits.

Car park entrances and exits, which incorporate boom gate control, behave as intersections with traffic signals allowing one vehicle through each green cycle. In the standard procedures of traffic engineering for capacity analysis, the rate of traffic flow is measured in 15 min periods, although a period of 30 minutes or the full period of one hour is often used. In the car parking application the peak 15 min rate of flow is then expressed as the peak hourly flow equivalent and as such is used for ascertaining dynamic capacity of individual entrances and exits or the internal circulation system in the car park. For example, a peak flow of 680 cars / hour has a peak hourly flow equivalent of say
800 cars / hour. In practical terms this means that two automatically controlled entry lanes, each having a service rate of say 400 cars / hour, would provide a satisfactory level of service during the peak 15 minutes and a high level of service outside this period. Queue length on entry is another dynamic characteristic, which must be established in order to ensure that cars would queue inside the car park and not on the street. Queues that would occur are derived from an application of the queuing theory, which is based on rather complicated equations of Poisson distribution of the volume of arriving vehicles for single and particularly multi-channel queue requirements.

2.4.3 INTERNAL TRAFFIC CIRCULATION

It is needless to say that employment of a simple and logical traffic circulation pattern, both interfloor and intrafloor, is an important consideration of good design practice. Whilst large shopping centre car parks, and particularly the ones entailing large surface parking areas, tend to allow for maximum dispersion capability of users, the multi-level parking facilities must provide for delineated and highly disciplined circulation patterns. Various types of patronage could dictate the pattern of internal traffic circulation in multi-storey car parks. In high turnover car parks, a one-way flow system would be preferable, whereas in commuter car parks with significant peak ingress in the morning and peak egress in the evening, consideration could be given to two-way traffic circulation. The latter usually results in a more economically attractive structure. However, in multi-level car parks the basic recommendation would be for one-way traffic circulation with a repetitive floor pattern. Two-way internal traffic circulation may cause congestion of tidal traffic, creating numerous collision points in general and on the interacting 2-way aisles in particular and slowing down the flow of traffic.

The following comments concern a recurring question as to the use of clockwise or anti-clockwise circulation pattern in car parks and are prompted by the author’s involvement several years ago in
arbitration between a local government authority and a developer. The authority insisted on using clockwise traffic circulation wherever possible. As we all know, circulation on a ramp system may be clockwise or anticlockwise. Clockwise rotation is generally preferred because it places drivers inside of turns, enabling better vehicle handling. This is particularly relevant and even amplified if ramp dimensions and related turning radii are at their minimum. It is important to note however, that this is first of all beneficial to the very means of interfloor travel, i.e. to the clearway ramp systems that are in fact relatively steep and narrow roadways and therefore have more prominent safety hazards than the level floors. Ramp systems usually dictate the pattern of intrafloor (i.e. horizontal) traffic circulation in commonly sized multi-level car parks containing up to say three parking modules and a repetitive floor pattern. Such ramp systems would often take up a significant proportion of the parking floor. A typical example is a split-level car park where the clockwise circulation is indeed advantageous. However, this advantage may be inhibited in car parks with large floor areas, containing a multi-aisle layout and accommodating hundreds of cars per floor. In these cases, it is the parking layout that usually dictates orientation of the intrafloor traffic circulation, which is then suitably complemented by the ramp system. It is quite common for large parking areas to adopt unidirectional flow along the floor perimeter aisles and two-way traffic in cross aisles with the clockwise traffic circulation having no clear advantage over anticlockwise. In fact, the use of anticlockwise traffic circulation along perimeter aisles may significantly reduce if not eliminate the crossing interactions of traffic streams between the perimeter aisle and cross aisles.
2.4.4 PSYCHOLOGICAL FACTORS

When a driver enters a car park which has columns situated along the edges of the parking module (i.e. the car park being a long span structure), the parking area appears to him as being wider, more spacious and giving him a perceived freedom of movement. This type of column grid creates a positive psychological effect on the driver and is therefore considered user friendly.

On the other hand there are numerous factors of a psychological nature which adversely affect drivers in car parking facilities and which can be avoided or mitigated, provided a little foresight is put into the process of functional design. Although psychological factors may be difficult to quantify, they can be broadly qualified as:

**Tunnel effect** - in long and narrow enclosed corridors, drivers feel anxious and claustrophobic after a short period of time. People tend to object driving in tunnels. Typical examples are long straight or circular ramps, enclosed with solid walls on both sides.

Ramp structures should be as open as practicable, with abundant illumination (avoiding glare which can blind drivers) and with adequate sight distances.

**Bridge effect:** when driving in long, narrow suspended corridors. Drivers feel uncertain on narrow bridges suspended in open space; their awareness of height is accentuated and their driving concentration distracted.

Note: Parapet walls along long ramp sides are often used to reduce drivers’ distraction by the emptiness outside the ramp structure.

**Spiral effect:** when too many revolutions take place over a relatively small area. Notes:

(a) There is consensus of opinion that about six revolutions is the preferred maximum for a circular ramp.

(b) It is agreed that the car park’s vertical circulation pattern should be limited to six revolutions (i.e.
maximum six floor circuits on the way up or down).

**Column effect:** when too many columns are employed within a car park, thus creating an impression of visual pollution, smallness and tightness of the space with increased hazard to safety or even personal security, increased difficulty of manoeuvring, etc. Drivers may feel that the space is closing in on them.

**Roller-coaster effect** – when there is no continuity of gradient maintained on ramps or ramped floors. This effect is amplified on the ramps linking floors with a highly repetitive floor pattern.

### 2.4.5 CAR PARK SIGNAGE AND LINE MARKING

Vertical signage and floor/pavement markings are an essential component in regulating parking and traffic activity in car parks. The significance of signage increases with the degree of complexity of the car parking facility. Huge shopping centre parking areas would require more signage than smaller parking facilities where only very little signage would be required. However, parking and traffic management cannot work efficiently without appropriate signs.

Signage has gone through considerable technological and qualitative improvement in recent years. Continuously increasing environmental and energy saving consciousness has brought about intensified application of dynamic guidance systems which are now being frequently used inside and outside car parking facilities. Application of dynamic signs can reduce the extent of travel and eliminate redundant traffic circulation, thus saving on travel time, reducing fuel consumption and at the same time decreasing air pollution. External route guidance sign systems are becoming an essential part of street networks and they should play an even more significant role in the future. In relation to car parking such route guidance systems guide motorists to the car park situated near or at their place of destination.
External signs are of great importance, especially for public car parks. Viability and usefulness of public car parks can largely depend upon external signs identifying the facility with enough impact to catch the attention of those who are unfamiliar with the car park.

As noted earlier, every car park can be described by its static and dynamic characteristics. Similarly the car park signs can be described as, Static signs i.e. painted (silk screened, laminated, etc.) or illuminated, imparting basic information for the drivers in terms of regulation and warning.

Dynamic signs – which automatically guide drivers to available parking spaces.

The principle of a dynamic sign system is in the inductive loop coils detectors embedded in the floor or overhead ceiling mounted ultra-sonic directional sensors. Ultrasonic sensors are gradually replacing inductive loops due to their extremely accurate directional vehicle counts including identification of non vehicles such as shopping trolleys and pedestrians and additional important positive features. They count cars in and out of the specific areas and relay this information to counters [or a central processing unit (CPU)] which has been preset with the capacity of a particular area. The counters (or the CPU) would, in turn, activate the relevant dynamic sign.

2.4.6 AESTHETICS AND CAR PARK USEFULNESS

Aesthetics in the car parking planning is a consideration of increasing significance, and simultaneously the subject of continuous controversy. A point of concern is that environmental requirements are frequently onerous; the expectation of high level of aesthetics may seriously affect the financial viability of some parking projects. Many architects do not realise that the quality of functional design is more important to the customer than an aesthetically pleasing façade. After all car parks are constructed for parking cars in them and that external presentation cannot compensate for an internal design which is not user friendly.

Therefore it is really up to the combined efforts of architects and parking consultants to sensibly
address the whole issue of aesthetics without interfering with the car park’s usefulness. An efficiently functional, bright and clean interior is as important as a good-looking exterior.

In all cases car parks need to accommodate visitors of differing abilities. Requirements include:

- Smooth, hard surfaces. Unbound surfaces such as gravel are not suitable.
- Dedicated parking bays that comply with the minimum standards for disabled people. At least 5% of all car parking bays must be reserved for disabled visitors. They must be clearly identified, both on the bay surface and with a vertical sign immediately adjacent to the bay.
- Illumination that avoids the creation of contrasting pools of light and darkness.
- Safe pedestrian routes, with dropped kerbs from the car park to the building.
- A drop-off bay adjacent to the main entrance that is long enough to allow ‘tail loading’.
- Gathering points for coach drop-offs.

In addition vehicles need to access the building for deliveries, servicing and emergencies, and hard standing next to the appropriate entrance must be provided. When planning the car park consider more than simply the car park surface and cars. Bear in mind the visual impact it will make, often greater than that of the facility itself. Provide for planting, shade by trees, safe access across and around the car park. Ensure that the design is linked to, and enhances, the appearance of the building.

2.5 PEDESTRIANS

Provide safe, suitably surfaced routes into the site with adequate lighting. Do not expect pedestrians to share the road and avoid, as far as possible, causing pedestrians to cross vehicular routes. Surfaces for pedestrian use should be smooth and even, suitable for buggies and wheelchairs. Provide external assembly areas for teams and groups of children and, if possible, cover some of these.
2.6 CYCLISTS

Access roads should be wide enough for cyclists and passing traffic. If necessary provide a separate cycle track with its own entrance. It is important to discourage cyclists from using the pavements or pedestrian areas. Dry, secure bicycle parking and locking up facilities should be provided close to the entrance. The ideal is for bicycle parking facilities to be within sight of reception. The building canopy can be extended to provide sheltered parking. Provision of safe cycling facilities and routes is especially important for children.

2.7 SECURITY

Security means the protection of users as well as the protection of facilities from vandalism, abuse and misuse. The keys to good site security are:

- Visibility in and out of the site.
- Visibility within the site and the use of passive supervision, that is to say windows overlooking potentially vulnerable areas and the reception overlooking the car park and service areas.
- Adequate lighting of main routes in and out of the building including car parks.
- Appropriate height and location of planting.
- Good general ambience around the facility.
- The design of buildings and external layout to avoid the inclusion of corners that can conceal people by day or night.

2.8 LANDSCAPE

Landscaping refers to the physical appearance of the external environment including gardens, plantings, paving and embellishment around a development. Landscaping is not restricted to the boundaries of any particular site, but includes the external elements which contribute to the sense of
the place. An understanding of the sense of the place is often the difference between good and bad landscape design. Successful landscape design understands the sense of the place including the site’s geology, existing landform, soil, hydrology, vegetation and the cultural heritage.

The landscaping of car parking areas and driveways can reduce the visual impact of expanses of hard paving and provide shade for cars and pedestrians. Trees and shrubs (Figure: 2.8.1) should be planted along boundaries and integrated with car parking bays. Plantings should not block driver sightlines. Avoid planting tree and shrub species that drop cones, flowers, berries, fruit or branches which may damage or stain vehicles. Evergreen species are preferable for use in car parks. Can parks can be screened with mound too (Figure: 2.8.2).

Figure: 2.8.1 Carparking arrangement that shows suitable position for trees and shrubs

Figure: 2.8.2 Screening carpark with mound


All landscape designs should promote the safety of the community to ensure surveillance as well as consider the following:

a) Vegetation used as barriers to deter unauthorized access;

b) Planting not to impede visibility or conceal spaces if the landscaping works include the public domain;

c) Avoid planting of large trees close to buildings that could provide access to second story windows;

d) Landscaping design to provide safe access for all people with disabilities.
2.9 HARD LANDSCAPE MATERIALS

A vast range of materials in different finishes and colours is available for paving purposes. Selection must be based on engineering and aesthetic qualities and successful application will depend on good detailing and thorough understanding of the product. Avoid loose cobbles or stones that can be removed or thrown, and ensure that loose gravel is not used where it will inhibit access for disabled people. The following list (plate 2.9.1 and 2.9.2) is not exhaustive; rather it gives a general introduction to some of the more easily available materials.
Plate2.9:1 paving materials, an overview.

Plate 2.9.2: Paving materials: an overview (continued).

2.10 SITE FURNITURE

Furniture must be robust. Simple designs are often preferable as they tend to be stronger and easier to replace if damaged. Careful selection can reduce costs and enhance the appearance of a facility. Site furniture comes in a bewildering array of styles, colours and materials. Steel, cast-iron, timber (hardwood and softwood) and recycled plastic are some of the materials available and consideration should be given to appearance, cost, lifespan, source and maintenance. Hardwoods must be from a sustainable source. Steel is strong, but if painted will need repainting. Galvanised or polished aluminium finishes are perfectly acceptable and reduce maintenance costs.

Bollards

Bollards are used to guide and control traffic and illuminated models are available. They must be used sparingly as they can be expensive, hinder and obstruct circulation and be visually intrusive. Good design can reduce dependency on bollards. For example, could a raised kerb do the job just as effectively? In certain locations coloured bollards may be easier to see. Bollards can be made of different materials such as concrete (plate 2.10.1), timber and stainless steel (plate 2.10.2).
LITTER BINS

Bins should be located to avoid damage from vehicles and discomfort to users arising from unpleasant smells. Maintenance costs will be reduced by ensuring that they are well positioned and emptied regularly. When selecting a waste bin (plate 2.10.3) look for one that is durable and easily emptied. Remember that plastic bins are flammable. Chewing gum and cigarette dispensers carefully positioned next to the entrance help reduce cleaning and maintenance costs. Bins may also be required for dog litter.
Plate 2.10.3: Types of waste bin.


**SEATING**

The following issues are considered for seats in shopping center. For what purpose are the seats intended? Will they be located in the waiting area or are they for people watching events? Elderly people prefer seats with backs and arms to assist sitting and standing. The location, user and intended use need to be considered. Are the seats to be placed in the sun or in the shade? Are they for spectators or players? The materials used (plate 2.10.4) will make the surface warm or cold: metal and stone seating is cold, timber is warmer. Like bins, seats should have secure below ground fixings.
Plate 2.10.4: Types of bench.


### 2.11 LIGHTING

Lighting will usually be required for car parks and footpaths. It may also be required for floodlighting pitches. Avoid light pollution not only for the benefit of local residents but also for wildlife. This is particularly important if the facility abuts any form of nature reserve or valuable wildlife habitat. Avoid sodium (yellow) light. Light fittings should be chosen to direct light down to where it is required. Floodlighting should always be directed away from residential and nature conservation areas. Planting can help reduce reflected glare from large areas of paving. Lighting is critical for security and safety. It is preferable to achieve a consistent low level of light rather than high levels of light in pools that cause shadows. Plate 2.11.1 shows light fittings which can be chosen to avoid pollution.
Plate 2.11.1: Choose light fittings to avoid light pollution.


### 2.12 REFERENCES

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4/19/2012.


LIST OF FIGURES

Figure 2.2.1: Modern shopping developments seem to destroy the natural permeability of an urban block.

Source: Time Savers for Building Types.

Figure 2.3.1: Floor plan of Bluewater shopping centre.

Source: Time Savers for Building Types.

Figure 2.3.2: Establishing Shopper Paths.


Figure 2.3.3: Shopper Movement Patterns.


Figure 2.3.4: A shopper’s route is the steepest downhill path over a proximity surface.


Figure 2.3.5: Analyzing coincidence between shopper movement/sales activity surfaces.


Figure 2.3.6: Snapshots from a movie of hourly maps of shopper movement and sales activity.

Figure 2.3.7: Departmental comparison of shopper movement patterns.

Figure: 2.8.1 Car Parking arrangement that shows suitable position for trees and shrubs.
Source: Time Savers for Building Types.

Figure: 2.8.2 Screening Car Park with mound.
Source: Time Savers for Building Types.

LIST OF PLATES

Plate 2.1.1: The "Sevens" shopping mall in Düsseldorf, Germany.
Source: www.wikipedia.com

Plate 2.1.2: Amusement park at the center of the Mall of America in Bloomington, Minnesota, the largest shopping mall in the United States.
Source: www.wikipedia.com

Plate 2.1.3: The Palms shopping mall in Lagos was one of the first modern shopping centres in Nigeria.

Plate 2.9.1 Paving Materials, an overview.

Plate 2.9.2: Paving materials: an overview (continued).
Plate 2.10.1: Concrete bollards.

Plate 2.10.2: Timber bollard with markings to improve visibility and stainless steel bollards.

Plate 2.10.3: Types of waste bin.

Plate 2.10.4: Types of bench.

Plate 2.11.1: Choose light fittings to avoid light pollution.
CHAPTER 3

GENERAL GUIDELINES AND ISSUES RELATING TO
SHOPPING CENTER
3.1 SHOPPING MALL PATTERN

**Strip shaped:** Strip shaped pattern is a straight line of stores with parking in front and a service lane in the rear. (See Figure 3.1.1) The anchor store, commonly a supermarket in small strip centers, is placed either at one end or in the center of the strip. A strip center is usually a small neighbourhood center and the terms have come to be used interchangeably; although a strip may also be a large center.

![Diagram of strip shaped pattern](image)

Figure 3.1.1: Strip Shaped. Source: Time Savers for Building Types

**L shaped:** A strip center with a line of stores placed at a right angle to it, forming an L with parking in front of the stores and service lanes behind them as shown in figure 3.1.2. Anchors are usually pieced at the ends, but it is possible to place an anchor in the crook formed by the two lines of stores. The L shape is adaptable to corner locations and is used widely for both neighbourhood and community type centers.
Figure 3.1.2: L Shaped.

Source: Time Savers for Building Types

**U shaped**: A strip center with two lines of stores placed at right angles to the strip, forming a U, with parking in front of the stores and service and lanes behind them. As seen in figure 3.1.3, U-shaped centers usually have more store space than a strip of L’s and consequently tend to be community-type rather than neighbourhood-type centers. Because of their size, they may have as many as three anchors, one at each end and one in the middle, with the major anchor generally located in the middle.
Cluster shaped: An early form of regional center design: Stores are arranged in a rectangular area, with parking on as four sides of the center and with service provided through a tunnel or shielded service bays or a combination of both. Shown in fig3.1.4; Early cluster canters were built as open centers although some have since been enclosed. The design results in a series of malls. A single-anchor cluster would probably have its anchor store extending from the periphery to the center of the cluster.
Fig 3.1.4: Cluster Shaped

Source: Time Savers for Building Types

**T shaped:** Fig 3.1.5 shows a center designed to accommodate three anchor store T type has parking on all the sides, with service provided through all a tunnel or shielded service bays or a combination of both. T centers may be open or enclosed.

Source: Time Savers for Building Types
**Triangle shaped:** Similar in many respects to the T but with the added factor of providing visibility of all anchor stores from the front of each as shown in fig3.1.6. A triangular design is likely to be somewhat wasteful of land, but it may be the optimum design for those sites that are not rectangular. Designed to accommodate three anchors, the triangle center may have two levels, with parking around its perimeter.

![Triangle Shaped Diagram](image)

**Fig3.1.6:** Triangle Shaped.

**Source:** Time Savers for Building Types

**Dumb bell shaped:** A double strip of stores placed face to face along a mall, with anchor stores placed at both ends of the mall, and with parking on all sides. The dumbbell is designed so that the anchors draw traffic the mall in an effort to achieve maximum interchange of shoppers. Graphically represented in fig 3.1.7
Figure 3.1.7: Dumb Bell Shaped.

Source: Time Savers for Building Types

**Double-dumbbell shaped:** Essential a dumbbell-type center. One dumbbell runs longitudinally and a second dumbbell runs latitudinal, forming malls that cross in a central court. This design accommodates four anchor stores and provides parking on four sides of the center and in the intervening u-shaped areas. Figure 3.1.8 shows Double-Dumbbell Shaped.

Figure 3.1.8: Double-Dumbbell Shaped.

Source: Time Savers for Building Types
**Vertical shaped:** Among the newer shopping center patterns, the high-rise mall has escalators and elevators to carry people from floor to floor. Frequently, the stores are placed around a central atrium. Such centres are usually in downtown areas or close to other high-density developments.

**3.2 ACOUSTICAL FEATURES OF SHOPPING MALLS**

Since shopping malls are contemporary examples of large public spaces where acoustics plays an important role in their overall quality as well as for their sustainability, then it is necessary to evaluate their acoustical qualities regarding their materials, plan layouts, geometrical forms and etc. The common architectural features of shopping malls including atrium, vault, dome and gallery determine not only the spatial qualities of malls, but also acoustics. Hence, these architectural elements should also be investigated in relation to acoustics.

**Acoustical characteristics of atrium spaces**

Atrium space is a popular architectural element that provides visual and aesthetic relations with different levels, rooms and locations at public and private buildings. The use of atrium spaces in shopping malls serves to provide visual relation with shops and to control the perception of spaces. In such large atrium spaces, acoustics is an important factor affecting the overall physical comfort. Atrium voids allow the sound to be transmitted from one level to another. Therefore, the concerning sound sources are not only the sources that are at the same level with receivers, but also sound sources situated at other levels. Since the use of atrium spaces are observed in many shopping malls significantly effecting acoustics, it should be considered as one of the parameters defining the typology.
The effect of volume and shape in acoustics

Volume, shape and size of a room or a space have crucial importance for the acoustical formations within the space. Large volumes of spaces increase reverberation times and ambient noise, resulting a decrease in speech intelligibility (Plate 3.2.1). Generally, shopping malls have large volumes and thus longer reverberation times.

Geometries of surfaces are also crucial for reflection patterns which determine noise, reverberation time and other sound parameters resulting in different acoustical properties. The concave surfaces tend to concentrate or focus the reflected sound, and the convex surfaces lead to diffuse reflection. The main geometrical features of the walls and ceiling of the shopping malls not only affect the users in architectural terms, but also have effects on acoustical quality of these spaces. Hence, surface geometries should be examined in terms of acoustics.

Plate 3.2.1: The interior view of Katum with Large volumes of spaces increase reverberation time and ambient noise, resulting a decrease in speech intelligibility.

Source: Ekrem, B.C., (2010), Acoustical Evaluation of Shopping Mall Typology
3.3 BASIC HISTORY

A shopping center is a complex of retail stores and related facilities planned as a unified group to give maximum shopping convenience to the customer and maximum exposure to the merchandise. The concept is not new. The agora of the typical city of ancient Greece was essentially a shopping center in the heart of the business district. The Emperor Trajan's architect, the Greek slave Apollodorus, built a shopping center adjacent to the Roman Forum in A.D. 110. It had a two-level enclosed and ventilated mall lined with open-fronted shops startlingly similar to today's most up-to-date concept. The typical Arabian souk, or market, of the Middle Ages also had narrow, weather-protected malls lined with open fronted shops. The past two decades, however, have seen such a tremendous development in planned shopping facilities in the United States that today's center has, in fact, become a new building type. First, population growth led to outward expansion of the cities and the building up of the vast residential suburbs. Downtown congestion, due to increased car ownership and inadequate streets, weakened the downtown merchants and prompted them to set up branches in the suburban periphery in order to be more convenient to their customers. As a result of these activities on a large scale, a whole new industry was born. Each suburban district soon had its own major shopping center and several minor ones. Such districts each had clearly defined trade areas. Another major change then set in: Vastly improved, high-speed circumferential highways soon tended to put all these suburban centers in competition with each other. At the same time, the decline of retail business and decay of buildings in the central business districts began forcing, in self-defense, a revitalization of downtown. As a result of these two new factors, the shopping center industry is today pointing in two new, significant directions. First, the suburban centers are becoming mega centers, complete with several department stores, office buildings, motels, amusements, and, of course, parking facilities. Second, the central business districts are making a
determined stand to counteract the ever-growing suburban competition by embarking on programs for construction of new high-speed connector routes to downtown and construction of major downtown renewal projects, also complete with stores, offices, hotels, amusements, and parking facilities, usually in decked garages due to the high downtown land cost.

3.4 TYPES OF CENTERS

Neighbourhood center (suburban)
This is a row of stores customarily (but not always) in a strip, or line, paralleling the highway and with parking between the line of storefronts and the highway. Service is by alley in the rear. Ranging from 20,000 to 100,000 sq ft of space, these projects usually contain a supermarket and a drugstore, often a variety store, and a half-dozen or more service-type stores. They cater to a very limited trade area and are not normally competitive with the major centers. A few of the newer of these centers have their retail units clustered around an enclosed "mini-mall." Intermediate or Community-Size Center this also is usually a strip of stores but substantially larger than the neighborhood center and usually containing a so-called "junior" department store as the major unit. This type is vulnerable to competition from the larger centers and hence has declined in desirability. The parking pattern is normally similar to that of the neighborhood center.

Regional center (suburban)
This contains one to four department stores plus 50 to 100 or more satellite shops and facilities, all fronting on an internal pedestrian mall, or shopping walkway. Parking completely surrounds the building group so that all stores face inward to the mall with their "backs" to the parking (Fig. 3.4.1). With today's rising land costs and diminishing supply of suitable large tracts, there has been a growing trend toward double-decked parking to save land area. It is simply a matter of the relation.
between the land cost and the cost of the parking deck (Fig.3.4.2). There is also a strong trend toward double decking of the stores themselves so that the central pedestrian mall has two interconnecting levels, each lined with shops. The double level mall is also due, in part, to the need to keep horizontal walking (shopping) distances within reason. As land costs continue to rise and projects to grow larger, three- and four level malls will, no doubt, become common.

Renewal projects (city center)

Because of their complexity in matters legal and political as well as physical downtown centers are still, to some extent, in the experimental stage. The trend is toward a close integration, on two or more shopping levels, of department stores, shops of all sorts, restaurants, etc. The multilevel malls may connect directly or by bridges to other shopping facilities, hotels, office buildings, theaters, and parking garages. Because of high land costs, all parking is normally multi decked and can be above, below, or, better, laterally contiguous to the shopping facilities. The city center trend is toward a multilevel pattern interconnecting the essential parts of the central business district.

Development and financing Shopping centers are customarily promoted and owned by developers whose primary motive is a return on their investment and, to a lesser extent, by department stores.
Fig 3.4.1: Plans of Department Stores.

Source: Time saver for building types.
Fig 3.4.2: Sections for level mall.

Source: Time saver for building types

### 3.5 GENERAL DESIGN AND PLANNING CRITERIA

**Column spacing**

Significant dimension is along the mall as this involves the widths, i.e., frontages, of stores.

Often used spaces are 20, 25 and 30 ft, with the last the roost flexible. Dimension from mall to rear of store can be set by the most economical structural system. It is essential to arrive at the most economical structural system, as the roof is a major cost factor.
**Store depths**

For one-story stores in America, buildings are usually 120 to 140 ft deep, sometimes more to accommodate larger stores. If there are basements or mezzanines, the depth dimension usually can be reduced 20 to 25 percent. In European centers and others with many very small stores, there is a problem in how to achieve shallow depth without incurring higher costs from greater mall lengths in relation to floor area. One often used and desirable device is to "dog leg," or "ell," a larger store around a smaller store.

**Clear heights**

These vary from 10 to 14 ft or more, with 12 ft a good average. Above this clear height, there must be adequate space for air-conditioning ducts, recessed lights, structural system, etc.

**Ducts and shafts**

The shells of the buildings must be flexible enough to accommodate any reasonable tenant requirements. It is essential that the mechanical engineer set up a schedule of the location and sizes of the principal duct runs and shafts to avoid serious future space problems. This requirement includes special exhaust ventilation through the roof and all other mechanical items that can be anticipated.

**Central plant vs. Individual HVAC system**

Regardless of which method is used, the space to be occupied by all equipment must be determined, both in size and location, in the earliest planning stages.

Central plant equipment can be in a separate building, on the project roof, or elsewhere so long as it is economical as to design and length of runs.

Individual plants in each store require roof space, cooling towers, etc.

Roof Equipment Concealment
The inexcusable eyesores so often seen can be avoided by proper coordination of work between the leasing agent, the architect, and the mechanical engineer and the resulting provision of properly located and designed roof screens and enclosures.

**Exterior walls**

As these may have, depending on each store's requirements, service doors, public entrance doors, trash rooms, show windows, etc., a modular design that can suitably accommodate for visual effect any of these features is very desirable. Show windows and public entrances are rare on parking lot facades, as it has been found that the great majority of customers enter stores from the mall rather than directly from the parking lot. Public entrances from the parking lot usually occur only for department stores, for stores open on Sundays, and for such tenants as restaurants, drugstores, and the likes.

**Anarchy vs. Regimentation**

In the original shopping centers, there often was no design control at all, with a resulting anarchy of signs, materials, and design. This situation gradually changed to one where so much rigid control was exercised that the projects became far too monotonous. Proper design calls for a homogeneous whole with the widest possible latitude for individual design of each store. Generally the greatest possible latitude (in good taste) should be given to the mall facades, with fairly severe restrictions placed on the exterior facades. This gives interest in the interior, where it is desirable, and unity of design for the exterior.

**Traffic**

The car capacity of all contiguous roadways used for ingress and egress (Fig3.5.1) must be sufficient to accommodate present and future through traffic plus the traffic generated by the shopping center. Proper signal controls, reservoir lanes, divider strips, and other traffic control features must be
provided. It should always be kept in mind that a center with, say, 5,000 - car parking and an average turnover of, say, four cars per parking space, accommodates a total number of cars per day that would stretch. Because of the complexity of the traffic problem, the developer or his architect frequently hires a traffic engineer to assure himself that the highways have adequate capacity and that the center can accommodate smoothly the ingress and egress of customers' cars. The traffic engineer is, however, interested in speed and smooth flow of traffic, while the architect for the project should be more concerned with convenience, simplicity, and customer's freedom of choice in selecting her route and parking procedure.

Fig 3.5.1: Car traffic of all contiguous roadways used for ingress and egress

Source: Time saver for building types
Leasing

Customarily the satellite stores and all other facilities retail or otherwise with the exception of the department store are leased by the developer. The developer may lease one or all the department stores and build them to the tenant's requirements, or he may sell or lease the land to one or more, in which case the department store designs and constructs its own facilities within the established limits and requirements of the overall project. The satellite leases usually provide for a minimum annual rent (on which the mortgage calculation is based) plus or against an average rent consisting of a percentage of the store's gross annual sales. It is the latter provision which makes the success of each individual store so important to the developer and which compensates him for future inflation. It puts the developer and tenant into a sort of partnership. It is obvious that the individual rent terms must reflect not only the cost of the land and overall project costs but also the amount of special work done by the developer for the individual tenant. In the past, the developer installed much of the tenant's special requirements and received a proportionally higher rent. The trend today, however, is for the developer to supply the shell of the premises only, with each tenant installing at his own expense the ceiling and floor finishes, decor, mall storefront, and some of the air-conditioning equipment items. Trade fixtures, except in unusual circumstances, are always installed by the tenant. As the leasing program takes time to consummate, it is absolutely essential that the leasing proceed simultaneously with the architectural design and drawings and that the leasing agent and the architect and his engineers keep in continuous communication. Otherwise, long delays and expensive changes ensue. In view of the importance of the department stores in generating customer traffic for the project, their lease terms usually provide only a minimum (if any) profit for the developer. The profit on the development as a whole must then come from proportionately higher rents from the satellites. For this reason, when the owner of a center is a developer and not a
department store, it is essential that at least half the total retail area be occupied by high-rent satellites.

**Tenant mix**

Tenant "mix" is the name for tire plan relationship to each other of the various types of stores and facilities. Proper tenant mix exposes the customer to a varying sequence of differing types of merchandise. If each store type is properly located in relation to every other store type, it has been demonstrated that each store will receive its maximum sales volume. In such cases, the center will be successful and all tenants, plus the developer, will profit. If the relationships are not correct, many of the stores may not receive their fair share of the customer's money and both the individual store and the developer will suffer. The developer may not, in such cases, receive any rent based on percentage of sales volume, and the strength of the center as a whole will be weakened. There are many theories on proper tenant mix. It has been fairly well established. However, that with few exceptions and regardless of length of malls or number of mail levels, a generally mixed pattern of high and low prices, soft goods and hard goods, retail and services produces the best individual sales volumes and overall success.

### 3.6 THE MALL

The pedestrian mall has become the feature of today's shopping center, whether the project is in the suburbs or in the central business district.

**The pedestrian Mall has the following characteristics:**

a. The mall usually consists of the principal mall, the major pedestrian shopping street of the project, and one or more subsidiary approach malls or access routes connecting the main mall with the parking areas or adjacent streets.
b. With few exceptions, all stores have their principal entrance on the main mall or, less desirable, on approach malls, whether or not these stores have additional entrances to parking lots or adjacent streets.

c. The mall can be on one level or on two or more superimposed levels. Each mall level should, however, avoid slopes or steps within its own walkways to avoid hindrance to shopping and a source of accidents.

d. The mall can be (1) open, with weather protection consisting solely of continuous canopies along the store fronts, (2) completely covered but open to the air, and or (3) completely enclosed, necessitating heating in winter and air-conditioning in summer. The trend has been almost exclusively toward the enclosed climatized mall except where weather conditions are ideal or some other factor makes the open mall preferable.

Enclosed malls have been in the form of huge courts; they have been wide, narrow, straight, circuitous, empty, or filled with amenities; they have had one level or two or more levels; and they have been lighted by skylights or solely by artificial means (Fig 3.6.1).
Fig3.6.1: Skylight or artificially lighted.

Source: Time saver for building types.

The trend has been steadily away from wide malls and court-type malls. Currently widths of 30 to 40 ft are outnumbering widths of 50 ft or more. The wider malls require more Land-Scapping and features to avoid a barren atmosphere. They also require more cubage and hence are less economical despite the possibility of high rents from kiosks and similar features spotted along their lengths. Furthermore, and most important, narrow malls facilitate back and forth comparison shopping from one side to the other and hence significantly aid the customer's exposure to the merchandise. A logical trend is toward stretches of narrow mall, generally devoid of amenities, punctuated by moderate-sized courts in front of departmental stores or elsewhere which become customer magnets. The courts have greater lighting intensity, greater height, and spectacular features such as fountains, lush landscaping, and monumental sculpture.
The length of malls generally should not be more than 800 ft (preferably less) between department stores or other major features; but, in the case of more than two department stores, total length can be substantially more. Because of the high downtown land costs and increasing land costs in the suburbs, plus the shortage of sites of adequate area, the two level Mall is becoming a standard solution; in due course, malls of three levels or more will doubtless increase in number. Such multi-levels make the shopping area much more compact and walking distances shorter.

In connection with any two-level (or more) mall, it is virtually mandatory that each level be as important as every other level; otherwise, one level will become the level, all the stores will want to be on that level, and the other level will be second choice, will command lower rents, and hence, in all probability, will not economically justify its construction.

To achieve this equality of desirability, of customer appeal, and of rent balance, it is essential that both (or all) levels have:

a. Equally convenient accessibility from parking areas by means of two or more levels of immediately adjacent parking, whether on grade or on decks or by means of other devices to equalize the parking convenience.

b. No mall dead end on any level without a department store as its terminus.

c. Adequate vertical transportation between levels, usually one or more sets of escalators and several sets of convenient stairs.

d. Visual interconnection of levels through the Maximum use of open wells permitting maximum visibility of one level's shops and customers from the other.
3.7 MALL AMENITIES

With the advent of the pedestrian mall came the need to give it interest and glamour as an enhancement to the overall customer appeal of the center. This interest or glamour is normally non-income producing; but, in the case of small retail kiosks for such items as keys, stockings, photo supplies, and soft drink facilities, very high rents can be obtained because of the conspicuous and high-exposure locations. Mall amenities generally include, in addition to landscaping, which will be elaborated on in another section, most of the following items:

"Trash and ash receptacles, a mandatory aid in preventing litter." Directories of one sort or another to facilitate finding specific stores." Public telephone installations." Seating groups and individual benches for resting, although many planners believe it is better to have frequent coffee stands both for better control and to produce income. Many also believe that, in city center areas, it is often better to avoid benches so as to discourage loitering by undesirable elements." Fountains, properly designed for public protection from water hazards. (Water seems to have a universal appeal.)" Kiosks of various sizes and shapes, generally less than 250 sq ft, though there is a trend to larger ones." Lockers (occasionally) for storing purchases while continuing to shop." Sculpture or other art forms as major design features. "Miscellaneous items occasionally used to catch the public interest, such as birdcages, kiddy mazes, fashion mirrors, closed-circuit TV, clocks, continuous music, fashion platforms, exhibit areas, etc. It is noted that in the case of exhibit areas, it is necessary to provide adequate Mall-access doors for bringing in large items to be exhibited. Mall lighting should be low-keyed and incandescent, should lend interest to dark or monotonous areas, and should, except in major courts, allow the storefronts to be the Main attraction. Natural light is often used in moderation to give variety of effect and sometimes to save power cost, but generally natural light must be limited in order to avoid dilution of the impact of the storefronts along the mall. As malls
are customarily open late afternoons and evenings, adequate artificial illumination must be provided regardless of the extent of the natural light. Mall materials are of great importance. Generally speaking, they should reflect the quality level of the project, be sturdy enough to resist vandalism, and require minimum maintenance. As an example, floor materials on projects vary from hardened cement to terrazzo, tile, or marble, and now, occasionally, to carpeting. It is noted that the floor of a mall is very conspicuous and the character, quality, and ease of maintenance of its surface materials should be of primary considerations.

3.8 STOREFRONTS AND SIGNS ON THE MALL

Open malls require glazed storefronts, and hence their requirements are similar to those of the typical city street. Enclosed, climatized malls can have open storefronts, i.e., the major part of the store's frontage can be without show windows and completely open, so that the shopper can enter the store virtually without being aware she has done so. At night the store is protected by sliding glass panels or roll-up grilles. Generally speaking, except for certain limitations on use of materials and, more particularly, on store signs, the tenant is encouraged to use as much imagination and variety in his store frontage as possible to give glamour, interest, and appeal not only to his own store but to the mall as a whole. Customarily the storefront as well as the store interior is designed by a firm retained by the individual store rather than by the developer.

Except for whatever devices are used to achieve overall unity and harmony, the mall frontage can be treated completely at the will of each tenant, subject only to such restrictions as are recorded in the lease terms. It is essential, however, that such terms give the developer and his architect the right of final approval at their sole discretion. Signs are primarily either for store identification or for general advertising of the store. The former has legitimate place in the shopping center concept. The latter generally does not. The larger the store, the greater the justification for a sign, as the larger stores are
the magnets that attract the public. Endless exterior signs for the smaller stores are confusing, unsightly, and useless to store, owner, and customer. The passerby cannot read the confusion of smaller signs, and the shopper who has already parked gets no identification value from small-store exterior signs as there is literally no way for her to relate any such sign to its own store once she has parked her car and entered the mall system.

Signs, on the other hand, are a necessity within the mall to identify the individual stores. Signs should be simple, easily grasped, in good taste, and so arranged as to be visible at close range as well as at a distance. Too often store identification to the passing potential customer is omitted in favor of huge signs legible only at a distance that may not exist. Properly designed and lighted signs can greatly enhance the interest and appeal. Sign regulations should accompany each lease, and all signs must be subject to final approval from the owner and his architect to ensure proper harmony. Signs or pylons on the exterior to identify the shopping center itself are a common practice but of dubious value. A regional project with its half-mile of construction is so conspicuous that anything more than simple identification is usually unnecessary.

**Exterior facades**

Some of the major satellite stores desire storefronts on the exterior of the complex, i.e., parking lot facades. The trend, however, whether by store preference for simpler control or by developer preference for economy, is to reduce to a minimum the number of show windows and public entrances on the exterior facade.

Experience has shown that the public does not like to enter a mall through anything but the regular mall entrances or else through major stores such as department stores. Furthermore, the whole theory of the present-day shopping center is to get the customers as quickly as possible into the mall, from which the shopping process originates. Department stores insist on having direct entrances on the
parking lot as well as the mall, but here again, exterior show windows are usually cut to the minimum. Even in the central-business-district projects, where some of the stores front on city streets and the mall, experience has shown that the majority of the shoppers enter the stores from the malls rather than from the city streets and many street entrances have been closed off.

In the matter of materials, the trend is toward permanence through good but not elaborate quality and the use of masonry and related types of material.

A major problem of recent origin that requires careful solution is that resulting from the fact that there may be several department stores, in addition to the satellite stores, each designed by a different architect. Achievement of harmony of design can, therefore, become difficult. The problem of visible mechanical equipment is always a serious one. Mechanical design and drawings should always be carefully checked for visual aspects, and when such equipment is visible, consideration has to be given to suitable methods of concealment, whether by masonry screens or whatever.

3.9 Servicing

Servicing involves the delivery of goods to the various stores and also the removal of trash and garbage. In the simple strip center, the servicing is customarily by an alley in the rear of the strip of stores. It is desirable to conceal the alley from adjacent neighborhood areas by a wall or landscaping. In the one-level regional suburban center, servicing is customarily by one of the following:
a. Underground service tunnel, usually under the mall, connecting directly to tenant leased basements which connect, in turn, to the stores above. This system avoids all unsightly trash, keeps parked trucks out of the way, and avoids allocation of prime parking space to servicing. It also relegates non-selling activities to the basement, reserving the main floor for sales. The tunnel adds, however, 3 percent or more to the total cost of the construction and more or less necessitates the
inclusion of basements. This, in turn, calls for realistic leasing and financing of these basement areas if they are to be self-supporting financially.

b. Service courts on the periphery of the building complex. These are usually partially shielded from public view by masonry walls 6 to 10 ft high or higher. Their cost is minimum, but they occupy space that is expensive if land costs are high and that could otherwise be utilized for prime parking. The interiors of the courts are objectionable in appearance and can rarely be adequately screened. Furthermore, these courts can usually be made directly accessible to only a portion of the stores present. This type of project normally has no basement space.

c. Over-the-curb and sidewalk directly from the street. This is the cheapest and uses the least land, but it requires rigid enforcement of cleanliness by the project management, delivery of merchandise and removal of trash generally before or after business hours, and the mandatory inclusion of trash rooms in each store. Generally speaking, markets, department stores, restaurants, end drug and variety stores have the greatest demand for adequate service facilities.

Service trucking routes on the site are often separated from customer routes, but this arrangement is generally not necessary as the relatively few number of trucks per day in a typical shopping center presents no traffic problem. In the case of sidewalk delivery, the parked trucks pose problems, and policing may be required to prevent the accumulation of trash. In multilevel projects, the use of strategically placed freight elevators is necessary. These usually connect to fireproof passages at the rear of the stores (whether on an upper level or below grade) and often serve also as fire exits. With this type of project, necessitating service corridors, service courts can usually be fewer and more concentrated.

Mezzanines are occasionally used to provide storage and non-selling space. Such facilities have value in that they reduce the depth of space required and hence the land occupied, but they rarely
produce savings in construction cost because of the need for greater height of store-building roofs for adequate clearances.

3.10 CLIMATE CONTROL

Today virtually all commercial space such as stores, offices, hotels, and pedestrian malls are maintained the year round within certain limits as to temperature and relative humidity.

In most climates this means heating and humidification in the winter, cooling and dehumidification in the summer, and at least ventilation in the intermediate seasons. The problem of cooling is proportionately more important than heating, even in relatively cold climates, because of the necessity to compensate for the body heat and moisture emitted by crowds of people and the heat from electric lighting, especially the incandescent type. It is not uncommon, even in the north, for the cooling system of a department store to operate almost into the winter season. When this climatization of commercial space began to be adopted in the earlier shopping centers, it was frequently a matter of tenant choice and expense. The developer would supply the minimum heating required by the code, and each tenant would then decide whether or not to install his own air-conditioning system. As air-conditioning became more universal, however, it became logical for the developer to take advantage of his stronger buying position and have the air conditioning installed on his own account as individual systems in each of the stores of his project, charging each tenant enough more rent to compensate for the cost and having each tenant responsible for operation and maintenance.

Compressors and fans, as well as "cooling towers" required in the case of larger stores, were installed in basements, on mezzanines, and on roofs. Roof installations, necessary both for lower cost and engineering requirements became large and unsightly. This led to efforts to concentrate the equipment as much as possible and to surround it with lightweight or, preferably, masonry screen
walls creating penthouses on the roofs. With this system of air-conditioning, each tenant always paid the retail electric rate applicable to the service required by him.

In the late 1960s, a new trend set in for the larger regional centers. The developer and his mechanical engineer found they could profitably work out a system involving a central cooling and heating plant for the entire project, metering and selling chilled water and hot water to each of the tenants and, of course, providing complete air-conditioning and heating for the mall and other public space. In this type of operation the developer installs the central plant, all the equipment for the mall, and the distribution lines for the heated and chilled water to the individual tenant spaces. Usually each tenant and/or store owner then installs the heat exchanger, fans, and distribution ducts within his own premises. The developer buys electric power at low rates because of the large amount purchased, and the individual tenant pays the developer for the water used at a lower rate than that which he would have had to pay in the case of his own individual plant. However, the tenant still pays enough to allow the developer to make a profit on the overall central plant operation. Because of this demonstrable and sometimes very substantial annual profit from the sale of heated and chilled water, the developer can finance the central plant so that it does not increase his equity investment.

In some states the developer can go even further and set up a so-called total energy plant, producing the electricity itself by means of gas or other fuels. Such systems are, in effect, private utility companies and subject to state law. Should the developer wish to stay out of the problems of negotiation with tenants and operation of the central plant, there are companies that will undertake, for suitable remuneration, the construction, operation, and ownership of the system on behalf of the developer. In this case, it is obvious that financial and engineering responsibility of the operating company must be clearly established. It is always essential that design provision be made in the earliest stages of the planning for all items of mechanical equipment, with allowance for floor space,
for weight, for ceiling clearances, and for suitable visual effects of supply and exhaust grilles, especially in malls.

3.11 FACILITIES FOR THE SHOPPING COMPLEX

1. Structures
   a. For retail purposes (retail areas)
   b. For service purposes (heating and air-conditioning plants, electric substations, maintenance shops, truck roads, loading docks, and equipment storage)
   c. For other commercial uses (offices and recreational facilities)
   d. For public use such as civic and social facilities (community center, auditorium, exhibition space, and children’s play areas)

2. Car storage areas
   a. Surface parking lots
   b. Double-deck or multiple-deck garages

3. Pedestrian areas
   a. Malls, courts, lanes, and plazas
   b. Covered pedestrian areas, such as public corridors and covered malls or courts

4. Automobile movement areas Distribution road system on site

5. Public transportation areas
   a. Bus roads, bus terminals, and taxi stands
   b. Buffer areas: Landscaped areas separating car storage areas or service areas from the public road system, or areas separating parking areas from one another or parking areas from service areas.

6. Reserve areas: Portions of site to be held in reserve for the planned growth of the shopping edifice.
3.12 SITE PLANNING PRINCIPLES

The allocation of space for these and possibly other uses should be guided by certain planning principles in order to attain the highest feasible productivity of the land over an extended period of time:

1. Safeguard surrounding areas against blight;
2. Expose retail facilities to maximum foot traffic;
3. Separate various mechanized traffic types from one another and from foot traffic;
4. Create a maximum of comfort and convenience for shoppers and merchants; and
5. Achieve orderliness, unity, and beauty.

**Foot traffic**

Exposure of all individual stores in a shopping center to the maximum amount of foot traffic is the best assurance of high sales volume. Suburban business real estate often has been evaluated on the basis of passing automobile traffic—an evaluation which overlooks the fact that automobiles do not buy merchandise. It is only after the driver of even the most expensive car leaves it and becomes a pedestrian that he can become a buyer.

Therefore, if shopping centers are to prosper, dense foot traffic must be created. "Shopping traffic," the act of walking from store to store, creates the lifeblood of a shopping center; and proper circulation of this shopping traffic ensures business success. Bearing in mind the relative importance in each instance of the size of the center, the shape of the site, the character of the tenancy, and other related circumstances, it is possible to weigh the advantages and drawbacks of various types of site planning to achieve the desired foot traffic. The manner in which site planning can influence the quantity of shopping traffic is illustrated in the schematic plans (Figs. 8 through 14) discussed below. The degree of completeness of the separation between transportation and pedestrian areas
depends on the size of the shopping center. In a single commercial building, this separation becomes effective only after the customer has entered the store. If there are two buildings, it might be possible to arrange a separated pedestrian area between them. The chances to create separated pedestrian areas are slightly higher in an intermediate center.

In a regional center, complete separation is almost always possible and should be effected. Even in the smallest grouping of stores, such as a neighborhood center, it is possible to achieve a certain amount of separation by means of broad sidewalks with landscaping, low garden walls, and the like.

Source: Time saver for Building Types

**Strip center with curb parking** (Fig.8): In this plan, the shopping center is comprised of a row of stores extending 2,000ft along the highway. The shopper parks at the curb in front of the store, transacts his business, and then is likely to enter his car and drive off. Shopping on foot traffic is limited.

**Strip center with off-street parking** (Fig .9): This shopping center consists of a 2,000-ft long row of stores set back from the highway sufficiently to permit parking in front. The sidewalk, or covered
walkway, encourages foot traffic along the store fronts. This plan generates a certain amount of shopping traffic and thus is clearly superior to the type shown in Fig. 8. Shopping traffic is nevertheless limited, chiefly because of the 2,000-ft distance between the extreme ends of the strip. The shopper may return to his car after each transaction and drive to the next store on his list, ignoring intervening merchants.

Double-strip center with off-street parking (Fig. 10): Here, the strip is divided into two rows of stores, facing each other along a pedestrian mall, with parking on four sides. A "magnet" (department store, junior department store, or other major tenant store) is placed at each end. The 2,000-ft strip of stores is now divided into two 1,000-ft-long strips. With the distance between the two magnets now only half as great, foot traffic will be greater and the intervening stores will profit accordingly. Also, the creation of a highly desirable pedestrian area shielded from the noise, smells, confusion, and hazards of automobile traffic will contribute to greater shopping traffic.

Mall center with only one magnet (Fig. 11): In this plan, the existence of only one magnet, located at the extreme end of the pedestrian mall, reduces shopping traffic because of lack of interchange. The stores farthest from the magnet will participate very little in the traffic it generates.

Mall center with magnet centrally placed (Fig. 12): The arrangement of the pedestrian mall is the same as that shown in Fig. 11, except that the magnet is moved to a center position on one side of the mall an improvement over the previous example.

Cluster-type center (Fig. 13). The major tenant is placed in the center of a cluster arrangement. Nearly oil stores thus become neighbors of the most powerful shopping-traffic puller.

"Introverted" center (Fig. 14): This type exemplifies what might be called the "introverted" center, in which all store fronts are turned toward the inside of the building cluster. Entry into individual stores directly from the parking lot is diminished or completely excluded. Shopping traffic is
funneled through a limited number of entrance arcades into pedestrian areas:o plan that markedly increases the density of shopping traffic and controls its direction.

3.13 SEPARATION OF TRAFFIC TYPES

1. Pedestrian from transportation: The separation of pedestrian areas from transportation areas is one of the cornerstones of good planning. The constant movement of vehicles within transportation areas inevitably creates a certain amount of danger, noise, fumes, and confusion, which distract the shopper and diminish shopping enjoyment.

2. Service from customer traffic: Service traffic in shopping centers represents a considerable portion of mechanized traffic. Even in the smallest shopping center, service vehicles for deliveries, pick-ups, garbage and trash collection, repair crews, construction and fixture contractors, and utility companies create a significant portion of the over-all traffic. Separation of service traffic from customer traffic is essential and may be accomplished on one or two levels.

Service areas on the merchandising or ground level in the form of truck roads, service courts, and other types of loading facilities, are practical in the neighborhood and intermediate centers. Good planning principles demand that such areas be properly shielded by screen walls or landscaping and that service vehicles be able to enter or leave without interference from automobiles or pedestrians.

Service areas on non merchandising levels permit the most productive space to be totally freed from service functions. Only the large center can achieve this separation, for which there are a number of possible arrangements. The truck tunnel under the shopping center mall is an expensive solution that is more talked about than used. Service roads located at the basement level provide a less expensive solution and are widely used. Where sub surface or topographical conditions make the construction of basements impractical, service and storage areas may be placed above the merchandising level and connected to it by ramps.
3. Public transportation from customer traffic: Separation of public transportation from customer traffic is essential. The designer must also consider the space needs for public transportation. Generous arrangements for public carriers with well located and well-protected waiting areas will encourage transportation companies to use them. Space requirements for existing and future public transportation facilities should be discussed at the outset of site planning work, and if possible, provisions should exceed the required minimum. Storage space for buses should be provided on or near the site so the transportation company can make extra facilities available for peak periods, especially at closing hours.

Orderliness, unity and beauty

The concept of orderliness, unity, and beauty is a major planning principle; it must be applied to every major and minor aspect of the project, and must permeate all architectural expressions. Landscaping, signs, the architecture of structures, architectural treatment of spaces between structures, composition of structures in relation to one another, colors, and materials—all must adhere to this vital principle.

3.14 PLANNING THE SURROUNDING AREA

The term "surrounding area" can be understood either in its narrowest sense, that is, strips of land on the opposite side of the public roads adjoining the shopping center, or in its widest sense: the entire community within which a shopping center is located.

A reciprocal relationship exists between a shopping center and its surrounding area. A well planned center can exert a highly invigorating influence and the area surrounding it, while a well-planned surrounding area can add in large measure to the prosperity of the center. Conversely, a poorly planned or unplanned commercial grouping of stores can have a deteriorating effect on its surrounding area, while the success of even the best-planned center can be endangered by a poorly
planned or blighted surrounding area. The degree to which effective planning can be applied depends on the general location of the center, the size of the center, the investment policy of the developer, and existing zoning and economic conditions.

In general, if the site for a shopping center is the one remaining piece of land within a completely built-up area, there will obviously be meager possibilities for influencing the character of the surrounding area. Shopping centers in such areas usually operate under the handicap of having to be fitted into existing area and traffic conditions. On the other hand, one should consider the undoubted advantage of being provided with a fully developed buying potential.

3.15 ADMINISTRATIVE PATTERN FOR SHOPPING MALL

The system will allow more than one shop owner to set up different shops, to sell various products under one roof i.e. mall. The concept, at its very basic, provides for an environment that allows the following:

- **Shop Owner:**
  - Any person wishing to setup shop in the mall can send a proposal to the mall owner.
  - The mall owner approves the proposal and confirms the deal.
  - Shop owners can then setup and maintain their own shop(s) in the Mall.

- **Customers**
  - Customers when enter the mall have to authenticate themselves on a central server.
  - After authentication, the customer is allocated a shopping cart and can enter a particular shop of his/her choice for shopping.
  - After entering a shop, customer can browse through the products available in the shop, can select some of them and put into the shopping cart.
• Customer can anytime change the items in the cart either by adding new items or by removing existing items. Customer proceeds towards the payment counter. Finalize product list of items he finally wish to buy and make the final payment.

• He / She then leave the shop and can either enter another shop or leave the mall.

➢ The prototype presented allows customers to purchase products from all the shops in the Mall.

Use Case Diagrams:

Following are the use case diagram required for the project:

Mall Admin:
Shop Owner:

![Shop Owner Diagram]

Customer:

![Customer Diagram]

State Machines: Adhering to the requirements, followings are the state machines for this project.

Shop Proposal:
Shop Contents/Setup:

Customer:

Guestbook:
Item:

Object Identification:

Here's a brief description of the objects we identified with respect to our project.

**Mall:** Mall will provide a single roof for various shops. The mall performs the creation of a set of different shops, such as a book store, a shoe store, etc. The mall greets an arriving customer, performs authentication for him/her and allocates him/her the shopping cart. Mall presents the customer with a list of different stores available and allows the customer to shop at any of stores in the mall.

Some of the things a customer can do at the mall are:

- Get a list of available stores
- Get a shopping cart
- Enter a store/shop

Notable Attributes:

- Name - the name of the mall
- Shops - a collection of stores of different types
- Customers - the customers currently in the mall
- Owner – the owner of the mall.
- Questbook – a collection of comments by different customers

Possible Methods:

- Void enter(Customer c) - customer c enters the mall
- Void exit(Customer c) - customer c exits the mall
Shopping Cart: get Shopping Cart - returns an empty shopping cart

Enumeration customers() - returns an enumeration of the customers in the mall

Void checkout(shopping Cart) - checkout and purchase the items in the shopping cart

**Shop:** The Abstract superclass for a shop

Notable Attributes:

- **Name** - the name of the store
- **Store Id** - unique ID for the store
- **Items** - items available for sale in the store
- **Customers** - the customers currently in the store
- **Owner** – the owner of the shop

Possible Methods:

- **Abstract void enter(Customer c)** - customer c enters the store
- **Abstract void exit(Customer c)** - customer c exits the store
- **Enumeration customers()** - returns an enumeration of the customers in the store
- **Enumeration items()** - returns an enumeration of the items available for sale in the store
- **Abstract void add To Cart (shopping Cart, item)** - add an item to the shopping cart
- **Abstract void remove From Cart (shopping Cart, item)** - remove an item from the shopping cart

**BookStore:** A possible subclass of Store

**ShoeStore:** A possible subclass of Store

**Game Store:** A possible subclass of Store

**Item:** An item for sale in a store
Notable Attributes:

✓ ItemName - the name of the item
✓ ItemId - unique ID for the item
✓ StoreId - the ID of the store from which the item came
✓ Price - the price of the item

**Customer:** A customer visiting the mall. This class extends the general person class.

Notable Attributes:

✓ Shopping Cart - the shopping cart being used by the customer
✓ Store - the store the customer is currently in.

**Shopping cart:** A shopping cart for the customer.

Notable Attributes:

✓ Items - items currently in the shopping cart
✓ Possible Methods:
  ✓ Enumeration items() - returns an enumeration of the items currently in the cart
  ✓ Add Item() - adds a given item to collection
  ✓ Remove Item() – removes the given item from the collection.
  ✓ Calc Sub Total() – calculates the incremental total of all the items in the cart.

**Guest Book:**

✓ Customers visiting the mall can send their comments about the shopping experience at the mall to mall admin via guestbook. Each customer will have comment as an attribute field and the guestbook is the collection of such comments and is an attribute of the Mall class.

Notable Attributes: Comments. Customer. Date. Possible functions: Add comment. View comments. Delete comments
**Mall Owner:** The owner of the mall or mall admin as referred in the class diagram above. This class also extends the person class.

Notable Attributes: password

**Shop Owner:** The owner of a shop. Each shop has a owner. This class also extends the person class.

Notable Attributes: password, Shop id

**Person:** name, Email, Phone, Address. For the sake of brevity, the required accessors and mutators are not listed in the above class description.

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  4/19/2012
- [http://www.informedesign.umn.edu](http://www.informedesign.umn.edu)

**LIST OF FIGURES**

Figure 3.1.1: Strip Shaped.

Source: Time Savers for Building Types.

Figure 3.1.2: L Shaped.

Source: Time Savers for Building Types

Figure 3.1.3: U Shaped.

Source: Time Savers for Building Types
Fig 3.1.4: Cluster Shaped

Source: Time Savers for Building Types

Fig 3.1.5: T Shaped.

Source: Time Savers for Building Types

Fig 3.1.6: Triangle Shaped.

Source: Time Savers for Building Types

Figure 3.1.7: Dumb Bell Shaped.

Source: Time Savers for Building Types

Figure 3.1.8: Double-Dumbbell Shaped.

Source: Time Savers for Building Types

**LIST OF PLATE**

Plate 3.2.1: The interior view of Katum with Large volumes of spaces increase reverberation time and ambient noise, resulting a decrease in speech intelligibility.

CHAPTER 4

CASE STUDIES
4.1 CASE STUDY 1: TINAPA BUSINESS RESORT (The emporiums), Calabar, Cross River state, Nigeria.

Plate 4.1.1: 3D representation of the shopping area, Tinapa Business Resort, Calabar, Cross River State, Nigeria.

Source: http://www.tinapa.com

Location: Calabar, Cross River State, Nigeria

Opening date: 2006

Developer: GAPP, Architects & Urban Designers, Africa

Management: Gendel Group
Client: Cross River State Government

Number of anchor tenants: 4 emporiums

Total retail floor area: 80,000m² emporiums (retail & wholesale).

Parking: 3000 public parking spaces, parking for trucks and services.

Plate 4.1.2: Perspective view of Tinapa Business Resort, Calabar, Cross River State, Nigeria.

Source: http://www.tinapa.com
Plate 4.1.3: Plan showing the site plan of Tinapa Business Resort, Calabar, Cross River State, Nigeria

Source: http://www.tinapa.com
Plate 4.1.4: Plan showing the emporiums, the entertainment area and the parking spaces, of Tinapa Business Resort, Calabar, Cross River State, Nigeria

Source: http://www.tinapa.com
Plate 4.1.5: Plan showing the emporiums and retail shops, Tinapa Business Resort, Calabar, Cross River State, Nigeria

Source: http://www.tinapa.com

The activities in the shopping area are as follows

**Emporium A**

Supermarkets: Fish market: Fruits and vegetables: Banks: Travel agents:

Books: Pharmacy: Tobacconist: Cell phones: Specialty: Photographic: Car hire:
Dry cleaner: Optometrist: Courier service:

**Emporium B**

Appliances and electronics: Furniture: Beddings and mattresses: Specialty audio:

Art and farming: Computers: Leather and luggage: Coffee shop: Lighting: Tile showroom: Home accessories:

**Emporium C**

Vehicle showroom: Outdoor showroom: Lifestyle: Hardware: Motor accessories:


Internet café: Books and music:

**Emporium 4**

Textiles fashion: Ladies shoes: Gents shoes: Hair dressers: Branded fashion: Specialist fashion:

Sports goods: Coffee shops: Children clothing: Fashion accessories: Cosmetics: Jewelry:
Plate 4.1.6: Picture showing the retail shops along the walkway, Tinapa Business Resort, Calabar, Cross River State, Nigeria

Source: http://www.tinapa.com
Plate 4.1.7: Front of the retail shops walkway, Tinapa Business Resort Calabar, Cross River State, Nigeria.

Source: Authors photograph
Plate 4.1.8: Picture showing the retail shops along the walkway, Tinapa Business Resort Calabar, Cross River State, Nigeria.

Source: http://www.tinapa.com

Tinapa business resort, calabar is a world-class business outfit in Nigeria, opened in the year (2006) amidst great excitement and anticipation. Foreign based GAPP, Architects and Urban Designers, Africa, internationally recognised designers, were retained by the developers to design the project with their Nigerian representative as COGEDS, calabar who were able to manage the project from start to its present stage.
Plate 4.1.9: The shopping emporium interior with roof open to hall showing service pipes, floor finished with epoxy which is expensive, Tinapa Business Resort Calabar, Cross River State, Nigeria.

Source: http://www.tinapa.com

The Tinapa business resort is the latest and most ambitious development in cross river state trade and leisure strategy, located in the Calabar trade zone. Tinapa is the realization of a calculated business initiative designed to attract traders and tourists alike. Calabar, a city in the southern part of Nigeria located around the oil producing states in Nigeria, Port Harcourt, Delta, Eket, Bayelsa, etc. Demographic studies have found out that there are about 400,000 people residing in calabar with an additional student population of 40,000.
The architectural design of Tinapa exploits the natural richness of Africa through explorations into worlds of water and succulent vegetation.

Plate 4.1.10: Picture showing the entertainment area, Tinapa Business Resort, Calabar, Cross River State, Nigeria

Source: http://www.tinapa.com

The emporium is an open space with partitions for rentable space. It is double volume of above 6m from finished floor level.

The total development comprises of wholesale emporiums, 4 of them. These emporiums are supported by a vast array of retailers of books, specialty CD and DVD outlets, pharmacies, beauty salons, banks and jewelry stores. Adjoining the shopping area is an entertainment complex embracing the hotels and a waterfront development - the Fisherman's Wharf. There are also cinemas,
food court, internet café, a game arcade and a parking facility for 3000 cars and other parking spaces for trucks and services.

Plate 4.1.11: Picture showing the retail shops along the walkway, Tinapa Business Resort, Calabar, Cross River State, Nigeria

Source: http://www.tinapa.com

APPRAISAL

Merits

- Tinapa is aimed at being a Business resort, and as such, the facilities introduced meets the functions in which it’s meant to perform.
• The use of the central air conditioning system to regulate the internal climate of the emporiums.

• The market hall/ emporium will create a busy atmosphere which should be a characteristic of a shopping center.

• The service/dock yards are well zoned such that it is away from the rest of the emporium by the use of dwarf wall partitioning and landscape screen elements.

• There is proper management and control of refuse.

• Its design and zoning suits the tropical climate of its host environment.

• The parking space of 3000 plus is enough and caters for the influx of visitors to the facility conveniently as regards the scale of the project and calabar.


Source: http://www.tinapa.com
Demerits

- The emporiums are very massive in size therefore quite difficult to maintain as well as inadequate security system.

- The hall has double volume headroom with the roof trusses showing. This does not look too good because all the service pipes and fittings are completely exposed.

- The roof is covered with aluminium sheets therefore heat transmittance to the interior through radiation is not reduced. The hall is open to the roof.

- Lighting in the interior space is solely with the use of artificial lighting. There is little or no space for natural lighting.

- The floor is finished with epoxy floor finish which is expensive. In the case of partitioning the floor into a number of rentable spaces, it has to be tampered with. This is dependent on the kind of partitioning. If they have to be fixed, the floor will be affected, but if moveable partitions are used it poses a threat to safety.
Plate 4.1.13: Exterior perspective view of Tinapa Business Resort, Calabar, Cross River State, Nigeria

Source: http://www.tinapa.com
4.2 CASE STUDY 2: Ceddi Plaza, 264 Tafawa Balewa Way, Central Business District, Abuja, Nigeria.

Name: Ceddi Plaza

Location: 264, Tafawa Balewa Way, Central Business District, Abuja, Nigeria

Owners: Ceddi Corporation

Management: Broll Property services

Size: 10,000 Sqm

Started: 2001

Opened: November 2005

About Ceddi Plaza: Ceddi Plaza is made up of 55 specialty shops, offices & service providers consisting of movie theaters, a bookstore, champagne lounge, the Atrium at Ceddi Plaza, restaurants, cafes, fashion boutiques, shoes, accessories, home interior design stores, furnishings, health & beauty salons, gift shops, telephones, banking and ATMs, dry cleaning services, a dental office, pharmacy, photo studio, children's entertainment, events hall and much more. Ceddi Plaza is owned by Ceddi Corporation and is located in the Central Business Area of Abuja. The Plaza consists of 10,000 square meters of retail and office space. The tenant mix is made up of three floors of retail (eateries, fashion boutiques, entertainment and services) and three floors of corporate office space. Nigerian owned and designed, the mixed use facility is managed by Broll Property Services Nigeria. Opened officially in November 2005, the Plaza is celebrated as the premiere Center for Shopping & Entertainment in the City of Abuja.
Entertainment profile:

3 Eateries: Kilimanjaro, Bon ice and Shujuiced


3 Entertainment: Orpheus Music, Aristotle Bar n lounge, Silver bird Cinemas

3 Furniture and Household: Bedmate, Svengali, Picol

4 health and Beauty: Ikani Salon, GNC Live well, Homegym, Aqua Wellness

1 Grocery: Spar Supermarket

4 Electronics and phones: Etisalat, Globacom, Cyni Traders, Gadget Place

4 Gift Shops and Kiosks: Jemi Gifts, Toys and Things, Newton and David, Storm

5 Services: UBA, Ideal dental, Wardrobe n Linen, Skysat Technologies, Travel king

4 Offices: Mansel oil, Vlisco, Netco Dietsmann, Harps Petroleum

Services provided at ceddi plaza

• Nos. Standby 750 kva Generators
• 1 No. Night time generator for emergency lighting and security
• Borehole and water treatment plant
• Central air-conditioning of the retail, commercial areas and ancillary common areas
• 24 hour Security, including CCTV
• Two Senic lifts
• Service Lift
• Landscape gardens
- Basement and street level parking
- Sitting areas in atrium
- Cleaning of common areas
- Lighting of common areas
- Five alarm system
- Water sprinkler system
- TV satellite link-up
- Board band Internet access
- Public address system

Plate 4.2.1: Approach view

Source: http://www.ceddiplaza.com/newplan.php
Plate 4.2.2: Site Plan

Source: http://www.ceddiplaza.com/newplan.php
Plate 4.2.3: Basement

Source: http://www.ceddiplaza.com/newplan.php

The Shops Key represents the services available in every shop:

- Gift / Kiosk
- Services
- Health
- Fashion
- Electronics
- Entertainment
- Eatery
- Furniture
- Grocery

Offices

Dryclinic (Shop 1): Skysnap Technologies (Shop 1 & 2): Aristotle (Shop 10): Ikani Salon (Shop 11): Aqua Massage Centre (Shop 12A): DryClinic (Shop 12B): Travel King (Shop 3A): (Shop 3B): Toys ’n Things (Shop 4): Ideal Dental (Shop 5): Management Office (Shop 5): GNC Live Well Pharmacy (Shop 6): Twice as Nice (Shop 7): Gene Bendi (Shop 8): United Bank for Africa Plc (Shop 9): (Shop kiosk 1): Storm (Shop Kiosk 2)
Plate 4.2.4: Ground floor

Source: http://www.ceddiplaza.com/newplan.php

**Shops Key**  This Key represents the services available in every shop

- Gift / Kiosk
- Health
- Services
- Fashion
- Vacant Shops
- Electronics
- Entertainment
- Eactory
- Furniture
- Grocery

**Offices**


Plate 4.2.5: First floor

Source: http://www.ceddiplaza.com/newplan.php

<table>
<thead>
<tr>
<th>Shops Key</th>
<th>This Key represents the services available in every shop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gift / Kiosk</td>
<td>Services</td>
</tr>
<tr>
<td>Health</td>
<td>Vacant Shops</td>
</tr>
<tr>
<td>Fashion</td>
<td>Furniture</td>
</tr>
</tbody>
</table>
Offices

Kilimanjaro (Shop 26A/B); (Shop 27); (Shop 28); Wisemen Apparel (Shop 29); Jems Accessories (Shop 30); Mims Afrik (Shop 31); Daviva (Shop 32); Gadget Place (Shop 33); Pierre Cardin (Shop 34); Silverbird Cinemas (Shop 35); Jemi Gifts (Shop 36); Feyi’s Fabrics (Shop 37); (Shop 38); (Shop 39); Gloworld (Shop 40); Tiffany Amber (Shop 41); (Shop kiosk 4); Suhjuiced (Shop Kiosk 5); Bon Café (Shop Kiosk 6)

Plate 4.2.6: Second floor

Source: http://www.ceddiplaza.com/newplan.php

Offices

Bedmate Nig. Int. Ent. Co. Ltd (Shop 1); Map Infotel (Shop 2); Guinness (Shop 3)
Third floor

Plate 4.2.7: Showing elliptical staircases
emporium. Author: photos

Plate 4.2.8: Showing walkway between
Plate 4.2.9: Showing circular pillar around the gallery. Plate 4.2.10: Showing atrium

Plate 4.2.11: Showing several floors of galleries
Plate 4.2.12: Exit staircases from the third floor down to the basement level.

Plate 4.2.13: Showing circular core with facilities like pillars, lifts and pathway.
Plate 4.2.14: Showing the walkway. Plate 4.2.15: Showing Bon eatery within Ceddi plaza.

Source: Author’s photo

APRAISAL

Merits:

1. Facilities like shops, offices, services providers and much more.
2. Good number of parking spaces with basement.

Demerits:

1. Circulation space within the complex is not spacious enough
2. Lighting and ventilation in the interior are mainly artificial; there is little or no space for natural lighting and ventilation.
CASE STUDY 3: Canal Walk, Century city, Cape Town, South Africa.

4. 3 Canal Walk, South Africa.

Plate 4.3.1: Exterior view canal walk Century City, Cape Town, South Africa.

Source: http://www.canalwalk.co.za/

Location: Century City, Cape Town, South Africa,

Opening date: 26, October 2000.

Management -  Hyprop Investments Limited and Ellerine Bros (Pty) Ltd

No. of stores and services - 400 +

Others - 20 cinemas, restaurants

Total floor area - 125,000m² of let table retail space and 9,600m² of office space
Parking - unknown

No. of floors: 2.

Website - http://www.canalwalk.co.za/

Plate 4.3.2: Ground floor Plan, Canal walk, Century City, Cape Town, South Africa,

Source: http://www.canalwalk.co.za/
Plate 4.3.3: First floor Plan, Canal walk, Century City, Cape Town, South Africa.

Source: http://www.canalwalk.co.za/

Plate 4.3.4: Legend: Canal walk, Century City, Cape Town, South Africa.

Source: http://www.canalwalk.co.za/
Canal Walk is a 125,000 m² shopping centre in Cape Town, South Africa, built around a series of canals. The centre forms the heart of a mixed-use development known as Century City, which includes office blocks, residential areas and the Ratanga Junction theme park.

Plate 4.3.5: Shoppers during a summer's evening, Canal walk, Century City, Cape Town, South Africa.

Source: Wikipedia, the free Encyclopaedias

Canal Walk is the largest shopping centre in Africa in lettable area (Gateway Centre in Durban is larger in total area) and the Sandton City complex in Johannesburg is larger if you include the Nelson Mandela Square annex. Built in what the developers call "Cape Venetian architecture", the shopping centre hosts over 400 stores, numerous restaurants, 20 cinemas plus a game arcade and the MTN Sciencentre, an interactive science centre which in 2007 applied to the Guinness Book of World Records for the world's largest cellphone.
The centre opened in 2000 and appeals to the mass of tourists that visits Cape Town regularly from all over the world.

Plate 4.3.6: Atrium-like glass ceilings provide natural light to the double-storey mall, Century City, Cape Town, South Africa.

Source: Wilkipedia, the free Encyclopedia

Canal Walk was developed at a cost of approximately R1.3 billion and opened on 26 October 2000 as the largest shopping centre in Africa at the time with 125,000m2 of lettable retail space and 9,600m2 of office space in the two office towers above the shopping centre. At R900 million, the Canal Walk contract was the largest single private sector contract awarded in South Africa at that time.
Plate 4.3.7: A massive food court with multi-media entertainment, Century City, Cape Town, South Africa.

Source: Wikipedia, the free Encyclopaedia

In October 2003, Canal Walk was purchased by listed property company Hyprop Investments Limited (80%) and Ellerine Bros (Pty) Ltd (20%).

APPRAISAL

Merits

• Canal walk is an ultramodern shopping center of an international standard aimed at being world class, and as such, the facilities introduced meets the functions in which it’s meant to perform.

• The mall is on both floors thereby allowing for adequate window shopping in both floors.
• The mall and food courts tend towards creating a busy atmosphere which should be a dominant characteristic of a shopping center.

• The use of the central air conditioning system to regulate the internal climate of the shopping center.

• There is proper management and control of refuse.

• Its design and zoning suits the tropical climate of its host environment.

• The use of sky lights and roof lights to lighten the interior space.

• The provision of above 400 shops will enhance a wide variety of wares and merchandise.

• Adequate provision of escalators, lifts, telephone booths, and other service facilities.

Demerits

• The plan of the structure is almost symmetrical but the spaces are not consistent in their sizes and shapes. This makes planning difficult and not very functional.
4.4 CASE STUDY 4: Buyeo Premium Outlet, Gyuam-myeon, Buyeo-gun, Chungcheongnam-do, Korea.

Project name: Buyeo Premium Outlet.

Architect: Yamasaki Ku Hong Associates Design Lab.

Program: Shopping Mall.

Location: Gyuam-myeon, Buyeo-gun, Chungcheongnam-do, Korea.

Status: 1st Prize Winner – Invited Design Competition.

Partner-in-charge: Tae Sun Hong, Won Jin Kim, Chan Park.

Team: Jong Seok Kim, Ki Wan Ahn, Yeo Jin Youn, Dong Soo Jang, Eun Jeong Kwon, Mi Ji Lee, Jong Nam Kim, Jang Do Ki.

Site area: 74,698 SM

Building area: 16,569 SM

Total floor area: 39,964 SM

Plate 4.4.1: Courtesy Yamasaki.Ku.Hong Associates

Source: http://www.ykhlab.com

**DESCRIPTION:** Yamasaki Ku Hong Associates Design Lab has been awarded first prize for the invited design competition for a new landmark shopping center in Buyeo, Korea.

Plate 4.4.2: Landmark for Buyeo.

Source: http://www.ykhlab.com
The Client Lotte’s design competition objective is to find a design that satisfies the three missions: New Landmark for Buyeo, the old capital of Korea; Fun Place, Lotte’s corporate direction for new shopping malls; Eco Design. Because the project site sits next to the old palace of Bakje, one of the three dynasties settled in Korean Peninsula 2000 years ago, we were trying to find a solution for ‘Old’ and ‘New’ to coexist; ‘Landscape’ as ‘Architecture’ was the theme for this project.

Plate 4.4.3: Ring like structure.

Source: http://www.ykhlab.com

A linear band of shops are connected to form a ring-like structure that are deformed to fit into the eastern part of the site; thus created are three distinctive inner court-yards.

The outer walls of the band are stone-clad so that it resembles the old castle walls and the roof of the shopping block is a ‘grand’ plaza park that provides visitors a new resting area.
Plate 4.4.4: Site.

Source: http://www.ykhlab.com

The notion of ‘Landscape’ as a new form of ‘Architecture’ allows us to focus inner courts to be expressed as a ‘modern’ creature that has a life of its own; this duality satisfies a problem of mixing old and new – the roof garden and the exterior stone walls are to act as an old castle’s remnants.
Plate 4.4.5: Basement Plan.

Source: http://www.ykhlab.com

Three court yards have different characteristics not only in the size and proportion but also in functional usage – to reflect different shopping categories and events; this design is based on the notion that shopping is no longer a mere process of ‘buying’ and ‘selling’ but an ‘entertainment’ and ‘cultural experience’.
Plate 4.4.6: First Floor Plan.

Source: http://www.ykhlab.com

Plate 4.4.7: Second Floor Plan

Source: http://www.ykhlab.com
Plate 4.4.8: Third Floor Plan

Source: http://www.ykhlab.com

Plate 4.4.9: Fourth Floor Plan

Source: http://www.ykhlab.com
Plate 4.4.10.: Roof Plan

Source: http://www.ykhlab.com

Elevations
Plate 4.4.11: Elevations and Sections

Source: http://www.ykhlab.com

Plate 4.4.12: Process Diagram.

Source: http://www.ykhlab.com
Plate 4.4.13: Models.

Source: http://www.ykhlab.com

**APPRAISAL**

**MERITS**

- The design satisfies: new landmark for Buyeo, old capital of Korea, fun place, eco design because it sit next to the old palace of Bakje, one of the three dynasties settled in Korea peninsula 2000 years ago.
- A linear band of shops connected to form a ring like structure that deforms to fit into the eastern part of the site.
- Outer walls are stone clad to resemble the old castle walls in order to harmonize with site structures around the vicinity.
- Three courtyards have different characteristics which reflect buying, selling, entertainment and cultural experiences.
4.5 CASE STUDY 5: Shopping Roof Apartments, Bohinjska Bistrica, Slovenia.

Project name: Shopping Roof Apartments

Architect: OFIS Arhitekti

Location: Bohinjska Bistrica, Slovenia

Design Year: 2006

Construction Year: 2006-2007

Collaborators: Rok Oman, Špela Videčnik, Martina Lipicer, Meta Fortuna, Andrej Gregoric

Shopping mall Design: Jelka Šolmajer (Mercator Optima)

Structural Engineering: Milan Sorc, Projecta d.o.o. Ljubljana

Technical Engineering: Matej Jelen, Bambi d.n.o.

Contractor: Gradis Skupina G d.d., Ljubljana

Client: Gradis Skupina G d.d., Ljubljana

Site Area: 4,200 sqm

Constructed Area: 7,500 sqm

Budget: 4,5 M EURO (US $7,08 M)

Photographs: Tomaz Gregoric
Plate 4.5.1: One side view Shopping Roof Apartments.

Source://cdn.archdaily.net/wp-content/uploads/2008/06/
Plate 4.5.2: Site plan, plans, elevations and sections

Source://cdn.archdaily.net/wp-content/uploads/2008/06/
The initial task from the client was to build a new shopping mall on the plot of the existing one.

Furthermore the new project proposed use of the shopping roof for additional volume-as new apartments. The wooden mass is located centrally in the village of Bohinjska Bistrica in the alpine area of Lake Bohinj. The village has beautiful views towards the mountains but unfortunately it was architecturally damaged in the 60s with a textile factory and housing blocks, that were build around them. The textile factory was later closed down and the plot later occupied the old shopping mall and today the new one. The side views therefore are not very nice.

Plate 4.5.3: View opens towards mountain and the sun.

Source://cdn.archdaily.net/wp-content/uploads/2008/06/

The organization of the housing and the envelope of the apartments open towards mountain views and the sun. Therefore the front, wooden facade is mostly transparent with panoramic windows. The side facade is closed – the windows open towards the balcony that is cut into the volume. From side windows also view open to the mountains.
The stepped volume of the building follows the silhouette of surrounding landscape. On top of the shopping mall apartments are set in the form of stepped L-volume. From the west strong wind and snow arrives the facade is opened only towards enclosed balconies and its material is gray slate – it is designed as a vertical roof. L-shape volume encloses inner communal garden that is the roof of the shopping mall.

Plate 4.5.4: The front and courtyard facade is warm and opened, made of wooden verticals with different rhythm.

Source://cdn.archdaily.net/wp-content/uploads/2008/06/

**Wood** – local larch is used and slates in diagonal pattern are traditional materials used for roof and facade. Play of transparency formed by wooden verticals that form balcony fences, facade panels or mask characterizes the north and south part of the building. On the east and west pitched rhomboid-textured roof interpolates into vertical surfaces that protect apartments from snow and wind. Shopping mall facade is combination of steel and glass panels.
Apartments are of different sizes – from 40m² studio flats up to 120m² apartment with gallery. They are made of local materials such as wooden oak floors; granite tiled bathrooms and mainly has large windows with metal blinds. The concept of structure is made in a way, that floor plans are flexible, since only structural walls are those, that separate apartment shell from the rest of the building. All other inner walls are non-structural. The structure is made as combination of columns in the shopping mall area and structural walls in the area of shopping storages and services. The same structure is adapted towards the cellar, where parking is located and towards the upper floors where apartments are. The slabs are of reinforced concrete, the rest of walls are brick.

Pitched roof is made as combination of flat roof at the top of the building. The purpose is to hide all installations such as chimneys, ventilation and external air-conditioning.

4.6 CASE STUDY 6: Mall of America, Bloomington, Minnesota, United States.

**MALL OF AMERICA**

Plate 4.6.1: Front elevation, Mall of America, Bloomington, Minnesota, United States of America.

Source: http://www.mallofamerica.com

Location: Bloomington, Minnesota, United States

Coordinates: 44°51′15″N 93°14′32″W

Opening date: August 11, 1992

Developer: Melvin Simon & Associates & Triple Five Group

Management: Triple Five Group

No. of stores and services: 520+

No. of anchor tenants: 4

Total retail floor area: 2.5 million sq ft. (230,000 m²)
Parking: 20,000 spaces, including two 7-story ramps and overflow surface lots.

No. of floors: 4

Source: http://www.malfoamerica.com/

Plate 4.6.2: Ground Floor Plan, Mall of America, Bloomington, Minnesota, United States

Source: http://www.malfoamerica.com
Plate 4.6.3: First Floor Plan. Mall of America Bloomington Minnesota, United States of America.

Source: http://www.mallofamerica.com

Plate 4.6.4: Second floor plan, Mall of America, Bloomington, Minnesota, United States of America.

Source: http://www.mallofamerica.com
Mall of America (also MOA or the Megamall) is a super-regional shopping mall located in the Twin Cities suburb of Bloomington, Minnesota. The mall is located southeast of the junction of Interstate 494 and Minnesota State Highway 77, north of the Minnesota River and is across the interstate from
the Minneapolis-St. Paul International Airport. In the United States, it is the second largest enclosed mall in terms of retail space but is largest in terms of total enclosed floor area. Opened in 1992, the mall received 40 million visitors in 2006. Triple Five Group fully owns and manages the property.

Plate 4.6.7: Interior view of atrium, Mall of America, Bloomington, Minnesota, United States,

Source: http://www.mallofamerica.com

Mall of America has a gross area of 4.2 million sq ft. (390,000 m²), with 2.5 million sq ft. (230,000 m²) available as retail space. The mall is a nearly symmetrical building, with a roughly rectangular floor plan. Over 520 stores are arranged along three levels of pedestrian walkways on the sides of the rectangle, with a fourth level on one side. An addition planned north of the mall will allow for up to 900 stores. Four "anchor" department stores are located at the corners. The Mall is organized into 4 different zones, each with its own decorative style.
Plate 4.6.8: A departmental store in the mall, Mall of America, Bloomington, Minnesota, United States of America.

Source: http://www.mallofamerica.com

Despite Minnesota's sub-zero temperatures in the winter, only the mall's entrances are heated. Heat is allowed in through skylights above Nickelodeon Universe. Heat is produced by lighting fixtures, other electric devices and also by employees and guests of the mall in sufficient amounts to keep it comfortable. In fact, even during the winter, air conditioning systems need to be run nonstop during peak hours to ensure a comfortable shopping environment.

Two nearly identical seven story parking ramps on east and west sides provide 12,550 parking spaces. Parking lots on the north and south of the building, along with nearby overflow parking, bring the total number of spaces up to approximately 20,000.
Plate 4.6.9: A departmental store in the mall, Mall of America, Bloomington, Minnesota, United States of America.

Source: http://www.mallofamerica.com

The mall is used as a major transportation hub in the region, with bus and light rail service linking the mall to other destinations. Regular public transit service is provided by Metro Transit and other area bus lines, and nearby Mystic Lake Casino offers free shuttles to their establishment. The primary bus/rail station for scheduled local service is in the lower level of the eastern parking ramp. There, the Hiawatha Line light rail line connects the mall to the Minneapolis-Saint Paul International Airport and from there to downtown Minneapolis (another major shopping destination in the region, particularly during weekdays). The mall is being discouraged as a park and ride facility, and overnight parking is banned to prevent passengers taking the train to the airport. Commuters are encouraged to use the nearby 28th Avenue Station's parking lot.
APPRAISAL

Merits

- The mall of America is a multi dimensional ultramodern shopping center of an international standard aimed at being world class, and as such, the facilities introduced meets the functions in which it’s meant to perform.
- The shopping center is multi storey and houses a wide range of facilities including, an amusement park, office spaces, restaurants, etc.
- The provision of multi level parking facilities. The two, 7 storey parking facility takes care of all visitors and customers.
- The mall and food courts tend towards creating a busy atmosphere which should be a dominant characteristic of a shopping center.
- The use of the central air conditioning system to regulate the internal climate of the shopping center.
- There is proper management and control of refuse.
- Its design and zoning suits the tropical climate of its host environment.
- The use of sky lights and roof lights to lighten the interior space.
- The provision of above 520 shops will enhance a wide variety of wares and merchandise.
- Adequate provision of escalators, lifts, telephone booths, and other service facilities.

Demerit

- The shopping center is very large and will be difficult to maintain.
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LIST OF PLATES

Plate 4.1.1: 3D representation of the shopping area, Tinapa Business Resort, Calabar, Cross River State, Nigeria.
Source: http://www.tinapa.com

Plate 4.1.2: Perspective view of Tinapa Business Resort, Calabar, Cross River State, Nigeria.
Source: http://www.tinapa.com

Plate 4.1.3: Plan showing the site plan of Tinapa Business Resort, Calabar, Cross River State, Nigeria
Source: http://www.tinapa.com

Plate 4.1.4: Plan showing the emporiums, the entertainment area and the parking spaces, of Tinapa Business Resort, Calabar, Cross River State, Nigeria
Source: http://www.tinapa.com

Plate 4.1.5: Plan showing the emporiums and retail shops, Tinapa Business Resort, Calabar, Cross River State, Nigeria
Source: http://www.tinapa.com

Plate 4.1.6: Picture showing the retail shops along the walkway, Tinapa Business Resort, Calabar, Cross River State, Nigeria
Plate 4.1.7: Front of the retail shops walkway, Tinapa Business Resort Calabar, Cross River State, Nigeria.

Source: Author photograph

Plate 4.1.8: Picture showing the retail shops along the walkway, Tinapa Business Resort Calabar, Cross River State, Nigeria.

Source: http://www.tinapa.com

Plate 4.1.9: The shopping emporium interior with roof open to hall showing service pipes, floor finished with epoxy which is expensive, Tinapa Business Resort Calabar, Cross River State, Nigeria.

Source: http://www.tinapa.com

Plate 4.1.10: Picture showing the entertainment area, Tinapa Business Resort, Calabar, Cross River State, Nigeria.

Source: http://www.tinapa.com

Plate 4.1.11: Picture showing the retail shops along the walkway, Tinapa Business Resort, Calabar, Cross River State, Nigeria.

Source: http://www.tinapa.com


Source: http://www.tinapa.com

Source: http://www.tinapa.com

Plate 4.2.1: Approach view

Source: http://www.ceddiplaza.com/newplan.php

Plate 4.2.2: Site Plan:

Source: http://www.ceddiplaza.com/newplan.php

Plate 4.2.3: Basement:

Source: http://www.ceddiplaza.com/newplan.php

Plate 4.2.4: Ground Floor:

Source: http://www.ceddiplaza.com/newplan.php

Plate 4.2.5: First Floor:

Source: http://www.ceddiplaza.com/newplan.php

Plate 4.2.6: Second Floor:

Source: http://www.ceddiplaza.com/newplan.php

Plate 4.2.7: Showing elliptical staircases

Source: Author Photograph

Plate 4.2.8: Showing walkway between Emporium.
Source: Author photos

Plate 4.2.9: Showing circular pillar around the gallery.

Source: Author Photograph

Plate 4.2.10: Showing atrium

Source: Author Photograph

Plate 4.2.11: Showing several floors of galleries

Source: Author Photograph

Plate 4.2.12: Exit staircases from the third floor down to the basement level.

Source: Author Photograph

Plate 4.2.13: Showing circular core with facilities like pillars, lifts and pathway.

Source: Author Photograph

Plate 4.2.14: The walkway.

Source: Author Photograph

Plate 4.2.15: In bon eatery within Ceddi plaza.

Source: Author Photograph

Plate 4.3.1: Exterior view canal walk Century City, Cape Town, South Africa.

Source: http://www.canalwalk.co.za/
Plate 4.3.2: Ground floor Plan, Canal walk, Century City, Cape Town, South Africa,

Source: http://www.canalwalk.co.za/

Plate 4.3.3: First floor Plan, Canal walk, Century City, Cape Town, South Africa.

Source: http://www.canalwalk.co.za/

Plate 4.3.4: Legend: Canal walk, Century City, Cape Town, South Africa.

Source: http://www.canalwalk.co.za/

Plate 4.3.5: Shoppers during a summer's evening, Canal walk, Century City, Cape Town, South Africa.

Source: Wikipedia, the free Encyclopaedias

Plate 4.3.6: Atrium-like glass ceilings provide natural light to the double-storey mall, Century City, Cape Town, South Africa.

Source: Wikipedia, the free Encyclopedia

Plate 4.3.7: A massive food court with multi-media entertainment, Century City, Cape Town, South Africa.

Source: Wikipedia, the free Encyclopedia

Plate 4.4.1: Courtesy Yamasaki.Ku.Hong Associates

Source: http://www.ykhlab.com
Plate 4.4.2: Landmark for Buyeo.
Source: http://www.ykhlab.com

Plate 4.4.3: Ring like structure.
Source: http://www.ykhlab.com

Plate 4.4.4: Site.
Source: http://www.ykhlab.com

Plate 4.4.5: Basement Plan.
Source: http://www.ykhlab.com

Plate 4.4.6: First Floor Plan.
Source: http://www.ykhlab.com

Plate 4.4.7: Second Floor Plan
Source: http://www.ykhlab.com

Plate 4.4.8: Third Floor Plan
Source: http://www.ykhlab.com

Plate 4.4.9: Fourth Floor Plan
Source: http://www.ykhlab.com
Plate 4.4.10.: Roof Plan
Source: http://www.ykhlab.com

Plate 4.4.11: Elevations and Sections
Source: http://www.ykhlab.com

Plate 4.4.12: Process Diagram.
Source: http://www.ykhlab.com

Plate 4.4.13: Models.
Source: http://www.ykhlab.com

Plate 4.5.1: One side view Shopping Roof Apartments.
Source://cdn.archdaily.net/wp-content/uploads/2008/06/

Plate 4.5.2: Site plan, plans, elevations and sections
Source://cdn.archdaily.net/wp-content/uploads/2008/06/

Plate 4.5.3: View opens towards mountain and the sun.
Source://cdn.archdaily.net/wp-content/uploads/2008/06/

Plate 4.5.4: The front and courtyard facade is warm and opened, made of wooden verticals with different rhythm.
Source://cdn.archdaily.net/wp-content/uploads/2008/06/
Plate 4.5.5: An Apartment

Source: cdn.archdaily.net/wp-content/uploads/2008/06/

Plate 4.6.1: Front elevation, Mall of America, Bloomington, Minnesota, United States of America.

Source: //www.mallofamerica.com

Plate 4.6.2: Ground Floor Plan, Mall of America, Bloomington, Minnesota, United States

Source: http://www.mallofamerica.com

Plate 4.6.3: First Floor Plan. Mall of America Bloomington Minnesota, United States of America.

Source: http://www.mallofamerica.com

Plate 4.6.4: Second floor plan, Mall of America, Bloomington, Minnesota, United States of America.

Source: http://www.mallofamerica.com

Plate 4.6.5: Third floor plan, Mall of America, Bloomington, Minnesota, United States of America.

Source: http://www.mallofamerica.com

Plate 4.6.6: Legend, Mall of America, Bloomington, Minnesota, United States

Source: http://www.mallofamerica.com

Plate 4.6.7: Interior view of atrium, Mall of America, Bloomington, Minnesota, United States,

Source: http://www.mallofamerica.com
Plate 4.6.8: A departmental store in the mall, Mall of America, Bloomington, Minnesota, United States of America.

Source: http://www.mallofamerica.com

Plate 4.6.9: A departmental store in the mall, Mall of America, Bloomington, Minnesota, United States of America.

Source: http://www.mallofamerica.com
CHAPTER 5

SITE LOCATION AND ANALYSIS
5.1 PRESENTATION OF ANALYSES

The proposed shopping complex will be sited in Awka Anambra state; Nigeria.

ABOUT AWKA: Awka (Igbo: Ọka) is the capital of Anambra State, Nigeria with an estimated population of 301,657 as of 2006 Nigerian census. The city is located about 600 miles east of Lagos in the centre of the densely-populated Igbo heartland in southeastern Nigeria. The West-East Federal highway links Lagos, Benin City, Asaba, Onitsha, and Enugu to Awka and several local roads link it to smaller towns and villages such as Agulu, Nibo, Amawbia, Enugwu-Ukwu and Abagana. Fig 5.1 shows map of Nigeria while Fig 5.2 depict location of Anambra state.

![Map of Nigeria](www.ananigeria.com/branches)

Fig 5.1: Map of Nigeria.

Source: www.ananigeria.com/branches
HISTORY

Awka was famous for metal working and its blacksmiths before the 20th century and were prized throughout the region for making farming implements, guns and tools. The Awka area in earlier times was the site of the Nri Civilization that produced the earliest documented bronze works in Sub-Saharan Africa around 800 AD.

Before the inception of British rule, Awka was governed by titled men known as Ozo and Ndichie who were accomplished individuals in the community. They held general meetings or Izu Awka either at the residence of the oldest man (Otochal Awka) or at a place designated by him. He was the Nne Uzu or master blacksmith, whether he knew the trade or not, for the only master known to Awka people was the master craftsman, the Nne Uzu.
In modern times, Awka has adapted to the republican system and is currently divided into two local government areas, Awka North and Awka South with local representatives. However, it still preserves traditional systems of governance with Ozo titled men often consulted for village and community issues and a paramount cultural ruler, the Eze Uzu who is elected by all Ozo titled men by rotation amongst different villages to represent the city at state functions. The current Eze Uzu of the city is Gibson Nwosu. Awka should not be confused with Awka Etiti which is a town in Idemili South local government area that is often mistaken for the main capital. Today it is the capital of Anambra state of Nigeria. Slogan: *Sires of Smiths*

**DEMOGRAPHICS**

Awka comprises seven Igbo groups sharing common blood lineage divided into two sections. Ifite Section, the senior section, comprises four groups, Ayom-na-Okpala, Nkwelle, Amchalla, and Ifite-Awka followed by Ezinator Section, which consists of three groups, Amikwo, Ezi-Awka and Agulu. Each of these groups has a number of villages”. All together, Awka comprises 33 villages.

Awka people as in traditional times travel far and wide and have a large diaspora primarily in the UK and in the USA. Living abroad, they formed themselves into social clubs like Awka Union USA and Canada, Awka town social community Uk and Ireland and other such useful associations. These associations have been a way for people to enjoy their culture as well as to engage in community self-help projects. Over the years Awka Town has attracted people from other states in Nigeria and has a significant number of immigrants from northern Nigeria, Delta state, Cameroon and Ghana.
GEOGRAPHY

Awka lies below 300 metres above sea in a valley on the plains of the Mamu River. Two ridges or cuestas, both lying in a North-South direction, form the major topographical features of the area. The ridges reach the highest point at Agulu just outside the Capital Territory. About six kilometers east of this, the minor cuesta peaks about 150 metres above sea level at Ifite –Awka.

Awka is sited in a fertile tropical valley but most of the original Rain forest has been lost due to clearing for farming and human settlement. A few examples of the original rain forest remains at places like the Ime Oka shrine. Wooded savannah grassland predominates primarily to the north and east of the city. South of the town on the slopes of the Awka-Orlu Uplands are some examples of soil erosion and gullying.

STATE CAPITAL: AWKA

There are 21 local government areas in the state:

Aguata, Awka North, Awka South, Anambra East, Anambra West, Anaocha, Ayamelum, Dunukofia, Ekwusigo, Idemili North, Idemili South, Ihiala, Njikoka, Nnewi North, Nnewi South, Ogbaru, Onitsha North, Onitsha South, Orumba North, Orumba South and Oyi. Below is a map showing the local government area in fig 5.3 while fig 5.4 shows Awka map.
Fig 5.3: Map of Anambra state showing the 21 local government areas

Source: www.speakersoffice.gov.ng/images/map.anambra1.gif
Fig 5.4: Awka Map

Source: http://uploadwikimedia.org/Wikipedia/commons/9/9a/Awka_map.gif
ECONOMY

Plate 5.1: Anambra State Government House, Awka.

Source: Wikipedia from free encyclopedia

The economy of Awka city revolves primarily around government since many state and federal institutions are located there. Awka hosts the State Governor's Lodge, State Assembly and State Ministries for Health, Education, Lands, water. Plate 5.1: Shows Anambra state Government House, Awka. The Anambra Broadcasting Service (ABS) a TV and radio station are located in the city center. A number of federal institutions including the Central Bank of Nigeria (which has a currency center in Awka), the NTA Awka media station, and branches of the Federal Inland Revenue Service, Federal Road Safety Commission, Nigerian Immigration Service, and Corporate Affairs Commission are also present in the city. The city also has two tertiary institutions, the Nnamdi Azikiwe University and Paul University.

In recent years, several new businesses have erected fascinating new buildings that have largely changed the face of Awka city. The partly state-owned Orient Petroleum Resources Ltd has the headquarters in Awka. The company is poised to set up a refinery at Igbariam to jump-start the exploitation of the huge crude oil deposits in the Anambra River basin. Also Juhel Nigeria has constructed a manufacturing plant for Parenteral drugs in the city.
Major Nigerian Banks such as Access Bank, Bank PHB, Diamond Bank, Ecobank, First Bank, Intercontinental, Oceanic Bank, UBA, Union Bank and Zenith Bank have opened branches in the city. Hotels such as Parktonian, Marble Arch, Suncity, Barnhill Resort provide modern convenience and hospitality.

RELIGION

On November 10, 1977 the Roman Catholic Diocese of Awka was established from the Metropolitan Archdiocese of Onitsha. The Cathedral is St. Patrick’s Cathedral in Awka. Anglican church Traditional Igbo / Awka religion (omena ana) (the word means tradition (similar to the word Kha ba la in hebrew).

5.2 SITE LOCATION ALTERNATIVES

SITE A: Beside Alex Ekwueme square. Area=112,250sq.m

SITE B: Beside CBN, facing Enugu- Onitsha express road. Area=33,751sq.m

SITE C: Within Awka township stadium, along Arthur Eze Avenue which leads eke awka. Area=55,000sq.m

Below is fig 5.5 showing three site location alternatives
Fig 5.5: Site options A: B: C

Source: Author Ministry of lands
Site A is 112250.0sq.metres in size. It is beside Alex Ekwueme square, facing the main road with an adjacent street leading into parts of the area. Around site A, we have buildings like Anambra state secretariat, Federal high court Awka, residential buildings, and commercial conference blocks.

Services like electrical pole cables, telecommunication mast, street light, drainages, roads, etc are available in the site. Pictures depicting some surrounding buildings and other existing services.
Plate 5.4: Back view of Alex Ekwueme square with vegetations

Plate 5.5: Federal high court, Awka
Plate 5.6: 3blocks of uncompleted buildings behind site A

Plate 5.7: Electrical pole wires
Plate 5.8: Street light along the major road facing site A
Source: Author-photographs

Plate 5.9: Building around site @ right side. Plate 5.10: adjoining Street beside the site

Plate 5.11: Part of site “A” facing the road Plate 5.12: Small gully @ right side of the site, can be utilized to channel drainage

Plate 5.13: Soil type- clay and humus Plate 5.14: Telecom mast with light dense vegetation
Fig 5.7: Site B

Source: Author. Ministry of lands

Fig 5.7 showing Site B is beside CBN. Area of the site is 33,751 m². It is around Juhel-parental drug manufactures, federal ministry of women affairs and social development Braille library.

Pictures depicting some structures around site B and services like electrical pole wires, roads, street light, telecommunication mast, and advertisement boards.

Plate 5.15: Vegetation on site B

Plate 5.16: Surrounding neighbour of CBN

Source: Author-photographs
Plate 5.17: Advert board  Plate 5.18: Street light  Plate 5.19: Electrical pole wires
Source: Author-photographs

Plate 5.20: Street of site B  Plate 5.21: Site B  Plate 5.22: CBN front view
Source: Author-photographs

Plate 5.23: Site B & existing open shelter  Plate 5.24: front view of site B
Source: Author-photographs
Plate 5.25: Federal ministry of women affairs

Plate 5.26: Express road, in front of site B

Around site B

Source: Author-photographs

Fig 5.8: Site C. Source: Author. Ministry of lands

Site C 55000sq.m is within Awka township stadium. Along Arthur Eze street which leads to Eke Awka.
5.3 CRITERIA FOR SELECTING THE PROPOSED SITE

Criteria for selecting site B

The location of a shopping centre is carefully selected because it is mainly a profit making venture as well as its need for maximum patronage. Therefore the need for a careful survey for the location of the site became necessary. A lot of criteria where adopted and are as follows:

The location of the site will contribute to the proper use of the shopping centre, therefore a site located in the business executive district zone of Awka, the Capital of Anambra State where the three arms of Government exist was considered.

As a mega structure therefore, the location of the site has no zoning restrictions as regards height of building, spread of building, etc.

Other important factors are considered:

- The site should be close to where there is availability of public transportation.
- The site should be close to the eligible populace, but located such that traffic problems are reduced.
- The site should be accessible to pedestrian, vehicular, and all forms of traffic.
- The site should have a topography that encourages good natural drainage of rainwater.
- The area should be already established for commercial use.
- The site for the shopping centre should be able to provide comfortable and safe conditions for shopping activities.
The topography and shape of the site must permit advantageous planning and reasonably economic construction.

5.4 SITE LOCATION STUDIES

The location of the site will contribute to the proper use of the shopping centre. Therefore, a site located in the business executive district zone of Awka, the Capital of Anambra State where the three arms of Government exist was considered.

In the executive business district, most companies, organizations and commercial bodies found in that vicinity can easily access the site. This proximity is of great advantage to the companies, organizations, commercial bodies, institutions and the proposed shopping centre. The site is in neighborhood with the central bank of Nigeria building, intercontinental bank, Oceanic bank, Anambra state Housing Development Corporation Awka, Juhel Company, Millennium Company, Access bank, Judiciary, First Bank and many other executive buildings.

Accessibility

The site is easily accessible from Onitsha-Enugu express road along the south part of the site and golden towers road along the north side of the site. Major access into the site will be from the south side of the site while service delivery into the site will be from the north side of the site.

Site topography

The site is relatively flat with thick grass growing on the site.

Noise

Major source of noise into the site is from Onitsha-Enugu express from the south part of the site and Golden towers road from the north part of the site.
This menace can be reduced by shielding the source of the noise

Site orientation

To obtain maximum natural ventilation, the orientation of the building is to be in the South East-North West axis. To avoid sun glare and solar radiation, buildings are better oriented so that the longer side faces the North-South pole while the shorter facade faces the East-West pole. The building will be oriented in such a way to maximize both natural ventilation and natural lighting. The use of sun shading devices will be employed where necessary.

Prevailing wind and sun path

The site experiences two prevailing winds, the north east trade winds and south west monsoon winds. The north east trade winds blows from the Sahara desert in Northern Africa, and is characterized by the dryness and dust it causes during the dry season. The north east trade wind brings harmattan winds- cool, dry, dusty, haze laden wind. On the other hand, the south west monsoon winds blows from the Atlantic Ocean, and is characterized by the wetness it causes during the rainy season. Plate 5.27 shows the proposed site.

The site also experiences sunrays which rises from the east and sets on the west. The intensity of the solar radiation produced will be controlled and reduced by proper landscaping, good orientation of the proposed shopping centre and use of shading elements on the building.
Plate 5.27: The Site.

Source: Photo by Author

Below are pictures showing different aspects of the proposed site:

Plate 5.28: The proposed site and Central Bank of Nigeria building

Plate 5.29: Access route into the site

Plate 5.30: North side of the site showing the site along the road

Plate 5.31: Un-tarred road along the south side of the site

Fig 5.9: The Executive Business District layout of Awka showing the site

Fig 5.10: Site analysis
Plate 5.28: The proposed site and Central Bank of Nigeria building.

Source: Photo by Author

Plate 5.29: Access route into the site

Source: Photo by Author
Plate 5.30: North side of the site showing the site along the road

Source: Photo by Author

Plate 5.31: Un-tarred road along the south side of the site.

Source: photo by Author
Fig 5.9: The Executive Business District layout of Awka showing the site

Source: Ministry of Lands, Survey and Urban Planning Department Awka
Area of site = 33,751 m$^2$

Fig 5.10: Site analysis

Source: Author’s Illustration
5.5 SITE CHARACTER AND ANALYSES

Climate

Awka is located in the transitional zone of the sub-equatorial south and the tropical hinterland of the Nigerian climatic regions.

The global solar radiation in Awka, located at lat 6.20°N and long 7.12°E has been measured using a Belfort actinography on a continuous basis from November 1985 to May 1986. The general pattern of radiation for each day resembles a normal curve. The irradiation level is found to be above 3.1 MJ/m\(^2\) between 10.00 and 14.00 h. The fluctuation of daily radiation is highest in the rainy season and least in December, which is, incidentally, in the harmattan season. April, which is a transition to the rainy season, has the highest radiation of 16.86 MJ/m\(^2\).

The clearness index varies from 0.36 in December to 0.45 in April, indicating that the atmosphere is generally heavily overcast. Thus, solar energy devices that are concentrating will not be very effective when used here.

Dry season

Tropical climate of wet (April-Oct) and dry (Nov-March) climate transits between the subequatorial and tropical hinterland climates with dry and wet seasons. The dry season tends to be very hot and sunny. Harmattan is another season typical of most Nigerian towns, though lasts very shortly annually. It is generally a season of cold, dry and atmosphere. It blows from December to March.

Rainfall

January is not usually a rainy period in the country. However, there were few rainfall events especially in the coastal areas in January and February 2009.
Awka being the warm humid zone experiences heavy down pour. Rain starts in April and last till October, with maximum rainfall occurring in July and September. The annual rainfall averages about 1,850mm (74inches) per annum though January and December record very low rainfall; there is no month without rainfall.

The peak rainfall alternates between June and September, in August there is a little break in rainfall, which is normally referred to as August break.

The seasonal distribution of rainfall over the area, the amount and type of rainfall in the place and time over the year is determined in relation to the inter-tropical convergence zone (ITC) and the inter tropical Discontinuity (ITD) which is the meeting point of two opposing winds, the N.E trade and S.W winds (the two Tropical Continental Air masses).

The prevalent winds are the N.E trade winds (harmattan winds - cool, dry, dusty, haze laden wind). The effect is low visibility especially in the morning and evenings tendency for walls, roof, and interior furnishings to be coated with layers of dust.

The ITD moves North of Anambra within the months of March to October. In these months, the warm moist, tropical maritime air mass, the S/W. trade wind brings in rainfall. Line grails (violent Easterly wind) herald the beginning and the ending of rainy season. They come with short spell torrential rainfall accompanied by violent winds, lightning and thunder. Elevated places often experiences hero graphic rainfall and experiences the devastating effects of the squall.

Occasionally, from June –August, occurrence to long, protracted rainfall lasting days are experienced. They are of the tropical cyclone type of winds following the formation of weak low pressure belts. The short spell of about one week called august break occurring in late July or in august divides the season of rain into two, due to high temperature and high humidity weather condition is usually enervating.
Generally, the weather is usually hot all year long. The maximum temp averages from 27-28°C and peaking about 35°C and in Onitsha, a maximum of 78°F and 81°F average temp of 77°F in Nnewi, a maximum of 27.2°C to 35°C, min 18.2°C to 23°C.

**Humidity**

Awka records a high humidity and rainfall (about 1,485.2mm, per annum while Onitsha-varies from 70% and 80% and Nnewi, a relative humidity varies from 40% to 92%. The month of lowest humidity is January. At such periods, the relative humidity of less than 45% could be recorded.

**Topography**

Awka topography lies between 150 and 300m above sea level on the plains of the Mamu River. Onitsha- mainly lowlands with topography varying from 150 and 240m in height and dissected by small streams draining into river Niger - Nnewi characterized by two main ridge formations to the west and east, lowest contour 150m and peaking at 1050m above sea level; the area is drained by rivers Niger and Idemili.

**Soil**

Awka soil is characterized by loamy, clay and fine white sands, and lateritic, red to brownish soil, poorly cemented and with moderate permeability. Another part of Anambra, which is Onitsha, is characterized by a wide plain of alluvium, punctuated by sandy and loamy soils around the Nkpor and Ogidi area. Nnewi soils are porous, non resistant non-load bearing and easily eroded.
Vegetation

Awka is located within the southern part of the Guinea Savannah vegetation zone of Nigeria, often called Derived Savannah. This region is the transitional zone between the true savannah zone in the north and the rainforest in the south. Fig 5.11 depicts the vegetation map of Nigeria.

The Rain forests is largely reduced to mixed savanna vegetation by farming, with thick forests along river valleys. Formerly covered with tropical forest, the area around Awka now mostly consists of wooded grassland. South of the town on the slopes of the Awka - Orlu Uplands are some examples of soil erosion and gulling. Onitsha has light forest interspersed in some cases with tall grasses while Nnewi is characterized of rainforest of thick forest in river valleys reduced to grasslands, mainly the long elephant grasses in the cultivated parts.

Fig 5.11: Vegetation map of Nigeria

Source: http://www.map of Nigeria.com
Wind

The two prevailing winds in Awka are the north east trade winds and south west monsoon winds. The north east trade winds blows from the Sahara desert in Northern Africa, and is characterized by the dryness and dust it causes during the dry season. The north east trade wind brings harmattan winds-cool, dry, dusty, haze laden wind. On the other hand, the south west monsoon winds blows from the Atlantic Ocean, and is characterized by the wetness it causes during the rainy season.

Deductions

- Orientation must consider wind force
- Roof pitch must be greater than 25° slope to be able to withstand wind storms
- Use wind breakers and landscape elements.

Sunshine

These generally progresses from morning to break in the afternoon only to fall to zero in the evening. There are 160 - 205 hours of mean sunshine during dry season. The sunshine is usually highest during this season (dry season). From July – September isolation is lowest. Mid-day sun is usually intensive and undesirable. Morning and evenings are the most comfortable times. Early morning sun is good for the health as it gives vitamin D.

Deduction

- Good landscaping will help softening the atmosphere.
- Sunshades will help reduce the penetration intense sunlight into the building.
- Orientation of the building must be properly positioned.
5.6 SPACE SCHEDULE


Admin: Conference hall. Chief Executive Officer. Offices.

<table>
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<tr>
<th>ACCOMMODATION</th>
<th>NO. OF UNITS</th>
<th>SPACE AREA (M²)</th>
<th>LOCATION</th>
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<tbody>
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<td>250</td>
<td>Ground floor</td>
</tr>
<tr>
<td>Storage</td>
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<tr>
<td>Maintenance shop</td>
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<td>Ground floor</td>
</tr>
<tr>
<td>Fashion accessories</td>
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</tr>
<tr>
<td>Groceries</td>
<td>2</td>
<td>250</td>
<td>Grd floor</td>
</tr>
<tr>
<td>Shops</td>
<td></td>
<td></td>
<td>1- 4</td>
</tr>
<tr>
<td>Eatery – restaurant</td>
<td>1</td>
<td>250</td>
<td>✓</td>
</tr>
<tr>
<td>Studio – cinema</td>
<td>2</td>
<td>250</td>
<td>✓</td>
</tr>
<tr>
<td>Furniture</td>
<td>1</td>
<td>250</td>
<td>First floor</td>
</tr>
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<td>Electronic</td>
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</tr>
<tr>
<td>Internet café</td>
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<td>250</td>
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</tr>
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<td>Floors</td>
<td>Dimensions</td>
<td>Location</td>
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<td>Unisex salon</td>
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<tr>
<td>Laundry</td>
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<tr>
<td>Offices</td>
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</tr>
<tr>
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<tr>
<td>Children’s amusement area.</td>
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<td>260</td>
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<tr>
<td>Multi-purpose hall</td>
<td>1</td>
<td>260</td>
<td>Ground floor</td>
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<td>Telecom</td>
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<td>26.5</td>
<td>2nd floor</td>
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<td>Nitel</td>
<td>1</td>
<td>26.5</td>
<td>2nd floor</td>
</tr>
<tr>
<td>Starcom</td>
<td>1</td>
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<tr>
<td>Etisalat</td>
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<td>Mtn</td>
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<td>Retail iii</td>
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<td>6th floor</td>
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<td>Anteroom</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Secretary</td>
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</tr>
<tr>
<td>Conference hall</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>All floors</td>
</tr>
<tr>
<td>----------------</td>
<td>---</td>
<td>---</td>
<td>------------</td>
</tr>
<tr>
<td>Office i</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office ii</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passengers lift</td>
<td>2</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Service lift</td>
<td>1</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>Chute</td>
<td>1</td>
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<td></td>
</tr>
<tr>
<td>stairs</td>
<td>2</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.1: Space Schedule

Source: Author
5.7 REFERENCES

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LIST OF FIGURES

- Fig 5.1: Map of Nigeria.
  Source: www.ananigeria.com/branches.
- Fig 5.2: Location map of Anambra
  Source: www.rnw.nl/.../NigeriaAnambra-wikipedia_0.png
- Fig 5.3: Map of Anambra state showing the 21 local government areas
  Source: www.speakersoffice.gov.ng/images/map.anambra1.gif
- Fig 5.4: Awka Map
  Source: http://uploadwikimedia.org/Wikipedia/commons/9/9a/Awka_map.gif
- Fig 5.5: Site options A: B: C
  Source: Author Ministry of Lands
- Fig 5.6: Site A
  Source: Author Ministry of Lands
- Fig 5.7: Site B
  Source: Author Ministry of Lands
- Fig 5.8: Site C.
  Source: Author Ministry of Lands
- Fig 5.9: The Executive Business District layout of Awka showing the site
  Source: Ministry of Lands, Survey and Urban Planning Department Awka
- Fig 5.10: Site analysis
  Source: Author’s Illustration
- Fig 5.11: Vegetation map of Nigeria
  Source: http://www.map of Nigeria.com
LIST OF PLATES

- Plate 5.1: Anambra State Government House, Awka.
  Source: Wikipedia from free encyclopedia
- Plate 5.2: Back view Anambra state Secretariat
  Source: Author Photograph
- Plate 5.3: Side of Alex Ekwueme Square
  Source: Author-photographs
- Plate 5.2: Back view Anambra State Secretariat
  Source: Author Photograph
- Plate 5.3: Side of Alex Ekwueme Square
  Source: Author-photographs
- Plate 5.4: Back view of Alex Ekwueme Square with vegetations
  Source: Author-photographs
- Plate 5.5: Federal high court, Awka
  Source: Author Photograph
- Plate5.6: 3blocks of uncompleted buildings behind site A
  Source: Author-photographs
- Plate 5.7: Electrical pole wires
  Source: Author Photograph
- Plate 5.8: Street light along the major road facing site A
  Source: Author-photographs
- Plate 5.9: Building around site @ right side.
  Source: Author Photograph
Plate 5.10: adjoining Street beside the site
Source: Author-photographs

Plate 5.11: Part of site “A” facing the road
Source: Author Photograph

Plate 5.12: Small gully @ right side of the site, can be utilized to channel drainage
Source: Author-photographs

Plate 5.13: Soil type- clay and humus
Source: Author Photograph

Plate 5.14: Telecom mast with light dense vegetation
Source: Author-photographs

Plate 5.15: Vegetation on site B
Source: Author Photograph

Plate 5.16: Surrounding neighbour of CBN
Source: Author-photographs

Plate 5.17: Advert board
Source: Author Photograph

Plate 5.18: Street light
Source: Author Photograph

Plate 5.19: Electrical pole wires
Source: Author-photographs

Plate 5.20: Street of site B
Source: Author Photograph

Plate 5.21: Site B
Plate 5.22: CBN front view
Source: Author-photographs

Plate 5.23: Site B & existing open shelter
Source: Author Photograph

Plate 5.24: Front view of site B
Source: Author-photographs

Plate 5.25: Federal ministry of women affairs
Source: Author Photograph

Plate 5.26: Express road, in front of site B
Source: Author-photographs

Plate 5.31: Un-tarred road along the south side of the site.
Source: photo by Author

Plate 5.27: The Site.
Source: Photo by Author

Plate 5.28: The proposed site and Central Bank of Nigeria building.
Source: Photo by Author

Plate 5.29: Access route into the site
Source: photo by Author

Plate 5.30: North side of the site showing the site along the road
Source: photo by Author

Table 5.1: Space schedule.
Source: Author
6.1 DESIGN CONCEPT

The design concept is a principle of development process. Shopping Center is a magnitude of structural complex, where ideas should be brought together like social activities, and still being able to unify the function of the design, form, aesthetics, scale, good imagery - showing colour, excitement, lightness and informality.

The functionality of the design is such that it enables proper accessibility, circulation, traffic and movement within and around the Shopping Center.

Hence, in the development process stage: Perspective of the customers must be a prime consideration, such as: Where his headed to? What to pass on his way? Where to park? Etc. These factors will enable better anchoring, allocation of spaces and circulation, ensuring a successful design.
6.2 CONCEPTUAL DIAGRAM

Fig 6.1 Conceptual diagram

Source: Authors’
The plan concept: Focuses on anchoring and circulation which defines the success of retail, mixed use Shopping Complex.

Considering:

- Perspective of a customer.
- Where to park?
- Where heading to?
- What to pass on their way?

The conceptual diagram above is described as follows:

Step I = four anchor stores connecting to each other. Anchor store is the major store in shopping center. It is a large retail store such as departmental store that is a major store in a shopping mall and is intended to attract shoppers who will patronize the smaller stores, to be located along the connecting routes.

Step II = Four anchor stores connecting each other. The connecting routes are intended to serve for sub-anchor store, in-line tenant store, and other services. They are double strip of stores placed face to face along mall.

Step III = The form of this shopping complex promote anchoring and circulation. The Anchors draw traffic in the mall to achieve maximum interchange of shopper. Another, advantage of this shape is that, it enables parking on all sides, with various services provided all through the shielded bays.
6.3 DESIGN CONTRIBUTION

The design evolution for a shopping mall is based on the quest to meet up with the trend of technological advancement in our world today as well as solve the prevailing problems of shopping in Akwa, Anambra state.

The shopping mall sets out to

- Creating an image and edifice that will stand out and arouse interests for shopping.
- Provide a decent environment that will offer maximum shopping convenience to its users.

In the determination of an architectural form, three basic things are considered simultaneously. They are function, structure and aesthetics. The degree of attention that any of these receive will depend on the nature of the project. All architectural works must inculcate all these aspects. The emphasis is layed more on the function afterwhich aesthetics and forms follow. In the design of shopping mall therefore, the dictum that form follows function is applicable. The shopping environment should look more into enhancing efficiency and convenience and in doing this more attention will be given to function before form/ aesthetics and this is solely because the architectural design cannot be rigid and contained in a predefined form, its shape should be dependent on the flow of the functional spaces which will naturally evolve into an appealing expression of beauty and elegance.

6.4 CONCLUSION

Shopping center is a complex of retail stores and related facilities planned as a unified group to give maximum shopping convenience to the customer and maximum exposure to the merchandise.

Car storage area as a shopping complex facility provides surface parking lots, double- deck or multi-deck garages for vehicles. Hence, logical vehicular movement pattern should be used in the site,
ensuring that vehicular traffic does not interfere with pedestrian and locating car storage area within walking distance to the shopping center.

Pedestrian areas include the mall itself, considering the spatial Syntax. Courts, lanes, plazas and corridors includes the pedestrian area, which serves as route or means of linkage and movement within and around the shopping complex.

Therefore, it is important to consider the perspective of a customer; where to park? Where headed to? What to pass on their way? These will help to ensure proper anchoring and circulation which defines the success of retail and mixed use shopping complex.

6.5 DESIGN
6.6 REFERENCES

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➤ Unpublished Thesis:

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➤ http://www.ananigeria.com/branches
➤ http://www.rnw.nl/.../NigeriaAnambra-wikipedia_0.png

LIST OF FIGURE

➤ Fig 6.1 Conceptual diagram
➤ Fig 6.2 Site plan
➤ Fig 6.3 Ground floor plan
➤ Fig 6.4 First floor plan
➤ Fig 6.5 2nd – 5th floor plan
➢ Fig 6.6 6th floor plan
➢ Fig 6.7 Roof plan
➢ Fig 6.8 Section 1 & 2
➢ Fig 6.9 Section 3 & 4
➢ Fig 6.10 Section 5 & 6
➢ Fig 6.11 East & North Elevation
➢ Fig 6.12 South & West Elevation
➢ Fig 6.13 South – East 3D view
➢ Fig 6.14 South – West 3D view
➢ Fig 6.15 North – East 3D view
➢ Source: Author

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